

Appendix I

Modeling Summary Results



In addition to the illustrative scenarios that were discussed in Chapter 7, project-level analysis was also completed for enhancement and expansion projects. The results of this project-level analysis are reported in this appendix. In addition to the projects included in the illustrative scenarios, this appendix also lists some projects that were not in any of the scenarios but were discussed in Chapter 6. There are a few projects that are not included in this appendix because, for the most part, they either have not entered the conceptual planning process or are still in the very early stages of that process.

**TABLE I-1
Results of Individual Project Modeling: Ridership**

PROJECTS	CORRIDOR	CHANGE IN TRANSIT RIDERSHIP						REDUC- TION IN TRANSIT TRANSFERS	DIVERSIONS FROM AUTO MODE		INCREASE IN TRANSIT MODE SHARE		TRAVEL TIME SAVINGS		REDUCTION IN VMT	
		LINKED TRIPS			UNLINKED TRIPS				Low	High	Low	High	Low	High	Low	High
		Low	High	Low	High	Low	High		Low	High	Low	High	Low	High	Low	High
Route 1 BRT: Harvard-Dudley	Northwest	3,000	4,000	4,500	6,000	3,000	4,000	N	3,000	4,000	.018%	.024%	2,400	3,200	15,600	20,800
Route 22 BRT: Ashmont-Ruggles	Circumfer- ential	1,900	2,600	2,850	3,900	1,900	2,600	N	1,900	2,600	.012%	.016%	1,500	2,100	9,880	13,520
Route 31 BRT: Mattapan-Forest Hills	Southwest	400	600	600	900	400	600	N	400	600	.002%	.004%	300	500	2,080	3,120
Route 32 BRT: Wolcott Sq.-Forest Hills	Southwest	900	1,200	1,350	1,800	900	1,200	N	900	1,200	.005%	.007%	700	1,000	4,680	6,240
Route 39 BRT: Forest Hills-Back Bay	Southwest	1,600	2,200	2,400	3,300	1,600	2,200	N	1,600	2,200	.010%	.013%	1,300	1,800	8,320	11,440
Route 57 BRT: Watertown-Kenmore	West	1,800	2,400	2,700	3,600	1,800	2,400	N	1,800	2,400	.011%	.015%	1,400	1,900	9,360	12,480
Route 66 BRT: Harvard-Dudley	Circumfer- ential	2,900	3,900	4,350	5,850	2,900	3,900	N	2,900	3,900	.018%	.024%	2,300	3,100	15,080	20,280
Route 71 BRT: Watertown Sq.-Harvard	Northwest	700	1,000	1,050	1,500	700	1,000	N	700	1,000	.004%	.006%	600	800	3,640	5,200
Route 73 BRT: Waverley-Harvard	Northwest	600	900	900	1,350	600	900	N	600	900	.004%	.005%	500	700	3,120	4,680
Route 77 BRT: Arlington Hights.-Harvard	Northwest	2,100	2,800	3,150	4,200	2,100	2,800	N	2,100	2,800	.013%	.017%	1,700	2,200	10,920	14,560
Route 111 BRT: Woodlawn-Haymarket	Northeast	1,900	2,600	2,850	3,900	1,900	2,600	N	1,900	2,600	.012%	.016%	1,500	2,100	9,880	13,520
Alewife access busways	Northwest	300	500	1,000	1,300	240	400	N	240	400	.002%	.003%	30	50	1,600	2,200
1000 New Park-and-Ride Spaces	Systemwide	300	400	450	600	300	400	N	300	400	.002%	.002%	180	240	6,360	8,480
Assembly Sq. Orange Line Station	North	2,100	2,900	2,700	3,800	2,100	2,900	Y	2,100	2,900	.013%	.018%	400	500	8,820	15,080
Improved Orange Line Frequencies	North	900	1,200	3,600	4,900	900	1,200	N	900	1,200	.005%	.007%	900	1,300	4,680	6,240
Yawkey Station upgrade	West	30	40	130	170	30	40	N	30	40	nm*	nm*	nm*	nm*	276	368
Ruggles Station expansion	Southwest	260	350	1,300	1,800	220	290	N	220	290	.002%	.002%	300	400	2,024	2,668
Fitchburg Line I improvements	Northwest	300	500	1,300	1,700	540	720	N	540	720	.002%	.003%	900	1,200	7,700	10,200
Worcester Line Service Improvements	West	400	600	1,000	1,300	420	540	N	420	540	.002%	.004%	440	660	6,000	7,700

Enhancement Scenario

**TABLE I-1 (cont.)
Results of Individual Project Modeling: Ridership**

PROJECTS	CORRIDOR	CHANGE IN TRANSIT RIDERSHIP						REDUC- TION IN	INCREASE IN TRANSIT MODE SHARE		TRAVEL TIME SAVINGS		REDUCTION IN VMT		
		LINKED TRIPS			UNLINKED TRIPS				Yes/No	Low	High	Low	High	Low	High
		Low	High	Low	High	Low	High								
Fairmount Line improvements	Southwest	100	200	2,300	3,000	100	200	Y	.001%	.001%	330	430	520	1,040	
Green Line to Medford	Northwest	6,500	8,900	-1,400	-1,800	5,300	7,100	Y	.039%	.054%	6,800	9,200	22,600	30,600	
Urban Ring	Circumfer- ential	42,500	57,500	112,500	152,100	30,400	41,200	Y	.258%	.349%	21,300	28,800	127,680	173,040	
Blue Line extension	Northeast	3,400	4,600	6,800	9,200	3,400	4,600	N	.021%	.028%	3,100	4,300	40,800	55,200	
Silver Line Phase III	Central	15,800	21,400	43,400	58,800	8,500	11,500	N*	.096%	.130%	14,600	19,800	61,300	82,800	
Dudley South BRT Extension	Southeast	1,400	1,800	-11,600	-15,900	1,400	1,800	Y	.008%	.011%	1,100	1,400	7,280	9,360	
Nashua/Manchester extension	North	6,300	8,500	7,000	9,500	6,300	8,500	N	.038%	.052%	570	770	121,900	164,900	
Platow extension	North	2,700	3,600	3,400	4,600	2,400	3,300	N	.016%	.022%	320	430	54,800	74,100	
T. F. Green extension	Southwest	800	1,000	1,300	1,800	800	1,000	N	.005%	.006%	310	420	8,900	12,000	
Red-Blue connector	Central	**	**	**	**	**	**	**	**	**	**	**	**	**	
South Coast Rail	Southwest	***	***	***	***	***	***	***	***	***	***	***	***	***	
North-South Rail Link	Central	44,900	60,700	95,300	128,900	40,500	54,900	Y	.272%	.368%	38,100	51,600	369,100	499,400	
Commuter rail to Gardner	Northwest	**	**	**	**	**	**	**	**	**	**	**	**	**	
Green Line to Needham	West	1,000	1,400	6,900	9,400	900	1,200	Y	.006%	.008%	48	65	4,417	5,975	
Commuter rail to Wareham	Southeast	2,800	3,700	3,100	4,100	2,800	3,700	N	.017%	.022%	tbd	tbd	90,340	122,225	
Commuter rail electrification	Systemwide	8,900	12,100	21,300	28,800	8,900	12,100	N	.054%	.073%	9,700	13,100	11,130	15,060	

* Not meaningful

** New analysis in progress

*** Analysis ongoing – preferred alternative not yet selected

Expansion Scenario

Other Projects

**TABLE I-2
Results of Individual Project Modeling: Air Quality**

PROJECTS	CORRIDOR	REDUCTION IN KILO-GRAMS OF CO ₂ (TRANSIT + AUTO)		REDUCTION IN KILO-GRAMS OF CO (TRANSIT + AUTO)		REDUCTION IN KILO-GRAMS OF VOC (TRANSIT + AUTO)		REDUCTION IN KILO-GRAMS OF NO _x (TRANSIT + AUTO)		REDUCTION IN KILOGRAMS OF PM ₁₀ (TRANSIT + AUTO)		REDUCTION IN KILO-GRAMS OF PM _{2.5} (TRANSIT + AUTO)	
		Low	High	Low	High	Low	High	Low	High	Low	High	Low	High
Route 1 BRT: Harvard-Dudley	Northwest	8,883	11,844	46.8	62.4	3.09	4.12	2.36	3.14	0.43	0.57	0.20	0.26
Route 22 BRT: Ashmont-Ruggles	Circumferential	5,626	7,698	29.7	40.6	1.96	2.68	1.49	2.04	0.27	0.37	0.13	0.17
Route 31 BRT: Mattapan-Forest Hills	Southwest	1,184	1,777	6.2	9.4	0.41	0.62	0.31	0.47	0.06	0.09	0.03	0.04
Route 32 BRT: Wolcott Sq.-Forest Hills	Southwest	2,665	3,553	14.0	18.7	0.93	1.24	0.71	0.94	0.13	0.17	0.06	0.08
Route 39 BRT: Forest Hills-Back Bay	Southwest	4,737	6,514	25.0	34.3	1.65	2.27	1.26	1.73	0.23	0.31	0.11	0.15
Route 57 BRT: Watertown-Kenmore	West	5,330	7,100	28.1	37.5	1.85	2.47	1.41	1.88	0.26	0.34	0.12	0.16
Route 66 BRT: Harvard-Dudley	Circumferential	8,587	11,547	45.3	60.9	2.99	4.02	2.28	3.06	0.41	0.56	0.19	0.26
Route 71 BRT: Watertown Sq.-Harvard	Northwest	2,073	2,961	10.9	15.6	0.72	1.03	0.55	0.79	0.10	0.14	0.05	0.07
Route 73 BRT: Waverley-Harvard	Northwest	1,777	2,665	9.4	14.0	0.62	0.93	0.47	0.71	0.09	0.13	0.04	0.06
Route 77 BRT: Arlington Heights.-Harvard	Northwest	6,218	8,290	32.8	43.7	2.16	2.88	1.65	2.20	0.30	0.40	0.14	0.18
Route 111 BRT: Woodlawn-Haymarket	Northeast	5,626	7,698	29.7	40.6	1.96	2.68	1.49	2.04	0.27	0.37	0.13	0.17
Alewife access busways	Northwest	911	1,253	4.8	6.6	0.32	0.44	0.24	0.33	0.04	0.06	0.02	0.03
1000 New Park-and-Ride Spaces	Systemwide	3,621	4,829	19.1	25.5	1.26	1.68	0.96	1.28	0.17	0.23	0.08	0.11
Assembly Sq. Orange Line Station	North	5,022	8,587	26.5	45.3	1.73	2.99	1.33	2.28	0.24	0.41	0.11	0.19
Improved Orange Line Frequencies	North	2,665	3,553	14.0	18.7	0.93	1.24	0.71	0.94	0.13	0.17	0.06	0.08
Yawkey Station upgrade	West	157	210	0.8	1.1	0.05	0.07	0.04	0.06	0.01	0.01	nm	nm
Ruggles Station expansion	Southwest	1,152	1,519	6.1	8.0	0.40	0.53	0.31	0.40	0.06	0.07	0.03	0.03
Fitchburg Line Improvements	Northwest	4,384	5,808	23.1	30.0	1.52	2.02	1.16	1.54	0.21	0.28	0.10	0.13
Worcester Line Service Improvements	West	3,416	4,384	18.0	23.1	1.19	1.52	0.91	1.16	0.16	0.21	0.08	0.10

Enhancement Scenario

**TABLE I-2 (cont.)
Results of Individual Project Modeling: Air Quality**

PROJECTS	CORRIDOR	REDUCTION IN KILO-GRAMS OF CO ₂ (TRANSIT + AUTO)		REDUCTION IN KILO-GRAMS OF CO (TRANSIT + AUTO)		REDUCTION IN KILO-GRAMS OF VOC (TRANSIT + AUTO)		REDUCTION IN KILO-GRAMS OF NO _x (TRANSIT + AUTO)		REDUCTION IN KILOGRAMS OF PM ₁₀ (TRANSIT + AUTO)		REDUCTION IN KILO-GRAMS OF PM _{2.5} (TRANSIT + AUTO)	
		Low	High	Low	High	Low	High	Low	High	Low	High	Low	High
Expansion Scenario													
Fairmount Line improvements	Southwest	298	592	1.6	3.1	0.10	0.20	0.08	0.16	0.01	0.03	0.01	0.01
Green Line to Medford	Northwest	12,900	16,400	190.6	256.5	5.95	8.05	3.40	4.60	0.60	0.81	0.30	0.40
Urban Ring	Circumferential	72,701	98,529	383.2	519.3	25.28	34.26	19.28	26.13	3.50	4.74	1.62	2.20
Blue Line extension	Northeast	23,232	43,431	122.4	165.7	85.08	10.93	6.16	8.34	1.12	1.51	0.52	0.70
Silver Line Phase III	Central	34,847	47,146	183.7	248.5	12.12	16.39	9.24	12.50	1.68	2.27	0.78	1.05
Dudley South BRT Extension	Southeast	4,145	5,330	21.9	28.1	1.44	1.85	1.10	1.41	0.20	0.26	0.09	0.12
Nashua/Manchester extension	North	61,864	83,698	992.8	1343.2	21.55	29.15	-16.10	-11.90	2.86	3.86	1.08	1.46
Plastow extension	North	29,458	39,856	450.5	609.5	9.86	13.34	1.19	1.61	1.39	1.89	0.59	0.79
T. F. Green extension	Southwest	1,851	2,504	63.7	86.1	1.22	1.60	-19.55	-14.45	-0.02	-0.02	-0.18	-0.14
Red-Blue connector	Central	**	**	**	**	**	**	**	**	**	**	**	**
South Coast Rail	Southwest	***	***	***	***	***	***	***	***	***	***	***	***
Other Projects													
North-South Rail Link	Central	210,200	284,400	3069.4	4152.7	67.15	90.85	52.70	70.30	5.10	6.90	10.20	13.80
Commuter rail to Gardner	Northwest	**	**	**	**	**	**	**	**	**	**	**	**
Green Line to Needham	West	2,515	3,403	36.6	49.5	0.85	1.15	0.85	1.15	nm*	nm*	nm*	nm*
Commuter rail to Wareham	Southeast	39,000	52,800	703.00	951.00	15.00	20.20	-64.90	-47.90	1.48	2.00	0.18	0.24
Commuter rail electrification	Systemwide	7,539	10,200	1544.0	2089.0	368.10	498.00	6487.35	8777.00	34.71	46.95	33.51	45.33

* Not meaningful

** New analysis in progress

*** Analysis ongoing – preferred alternative not yet selected