THE 2005 URBAN MOBILITY REPORT

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Table of Contents

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2005 Urban Mobility Report

Congestion continues to grow in America's urban areas. Despite a slow growth in jobs and travel in 2003, congestion caused 3.7 billion hours of travel delay and 2.3 billion gallons of wasted fuel, an increase of 79 million hours and 69 million gallons from 2002 to a total cost of more than $63 billion. The solutions to this problem will require commitment by the public and by national, state and local officials to increase investment levels and identify projects, programs and policies that can achieve mobility goals. The 2005 Report shows that the current pace of transportation improvement, however, is not sufficient to keep pace with even a slow growth in travel demands in most major urban areas. The complete report, methodology, data, charts and tables can be found at: http://mobility.tamu.edu/ums

Major Findings for 2005 – The Big Numbers

The problem can be stated simply – **urban areas are not adding enough capacity, improving operations or managing demand well enough to keep congestion from growing larger.** Over the most recent 3 years, the contribution of operations improvements has grown from 260 to 340 million hours of congestion relief, but delay has increased by 300 million hours over the same period. Congestion occurs during longer portions of the day and delays more travelers and goods than ever before. And if the **current fuel prices are used, the congestion "invoice" climbs another $1.7 billion which would bring the total cost to about $65 billion**. Some important statistics are shown below.

Measures of…	**1982**	**1993**	**2002**	**2003**
… Individual Traveler Congestion				
Annual delay per peak traveler (hours)	16	40	47	47
Travel Time Index	1.12	1.28	1.37	1.37
Number of urban areas with more than 20 hours of delay per peak traveler	5	37	50	51
… The Nation's Congestion Problem				
Total hours of delay (billion)	0.7	2.4	3.6	3.7
Total gallons of "wasted" fuel (billion)	0.4	1.3	2.2	2.3
Cost of congestion (billions of 2003 $)	$12.5	$39.4	$61.5	$63.1
… Travel Needs Served				
Daily vehicle-miles of travel on major roads (billion)	1.06	1.66	2.09	2.14
Annual person-miles of public transportation travel (billion)	22.9	35.1	43.7	43.4
… Expansion Needed to Keep Today's Congestion Level				
Additional lane-miles of freeways and major streets	7,638	6,459	4,927	5,002
Additional daily public transportation riders (million)	8.6	8.2	7.2	7.3
… The Effect of Some Solutions				
Hours of delay saved by				
Operational treatments (million)	NA	NA	301	336
Public transportation (million)	269	696	1,097	1,096
Congestion costs saved by				
Operational treatments (billions of 2003 $)	NA	NA	$5.0	$5.6
Public transportation (billions of 2003 $)	$4.6	9.0	$18.2	$18.2

NA – No Estimate Available

Pre-2000 data do not include effect of operational strategies and public transportation.

Travel Time Index – The ratio of travel time in the peak period to travel time at free-flow conditions. A Travel Time Index of 1.35 indicates a 20-minute free-flow trip takes 27 minutes in the peak.

Delay per Peak Traveler – The extra time spent traveling at congested speeds rather than free-flow speeds divided by the number of persons making a trip during the peak period.

Wasted Fuel – Extra fuel consumed during congested travel.

Expansion Needed – Either lane-miles or daily riders to keep pace with travel growth (maintain congestion).

What's New?

Each year the Urban Mobility Report revises procedures and improves the processes and data used in the estimates. In doing so, the report also revises all previous estimates so that true trends can be developed whenever possible. Some key changes for this year are:

- Four urban areas moved into a new population group in 2003. All historical statistics were updated with these changes. Atlanta and Phoenix were moved into the "Very Large" group. Providence was moved into the "Large" group. Allentown-Bethlehem was moved into the "Medium" group.
- The researchers have refined the numerous equations and calculations used to produce the Urban Mobility Report. Minor changes to the computer programs have been made and the historical trend data reflect the new information and procedures. Additional changes are anticipated at the conclusion of the study.
- The calculation methodology has been changed to provide an improved estimate of fuel wasted during congested conditions. The new values show the amount of wasted fuel as approximately half of the previous total. The year-to-year trend is the same—increasing fuel consumption and fuel costs.
- The operational treatment effects are included for 2000, 2001, 2002 and 2003 mobility estimates. The data provide a better picture of the travel conditions in those four years. Unfortunately, the long-term trend analysis for years before 2000, does not yet include this information.

The Problem

Mobility problems have increased at a relatively consistent rate during the two decades studied. Congestion is present on more of the transportation systems, affecting more of the trips and a greater portion of the average week in urban areas of all sizes.

Congestion affects more of the roads, trips and time of day. The worst congestion levels increased from 12% to 40% of peak period travel. And free-flowing travel is less than half of the amount in 1982 (Exhibit 1).

Congestion has grown in areas of every size. Measures in all of the population size categories show more severe congestion that lasts a longer period of time and affects more of the transportation network in 2003 than in 1982. The average annual delay for every person using motorized travel in the peak periods in the 85 urban areas studied climbed from 16 hours in 1982 to 47 hours in 2003 (Exhibit 2).

The delay statistics in Exhibit 2 point to the importance of action. Major projects, programs and funding efforts take 10 to 15 years to develop. In that time, congestion endured by travelers and businesses grow to those of the next largest population group. So in ten years, medium-sized regions will have the traffic problems that large areas have now, if trends do not change.

Exhibit 1. Percent of Travel in Each Congestion Level

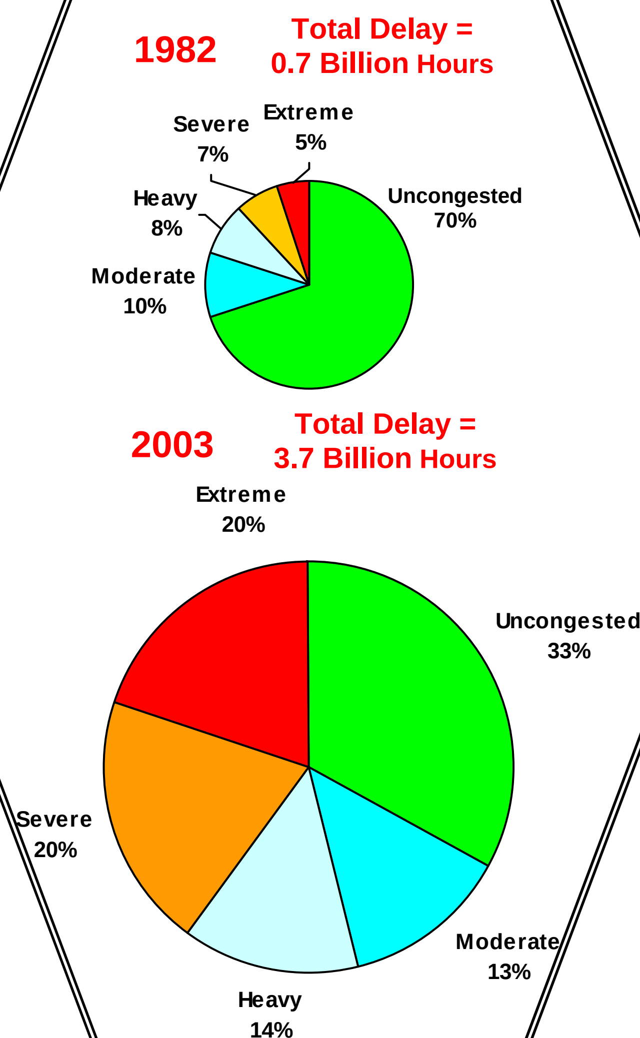
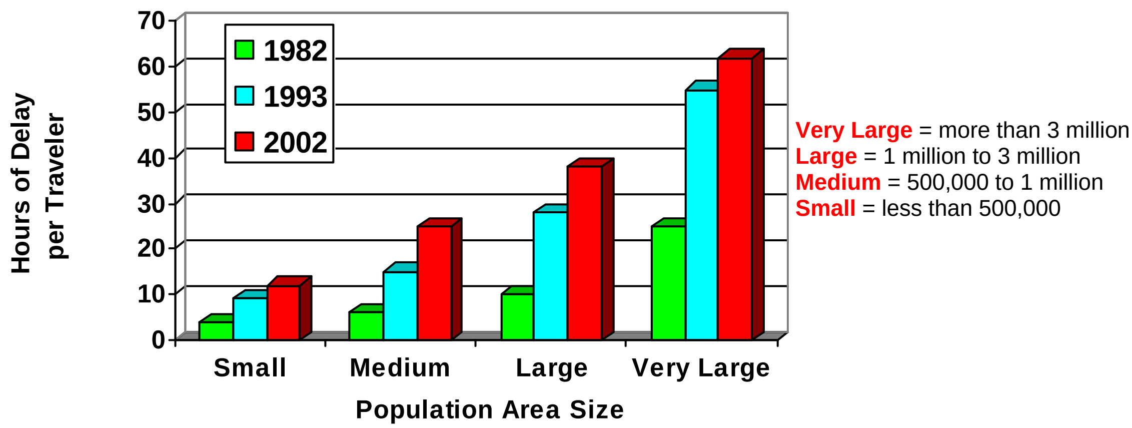


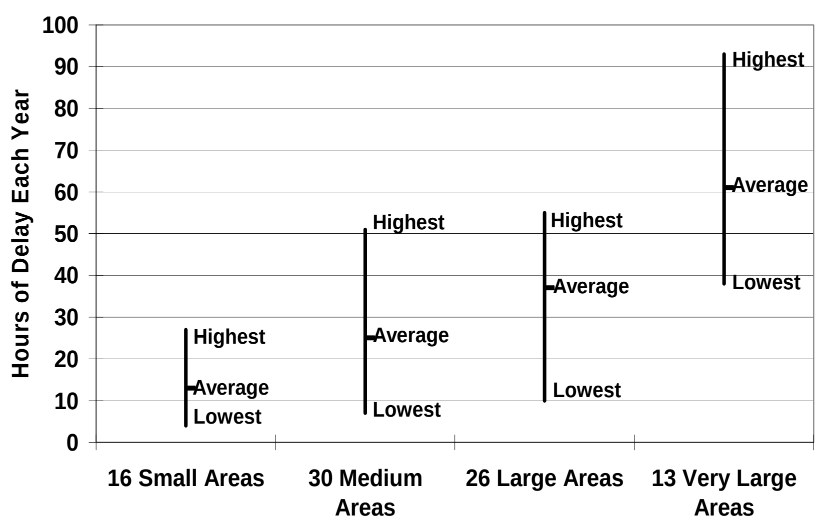
Exhibit 2. Congestion Growth Trend



Congestion costs are increasing. The total congestion "invoice" for the 85 areas in 2003 was approximately $63 billion, an increase from about $62 billion in 2002. The 3.7 billion hours of delay and 2.3 billion gallons of fuel consumed due to congestion are only the elements that are easiest to estimate. The effect of uncertain or longer delivery times, missed meetings, business relocations and other congestion results are not included.

Congestion is more severe in larger areas. Exhibit 3 shows the range of congestion levels for each population size group. It is not surprising that congestion is more severe in larger urban areas. What might not be expected is the large range of values. Congestion problems occur in many ways. Some congestion is determined by the design of an area, some is determined by geographic features, weather, collisions and vehicle breakdowns, and some congestion is the result of decisions about investment levels. Likewise, the mobility levels targeted by agencies in each area will vary as well. The answer is not to grade every city, every project and every hour of delay on the same scale, but rather to identify the community goals, benefits, and costs and decide how to reach the mobility targets.

Exhibit 3. Congestion and Urban Area Size, 2003



The Solutions

The problem has grown too rapidly and is too complex for only one technology or service to be "the solution." The increasing trends also indicate the urgency of the improvement need. Major improvements can take 10 to 15 years and smaller efforts may not satisfy all the needs. So we recommend a ***balanced approach***—begin to plan and design ***major capacity increasing projects, plans or policy changes*** while immediately relieving critical ***bottlenecks*** or chokepoints, and aggressively pursuing ***operations*** improvements and ***demand*** management options that are available.

- **More capacity**— More road and public transportation improvement projects are part of the equation. New streets and urban freeways will be needed to serve new developments; public transportation improvements are particularly important in congested corridors and to serve major activity centers; and, toll highways and toll lanes are being used more frequently in urban corridors. Capacity expansions are also important additions for freeway-to-freeway interchanges and connections to ports, rail yards, intermodal terminals and other major activity centers for people and freight transportation.

- **Greater efficiency**—More efficient operation of roads and public transportation can provide more productivity from the existing system at relatively low cost. Some of these can be accelerated by information technology, some are the result of educating travelers about their options, and some are the result of providing a more diverse set of travel and development options than are currently available. This report presents information on the effect of five prominent operational treatments.

- **Manage the demand**—The way that travelers use the transportation network can be modified to accommodate more demand. Using the telephone or internet for certain trips, traveling in off-peak hours and using public transportation and carpools are examples. Projects that use tolls or pricing incentives can be tailored to meet both transportation needs and economic equity concerns. The key will be to provide better conditions and more travel options for shopping, school, health care and a variety of other activities.

- **Development patterns**—There are a variety of techniques that are being tested in urban areas to change the way that commercial, office and residential developments occur. These also appear to be part, but not all, of the solution. Sustaining the urban "quality of life" and gaining an increment of economic development without the typical increment of mobility decline is one way to state this goal.

- **Realistic expectations** are also part of the solution. Large urban areas will be congested. Some locations near key activity centers in smaller urban areas will also be congested. But congestion does not have to be an all-day event. Identifying solutions and funding sources that meet a variety of community goals is challenging enough without attempting to eliminate congestion in all locations.

The solutions will vary not only by the state or city they are implemented in, but also by the type of development, the level of activity and constraints in particular sub-regions, neighborhoods and activity centers. Portions of a city might be more amenable to construction solutions, other areas might use more demand management, efficiency improvements and land use pattern or redevelopment solutions.

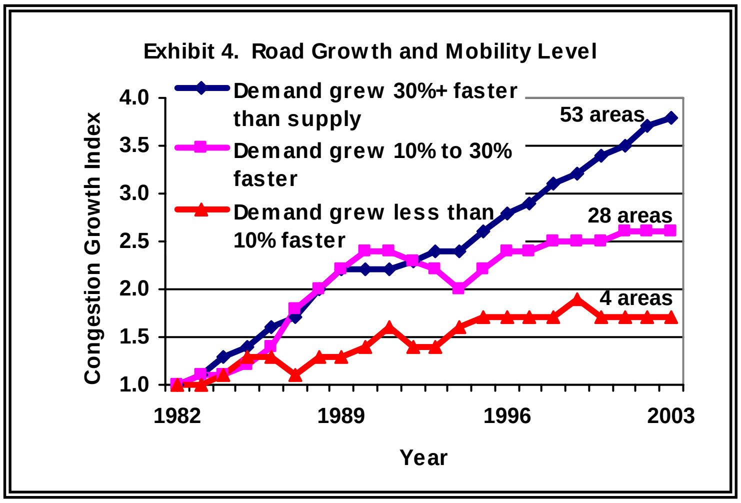
The Benefits of Action

All types of improvement actions are necessary. Without a detailed analysis it is impossible to say which action or set of actions will best meet the corridor or community needs. But, it is important to recognize that actions can make a difference. It is possible to at least slow the growth and in the right circumstances, reduce congestion.

Roadway Capacity Increases

Urban areas that address the growing travel demand have seen lower delay growth than areas where travel growth greatly exceeds supply growth. Exhibit 4 illustrates that when changes in supply more closely match changes in demand, there is less increase in delay. The three groups were studied using data from 1982 to 2003. The change in miles traveled was compared to the change in lane-miles for each of the 85 urban areas. The change in congestion level was calculated for the following groups:

- **Significant mismatch**—Traffic growth was more than 30 percent faster than the growth in road capacity for the 53 urban areas in this group.
- **Closer match**—Traffic growth was between 10 percent and 30 percent more than road capacity growth. There were 28 urban areas in this group.
- **Narrow gap**—Road growth was within 10 percent of traffic growth for the 4 urban areas in this group.



Additional roadways reduce the rate of increase in the time it takes travelers to make congested period trips. It appears that the growth in facilities has to be at a rate slightly greater than travel growth in order to maintain constant travel times if additional roads are the only solution used to address mobility concerns. It is clear that adding roadway at about the same rate as traffic grows will slow the growth of congestion.

It is equally clear, however, that if only four of the 85 areas studied were able to accomplish that rate, ***there must be a broader set of solutions*** applied to the problem, as well as more of each solution.

Public Transportation Service

Regular route public transportation service on buses and trains provides a significant amount of peak period travel in the most congested corridors and urban areas in the U.S. If public transportation service was discontinued and the riders traveled in private vehicles, the 85 urban areas would have suffered an additional 1.1 billion hours of delay in 2003.

Public transportation service provides many additional benefits in the corridors and areas it serves. Access to jobs, shops, medical, school and other destinations for those who do not have access to private transportation may provide more societal benefits than the congestion relief, but this report only examined part of the mobility aspect. Typically, in contrast to roads, the ridership is concentrated in a relatively small portion of the urban area. That is often the most congested area and the locations where additional road capacity is difficult to construct.

In the 85 urban areas studied there were approximately 43 billion passenger-miles of travel on public transportation systems in 2003 (1). The annual travel ranges from an average of 17 million miles per year in Small urban areas to about 2.7 billion miles in Very Large areas. Overall, if these riders did not have access to public transportation systems, the 1.1 billion hours of additional roadway delay would represent a 27 percent increase in delay and an additional congestion cost of $18 billion. More information on the effects for each urban area is included in Table 3.

- The Very Large areas would experience an increase in delay of about 920 million hours per year (33 percent of total delay) if there were no public transportation service. Most of the urban areas over 3 million population have significant public transportation ridership, extensive rail systems and very large bus systems.

- The Large urban areas would experience the second largest increase in delay with about 150 million additional hours of delay per year (16 percent of today delay) if public transportation service were not available.

Exhibit 5. Delay Increase if Public Transportation Service Were Eliminated – 85 Areas

Population Group and Number of Areas	Average Annual Passenger-Miles of Travel (Million)	Delay Reduction Due to Public Transportation		
		Hours of Delay (Million)	Percent of Base Delay	Dollars Saved ($ Million)
Very Large (13)	2,718	919	33	15,289
Large (26)	233	148	16	2,485
Medium (30)	58	27	9	444
Small (16)	17	2	4	25
85 Area Total	43,403	1,096	27	18,243

Source: APTA Operating Statistics and TTI Review

High-Occupancy Vehicle Lanes

High-occupancy vehicle lanes (also known as diamond lanes, bus and carpool lanes, transitways) provide a high-speed travel option to buses and carpools as an incentive to reduce the number of vehicle trips. The lanes are most used during the peak travel periods when congestion is worst and the time savings compared to the general travel lanes are the most significant. In addition to saving time on an average trip, the HOV lanes also provide more reliable service because they are less affected by collisions or vehicle breakdowns.

The Urban Mobility Report includes estimates of the mobility improvements provided by HOV lanes in eight regions where detailed project data are available. Because HOV lane travel is not included in the basic freeway statistics, the person miles traveled and the travel time can be added directly to the mobility measures. The effect of this is to create an estimate of the mobility level provided to the combination of travelers in the slow speed freeway lanes and the higher speed HOV lanes. While only a partial list of HOV projects are included in the current study database (see http://mobility.tamu.edu/ums/hov), it provides a way to understand the measures and the mobility contribution provided by HOV facilities.

Data for the 19 significantly congested corridors studied showed a median decline of 0.20 for the Travel Time Index measure. This involved comparing the mainlane freeway congestion levels and the combined freeway and mainlane value. This is equivalent to 10 to 15 years worth of congestion growth in the average area. These HOV lanes carry one-third of the peak-direction passenger load, providing significant passenger movement at much higher speeds and with more reliable travel times than the congested mainlanes.

Operational Treatments

The 2005 Urban Mobility Report includes the effect of four technologies or treatments designed to gain more benefits from the existing infrastructure (2). These four techniques provide smoother and more regular traffic flow, which also reduces collision rates and the effect of vehicle breakdowns. Freeway entrance ramp metering, freeway incident management, traffic signal coordination and arterial street access management were estimated to provide 336 million hours of delay reduction and $5.6 billion in congestion savings for the 85 urban areas studied with 2003 data. If these treatments were deployed on all the major roads in every area, an estimated 613 million hours of delay and more than $10.2 billion would be saved.

Freeway Entrance Ramp Metering

Entrance ramp meters regulate the flow of traffic on freeway entrance ramps using traffic signals similar to those at street intersections. They are designed to create more space between entering vehicles so those vehicles do not disrupt the mainlane traffic flow. The signals allow one vehicle to enter the freeway at some interval (for example, every two to five seconds). They also reduce the number of entering vehicles due to the short distance trips that are encouraged to use the parallel streets to avoid the ramp wait time (3).

Twenty-five of the urban areas reported ramp metering on some portion of their freeway system in 2003 (4,5) for a total of 33 percent of the freeway miles. The effect was to reduce delay by 102 million person hours, approximately 5 percent of the freeway delay in those areas.

Freeway Incident Management Programs

Freeway Service Patrol, Highway Angel, Highway Helper, The Minutemen and Motorists Assistance Patrol are all names that have been applied to the operations that attempt to remove crashed and disabled vehicles from the freeway lanes and shoulders. They work in conjunction with surveillance cameras, cell phone reported incident call-in programs and other elements to remove these disruptions, decrease delay and improve the reliability of the system. The benefits of these programs can be significant. Benefit/cost ratios from the reduction in delay between 3:1 and 10:1 are common for freeway service patrols (6). An incident management program can also reduce "secondary" crashes—collisions within the stop-and-go traffic caused by the initial incident. The range of benefits is related to traffic flow characteristics as well as to the aggressiveness and timeliness of the service.

Seventy-one areas reported one or both treatments in 2003, with the coverage representing from 40 percent to 67 percent of the freeway miles in the urban areas (4,5). The effect was to reduce delay by 177 million person hours, approximately 7 percent of the freeway delay in those areas.

Traffic Signal Coordination Programs

Traffic signal timing can be a significant source of delay on the major street system. Much of this delay is the result of managing the flow of intersecting traffic, but some of the delay can be reduced if the traffic arrives at the intersection when the signal is green instead of red. This is difficult in a complex urban environment, and when traffic volumes are very high, coordinating the signals does not work as well due to the long lines of cars already waiting to get through the intersection in both directions.

All 85 areas reported some level of traffic signal coordination in 2003, with the coverage representing slightly over half of the street miles in the urban areas (4,5). Signal coordination projects have the highest percentage treatment within the urban areas studied because the technology has been proven, the cost is relatively low and the government institutions are familiar with the implementation methods. The effect of the signal coordination projects was to reduce delay by 11 million person hours, approximately one percent of the street delay. While the total effect is relatively modest, the cost is relatively low and the benefits decline as the system becomes more congested. The modest effect does not indicate that the treatment should not be implemented—why should a driver encounter a red light if it were not necessary?

Arterial Street Access Management Programs

Providing smooth traffic flow and reducing collisions are the goal of a variety of individual treatments that make up a statewide or municipal access management program. Typical treatments include consolidating driveways to minimize the disruptions to traffic flow, median turn lanes or turn restrictions, acceleration and deceleration lanes and other approaches to reduce the potential collision and conflict points. Such programs are a combination of design standards, public sector regulations and private sector development actions.

Eighty-three areas reported characteristics of an access management treatment in 2003, with the coverage representing just less than 40 percent of the major street miles in the urban areas (4,5). The effect was to reduce delay by 46 million person hours, approximately 3.5 percent of the street delay in those areas.

Operational Treatment Summary

Estimating the effect of a few operational projects on urban area congestion levels with a "national default value" sort of analysis may not be a particularly useful exercise. This type of methodology misses the importance of addressing the operating bottlenecks in the system and do not accommodate the benefits from exceptionally aggressive operating practices or policies aimed at congested locations. Recognizing these shortcomings, the information suggests that 9 percent of the roadway delay is being addressed by these four operational treatments for a total of 336 million hours in 2003 (Exhibit 6). And if the treatments were deployed on all major freeways and streets, the benefit would expand to about 15 percent of delay. These are significant benefits, especially since these techniques can be enacted much quicker than significant roadway or public transportation system expansions can occur. But the operational treatments do not replace the need for those expansions.

Exhibit 6. Operational Improvement Summary

Operations Treatment	Delay Reduction from Current Projects		Possible Delay Reduction if Implemented on All Roads (Million Hours)
	Hours Saved (Million)	Dollars Saved ($ Million)	
Ramp Metering	102	1,698	230
Incident Management	177	2,926	250
Signal Coordination	11	187	25
Access Management	46	779	108
TOTAL	336	5,590	613

Note: This analysis uses nationally consistent data and relatively simplistic estimation procedures. Local or more detailed evaluations should be used where available. These estimates should be considered preliminary pending more extensive review and revision of information obtained from source databases.

Other Actions

Most large city transportation agencies are pursuing all of these strategies as well as others. The mix of programs, policies and projects may be different in each city and the pace of implementation varies according to overall funding, commitment, location of problems, public support and other factors. It also seems that big city residents should expect congestion for 1 or 2 hours in the morning and in the evening. The agencies should be able to improve the performance and reliability of the service at other hours and they may be able to slow the growth of congestion, but they cannot expand the system or improve the operation rapidly enough to eliminate congestion.

Methodology

The base data for the 2005 Annual Report come from the states and the US Department of Transportation (4,5). The travel and road inventory statistics are analyzed with a set of procedures developed from computer models and empirical studies. The travel time and speed estimation process is described at: http://mobility.tamu.edu/ums/report/methodology.stm

The methodology creates a set of "base" statistics developed from traffic density values. The density data—daily traffic volume per lane of roadway—is converted to average peak-period speed using a set of estimation curves based on relatively ideal travel conditions—no crashes, breakdowns or weather problems for the years 1982 to 2003.

The "base" estimates, however, do not include the effect of many transportation improvements. The 2005 Report addresses this estimation deficiency with methodologies designed to identify the effect of operational treatments and public transportation services. The delay, cost and index measures for 2000, 2001, 2002 and 2003 include these treatments and identify them as "with strategies." The effects of public transportation, however, are shown for every year since 1982.

The calculation details for estimating the effect of operational treatments and public transportation service are described in a separate report available at http://mobility.tamu.edu/ums/report/methodology.stm

Combining Performance Measures

Table 6 illustrates an approach to understanding several of the key measures. The value for each statistic is rated according to the relationship to the average value for the population group. The terms "higher" and "lower" than average congestion are used to characterize the 2003 values and trends from 1982 to 2003. These descriptions do not indicate any judgment about the extent of mobility problems. Urban areas that have better than average rankings may have congestion problems that residents consider significant. What Table 6 does, however, is provide the reader with some context for the mobility discussion.

CONCLUSIONS

Careful examination of the data in the 2005 Urban Mobility Report will leave the reader with no doubt as to the growing urban congestion problem. The broad set of solutions recommended in the Report, is a diverse reaction to the problem. The future is not about a choice between or among these solutions, the choice is about how to use each project, program or strategy and how much transportation improvement will be pursued. In 2004, over three-quarters of the initiatives dealing with transportation at the state and local levels were approved by voters, indicating that travelers, shippers, businesses and elected leaders do support improvements.

To highlight the need for a broad solution set, the 2003 Urban Mobility Report presented an estimate of the effect of operational treatments on urban congestion. Those benefits have expanded in subsequent years, but the increase has not been significant enough to stop the growth in congestion. In fact, if the five operating improvements studied in this report were deployed on all major streets and freeways in the 85 urban areas the total delay would decline by an important 300 million hours per year. Delay per traveler would decline to 44 hours per year.

The next question is obvious: Is that good enough? If not, the future will require more roadway and public transportation capacity, and that capacity will have to be operated as efficiently as possible. The travel patterns of commuters and businesses, and the design of developments must also be examined if the current congestion levels are to be reduced and the estimated 65 million new urban residents accommodated over the next 20 years.

Table 1. Key Mobility Measures, 2003

Urban Area	Annual Delay per Traveler		Travel Time Index	
	2003 Hours	Rank	2003 Values	Rank
85 Area Average	47		1.37	
Very Large Average	61		1.48	
Very Large (13 areas)				
Los Angeles-Long Beach-Santa Ana, CA	93	1	1.75	1
San Francisco-Oakland, CA	72	2	1.54	3
Washington, DC-VA-MD	69	3	1.51	4
Atlanta, GA	67	4	1.46	5
Houston, TX	63	5	1.42	6
Dallas-Fort Worth-Arlington, TX	60	6	1.36	19
Chicago, IL-IN	58	7	1.57	2
Detroit, MI	57	8	1.38	12
Miami, FL	51	13	1.42	6
Boston, MA-NH-RI	51	13	1.34	21
New York-Newark, NY-NJ-CT	49	18	1.39	10
Phoenix, AZ	49	18	1.35	20
Philadelphia, PA-NJ-DE-MD	38	27	1.32	25
85 Area Average	47		1.37	
Large Average	37		1.28	
Large (26 areas)				
Riverside-San Bernardino, CA	55	9	1.37	14
Orlando, FL	55	9	1.30	28
San Jose, CA	53	11	1.37	14
San Diego, CA	52	12	1.41	8
Denver-Aurora, CO	51	13	1.40	9
Baltimore, MD	50	17	1.37	14
Seattle, WA	46	20	1.38	12
Tampa-St. Petersburg, FL	46	20	1.33	23
Minneapolis-St. Paul, MN	43	22	1.34	21
Sacramento, CA	40	25	1.37	14
Portland, OR-WA	39	26	1.37	14
Indianapolis, IN	38	27	1.24	32
St. Louis, MO-IL	35	31	1.22	35
San Antonio, TX	33	33	1.22	35
Providence, RI-MA	33	33	1.19	42
Las Vegas, NV	30	39	1.39	10
Cincinnati, OH-KY-IN	30	39	1.22	35
Columbus, OH	29	42	1.19	42
Virginia Beach, VA	26	46	1.21	39
Milwaukee, WI	23	48	1.21	39
New Orleans, LA	18	54	1.19	42
Kansas City, MO-KS	17	57	1.11	60
Pittsburgh, PA	14	63	1.10	64
Buffalo, NY	13	65	1.10	64
Oklahoma City, OK	12	68	1.10	64
Cleveland, OH	10	73	1.09	69

Very Large Urban Areas—over 3 million population.
Large Urban Areas—over 1 million and less than 3 million population.

Annual Delay per Traveler – Extra travel time for peak period travel during the year divided by the number of travelers who begin a trip during the peak period (6 to 9 a.m. and 4 to 7 p.m.). Free-flow speeds (60 mph on freeways and 35 mph on principal arterials) are used as the comparison threshold.

Travel Time Index – The ratio of travel time in the peak period to the travel time at free-flow conditions. A value of 1.35 indicates a 20-minute free-flow trip takes 27 minutes in the peak

2003 values include the effects of operational treatments.

Note: Users of this data are cautioned to avoid placing too much value on the rankings of all 85 urban areas. Often, there is little difference between being 6th on the list and being 12th, for example. Furthermore, these rankings compare all urban areas without respect to population or other differences which can significantly influence the ranking outcomes. Rankings should be used to make broad, general comparisons only and not distinguish between urban areas based on small differences in ranking outcomes.

Table 1. Key Mobility Measures, 2003, Continued

Urban Area	Annual Delay per Traveler		Travel Time Index	
	2003 Hours	Rank	2003 Values	Rank
85 Area Average	47		1.37	
Medium Average	25		1.18	
Medium (30 areas)				
Austin, TX	51	13	1.33	23
Charlotte, NC-SC	43	22	1.31	26
Louisville, KY-IN	42	24	1.24	32
Nashville-Davidson, TN	37	29	1.18	48
Tucson, AZ	36	30	1.31	26
Jacksonville, FL	34	32	1.18	48
Oxnard-Ventura, CA	33	33	1.23	34
Memphis TN-MS-AR	33	33	1.22	35
Bridgeport-Stamford, CT-NY	32	37	1.29	29
Salt Lake City, UT	31	38	1.28	30
Albuquerque, NM	30	39	1.17	52
Raleigh-Durham, NC	27	43	1.19	42
Birmingham AL	27	43	1.17	52
Omaha NE-IA	23	48	1.18	48
Honolulu, HI	20	50	1.19	42
New Haven, CT	20	50	1.13	58
Sarasota-Bradenton, FL	19	52	1.25	31
Grand Rapids, MI	19	52	1.14	55
El Paso, TX-NM	18	54	1.17	52
Allentown-Bethlehem, PA-NJ	17	57	1.14	55
Richmond, VA	17	57	1.09	69
Hartford, CT	16	60	1.11	60
Fresno, CA	13	65	1.14	55
Albany-Schenectady, NY	13	65	1.08	72
Toledo, OH-MI	12	68	1.10	64
Tulsa, OK	12	68	1.10	64
Akron, OH	12	68	1.09	69
Dayton, OH	11	72	1.08	72
Rochester, NY	7	80	1.07	77
Springfield, MA-CT	7	80	1.06	80
85 Area Average	47		1.37	
Small Average	13		1.11	
Small (16 areas)				
Colorado Springs, CO	27	43	1.19	42
Charleston-North Charleston, SC	25	47	1.20	41
Pensacola, FL-AL	18	54	1.12	59
Cape Coral, FL	15	61	1.18	48
Salem, OR	15	61	1.11	60
Beaumont, TX	14	63	1.07	77
Spokane, WA	10	73	1.08	72
Little Rock, AR	10	73	1.06	80
Eugene, OR	9	76	1.11	60
Boulder, CO	9	76	1.08	72
Columbia, SC	9	76	1.06	80
Laredo, TX	8	79	1.08	72
Bakersfield, CA	7	80	1.07	77
Corpus Christi, TX	7	80	1.05	84
Anchorage, AK	5	84	1.05	84
Brownsville, TX	4	85	1.06	80

Medium Urban Areas—over 500,000 and less than 1 million population.
Small Urban Areas—less than 500,000 population.

Annual Delay per Traveler – Extra travel time for peak period travel during the year divided by the number of travelers who begin a trip during the peak period (6 to 9 a.m. and 4 to 7 p.m.). Free-flow speeds (60 mph on freeways and 35 mph on principal arterials) are used as the comparison threshold.

Travel Time Index – The ratio of travel time in the peak period to the travel time at free-flow conditions. A value of 1.35 indicates a 20-minute free-flow trip takes 27 minutes in the peak.

2003 values include the effects of operational treatments.

Note: Users of this data are cautioned to avoid placing too much value on the rankings of all 85 urban areas. Often, there is little difference between being 6th on the list and being 12th, for example. Furthermore, these rankings compare all urban areas without respect to population or other differences which can significantly influence the ranking outcomes. Rankings should be used to make broad, general comparisons only and not distinguish between urban areas based on small differences in ranking outcomes.

Table 2. Components of the Congestion Problem, 2003 Urban Area Totals

Urban Area	Travel Delay (1000 Hours)	Rank	Excess Fuel Consumed (1000 Gallons)	Rank	Congestion Cost ($ Million)	Rank
85 Area Total	3,723,157		2,258,708		63,085	
85 Area Average	43,802		26,573		742	
Very Large Average	194,317		115,272		3,290	
Very Large (13 areas)						
Los Angeles-Long Beach-Santa Ana, CA	623,796	1	407,147	1	10,686	1
New York-Newark, NY-NJ-CT	404,480	2	198,217	2	6,780	2
Chicago, IL-IN	252,822	3	150,728	3	4,274	3
San Francisco-Oakland, CA	152,352	4	96,571	4	2,605	4
Dallas-Fort Worth-Arlington, TX	151,840	5	82,862	7	2,545	5
Miami, FL	147,294	6	87,249	6	2,486	6
Washington, DC-VA-MD	145,484	7	87,567	5	2,465	7
Houston, TX	135,652	8	80,707	8	2,283	8
Detroit, MI	119,581	9	72,796	9	2,019	9
Philadelphia, PA-NJ-DE-MD	112,309	10	60,323	11	1,884	10
Atlanta, GA	103,618	11	70,829	10	1,754	11
Boston, MA-NH-RI	100,237	12	59,556	12	1,692	12
Phoenix, AZ	76,662	14	43,988	15	1,294	14
85 Area Total	3,723,157		2,258,708		63,085	
85 Area Average	43,802		26,573		742	
Large Average	33,647		21,541		572	
Large (26 areas)						
San Diego, CA	81,756	13	59,215	13	1,411	13
Seattle, WA	72,461	15	49,220	14	1,237	15
Denver-Aurora, CO	64,506	16	37,792	17	1,087	16
Baltimore, MD	62,436	17	39,502	16	1,057	17
Minneapolis-St. Paul, MN	57,537	18	37,324	18	975	18
Tampa-St. Petersburg, FL	51,360	19	29,098	21	865	19
Riverside-San Bernardino, CA	50,155	20	34,952	19	863	20
San Jose, CA	48,134	21	30,691	20	823	21
St. Louis, MO-IL	39,936	22	26,362	22	675	22
Orlando, FL	38,157	23	22,104	24	643	23
Sacramento, CA	35,929	24	25,609	23	619	24
Portland, OR-WA	33,387	25	21,857	25	569	25
Cincinnati, OH-KY-IN	27,288	26	16,694	26	461	26
San Antonio, TX	23,788	27	14,518	27	401	27
Las Vegas, NV	22,245	29	14,354	28	380	29
Virginia Beach, VA	21,746	30	13,839	31	367	30
Providence, RI-MA	21,668	31	10,725	37	363	31
Indianapolis, IN	21,358	32	14,032	30	362	32
Columbus, OH	18,550	35	11,507	34	314	35
Milwaukee, WI	18,249	36	11,834	33	310	36
Pittsburgh, PA	14,530	42	7,355	45	243	42
Kansas City, MO-KS	13,874	43	9,095	42	235	43
New Orleans, LA	10,853	46	6,792	48	183	46
Cleveland, OH	10,709	47	6,931	47	182	47
Oklahoma City, OK	7,218	55	4,792	52	122	55
Buffalo, NY	6,981	56	3,869	57	118	56

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Large Urban Areas—over 1 million and less than 3 million population.

Travel Delay – Travel time above that needed to complete a trip at free-flow speeds.

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

Congestion Cost – Value of travel time delay (estimated at $13.45 per hour of person travel and $71.05 per hour of truck time) and excess fuel consumption (estimated using state average cost per gallon).

2003 values include the effects of operational treatments.

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Table 2. Components of the Congestion Problem, 2003 Urban Area Totals, Continued

Urban Area	Travel Delay		Excess Fuel Consumed		Congestion Cost	
	(1000 Hours)	Rank	(1000 Gallons)	Rank	($ Million)	Rank
85 Area Total	3,723,157		2,258,708		63,085	
85 Area Average	43,802		26,573		742	
Medium Average	9,598		5,995		162	
Medium (30 areas)						
Austin, TX	23,201	28	14,073	29	391	28
Louisville, KY-IN	19,916	33	12,329	32	336	33
Nashville-Davidson, TN	18,890	34	10,960	35	318	34
Memphis TN-MS-AR	17,465	37	10,066	40	294	37
Jacksonville, FL	16,850	38	10,159	39	285	38
Charlotte, NC-SC	16,692	39	10,564	38	282	39
Salt Lake City, UT	15,094	40	9,821	41	257	40
Bridgeport-Stamford, CT-NY	14,550	41	11,032	35	250	41
Tucson, AZ	13,767	44	8,424	43	233	44
Raleigh-Durham, NC	11,481	45	7,608	44	194	45
Oxnard-Ventura, CA	10,249	48	7,121	46	176	48
Birmingham AL	9,705	49	6,564	49	165	49
Albuquerque, NM	9,258	50	5,338	50	156	50
Richmond, VA	8,305	51	4,763	52	140	51
Omaha NE-IA	7,984	52	4,431	55	134	52
Honolulu, HI	7,476	53	4,541	54	129	53
Hartford, CT	7,434	54	4,923	51	127	54
El Paso, TX-NM	6,491	58	4,172	56	110	58
Grand Rapids, MI	5,852	60	3,598	61	99	61
New Haven, CT	5,848	61	3,940	57	100	60
Sarasota-Bradenton, FL	5,772	62	3,480	62	97	62
Allentown-Bethlehem, PA-NJ	5,618	63	3,514	62	95	63
Tulsa, OK	5,419	64	3,255	64	91	64
Dayton, OH	4,438	65	2,836	65	75	65
Fresno, CA	4,180	66	2,678	66	72	66
Albany-Schenectady, NY	3,784	67	2,276	67	64	67
Akron, OH	3,672	68	2,217	68	62	68
Toledo, OH-MI	3,391	69	2,094	69	57	69
Springfield, MA-CT	2,,619	72	1,526	73	44	72
Rochester, NY	2,547	73	1,559	71	43	73
85 Area Total	3,723,157		2,258,708		63,085	
85 Area Average	43,802		26,573		742	
Small Average	2,142		1,265		36	
Small (16 areas)						
Colorado Springs, CO	6,953	57	3,694	60	117	57
Charleston-North Charleston, SC	6,364	59	3,879	57	107	59
Pensacola, FL-AL	2,977	70	1,701	70	50	70
Cape Coral, FL	2,712	71	1,572	71	46	71
Columbia, SC	2,029	74	1,331	75	34	74
Little Rock, AR	1,884	75	1,400	74	32	75
Spokane, WA	1,881	76	1,146	76	32	75
Bakersfield, CA	1,776	77	1,083	76	30	77
Salem, OR	1,714	78	1,005	78	29	78
Corpus Christi, TX	1,238	79	683	79	21	79
Eugene, OR	1,196	80	744	79	20	80
Beaumont, TX	1,101	81	610	81	18	81
Laredo, TX	835	82	461	82	14	82
Anchorage, AK	691	83	386	83	12	83
Boulder, CO	543	84	324	84	9	84
Brownsville, TX	380	85	221	85	6	85

Medium Urban Areas—over 500,000 and less than 1 million population.
Small Urban Areas—less than 500,000 population.

Travel Delay – Travel time above that needed to complete a trip at free-flow speeds.

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

Congestion Cost – Value of travel time delay (estimated at $13.45 per hour of person travel and $71.05 per hour of truck time) and excess fuel consumption (estimated using state average cost per gallon).

2003 values include the effects of operational treatments.

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Table 3. 2003 Effect of Mobility Improvements

Urban Area	Operational Treatment Savings				Public Transportation Savings		
	Treatments	Delay (1000 Hours)	Rank	Cost ($ Million)	Delay (1000 Hours)	Rank	Cost ($ Million)
85 Area Total		336,758		5,589.7	1,107,509		18,444.5
85 Area Average		3,962		65.8	13,030		217.0
Very Large Average		19,634		325.1	71,531		1,190.0
Very Large (13 areas)							
Los Angeles-Long Beach-Santa Ana, CA	r,i,s,a	95,032	1	1,579.9	129,442	2	2,167.9
New York-Newark, NY-NJ-CT	i,s,a	52,118	2	854.3	379,168	1	6,284.3
San Francisco-Oakland, CA	r,i,s,a	18,137	3	301.6	82,702	4	1,382.8
Miami, FL	i,s,a	12,966	4	214.8	20,133	12	333.9
Chicago, IL-IN	r,i,s,a	12,327	5	205.0	94,448	3	1,577.3
Houston, TX	r,i,s,a	12,134	6	200.2	20,579	10	341.7
Dallas-Fort Worth-Arlington, TX	i,s,a	10,088	7	166.1	15,068	13	248.8
Atlanta, GA	i,s,a	9,448	8	156.9	27,765	9	463.3
Philadelphia, PA-NJ-DE-MD	i,s,a	7,588	11	125.3	34,890	7	576.2
Washington, DC-VA-MD	r,i,s,a	6,837	12	114.2	59,502	5	997.9
Detroit, MI	r.i,s,a	6,455	13	107.7	5,763	19	96.0
Phoenix, AZ	r.i,s,a	6,260	15	103.4	5,967	18	98.8
Boston, MA-NH-RI	i,s,a	5,856	16	97.0	54,482	6	900.3
85 Area Total		336,758		5,589.7	1,107,509		18,444.5
85 Area Average		3,962		65.8	13,030		217.0
Large Average		2,563		42.9	5,753		96.4
Large (26 areas)							
San Diego, CA	r,i,s,a	8,770	9	147.9	13,163	15	224.1
Minneapolis-St. Paul, MN	r,i,s,a	8,217	10	136.1	9,823	17	163.7
Seattle, WA	r,i,s,a	6,417	14	107.4	33,693	8	566.4
Riverside-San Bernardino, CA	r,i,s,a	5,792	17	97.5	2,894	30	48.7
San Jose, CA	r,i,s,a	4,689	18	78.6	4,584	21	77.1
Tampa-St. Petersburg, FL	i,s,a	3,988	19	66.4	1,589	36	26.3
Sacramento, CA	r,i,s,a	3,799	20	64.5	4,410	22	75.1
Denver-Aurora, CO	r,i,s,a	3,642	21	60.5	10,260	16	170.3
Baltimore, MD	i,s,a	3,629	22	60.2	20,175	11	335.7
Portland, OR-WA	r,i,s,a	3,487	23	58.2	14,487	14	242.4
Milwaukee, WI	r,i,s,a	2,066	24	34.4	3,463	27	57.9
St. Louis, MO-IL	i,s,a	1,776	25	29.8	3,362	28	56.5
Orlando, FL	i,s,a	1,689	26	28.2	2,619	32	43.5
Virginia Beach, VA	i,s,a	1,514	27	25.3	1,396	37	23.3
Cincinnati, OH-KY-IN	i,s,a	1,055	31	17.5	2,810	31	47.0
San Antonio, TX	i,s,a	1,041	32	17.3	3,465	26	57.8
Indianapolis, IN	i,s,a	866	36	14.6	684	47	11.5
Las Vegas, NV	i,s,a	804	38	13.5	4,316	24	72.6
Pittsburgh, PA	i,s,a	782	40	12.9	3,724	25	61.5
New Orleans, LA	i,s,a	709	42	11.8	2,127	34	35.7
Kansas City, MO-KS	i,s,a	621	44	10.4	673	48	11.3
Cleveland, OH	i,s,a	600	45	10.0	2,407	33	40.3
Columbus, OH	r,i,s,a	354	50	6.0	1,047	41	17.5
Buffalo, NY	i,s,a	161	58	2.7	880	44	14.6
Providence, RI-MA	i,s,a	122	61	2.1	1,352	38	22.4
Oklahoma City, OK	s,a	49	72	0.9	166	69	2.8

Very Large Urban Areas—over 3 million population.
Large Urban Areas—over 1 million and less than 3 million population.

Operational Treatments – Freeway incident management (i), freeway ramp metering (r) arterial street signal coordination (s) and arterial street access management (a).

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

Delay savings are affected by the amount of treatment or service in each area, as well as the amount of congestion and the urban area population.

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Table 3. 2003 Effect of Mobility Improvements, Continued

Urban Area	Operational Treatment Savings				Public Transportation Savings		
	Treatments	Delay (1000 Hours)	Rank	Cost ($ Million)	Delay (1000 Hours)	Rank	Cost ($ Million)
85 Area Total		336,758		5,589.7	1,107,509		18,444.5
85 Area Average		3,962		65.8	13,030		217.0
Medium Average		467		7.8	885		14.8
Medium (30 areas)							
Austin, TX	i,s,a	1,334	28	22.1	2,952	29	49.0
Salt Lake City, UT	i,s,a	1,327	29	22.1	4,374	23	73.0
Nashville-Davidson, TN	i,s,a	1,067	30	17.6	634	51	10.5
Memphis TN-MS-AR	i,s,a	1,008	33	16.6	1,259	39	20.9
Jacksonville, FL	i,s,a	987	34	16.5	738	45	12.4
Louisville, KY-IN	i,s,a	956	35	15.9	924	42	15.3
Charlotte, NC-SC	i,s,a	845	37	14.0	2,082	35	34.6
Tucson, AZ	i,s,a	792	39	13.3	1,059	40	17.6
Omaha NE-IA	i,s,a	746	41	12.4	259	58	4.3
Bridgeport-Stamford, CT-NY	i,s,a	700	43	11.8	286	57	4.8
Albuquerque, NM	i,s,a	563	46	9.4	244	61	4.0
Birmingham AL	i,s,a	493	47	8.3	254	59	4.3
El Paso, TX-NM	i,s,a	476	48	8.0	881	43	14.7
Hartford, CT	i,s,a	400	49	6.7	652	50	11.0
Sarasota-Bradenton, FL	i,s,a	346	51	5.8	185	68	3.1
Fresno, CA	r,i,s,a	323	52	5.5	351	55	5.9
Raleigh-Durham, NC	i,s,a	279	53	4.7	693	46	11.6
Richmond, VA	i,s,a	238	54	4.0	366	54	6.1
New Haven, CT	i,s,a	232	55	3.9	657	49	11.0
Oxnard-Ventura, CA	i,s,a	191	56	3.3	422	52	7.1
Honolulu, HI	i,s,a	153	59	2.6	5,146	20	86.9
Dayton, OH	s,a	123	60	2.1	250	60	4.2
Allentown-Bethlehem, PA-NJ	r,s,a	122	61	2.1	206	66	3.5
Albany-Schenectady, NY	i,s,a	95	63	1.6	290	56	4.9
Grand Rapids, MI	s,a	81	66	1.4	230	62	3.9
Rochester, NY	i,s,a	49	72	0.8	392	53	6.6
Tulsa, OK	i,s,a	30	76	0.5	155	73	2.6
Toledo, OH-MI	i,s,a	24	77	0.4	209	65	3.5
Springfield, MA-CT	i,s,a	22	78	0.4	158	72	2.7
Akron, OH	s,a	4	84	0.1	230	62	3.9
85 Area Total		336,758		5,589.7	1,107,509		18,444.5
85 Area Average		3,962		65.8	13,030		217.0
Small Average		54		0.9	94		1.6
Small (16 areas)							
Colorado Springs, CO	i,s,a	189	57	3.2	210	64	3.5
Little Rock, AR	i,s,a	92	64	1.6	35	84	0.6
Cape Coral, FL	s,a	82	65	1.4	93	76	1.6
Spokane, WA	i,s,a	74	67	1.3	189	67	3.2
Bakersfield, CA	i,s,a	72	68	1.2	159	71	2.7
Charleston-North Charleston, SC	i,s	70	69	1.2	147	74	2.5
Eugene, OR	i,s,a	68	70	1.2	163	70	2.8
Pensacola, FL-AL	i,s,a	64	71	1.1	38	82	0.6
Columbia, SC	i,s,a	46	74	0.8	23	85	0.4
Boulder, CO	i,s,a	35	75	0.6	36	83	0.6
Anchorage, AK	s,a	20	79	0.3	50	80	0.8
Laredo, TX	i,s,a	19	80	0.3	75	78	1.2
Salem, OR	i,s,a	18	81	0.3	88	77	1.5
Beaumont, TX	s,a	9	82	0.2	39	81	0.7
Brownsville, TX	s,a	9	82	0.1	52	79	0.9
Corpus Christi, TX	s,a	3	85	0.1	101	75	1.7

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Table 4. Trends—Annual Delay per Traveler, 1982 to 2003

Urban Area	Annual Hours of Delay per Traveler 2003	2002	1993	1982	Long-Term Change 1982 to 2003 Hours	Rank
85 Area Average	47	47	40	16	31	
Very Large Average	61	62	55	23	38	
Very Large (13 areas)						
Atlanta, GA	67	64	38	14	53	1
Washington, DC-VA-MD	69	66	51	21	48	2
Dallas-Fort Worth-Arlington, TX	60	61	47	13	47	3
Los Angeles-Long Beach-Santa Ana, CA	93	98	113	47	46	4
Chicago, IL-IN	58	55	42	16	42	8
San Francisco-Oakland, CA	72	75	62	30	42	8
Detroit, MI	57	54	77	17	40	11
Miami, FL	51	53	39	11	40	11
Boston, MA-NH-RI	51	48	38	14	37	15
New York-Newark, NY-NJ-CT	49	50	34	18	31	22
Phoenix, AZ	49	49	42	18	31	22
Houston, TX	63	65	38	39	24	38
Philadelphia, PA-NJ-DE-MD	38	40	25	14	24	38
85 Area Average	47	47	40	16	31	
Large Average	37	36	28	9	28	
Large (26 areas)						
Riverside-San Bernardino, CA	55	54	51	9	46	4
San Diego, CA	52	51	29	8	44	6
Orlando, FL	55	55	40	12	43	7
Baltimore, MD	50	47	30	9	41	10
Minneapolis-St. Paul, MN	43	43	30	3	40	11
Denver-Aurora, CO	51	52	38	16	35	16
Indianapolis, IN	38	37	28	4	34	17
Seattle, WA	46	48	56	12	34	17
Portland, OR-WA	39	41	33	7	32	20
Providence, RI-MA	33	31	17	5	28	26
Sacramento, CA	40	38	28	12	28	26
San Jose, CA	53	54	53	25	28	26
Tampa-St. Petersburg, FL	46	42	42	18	28	26
Cincinnati, OH-KY-IN	30	30	18	4	26	33
San Antonio, TX	33	36	12	7	26	33
Columbus, OH	29	29	24	4	25	36
Las Vegas, NV	30	29	22	7	23	41
St. Louis, MO-IL	35	38	31	14	21	43
Milwaukee, WI	23	24	19	5	18	47
Kansas City, MO-KS	17	15	13	2	15	50
Virginia Beach, VA	26	27	18	12	14	51
Buffalo, NY	13	11	6	3	10	60
Cleveland, OH	10	11	10	1	9	65
New Orleans, LA	18	17	16	9	9	65
Oklahoma City, OK	12	14	7	3	9	65
Pittsburgh, PA	14	13	14	10	4	81

Very Large Urban Areas—over 3 million population.
Large Urban Areas—over 1 million and less than 3 million population.

Annual Delay per Traveler – Extra travel time for peak period travel during the year divided by the number of travelers who begin a trip during the peak period (6 to 9 a.m. and 4 to 7 p.m.). Free-flow speeds (60 mph on freeways and 35 mph on principal arterials) are used as the comparison threshold.

2002 and 2003 data Include the effects of operational treatments.

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Table 4. Trends—Annual Delay per Traveler, 1982 to 2003, Continued

Urban Area	Annual Hours of Delay per Traveler 2003	2002	1993	1982	Long-Term Change 1982 to 2003 Hours	Rank
85 Area Average	47	47	40	16	31	
Medium Average	25	24	15	5	20	
Medium (30 areas)						
Austin, TX	51	50	24	11	40	11
Charlotte, NC-SC	43	45	27	10	33	19
Louisville, KY-IN	42	40	25	10	32	20
Tucson, AZ	36	31	15	5	31	22
Memphis TN-MS-AR	33	32	15	3	30	25
Salt Lake City, UT	31	30	14	3	28	26
Bridgeport-Stamford, CT-NY	32	33	17	5	27	31
Oxnard-Ventura, CA	33	32	15	6	27	31
Jacksonville, FL	34	31	27	8	26	33
Albuquerque, NM	30	28	23	6	24	38
Nashville-Davidson, TN	37	39	20	14	23	41
Birmingham AL	27	26	13	6	21	43
Raleigh-Durham, NC	27	26	21	7	20	45
Omaha NE-IA	23	23	13	4	19	46
El Paso, TX-NM	18	19	8	2	16	48
New Haven, CT	20	22	10	4	16	48
Grand Rapids, MI	19	18	17	5	14	51
Richmond, VA	17	15	13	4	13	55
Hartford, CT	16	17	10	4	12	56
Albany-Schenectady, NY	13	12	8	2	11	59
Akron, OH	12	12	8	2	10	60
Allentown-Bethlehem, PA-NJ	17	17	14	7	10	60
Honolulu, HI	20	18	28	10	10	60
Toledo, OH-MI	12	13	7	2	10	60
Tulsa, OK	12	13	5	3	9	65
Dayton, OH	11	12	11	3	8	70
Sarasota-Bradenton, FL	19	19	14	12	7	71
Rochester, NY	7	6	4	1	6	76
Fresno, CA	13	15	11	8	5	79
Springfield, MA-CT	7	9	7	7	0	84
85 Area Average	47	47	40	16	31	
Small Average	13	13	9	4	9	
Small (16 areas)						
Colorado Springs, CO	27	29	8	2	25	36
Charleston-North Charleston, SC	25	22	21	11	14	51
Pensacola, FL-AL	18	19	17	4	14	51
Cape Coral, FL	15	14	10	3	12	56
Salem, OR	15	15	10	3	12	56
Beaumont, TX	14	15	8	5	9	65
Boulder, CO	9	10	6	2	7	71
Eugene, OR	9	9	6	2	7	71
Little Rock, AR	10	9	6	3	7	71
Spokane, WA	10	10	11	3	7	71
Columbia, SC	9	8	7	3	6	76
Laredo, TX	8	7	3	2	6	76
Bakersfield, CA	7	7	5	2	5	79
Brownsville, TX	4	5	3	1	3	82
Corpus Christi, TX	7	6	5	5	2	83
Anchorage, AK	5	5	3	5	0	84

Medium Urban Areas—over 500,000 and less than 1 million population.
Small Urban Areas—less than 500,000 population.

Annual Delay per Traveler – Extra travel time for peak period travel during the year divided by the number of travelers who begin a trip during the peak period (6 to 9 a.m. and 4 to 7 p.m.). Free-flow speeds (60 mph on freeways and 35 mph on principal arterials) are used as the comparison threshold.

2002 and 2003 data Include the effects of operational treatments.

Note: Users of this data are cautioned to avoid placing too much value on the rankings of all 85 urban areas. Often, there is little difference between being 6th on the list and being 12th, for example. Furthermore, these rankings compare all urban areas without respect to population or other differences which can significantly influence the ranking outcomes. Rankings should be used to make broad, general comparisons only and not distinguish between urban areas based on small differences in ranking outcomes.

Table 5. Trends—Travel Time Index, 1982 to 2003

Urban Area	Travel Time Index 2003	2002	1993	1982	Point Change in Peak-Period Time Penalty 1982 to 2003 Points	Rank
85 Area Average	1.37	1.37	1.28	1.12	25	
Very Large Area Average	1.48	1.49	1.38	1.18	30	
Very Large (13 areas)						
Los Angeles-Long Beach-Santa Ana, CA	1.75	1.77	1.73	1.30	45	1
Chicago, IL-IN	1.57	1.54	1.34	1.18	39	2
Atlanta, GA	1.46	1.42	1.18	1.08	38	3
San Francisco-Oakland, CA	1.54	1.55	1.44	1.21	33	5
Washington, DC-VA-MD	1.51	1.50	1.38	1.18	33	5
Miami, FL	1.42	1.40	1.26	1.09	33	5
Dallas-Fort Worth-Arlington, TX	1.36	1.35	1.20	1.07	29	16
New York-Newark, NY-NJ-CT	1.39	1.40	1.28	1.13	26	17
Detroit, MI	1.38	1.36	1.36	1.12	26	17
Boston, MA-NH-RI	1.34	1.35	1.26	1.10	24	22
Phoenix, AZ	1.35	1.35	1.27	1.13	22	25
Philadelphia, PA-NJ-DE-MD	1.32	1.35	1.20	1.13	19	28
Houston, TX	1.42	1.41	1.24	1.28	14	39
85 Area Average	1.37	1.37	1.28	1.12	25	
Large Area Average	1.28	1.28	1.19	1.07	21	
Large (26 areas)						
San Diego, CA	1.41	1.40	1.22	1.06	35	4
Riverside-San Bernardino, CA	1.37	1.34	1.27	1.04	33	5
Las Vegas, NV	1.39	1.36	1.24	1.07	32	9
Portland, OR-WA	1.37	1.38	1.24	1.05	32	9
Seattle, WA	1.38	1.36	1.35	1.07	31	11
Minneapolis-St. Paul, MN	1.34	1.34	1.16	1.03	31	11
Denver-Aurora, CO	1.40	1.40	1.24	1.10	30	13
Sacramento, CA	1.37	1.34	1.19	1.07	30	13
Baltimore, MD	1.37	1.35	1.20	1.07	30	13
Orlando, FL	1.30	1.31	1.21	1.09	21	26
Indianapolis, IN	1.24	1.24	1.16	1.03	21	26
San Jose, CA	1.37	1.39	1.34	1.18	19	28
Cincinnati, OH-KY-IN	1.22	1.22	1.15	1.04	18	32
San Antonio, TX	1.22	1.23	1.07	1.05	17	33
Milwaukee, WI	1.21	1.23	1.17	1.05	16	35
Columbus, OH	1.19	1.19	1.14	1.03	16	35
Tampa-St. Petersburg, FL	1.33	1.31	1.30	1.19	14	39
Providence, RI-MA	1.19	1.18	1.11	1.05	14	39
St. Louis, MO-IL	1.22	1.24	1.18	1.09	13	46
Virginia Beach, VA	1.21	1.20	1.13	1.08	13	46
Kansas City, MO-KS	1.11	1.10	1.06	1.01	10	54
New Orleans, LA	1.19	1.18	1.16	1.10	9	56
Oklahoma City, OK	1.10	1.11	1.04	1.02	8	62
Buffalo, NY	1.10	1.08	1.04	1.03	7	67
Cleveland, OH	1.09	1.10	1.08	1.02	7	67
Pittsburgh, PA	1.10	1.10	1.09	1.08	2	82

Very Large Urban Areas—over 3 million population.
Large Urban Areas—over 1 million and less than 3 million population.

Travel Time Index – The ratio of travel time in the peak period to the travel time at free-flow conditions. A value of 1.35 indicates a 20-minute free-flow trip takes 27 minutes in the peak. Free-flow speeds (60 mph on freeways and 35 mph on principal arterials) are used as the comparison threshold.

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Table 5. Trends—Travel Time Index, 1982 to 2003, Continued

Urban Area	Travel Time Index 2003	2002	1993	1982	Point Change in Peak-Period Time Penalty 1982 to 2003 Points	Rank
85 Area Average	1.37	1.37	1.28	1.12	25	
Medium Area Average	1.18	1.18	1.11	1.05	13	
Medium (30 areas)						
Austin, TX	1.33	1.31	1.14	1.08	25	19
Tucson, AZ	1.31	1.28	1.14	1.06	25	19
Salt Lake City, UT	1.28	1.26	1.13	1.03	25	19
Charlotte, NC-SC	1.31	1.31	1.17	1.07	24	22
Bridgeport-Stamford, CT-NY	1.29	1.30	1.15	1.05	24	22
Oxnard-Ventura, CA	1.23	1.21	1.10	1.04	19	28
Memphis TN-MS-AR	1.22	1.22	1.11	1.03	19	28
Louisville, KY-IN	1.24	1.24	1.15	1.09	15	37
El Paso, TX-NM	1.17	1.17	1.07	1.02	15	37
Raleigh-Durham, NC	1.19	1.18	1.12	1.05	14	39
Jacksonville, FL	1.18	1.16	1.14	1.04	14	39
Omaha NE-IA	1.18	1.17	1.10	1.04	14	39
Sarasota-Bradenton, FL	1.25	1.25	1.18	1.12	13	46
Albuquerque, NM	1.17	1.17	1.14	1.04	13	46
Birmingham AL	1.17	1.16	1.08	1.05	12	50
Nashville-Davidson TN	1.18	1.19	1.09	1.07	11	52
Grand Rapids, MI	1.14	1.13	1.11	1.03	11	52
New Haven, CT	1.13	1.14	1.08	1.03	10	54
Honolulu, HI	1.19	1.18	1.21	1.10	9	56
Fresno, CA	1.14	1.15	1.12	1.05	9	56
Allentown-Bethlehem, PA-NJ	1.14	1.15	1.12	1.06	8	62
Hartford, CT	1.11	1.12	1.07	1.03	8	62
Toledo, OH-MI	1.10	1.11	1.04	1.02	8	62
Tulsa, OK	1.10	1.10	1.05	1.02	8	62
Akron, OH	1.09	1.09	1.06	1.02	7	67
Richmond, VA	1.09	1.08	1.07	1.03	6	70
Albany-Schenectady, NY	1.08	1.07	1.04	1.02	6	70
Rochester, NY	1.07	1.06	1.04	1.01	6	70
Dayton, OH	1.08	1.09	1.07	1.03	5	76
Springfield, MA-CT	1.06	1.07	1.06	1.05	1	84
85 Area Average	1.37	1.37	1.28	1.12	25	
Small Area Average	1.10	1.10	1.06	1.03	7	
Small (16 areas)						
Colorado Springs, CO	1.19	1.21	1.07	1.02	17	33
Cape Coral, FL	1.18	1.17	1.11	1.04	14	39
Charleston-North Charleston, SC	1.20	1.18	1.15	1.08	12	50
Pensacola, FL-AL	1.12	1.12	1.11	1.03	9	56
Salem, OR	1.11	1.11	1.06	1.02	9	56
Eugene, OR	1.11	1.10	1.05	1.02	9	56
Spokane, WA	1.08	1.07	1.08	1.02	6	70
Boulder, CO	1.08	1.09	1.05	1.02	6	70
Bakersfield, CA	1.07	1.06	1.04	1.01	6	70
Laredo, TX	1.08	1.07	1.04	1.03	5	76
Beaumont, TX	1.07	1.07	1.04	1.03	4	78
Little Rock, AR	1.06	1.06	1.03	1.02	4	78
Brownsville, TX	1.06	1.07	1.04	1.02	4	78
Columbia, SC	1.06	1.05	1.04	1.03	3	81
Corpus Christi, TX	1.05	1.04	1.03	1.03	2	82
Anchorage, AK	1.05	1.05	1.03	1.04	1	84

Medium Urban Areas—over 500,000 and less than 1 million population.
Small Urban Areas—less than 500,000 population.

Travel Time Index – The ratio of travel time in the peak period to the travel time at free-flow conditions. A value of 1.35 indicates a 20-minute free-flow trip takes 27 minutes in the peak. Free-flow speeds (60 mph on freeways and 35 mph on principal arterials) are used as the comparison threshold.

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Table 6. Summary of Congestion Measures and Trends

	Congestion Levels in 2003				Congestion Increase 1982 to 2003	
Urban Area	**Delay per Traveler (Hours)**	**Travel Time Index**	**Total Delay (1000 Hours)**	**Total Cost ($ Million)**	**Delay per Traveler (Hours)**	**Total Delay (1000 Hours)**
Very Large Average (13 areas)	61	1.48	194,317	325.1	38	154,841
New York-Newark, NY-NJ-CT	LL	LL	HH	HH	L	HH
Los Angeles-Long Beach-Santa Ana, CA	HH	HH	HH	HH	HH	HH
Chicago, IL-IN	L	HH	HH	H	H	HH
Philadelphia, PA-NJ-DE-MD	LL	LL	LL	L	LL	LL
Miami, FL	LL	L	LL	L	0	LL
Dallas-Fort Worth-Arlington, TX	0	LL	L	L	HH	LL
Washington, DC-VA-MD	HH	0	LL	L	HH	LL
San Francisco-Oakland, CA	HH	H	L	L	H	LL
Detroit, MI	L	LL	LL	L	0	LL
Boston, MA-NH-RI	LL	LL	LL	L	0	LL
Houston, TX	0	L	LL	L	LL	LL
Atlanta, GA	H	L	LL	L	HH	LL
Phoenix, AZ	LL	LL	LL	LL	L	LL
Large Average (26 areas)	37	1.28	33,647	42.9	28	30,784
Seattle, WA	HH	HH	HH	HH	H	HH
San Diego, CA	HH	HH	HH	HH	HH	HH
Minneapolis-St. Paul, MN	H	H	HH	H	HH	HH
Baltimore, MD	HH	HH	HH	H	HH	HH
St. Louis, MO-IL	0	L	H	0	L	0
Denver-Aurora, CO	HH	HH	HH	HH	H	HH
Tampa-St. Petersburg, FL	HH	H	HH	H	0	HH
Cleveland, OH	LL	LL	LL	L	LL	LL
Pittsburgh, PA	LL	LL	LL	L	LL	LL
San Jose, CA	HH	HH	HH	H	0	HH
Portland, OR-WA	0	HH	0	0	H	0
Riverside-San Bernardino, CA	HH	HH	HH	H	HH	HH
Sacramento, CA	H	HH	0	0	0	H
Cincinnati, OH-KY-IN	L	L	L	0	0	LL
Virginia Beach, VA	LL	L	L	L	LL	LL
Kansas City, MO-KS	LL	LL	LL	L	LL	LL
Milwaukee, WI	LL	L	LL	L	LL	LL
Las Vegas, NV	L	HH	L	L	L	LL
San Antonio, TX	L	L	L	L	0	LL
Orlando, FL	HH	0	H	0	HH	HH
Providence, RI-MA	L	LL	L	L	0	LL
Columbus, OH	LL	LL	LL	L	L	LL
Buffalo, NY	LL	LL	LL	L	LL	LL
New Orleans, LA	LL	LL	LL	L	LL	LL
Oklahoma City, OK	LL	LL	LL	L	LL	LL
Indianapolis, IN	0	L	L	L	H	LL
Interval Values – Very Large and Large	5 hours	5 index points	(5 hours x average popn. for group)	($0.2 M x average popn. for group)	5 hours	(5 hours x average change in popn. for group)

O – Average congestion levels or average congestion growth (within 1 interval of population group average)

H – Higher congestion or faster increase in congestion (between 1 and 2 intervals)

L – Lower congestion or slower congestion increase (between 1 and 2 intervals)

LL or HH – Lower / Slower or Higher / Faster by more than 2 intervals.

Interval – Within this value there may not be a difference in congestion level

Table 6. Summary of Congestion Measures and Trends, Continued

Urban Area	Congestion Levels in 2003				Congestion Increase 1982 to 2003	
	Delay per Traveler (Hours)	Travel Time Index	Total Delay (1000 Hours)	Total Cost ($ Million)	Delay per Traveler (Hours)	Total Delay (1000 Hours)
Medium Average (30 areas)	25	1.18	9,598	7.8	20	8,263
Memphis, TN-MS-AR	HH	H	HH	HH	HH	HH
Nashville-Davidson, TN	HH	0	HH	HH	H	HH
Jacksonville, FL	HH	0	HH	HH	HH	HH
Salt Lake City, UT	HH	HH	HH	HH	HH	HH
Richmond, VA	LL	LL	L	L	LL	LL
Louisville, KY-IN	HH	HH	HH	HH	HH	HH
Hartford, CT	LL	LL	L	L	LL	LL
Bridgeport-Stamford, CT-NY	HH	HH	HH	HH	HH	HH
Austin, TX	HH	HH	HH	HH	HH	HH
Tulsa, OK	LL	LL	LL	LL	LL	LL
Raleigh-Durham, NC	H	0	H	H	0	HH
Dayton, OH	LL	LL	LL	LL	LL	LL
Charlotte, NC-SC	HH	HH	HH	HH	HH	HH
Tucson, AZ	HH	HH	HH	HH	HH	HH
Honolulu, HI	LL	0	L	L	LL	LL
Birmingham, AL	H	0	0	0	H	0
El Paso, TX-NM	LL	0	L	L	L	LL
Rochester, NY	LL	LL	LL	LL	LL	LL
Springfield, MA-CT	LL	LL	LL	LL	LL	LL
Omaha, NE-IA	L	0	L	L	0	LL
Allentown-Bethlehem, PA-NJ	LL	L	LL	LL	LL	LL
Fresno, CA	LL	L	LL	LL	LL	LL
Akron, OH	LL	LL	LL	LL	LL	LL
Grand Rapids, MI	LL	L	LL	LL	LL	LL
Albuquerque, NM	HH	0	0	0	HH	0
Oxnard-Ventura, CA	HH	HH	0	0	HH	HH
Sarasota-Bradenton, FL	LL	HH	LL	LL	LL	LL
New Haven, CT	LL	LL	LL	LL	L	LL
Albany-Schenectady, NY	LL	LL	LL	LL	LL	LL
Toledo, OH-MI	LL	LL	LL	LL	LL	LL
Small Average (16 areas)	13	1.11	2,142	0.9	8	1,659
Colorado Springs, CO	HH	HH	HH	HH	HH	HH
Charleston-North Charleston, SC	HH	HH	HH	HH	HH	HH
Bakersfield, CA	LL	L	0	0	L	L
Columbia, SC	L	L	0	0	L	L
Spokane, WA	L	L	0	0	L	L
Little Rock, AR	L	L	0	0	L	L
Cape Coral, FL	H	HH	H	H	H	HH
Corpus Christi, TX	LL	LL	L	L	LL	LL
Pensacola, FL-AL	HH	H	H	H	HH	HH
Anchorage, AK	LL	LL	LL	LL	LL	LL
Eugene, OR	L	0	L	L	L	LL
Salem, OR	H	0	0	L	H	L
Laredo, TX	LL	L	L	LL	L	LL
Brownsville, TX	LL	L	LL	LL	LL	LL
Beaumont, TX	0	L	L	L	0	LL
Boulder, CO	L	L	LL	LL	L	LL
Interval Values – Medium and Small	3 hours	3 index points	(3 hours x average popn. for group)	($0.05 M x average popn. for group)	3 hours	(3 hours x average change in popn. for group)

O – Average congestion levels or average congestion growth (within 1 interval of population group average)

H – Higher congestion or faster increase in congestion (between 1 and 2 intervals)

L – Lower congestion or slower congestion increase (between 1 and 2 intervals)

LL or HH – Lower / Slower or Higher / Faster by more than 2 intervals.

Interval – Within this value there may not be a difference in congestion level

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