

CHAPTER 9

UTILIZATION

TABLE 9.1 Regional freeway and arterial congestion levels

	Daily Freeway VMT (000)		Freeway Lane Miles		Freeway Daily VMT/Lane Miles		Congested Freeway Travel (%)		Congested Freeway Lane Miles (%)	
	1990	1996	1990	1996	1990	1996	1990	1996	1990	1996
Albuquerque	2,430	3,500	235	250	10,340	14,000	35%	55%	25%	35%
Baltimore	15,800	20,435	1,240	1,430	12,740	14,290	55%	60%	35%	45%
Boston	20,590	21,375	1,380	1,310	14,920	16,315	60%	65%	45%	55%
Brownsville, TX	230	250	30	30	7,665	8,335	10%	15%	5%	10%
Buffalo	5,125	5,750	650	615	7,885	9,300	15%	25%	10%	15%
Chicago	38,030	46,000	2,425	2,610	15,680	17,625	75%	80%	55%	60%
Cincinnati	11,380	13,870	910	960	12,505	14,450	55%	60%	40%	40%
Cleveland	13,700	16,020	1,160	1,190	11,810	13,460	30%	50%	20%	35%
Corpus Christi	1,990	2,550	220	280	9,045	9,105	15%	20%	5%	10%
Dallas	23,510	27,165	1,670	1,930	14,080	14,075	55%	65%	40%	40%
Denver	11,205	15,100	880	1,000	12,735	15,100	60%	65%	35%	45%
Detroit	26,645	28,260	1,775	1,790	15,010	15,790	65%	70%	45%	55%
Eugene	950	1,165	110	110	8,635	10,590	N/A	10%	N/A	5%
Houston	27,500	35,150	1,940	2,445	14,175	14,375	70%	70%	45%	45%
Jacksonville	5,380	8,150	445	630	12,090	12,935	45%	55%	30%	35%
Kansas City	11,580	16,940	1,285	1,675	8,010	10,115	20%	35%	10%	20%
Las Vegas	2,820	5,280	230	350	12,260	15,085	70%	75%	45%	50%
Los Angeles	110,345	117,800	4,730	5,170	23,330	22,785	95%	95%	85%	85%
Milwaukee	7,615	8,800	575	610	13,245	14,425	60%	70%	40%	50%
Minn./St. Paul	17,790	22,930	1,455	1,510	12,225	15,185	40%	60%	25%	45%
New York City	81,475	91,270	6,000	6,545	13,580	13,945	60%	65%	40%	40%
Philadelphia	19,140	22,380	1,525	1,670	12,550	13,400	45%	55%	25%	30%
Phoenix	7,850	12,745	580	825	13,535	15,450	65%	75%	40%	55%
Portland, OR	8,535	11,105	600	690	14,225	16,825	65%	70%	35%	45%
Rochester	4,355	5,325	440	500	9,900	10,650	20%	30%	10%	20%
Sacramento	9,265	10,755	650	680	14,255	15,815	55%	65%	40%	60%
San Antonio	9,280	13,275	900	1,065	10,310	12,465	40%	50%	20%	30%
San Diego	26,690	28,985	1,630	1,790	16,375	16,195	80%	80%	70%	70%
San Francisco	40,600	42,795	2,150	2,245	18,885	19,060	85%	85%	70%	75%
Seattle	17,000	22,100	1,020	1,265	16,665	17,470	85%	80%	75%	65%
St. Louis	19,100	23,765	1,555	1,670	12,285	14,230	35%	55%	20%	45%
Tampa	3,815	5,490	310	410	12,305	13,390	50%	40%	35%	30%
Tucson	1,270	1,670	105	165	12,095	10,120	50%	45%	35%	35%
Washington, DC	25,080	33,045	1,520	1,830	16,500	18,055	75%	80%	60%	60%

(continued)

TABLE 9.1 (Continued)

	Daily Principal Arterial VMT (000)		Arterial Lane Miles		Arterial Daily VMT/Lane Miles		Congested Arterial Travel (%)		Congested Arterial Lane Miles (%)	
	1990	1996	1990	1996	1990	1996	1990	1996	1990	1996
Albuquerque	4,410	4,970	800	890	5,515	5,585	55%	65%	45%	50%
Baltimore	9,200	8,920	1,585	1,425	5,805	6,260	75%	75%	55%	60%
Boston	12,540	15,860	1,975	2,050	6,350	7,735	80%	85%	70%	75%
Brownsville, TX	400	550	100	125	4,000	4,400	45%	45%	25%	30%
Buffalo	4,910	5,095	1,080	1,030	4,545	4,945	45%	40%	25%	25%
Chicago	30,450	38,010	4,450	5,405	6,845	7,030	75%	80%	60%	70%
Cincinnati	3,670	4,290	750	820	4,895	5,230	65%	60%	40%	35%
Cleveland	6,215	6,520	980	1,030	6,340	6,330	55%	65%	40%	45%
Corpus Christi	1,660	1,310	360	300	4,610	4,365	40%	35%	25%	20%
Dallas	9,400	12,510	1,865	2,410	5,040	5,190	40%	60%	25%	30%
Denver	9,150	10,950	1,850	1,945	4,945	5,630	65%	80%	45%	70%
Detroit	23,990	28,400	3,900	4,290	6,150	6,620	75%	80%	55%	60%
Eugene	670	730	175	125	3,830	5,840	65%	65%	50%	50%
Houston	8,830	12,350	1,780	2,250	1,960	5,490	55%	65%	35%	45%
Jacksonville	5,805	6,800	1,200	1,390	4,840	4,890	50%	60%	40%	45%
Kansas City	4,810	5,735	1,200	1,105	4,010	5,190	60%	70%	45%	50%
Las Vegas	3,090	3,540	505	540	6,120	6,555	75%	85%	60%	70%
Los Angeles	80,370	85,000	12,405	12,700	6,480	6,695	65%	75%	55%	65%
Milwaukee	5,000	6,475	1,030	1,255	4,855	5,160	45%	60%	30%	40%
Minn./St. Paul	5,640	7,220	1,000	1,270	5,640	5,685	60%	65%	50%	55%
New York City	52,055	55,635	6,825	7,590	7,625	7,330	85%	85%	40%	55%
Philadelphia	19,790	21,200	2,970	3,105	6,665	6,830	75%	80%	55%	65%
Phoenix	17,610	18,110	2,870	2,940	6,135	6,160	70%	75%	50%	60%
Portland, OR	4,000	5,580	700	860	5,715	6,490	45%	70%	25%	55%
Rochester	725	1,120	145	180	5,000	6,220	60%	50%	40%	35%
Sacramento	6,995	8,475	1,050	1,250	6,660	6,780	65%	70%	70%	65%
San Antonio	5,145	4,690	1,175	940	4,380	4,990	45%	60%	25%	40%
San Diego	9,340	10,000	1,710	1,810	5,460	5,525	45%	60%	35%	50%
San Francisco	13,995	14,840	1,750	1,965	7,995	7,550	75%	75%	65%	60%
Seattle	9,130	8,330	1,300	1,465	7,025	5,685	65%	80%	45%	60%
St. Louis	11,180	12,125	1,720	2,200	6,500	5,510	65%	85%	45%	65%
Tampa	4,750	7,000	660	940	7,195	7,445	65%	70%	50%	65%
Tucson	2,900	4,700	580	740	5,000	6,350	75%	80%	65%	70%
Washington, DC	16,325	1,925	2,200	2,390	7,420	8,055	85%	85%	75%	75%

(continued)

TABLE 9.1 (Continued)

	Average Peak Period Speed Freeway (MPH)		Average Peak Period Speed Arterial (MPH)		TTI Roadway Congestion Index	
	1990	1996	1990	1996	1990	1996
Albuquerque	55	49	33	31	0.85	1.01
Baltimore	51	49	29	29	0.94	1.04
Boston	48	46	29	27	1.08	1.22
Brownsville, TX	59	59	34	34	0.62	0.69
Buffalo	59	58	33	34	0.64	0.73
Chicago	44	41	28	28	1.15	1.26
Cincinnati	52	49	31	30	0.89	1.02
Cleveland	56	52	32	30	0.89	0.99
Corpus Christi	59	58	34	34	0.69	0.67
Dallas	50	49	32	30	0.99	1.00
Denver	50	47	31	28	0.91	10.7
Detroit	47	46	29	28	10.8	1.15
Eugene	60	59	33	32	0.63	0.82
Houston	47	47	31	30	1.00	1.02
Jacksonville	50	47	31	28	0.91	1.07
Kansas City	58	57	33	31	0.66	0.75
Las Vegas	47	43	30	28	0.95	1.10
Los Angeles	35	36	28	28	1.56	1.54
Milwaukee	51	47	33	31	0.93	1.01
Minn./St. Paul	54	48	31	30	0.89	1.08
New York City	48	48	27	27	1.05	1.06
Philadelphia	53	50	29	29	0.99	1.03
Phoenix	46	42	29	29	1.04	1.11
Portland, OR	50	44	32	28	1.02	1.2
Rochester	58	57	33	33	0.72	0.79
Sacramento	51	48	28	28	1.06	1.15
San Antonio	55	52	33	31	0.75	0.89
San Diego	44	44	31	30	1.15	1.14
San Francisco	40	40	27	28	1.36	1.36
Seattle	42	42	28	28	1.21	1.22
St. Louis	55	50	30	27	0.93	1.01
Tampa	51	52	30	29	1.02	1.09
Tucson	53	54	31	30	0.89	0.95
Washington, DC	44	41	27	26	1.21	1.32

Source: Texas Transportation Institute; <http://tti.tamu.edu>.

Note: Congested travel is defined by TTI as travel they classify on freeways at speed levels of 45 mph and below and on arterials at 30 mph and below.

TABLE 9.2 Most congested freeway links, 1998 (ranked by annual hours of delay)

Rank	City	Freeway	Location	Vehicles Per Day	Annual Hours Of Delay (000)
1	Los Angeles	I-405	I-10 jct.	296,400	22,284
2	Houston	U.S. 59(SW Fwy)	I-610 jct.	321,000	22,085
3	Seattle	I-5	I-90 jct.	283,226	21,884
4	Boston	I-93 (Central Artery)	U.S. 1 jct.	223,300	20,264
5	Washington, DC	I-495	I-270 jct.	255,500	20,145
6	Washington, DC	I-95	I-495 jct.	267,000	19,629
7	Los Angeles	U.S. 101 (Ventura Fwy)	I-405 jct.	278,000	18,787
8	Los Angeles	SR 55 (Newport Fwy)	SR 22 jct.	221,500	18,049
9	Los Angeles	I-10 (Santa Monica Fwy)	I-5 jct.	308,787	16,364
10	Albuquerque	I-40	I-25 jct.	209,900	16,029
11	Atlanta	I-285	I-85 jct. (De Kalb Co.)	256,400	14,013
12	Atlanta	I-75	I-85 jct.	234,700	13,496
13	Chicago	I-290	I-88/I-294 jct.	220,635	12,628
14	Denver	I-25	I-225 jct.	192,000	11,296
15	Houston	I-610	I-10 jct.	251,540	10,877
16	Washington, DC	I-66	I-495 jct.	196,000	10,220
17	Washington, DC	I-95/I-495	U.S. 1 to I-95 N jct.	168,025	10,115
18	Atlanta	I-285	I-75 jct.	220,400	9,585

Source: Cambridge Systematics, Inc., "Unclogging America's Arteries," prepared for American Highway Users Alliance, 2000.

TABLE 9.3 Examples of vehicle and person utilization information for exclusive freeway HOV lanes

City (Year Of Data)	Number Of Directional Lanes		AM Peak-Hour HOV Facility						AM Peak-Period HOV Facility						Peak-Period Length (Hours)
			Bus		Van & Carpool		Peak-Hour Non-HOV		Bus		Van & Carpool		Peak-Period Non-HOV		
			HOV	Mixed	Veh.	Pass.	Veh.	Pass.	Veh.	Pass.	Veh.	Pass.	Veh.	Pass.	
Exclusive-Two Directional															
Los Angeles, CA															
I-10 San Bernardino (1989)	1	4	71	2,750	1,374	4,352	8,375	9,548	132	5,110	2,516	8,075	16,515	19,295	2
Hartford, CT															
I-84 (1988)	1	4	12	288	540	1,193	N/A	N/A	28	698	923	2,101	N/A	N/A	3
I-91 (1988)	1	4	11	280	641	1,416	N/A	N/A	24	592	1,168	2,708	N/A	N/A	3
Exclusive - Reversible															
Minneapolis, MN I-394 (1998)															
Pittsburgh, PA I-279/579 (1989)	1	2	23	1,050	845	1,527	4,361	5,001	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Houston, TX															
I-10 (Katy Freeway) (1998)	1	3 ^a	40	1,355	895	2,091	5,122	6,187	89	2,645	2,564	5,603	16,424	18,786	3.5
I-45 (Gulf Freeway) (1998)	1	4	31	740	1,299	2,682	3,918	4,564	66	1,490	2,309	4,763	12,843	14,744	3.5
U.S. 290 (Northwest) (1998)	1	3	22	1,035	1,521	3,030	5,130	5,307	43	1,830	2,924	5,873	17,576	19,678	3.5
I-45 (North Freeway) (1998)	1	4	53	2,100	13,341	2,725	6,348	6,966	114	3,890	2,640	5,423	19,427	20,983	3.5
U.S. 59 (Southwest) (1998)	1	4	38	1,420	1,466	3,147	N/A	N/A	98	3,015	2,852	6,069	N/A	N/A	3.5
Northern Virginia/Washington, DC															
I-395 (Shirley Hwy.) (1998)	2	4	118	3,085	2,654	8,212	N/A	N/A	275	7,111	5,637	16,588	N/A	N/A	2.5
I-66 (1998)	2	0	16	484	3,405	6,486	--	--	37	1,118	7,608	13,976	--	--	2.5
Norfolk, VA I-64 (1989)	2	3	--	--	930	2,130	5,400	6,426	--	--	2,480	5,680	15,200	18,088	3

Sources: Connecticut DOT (1998), Minnesota DOT (1998a), Metropolitan Washington COG (1998), Texas Transportation Institute (1998b), Turnbull (1992a).
 Traveler Response to Transportation System Changes, Interim Updated Handbook, as reported by TCRP Project B-12.

Notes: N/A - information not available.

Within facility type categories, first order alphabetization is by state/province, second order is by city/county metropolitan area.

^a Plus auxiliary lane in a.m.; 2-lane section upstream.

TABLE 9.4 General characteristics of concurrent flow freeway HOV lanes

HOV Facility	Number Of Lanes	Project Length Miles	Year Implemented	Weekday HOV Operation Period	General Eligibility Requirements
Phoenix, AZ					
I-10	1 each direction	21	1987-1990	24 hours	2+HOVs
SR 202	1 each direction	8	N/A	24 hours	2+HOVs
I-17	1 each direction	6	N/A	24 hours	2+HOVs
Vancouver, BC, Canada					
H-99	1 each direction	SB4, NB1	1980	24 hours	3+HOVs
Alameda County, CA					
I-80 (Bay Bridge)	3 WB only	1	1970	5-10 a.m., 3-6 p.m.	3+HOVs
I-880	1 each direction	5	1991/1995	5-9 a.m., 3-7 p.m.	2+HOVs
Contra Costa County, CA					
I-80	1 each direction	8	1997	5-9 a.m., 3-7 p.m.	3+HOVs
I-680	1 each direction	14.4	1994	5-9 a.m., 3-7 p.m.	2+HOVs
I-580	1 each direction	6.1	1989	7-8 a.m., 5-6 p.m.	2+HOVs
Los Angeles County, CA					
I-105	1 each direction	16	1993	24 hours	2+HOVs
I-110	2 each direction	15.2	1996	24 hours	2+HOVs
I-210	1 each direction	18.5	1993	24 hours	2+HOVs
I-405	1 each direction	19.4	1989-1993	24 hours	2+HOVs
I-605	1 each direction	7	1997	24 hours	2+HOVs
SR 91	1 each direction	14.3	1983/1993	24 hours	2+HOVs
SR 118	1 each direction	11.4	1997	24 hours	2+HOVs
SR 134	1 each direction	13.3	1996	24 hours	2+HOVs
SR 170	1 each direction	6.1	1996	24 hours	2+HOVs
Marin County, CA U.S. 101 (2 projects)	1 each direction	13	1971-1976/1987-1991	6:30-8:30 a.m., 4:30-7 p.m.	2+HOVs
Orange County, CA					
I-5	1-2 each direction	34	1996	24 hours	2+HOVs
SR 55	1 each direction	12.3	1985	24 hours	2+HOVs
I-405	1 each direction	24	1990	24 hours	2+HOVs
SR 57	1 each direction	12	1992	24 hours	2+HOVs
SR 91	1 each direction	2.6	1995	24 hours	2+HOVs
Riverside County, CA SR 91	1 each direction	17	N/A	24 hours	2+HOVs
Sacramento, CA SR 99	1 each direction	10	1994	24 hours	2+HOVs
San Bernardino County, CA					
SR 60	1 each direction	10	1997	24 hours	2+HOVs
SR 71	1 each direction	8	1997/1998	24 hours	2+HOVs
Santa Clara/San Mateo Counties, CA					
U.S. 101	1 each direction	25	1974/1987/1991	5-9 a.m., 3-7 p.m.	2+HOVs
SR 237	1 each direction	6	1984/1995	5-9 a.m., 3-7 p.m.	2+HOVs
SR 85	1 each direction	22		5-9 a.m., 3-7 p.m.	2+HOVs
I-280	1 each direction	11	1990	5-9 a.m., 3-7 p.m.	2+HOVs
San Tomas Expressway	1 each direction	8	1982/1984	5-9 a.m., 3-7 p.m.	2+HOVs
Montague Expressway	1 each direction	6	1982/1984/1988	5-9 a.m., 3-7 p.m.	2+HOVs
Denver, CO U.S. 36 Boulder Turnpike	1 EB only	4.1	1986-1988	6-9 a.m.	Busses only
Ft. Lauderdale, FL I-95	1 each direction	27	N/A	7-9 a.m., 4-6 p.m.	2+HOVs
Miami, FL I-95	1 each direction	14	1976-1978	7-9 a.m., 4-6 p.m. NB	2+HOVs
Orlando, FL I-4	1 each direction	30	1980	7-9 a.m., 4-6 p.m. NB	2+HOVs
Atlanta, GA					
I-20	1 each direction	9.4	N/A	6:30-9:30 a.m. WB, 4:30-7 p.m. EB	2+HOVs
I-75	1 each direction	40	N/A	24 hours	2+HOVs
I-85	1 each direction	20	N/A	24 hours	2+HOVs
Honolulu, HI					
Monaloa Freeway	1 each direction	2.4	1978	6-8 a.m., 3:30-6 p.m.	2+HOVs
Kalanianole Highway	1 (WB only)	2	N/A	5-8:30 a.m.	2+HOVs
H-1	1 each direction	7	1987	6-8 a.m., 3:30-6 p.m.	2+HOVs
H-2	1 each direction	8.2	N/A	6-8 a.m., 3:30-6 p.m.	2+HOVs
Montgomery County, MD					
U.S. 29	1 each direction	3	N/A	Peak periods only	Busses only
I-270 (eastern connection)	1 each direction	2.5	N/A	Peak periods only	2+HOVs
Boston, MA I-93 North	1 (SB only)	2.5	1972/1999	6:30-10:00 a.m.	2+HOVs
Minneapolis, MN					
I-35W	1 each direction	5	N/A	6-9 a.m. NB, 4-7 p.m. SB	2+ HOVs
I-394	1 each direction	7	1985-1991	6-9 a.m. EB 4-7 p.m. WB	2+ HOVs
Morris County, NJ					
I-80 ^a	1 each direction	11	1994	6-9 a.m. EB 3-7 p.m. WB	2+ HOVs
I-287 ^a	1 each direction	SB6, NB 20, a.m. +- reverse in p.m.	1998	6-9 a.m., 3-7 p.m.	2+ HOVs
Suffolk County, NY I-495	1 each direction	12	N/A	6 a.m.-8 p.m.	2+ HOVs
Ottawa, Ontario, Canada Hwy. 17	1 (WB only)	3	N/A	7-9 a.m.	Busses only
Nashville, TN I-65	1 each direction	7.2	N/A	7-9 a.m. NB, 4-6 p.m. SB	2+ HOVs

(continued)

TABLE 9.4 (Continued)

HOV Facility	Number Of Lanes	Project Length Miles	Year Implemented	Weekday HOV Operation Period	General Eligibility Requirements
Dallas, TX					
I-35 E (Stemmons)	1 each direction	SB 7.3, NB 6.0	1996	24 hours	2+ HOVs
I-635 (LBJ)	1 each direction	WB 6.1, EB 6.8	1998	24 hours	2+ HOVs
Norfolk/Virginia Beach, VA					
SR 44 (Shoulder)	1 each direction	4	N/A	5-8:30 a.m. WB, 3-6 p.m. EB	2+ HOVs
I-64	1 each direction	5	N/A	Peak periods only	2+ HOVs
I-564	1 (EB only)	2	N/A	3:30-6 p.m. EB	2+ HOVs
Northern Virginia					
I-66 (outside Capital Beltway)	1 each direction	7	N/A	6-9 a.m., 3:30-6 p.m.	2+ HOVs
Seattle, WA					
I-5 North	1 each direction	SB 7.7, NB 6.2	1983	24 hours	2+ HOVs
I-5 South	1 each direction	S B8.4, NB 16.1	1991	24 hours	2+ HOVs
I-90	1 each direction	7.3	1988	24 hours	2+ HOVs
I-405	1 each direction	SB 22.5, NB 21.7	1986	24 hours	2+ HOVs
SR 167	1 each direction	4.2	N/A	24 hours	2+ HOVs
SR 520	1 (WB only)	2.3	N/A	24 hours	3+ HOVs

Sources: Turnbull (1992a), Texas Transportation Institute, Parsons Brinckerhoff, and Pacific Rim Resources (1988), Lisco (1999), Billheimer, Moore, and Stamm (1994), Metropolitan Transportation Commission (1997), Urban Transportation Monitor (November 6, 1998), New Jersey DOT (1998), Rankin (1999).

Traveler Response to Transportation System Changes, Interim Updated Handbook, as reported by TCRP Project B-12.

Notes: First order alphabetization is by state/province, second order is by city/county metropolitan area.

^a The HOV lanes on I-80 and I-287 were terminated by the New Jersey Department of Transportation on November 30, 1998.

TABLE 9.5 Examples of vehicle and person utilization levels for contraflow freeway HOV lanes

City (Year Of Data)	Number Of Directional Lanes		AM Peak-Hour HOV Facility						AM Peak-Period HOV Facility						Peak-Period Length (Hours)
			Bus		Van & Carpool		Peak-Hour Non-HOV		Bus		Van & Carpool		Peak-Period Non-HOV		
			HOV	Mixed	Veh.	Pass.	Veh.	Pass.	Veh.	Pass.	Veh.	Pass.	Veh.	Pass.	
Exclusive-Two Directional															
<i>New Jersey</i>															
Rte. 495 (to Lincoln Tunnel) (1989)	1	3	725	34,685	--	--	4,475	7,380	1,640	65,000	--	--	17,435	29,120	4.0
<i>New York City</i>															
I-495 Long Island Expressway (1989)	1	3	165	7,838	214	394	N/A	N/A	366	17,385	428	761	--	--	3.0
Gowanus Expressway (1989)	1	4	202	8,686	173	899	3,794	7,569	409	14,724	399	1,097	10,720	20,818	2.5
<i>Montreal, Quebec, Canada</i>															
Champlain Bridge (1992)	1	3	91	5,300	--	--	N/A	N/A	208	10,049	--	--	N/A	N/A	3.0
<i>Dallas, TX I-30 R.L. Thornton</i>															
(1996)	1	4	64	1,041	1,197	2,494	7,253	7,749	139	2,089	2,382	4,886	19,675	21,143	3.0

Sources: Turnbull (1992a), Stockton et al. (1997).

Notes: N/A - information not available.

-- Information not applicable.

Alphabetization is by state/province.

TABLE 9.6 Peak hour subway and commuter rail passenger volumes (Manhattan CBD cordon counts 8:00 a.m. to 9:00 a.m. on a fall business day)

Facility And Year	Subway Cars		Passengers	Floor Space (Sq. Ft.)	Floor Space/ Passenger
	Trains	Or Coaches			
Subways					
IRT Lexington Ave. Express (1996)	23	230	33,644	103,730	3.1
IRT Lexington Ave. Local (1996)	23	230	27,308	103,730	3.8
BMT Manhattan Bridge (1995)	26	220	25,574	132,440	5.2
IND Cranberry Tunnel (1995)	28	238	35,058	143,276	4.1
IND 53rd Street Tunnel (1995)	27	238	43,491	178,500	4.1
PATH Downtown Tunnel (1996)	33	248	18,460	107,932	5.8
Commuter Rail					
LIRR/Amtrak Tunnels (1995)	38	372	38,730	316,200	8.2
MNRR Tunnel, Amtrak (1995)	50	379	34,848	322,150	9.2
NJ Transit/Amtrak Tunnel (1996)	16	162	13,267	137,700	10.4

Source: New York MTC, annual cordon counts of passengers and vehicles entering Manhattan Central Business District (south of 60th Street).

TABLE 9.7 Peak hour bus passenger volumes (Manhattan CBD cordon counts 8:00 a.m. to 9:00 a.m. on a fall business day)

Roadway	Entering Passengers 8:00 a.m. - 9:00 a.m. (1996)
<i>From North</i>	
York Ave.	1,310
Second Ave.	1,654
Lexington Ave.	1,344
Fifth Ave.	3,193
Broadway	1,583
Columbus Ave.	463
West End Ave.	322
<i>From Brooklyn</i>	
Williamsburg Bridge	68
Manhattan Bridge	102
Brooklyn Battery Tunnel	5,425
<i>From Queens</i>	
Queens Midtown Tunnel	5,180
Queensboro Bridge	570
Holland Tunnel	2,533
Lincoln Tunnel	32,118
TOTALS	55,865

Source: NY MTC, annual cordon counts of passengers and vehicles entering Manhattan Central Business District (south of 60th Street).

TABLE 9.8 Recent usage characteristics of commuter rail lines

Location	Riders/Day
<i>Los Angeles (2000)</i>	
Ventura Line	3,929
Antelope Valley Line	4,696
San Bernardino Line	9,017
Riverside Line	4,501
Orange County Line	5,672
Inland Empire Line	2,040
TOTALS	29,855
<i>Boston (1999)</i>	
Rockport Line	7,170
Ipswich Branch	7,680
Haverhill Line	9,240
Lowell Line	8,610
Fitchburg Line	8,990
Attleborough/Stoughton	25,600
Framingham/Worcester	14,700
Needham Line	8,680
Franklin Line	14,750
Fairmount Line	1,330
Middleborough/Lakeville	6,180
Plymouth/Kingston	7,000
TOTALS	119,930

Sources: Los Angeles MTA and Boston MTA.

**TABLE 9.9 Peak-hour passenger volumes on streetcar and light rail systems
(one-way in peak direction)**

Study Area	Location	Year	Trains Per Hour	Cars Per Hour	Persons Per Hour	Passengers	
						Per Train	Per Car
<i>On Street</i>							
Pittsburgh	Smithfield Street	1976	51	51	3,800	74	74
San Francisco	Market Street (before subway)	1977	68	68	4,900	72	72
<i>In Tunnel or Off Street</i>							
Boston	Green Line - Boylston	1985	45	85	10,600	235	125
	Green Line - Lechmere	1985	12	12	1,600	135	135
Cleveland	Shaker Hts.	1976	30a	60a	4,400	143	73
Newark	City Subway	1978	30	30	1,500	50	50
Philadelphia	Market Street	1976	73	73	3,700	51	51
San Diego	LRT	1981	3	6	600	200	100
San Francisco	Market Street	1983	N/A	62	6,340	109	102

Source: Transportation Research Board, Highway Capacity Manual, Special Report 209, 1985 p. 12-16; Massachusetts Bay Transportation Authority (1988 "Characteristics of Transportation Demand").

Note: a Estimated.

TABLE 9.10 CBD pedestrian trip rates

Type Of Use	Location	Gross Floor Space (Sq. Ft.)	Hours	Destinations Or Arrivals/1,000 (Sq. Ft.)	Source
<i>Urban Office Buildings</i>					
Mixed Use	Manhattan	314,000	24	8.7	(1)
Headquarters	Manhattan	1,634,000	24	7.1	(1)
Headquarters	Manhattan	1,048,000	24	6.6	(1)
24 Buildings	Seattle	5,241,000	24	7.7	(1)
40 Westminster (general)	Providence	286,000	7 a.m. - 6 p.m.	10.3	(2)
Industrial Ntl. Bank (general)	Providence	350,000	7 a.m. - 6 p.m.	13.7	(2)
Hosp. Trust (general)	Providence	538,000	7 a.m. - 6 p.m.	13.1	(2)
Providence Journal (specialized)	Providence	162,000	7 a.m. - 6 p.m.	14.2	(2)
State Capitol	Providence	146,000	7 a.m. - 5 p.m.	8.9	(2)
Steven Office Bldgs.	Downtown Boston	11,600,000	7 a.m. - 6 p.m.	7.5(a)	(3)
<i>Restaurants</i>					
Cafeteria	57th Street	7,200	10 a.m. - 8 p.m.	246.0	(1)
Sandwich Shop	Garment District	1,000	6 a.m. - 3 p.m. (b)	215.0	(1)
Restaurant	Times Square	12,000	9 a.m. - 9 p.m.	86.5	(1)
<i>Urban Retail Stores</i>					
Delicatessen	Manhattan	2,500	10 a.m. - 10 p.m. (c)	1,230.0	(1)
Supermarket	Staten Island	7,500	9 a.m. - 9 p.m.	142.5	(1)
Supermarket	Manhattan	5,100	9 a.m. - 6 p.m. (c)	254.5	(1)
Supermarket	Manhattan	14,500	9 a.m. - 9 p.m. (b)	186.5	(1)
Junior Dept. Store	Manhattan	69,600	9 a.m. - 9 p.m. (b)	192.5	(1)
Dept. Store	Manhattan	176,700	9 a.m. - 9 p.m. (b)	126.0	(1)
Boutique	Manhattan	3,400	11 a.m. - 7 p.m. (b)	102.5	(1)
Dept. Store	Providence	431,000	8:45 a.m. - 6 p.m. (b)	244.0	(1)
Dept. Store	Boston	792,000	7 a.m. - 6 p.m.	18.3	(1)
Hotel	Boston	644,000	7 a.m. - 6 p.m.	4.3	(2)

Source: Reprinted from 1988 "Characteristics of Urban Transportation Demand: An Update."

Original Sources:

- 1) Pushkarev, B., and Zupan, J. Urban Space for Pedestrians, a Report of the Regional Plan Association, MIT Press, Cambridge, MA, 1975.
- 2) Downtown Providence Traffic Circulation and Development Study, Wilbur Smith and Associates, New Haven, CT, 1978.
- 3) Final Report: An Access Oriented Parking Strategy for the Boston Metropolitan Area, Wilbur Smith and Associates, New Haven, CT, 1972.

TABLE 9.11 Heavy rail transit ridership report (estimated unlinked transit passenger trips)

Urbanized Area/Location	Transit Agency	1996 Annual Trips (000s)
Atlanta, GA	Metro Atlanta Rapid Tr. Authority	89,748
Baltimore, MD	Mass Transit Adm. Of Maryland	12,250
Boston, MA	Massachusetts Bay Trp. Auth	118,074
Chicago, IL	Chicago Transit Authority	124,053
Cleveland, OH	Greater Cleveland Reg. TA	5,140
Los Angeles, CA	Los Angeles County MTA	8,481
Miami, FL	Metro-Dade Transit Agency	14,245
New York, NY	MTA New York City Transit	1,251,199
New York, NY	MTA Staten Island Railway	4,897
New York, NY	Port Authority of NY&NJ	66,662
Philadelphia, PA	Port Authority Transit Corp.	10,707
Philadelphia, PA	Southeastern Pennsylvania TA	90,788
San Francisco, CA	San Francisco Bay Area RTD	78,598
Washington, DC	Washington Metro Area TA	192,529
Reported Total		2,067,370
Projected Total (includes missing agencies)		2,067,370

Source: American Public Transit Association, July 1997.

TABLE 9.12 Commuter rail transit ridership report (estimated unlinked transit passenger trips)

Urbanized Area/Location	Transit Agency	1996 Annual Trips (000s)
Baltimore, MD	Mass Transit Adm. Of Maryland	4,609
Boston, MA	Massachusetts Bay Trp. Auth	27,533
Chicago, IL	Chicago Transit Authority	73,366
Chicago, IL	Northern IN Commuter TD	3,317
Los Angeles, CA	Southern California RRA	5,688
Miami, FL	Tri-Cnty Commuter Rail Auth	2,301
New Haven, CT	Connecticut DOT	308
New York, NY	MTA Long Island Rail Road	98,804
New York, NY	New Jersey Transit Corp.	48,008
Philadelphia, PA	Pennsylvania DOT	156
Philadelphia, PA	Southeastern Pennsylvania TA	22,655
San Francisco, CA	San Francisco Bay Area RTD	7,765
Washington, DC	Virginia Railway Express	1,827
Reported Total		296,338
Projected Total (includes missing agencies)		361,532

Source: American Public Transit Association, July 1997.

TABLE 9.13 Light rail transit ridership report (estimated unlinked transit passenger trips)

Urbanized Area/Location	Transit Agency	1996 Annual Trips (000s)
Baltimore, MD	Mass Transit Adm. Of Maryland	6,747
Boston, MA	Massachusetts Bay Trp. Auth	73,301
Buffalo, NY	Niagara Frontier Transp. Authority	6,812
Cleveland, OH	Greater Cleveland Reg. TA	3,847
Dallas, TX	Dallas Area Rapid Transit	2,534
Denver, CO	Regional Transportation Dist.	4,109
Los Angeles, CA	Los Angeles County MTA	19,279
Memphis, TN	Memphis Area Transit Auth	504
New York, NY	New Jersey Transit Corp.	4,161
Philadelphia, PA	Southeastern Pennsylvania TA	19,472
Pittsburgh, PA	Port Authority of Allegheny County	7,450
Portland, OR	Tri-County Metro Transp. Dist.	9,243
Sacramento, CA	Sacramento Regional Tr Dist	7,704
Saint Louis, MO	Bi-State Development Agency	13,860
San Diego, CA	San Diego Trolley	17,220
San Jose, CA	Santa Clara County Transp. Auth	6,535
Seattle, WA	King County DOT	467
Reported Total		203,245
Projected Total (includes missing agencies)		269,479

Source: American Public Transit Association, July 1997.