

# Performance Measure Summary - Virginia Beach VA

There are several inventory and performance measures listed in the pages of this Urban Area Report for the years from 1982 to 2017. There is no single performance measure that experts agree "says it all". A few key points should be recognized by users of the Urban Mobility Scorecard data.

**Use the trends** - The multi-year performance measures are better indicators, in most cases, than any single year. Examining a few measures over many years reduces the chance that data variations or the estimating procedures may have caused a "spike" in any single year. (5 years is 5 times better than 1 year.)

**Use several measures** - Each performance measure illustrates a different element of congestion. (The view is more interesting from atop several measures.)

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

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

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

## Performance Measures and Definition of Terms

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

**Planning Time Index** - A travel time reliability measure that represents the total travel time that should be planned for a trip. Computed with the 95th percentile travel time it represents the amount of time that should be planned for a commute trip to be late for only 1 day a month. If it is computed with the 80th percentile travel time it represents the amount of time that should be planned for a trip to be late for only 1 day a week. A PTI of 2.00 means that for a 20-minute trip in light traffic, 40 minutes should be planned.

**Peak Commuters** - Number of travelers who begin a trip during the morning or evening peak travel periods (6 to 10 a.m. and 3 to 7 p.m.). "Commuters" are private vehicle users unless specifically noted.

**Annual Delay per Commuter** - A yearly sum of all the per-trip delays for those persons who travel in the peak period (6 to 10 a.m. and 3 to 7 p.m.). This measure illustrates the effect of traffic slowdowns as well as the length of each trip.

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

**Free-Flow Speeds** - These values are derived from time periods with lighter traffic volumes in the INRIX speed database. They are used as the national comparison thresholds. Other speed thresholds may be appropriate for urban project evaluations or sub-region studies.

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

**Congestion Cost** - Value of travel delay for 2017 (estimated at \$18.29 per hour of person travel and \$59.94 per hour of truck time) and excess fuel consumption estimated using state average cost per gallon.

**Urban Area** - The developed area (population density more than 1,000 persons per square mile) within a metropolitan region. The urban area boundaries change frequently (every year for most growing areas), so increases include both new growth and development that was previously in areas designated as rural.

**Number of Rush Hours** - Time when the road system might have congestion.

# Mobility Data for Virginia Beach VA

Inventory Measures	2017	2016	2015	2014	2013	2012
<b>Urban Area Information</b>						
Population (1000s)	1,470	1,470	1,465	1,460	1,455	1,455
Rank	36	36	36	35	35	35
Commuters (1000s)	748	748	745	742	746	754
<b>Daily Vehicle-Miles of Travel (1000s)</b>						
Freeway	12,882	12,717	12,395	12,820	13,003	13,120
Arterial Streets	14,932	15,082	15,935	14,829	15,843	16,405
<b>Cost Components</b>						
Value of Time (\$/hour)	18.12	17.91	17.69	17.67	17.39	17.14
Commercial Cost (\$/hour)	52.14	50.20	46.87	44.82	41.23	39.66
Gasoline (\$/gallon)	2.15	2.01	2.09	3.09	3.37	3.39
Diesel (\$/gallon)	2.39	2.16	2.43	3.48	3.77	3.78
System Performance	2017	2016	2015	2014	2013	2012
<b>Congested Travel (% of peak VMT)</b>	15.9	--	--	--	--	--
<b>Congested System (% of lane-miles)</b>	9.3	--	--	--	--	--
<b>Congested Time (number of "Rush Hours")</b>	1.9	--	--	--	--	--
<b>Annual Excess Fuel Consumed</b>						
Total Fuel (1000 gallons)	14,149	14,289	14,414	14,489	14,395	14,198
Rank	45	45	44	43	43	43
Fuel per Peak Auto Commuter (gallons)	15	15	15	16	16	16
Rank	84	83	83	70	71	69
<b>Annual Delay</b>						
Total Delay (1000s of person-hours)	40,510	40,180	39,492	39,001	38,055	36,852
Rank	41	41	41	41	41	40
Delay per Auto Commuter (pers-hrs)	46	46	44	43	41	39
Rank	47	47	49	49	52	61
<b>Travel Time Index</b>						
Rank	1.17	1.17	1.17	1.17	1.18	1.18
Rank	49	49	49	52	41	40
<b>Commuter Stress Index</b>						
Rank	1.18	--	--	--	--	--
Rank	56	--	--	--	--	--
<b>Freeway Planning Time Index (95th Pctile)</b>						
Rank	1.46	--	--	--	--	--
Rank	47	--	--	--	--	--
<b>Congestion Cost</b>						
Total Cost (\$ millions)	812	793	769	771	742	708
Rank	41	41	41	41	41	40
Cost per Auto Commuter (\$)	758	758	740	728	717	704
Rank	66	63	60	58	58	58
<b>Truck Congestion</b>						
Annual Person-Hours of Delay (000)	1,701	1,688	1,659	1,638	1,598	1,548
Rank	41	41	41	41	41	40
Annual Gallons of Wasted Fuel (000)	3,000	3,029	3,056	3,072	3,052	3,010
Rank	45	45	44	43	43	43
Annual Congestion Cost (\$ million)	85	81	76	75	69	65
Rank	41	41	41	41	41	41

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

# Mobility Data for Virginia Beach VA

Inventory Measures	2011	2010	2009	2008	2007	2006
<b>Urban Area Information</b>						
Population (1000s)	1,450	1,450	1,450	1,450	1,450	1,445
Rank	33	33	33	32	32	32
Commuters (1000s)	750	748	745	743	737	730
<b>Daily Vehicle-Miles of Travel (1000s)</b>						
Freeway	13,144	13,110	12,907	13,090	13,115	13,200
Arterial Streets	18,165	18,118	17,712	16,900	16,300	15,815
<b>Cost Components</b>						
Value of Time (\$/hour)	16.79	16.28	16.01	16.07	15.47	15.06
Commercial Cost (\$/hour)	44.62	42.50	41.83	40.77	39.30	37.88
Gasoline (\$/gallon)	3.29	2.63	2.18	3.35	2.88	2.57
Diesel (\$/gallon)	3.60	2.88	2.50	4.08	3.27	2.74
System Performance	2011	2010	2009	2008	2007	2006
<b>Congested Travel (% of peak VMT)</b>	--	--	--	--	--	--
<b>Congested System (% of lane-miles)</b>	--	--	--	--	--	--
<b>Congested Time (number of "Rush Hours")</b>	--	--	--	--	--	--
<b>Annual Excess Fuel Consumed</b>						
Total Fuel (1000 gallons)	14,170	14,131	13,816	13,971	13,908	13,742
Rank	41	40	40	42	39	39
Fuel per Peak Auto Commuter (gallons)	16	16	16	17	17	17
Rank	67	68	54	61	61	56
<b>Annual Delay</b>						
Total Delay (1000s of person-hours)	36,438	36,000	34,866	33,578	33,425	33,028
Rank	40	38	37	39	38	36
Delay per Auto Commuter (pers-hrs)	39	38	39	37	38	38
Rank	54	57	47	54	48	45
<b>Travel Time Index</b>						
Rank	1.17	1.17	1.17	1.18	1.18	1.18
Rank	45	43	45	44	44	43
<b>Commuter Stress Index</b>						
Rank	--	--	--	--	--	--
Rank	--	--	--	--	--	--
<b>Freeway Planning Time Index (95th Pctile)</b>						
Rank	--	--	--	--	--	--
Rank	--	--	--	--	--	--
<b>Congestion Cost</b>						
Total Cost (\$ millions)	694	656	620	616	585	558
Rank	40	39	38	40	39	37
Cost per Auto Commuter (\$)	717	731	720	687	711	722
Rank	54	51	51	55	55	53
<b>Truck Congestion</b>						
Annual Person-Hours of Delay (000)	1,530	1,512	1,464	1,410	1,404	1,387
Rank	40	38	37	39	38	36
Annual Gallons of Wasted Fuel (000)	3,004	2,996	2,929	2,962	2,948	2,913
Rank	41	40	40	42	39	39
Annual Congestion Cost (\$ million)	71	65	61	63	58	54
Rank	40	39	38	40	39	37

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

# Mobility Data for Virginia Beach VA

Inventory Measures	2005	2004	2003	2002	2001	2000
<b>Urban Area Information</b>						
Population (1000s)	1,445	1,445	1,445	1,440	1,440	1,440
Rank	32	32	32	32	31	29
Commuters (1000s)	724	720	716	703	692	681
<b>Daily Vehicle-Miles of Travel (1000s)</b>						
Freeway	13,105	12,995	12,875	12,460	11,635	11,400
Arterial Streets	15,900	15,725	15,710	16,000	15,780	15,250
<b>Cost Components</b>						
Value of Time (\$/hour)	14.58	14.10	13.73	13.43	13.22	12.85
Commercial Cost (\$/hour)	36.51	35.19	33.92	32.69	31.51	30.38
Gasoline (\$/gallon)	2.24	1.85	1.46	1.32	1.47	1.49
Diesel (\$/gallon)	2.41	1.89	1.49	1.31	1.46	1.45
System Performance	2005	2004	2003	2002	2001	2000
<b>Congested Travel (% of peak VMT)</b>	--	--	--	--	--	--
<b>Congested System (% of lane-miles)</b>	--	--	--	--	--	--
<b>Congested Time (number of "Rush Hours")</b>	--	--	--	--	--	--
<b>Annual Excess Fuel Consumed</b>						
Total Fuel (1000 gallons)	13,436	13,194	12,896	12,662	12,524	12,184
Rank	40	40	40	40	37	37
Fuel per Peak Auto Commuter (gallons)	17	17	16	16	16	16
Rank	48	46	49	42	36	32
<b>Annual Delay</b>						
Total Delay (1000s of person-hours)	32,291	31,709	30,993	30,430	30,099	29,281
Rank	37	38	38	36	34	33
Delay per Auto Commuter (pers-hrs)	38	38	39	39	39	39
Rank	46	42	37	36	32	30
<b>Travel Time Index</b>						
Rank	41	38	45	41	38	37
<b>Commuter Stress Index</b>						
Rank	--	--	--	--	--	--
<b>Freeway Planning Time Index (95th Pctile)</b>						
Rank	--	--	--	--	--	--
<b>Congestion Cost</b>						
Total Cost (\$ millions)	525	494	465	445	435	411
Rank	38	38	38	37	36	34
Cost per Auto Commuter (\$)	729	740	743	747	747	747
Rank	51	49	46	45	41	38
<b>Truck Congestion</b>						
Annual Person-Hours of Delay (000)	1,356	1,332	1,302	1,278	1,264	1,230
Rank	37	38	38	36	34	33
Annual Gallons of Wasted Fuel (000)	2,848	2,797	2,734	2,684	2,655	2,583
Rank	40	40	40	40	37	37
Annual Congestion Cost (\$ million)	50	46	43	40	39	37
Rank	38	38	38	37	36	33

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

# Mobility Data for Virginia Beach VA

Inventory Measures	1999	1998	1997	1996	1995	1994
<b>Urban Area Information</b>						
Population (1000s)	1,440	1,435	1,435	1,430	1,415	1,400
Rank	29	28	28	25	26	26
Commuters (1000s)	669	657	646	634	617	601
<b>Daily Vehicle-Miles of Travel (1000s)</b>						
Freeway	11,200	10,755	10,680	10,200	9,750	9,550
Arterial Streets	14,900	14,250	13,845	13,255	12,800	12,115
<b>Cost Components</b>						
Value of Time (\$/hour)	12.43	12.17	11.98	11.71	11.37	11.06
Commercial Cost (\$/hour)	29.28	28.89	28.50	28.12	27.75	27.38
Gasoline (\$/gallon)	1.05	1.02	1.13	1.21	1.15	1.03
Diesel (\$/gallon)	1.06	1.09	1.18	1.29	1.22	1.09
System Performance	1999	1998	1997	1996	1995	1994
<b>Congested Travel (% of peak VMT)</b>	--	--	--	--	--	--
<b>Congested System (% of lane-miles)</b>	--	--	--	--	--	--
<b>Congested Time (number of "Rush Hours")</b>	--	--	--	--	--	--
<b>Annual Excess Fuel Consumed</b>						
Total Fuel (1000 gallons)	11,724	11,286	10,703	10,119	9,238	8,369
Rank	36	36	36	36	36	37
Fuel per Peak Auto Commuter (gallons)	16	15	15	14	13	12
Rank	27	25	17	18	19	21
<b>Annual Delay</b>						
Total Delay (1000s of person-hours)	28,178	27,124	25,722	24,319	22,201	20,113
Rank	34	34	34	34	35	36
Delay per Auto Commuter (pers-hrs)	38	37	36	34	32	29
Rank	32	31	28	33	34	42
<b>Travel Time Index</b>						
Rank	41	36	41	40	41	42
<b>Commuter Stress Index</b>						
Rank	--	--	--	--	--	--
<b>Freeway Planning Time Index (95th Pctile)</b>						
Rank	--	--	--	--	--	--
<b>Congestion Cost</b>						
Total Cost (\$ millions)	378	357	334	310	275	242
Rank	35	34	34	34	35	36
Cost per Auto Commuter (\$)	745	732	706	683	641	599
Rank	36	31	30	32	32	35
<b>Truck Congestion</b>						
Annual Person-Hours of Delay (000)	1,183	1,139	1,080	1,021	932	845
Rank	34	34	34	34	35	36
Annual Gallons of Wasted Fuel (000)	2,486	2,393	2,269	2,145	1,958	1,774
Rank	36	36	36	36	36	37
Annual Congestion Cost (\$ million)	33	31	30	28	25	22
Rank	35	34	34	34	35	36

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

# Mobility Data for Virginia Beach VA

Inventory Measures	1993	1992	1991	1990	1989	1988
<b>Urban Area Information</b>						
Population (1000s)	1,390	1,375	1,355	1,325	1,315	1,275
Rank	26	26	25	25	25	25
Commuters (1000s)	587	572	554	533	525	505
<b>Daily Vehicle-Miles of Travel (1000s)</b>						
Freeway	9,195	8,900	8,675	8,475	8,300	7,975
Arterial Streets	11,500	10,955	10,700	10,620	10,480	10,265
<b>Cost Components</b>						
Value of Time (\$/hour)	10.78	10.47	10.17	9.75	9.25	8.83
Commercial Cost (\$/hour)	27.02	26.66	26.30	25.95	25.60	25.26
Gasoline (\$/gallon)	1.07	1.08	1.08	1.06	1.10	1.02
Diesel (\$/gallon)	1.13	1.17	1.21	1.08	1.02	0.94
System Performance	1993	1992	1991	1990	1989	1988
<b>Congested Travel (% of peak VMT)</b>	--	--	--	--	--	--
<b>Congested System (% of lane-miles)</b>	--	--	--	--	--	--
<b>Congested Time (number of "Rush Hours")</b>	--	--	--	--	--	--
<b>Annual Excess Fuel Consumed</b>						
Total Fuel (1000 gallons)	7,652	7,105	6,594	6,082	5,722	5,060
Rank	37	37	36	36	36	37
Fuel per Peak Auto Commuter (gallons)	11	10	9	9	8	7
Rank	22	24	27	23	26	27
<b>Annual Delay</b>						
Total Delay (1000s of person-hours)	18,390	17,075	15,846	14,617	13,751	12,160
Rank	36	35	34	34	34	34
Delay per Auto Commuter (pers-hrs)	27	26	25	24	23	21
Rank	45	41	39	39	37	38
<b>Travel Time Index</b>						
Rank	44	49	45	46	43	43
<b>Commuter Stress Index</b>						
Rank	--	--	--	--	--	--
<b>Freeway Planning Time Index (95th Pctile)</b>						
Rank	--	--	--	--	--	--
<b>Congestion Cost</b>						
Total Cost (\$ millions)	217	196	177	157	141	119
Rank	36	35	34	34	34	34
Cost per Auto Commuter (\$)	563	539	515	497	495	459
Rank	37	39	39	36	34	38
<b>Truck Congestion</b>						
Annual Person-Hours of Delay (000)	772	717	666	614	578	511
Rank	36	35	34	34	34	34
Annual Gallons of Wasted Fuel (000)	1,622	1,506	1,398	1,289	1,213	1,073
Rank	37	37	36	36	36	37
Annual Congestion Cost (\$ million)	20	19	17	15	14	12
Rank	36	34	34	34	34	34

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

# Mobility Data for Virginia Beach VA

Inventory Measures	1987	1986	1985	1984	1983	1982
<b>Urban Area Information</b>						
Population (1000s)	1,240	1,210	1,190	1,150	1,125	1,100
Rank	25	26	26	26	28	28
Commuters (1000s)	488	471	460	442	429	415
<b>Daily Vehicle-Miles of Travel (1000s)</b>						
Freeway	7,560	7,200	6,850	6,600	6,200	5,850
Arterial Streets	10,125	10,000	9,870	9,755	9,615	9,500
<b>Cost Components</b>						
Value of Time (\$/hour)	8.48	8.18	8.03	7.75	7.43	7.20
Commercial Cost (\$/hour)	24.93	24.60	24.27	23.94	23.63	23.31
Gasoline (\$/gallon)	1.02	0.99	1.30	1.31	1.34	1.41
Diesel (\$/gallon)	0.94	0.92	1.20	1.22	1.24	1.30
System Performance	1987	1986	1985	1984	1983	1982
<b>Congested Travel (% of peak VMT)</b>	--	--	--	--	--	--
<b>Congested System (% of lane-miles)</b>	--	--	--	--	--	--
<b>Congested Time (number of "Rush Hours")</b>	--	--	--	--	--	--
<b>Annual Excess Fuel Consumed</b>						
Total Fuel (1000 gallons)	4,564	4,219	3,930	3,520	3,322	3,070
Rank	37	37	36	35	35	35
Fuel per Peak Auto Commuter (gallons)	6	5	6	4	4	3
Rank	32	40	22	41	35	34
<b>Annual Delay</b>						
Total Delay (1000s of person-hours)	10,969	10,139	9,444	8,460	7,985	7,377
Rank	35	32	31	31	31	30
Delay per Auto Commuter (pers-hrs)	19	18	17	16	16	15
Rank	43	42	38	41	33	33
<b>Travel Time Index</b>						
Rank	44	42	39	42	39	43
<b>Commuter Stress Index</b>						
Rank	--	--	--	--	--	--
<b>Freeway Planning Time Index (95th Pctile)</b>						
Rank	--	--	--	--	--	--
<b>Congestion Cost</b>						
Total Cost (\$ millions)	104	93	86	75	68	61
Rank	35	32	32	31	31	30
Cost per Auto Commuter (\$)	432	413	392	367	362	345
Rank	36	35	35	35	34	34
<b>Truck Congestion</b>						
Annual Person-Hours of Delay (000)	461	426	397	355	335	310
Rank	35	31	31	31	31	30
Annual Gallons of Wasted Fuel (000)	968	894	833	746	704	651
Rank	37	37	36	35	35	35
Annual Congestion Cost (\$ million)	11	10	9	8	8	7
Rank	32	30	32	32	31	30

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