

Inbound Framingham/Worcester Line EMU times per Alon Levy, infill stations omitted, full high platforms at all stations

km	station	time from prev (s)	station time (s)	total time (s)	time with 7% pad	minute	current P512	savings
71.3	Worcester Union			0				
68.8	Biotech Park	103	55	158	169.06	3	infill	infill
58.7	Grafton	276	72	506	541.42	10	13	3
51.5	Westborough	166	75	747	799.29	14	17	3
44.2	Southborough	172	68	987	1056.09	18	26	8
39.0	Ashland	144	65	1196	1279.72	22	30	8
34.3	Framingham	131	67	1394	1491.58	25	41	16
32.1	West Natick	57	68	1519	1625.33	28	46	18
28.5	Natick Center	93	68	1680	1797.6	30	51	21
23.8	Wellesley Square	121	63	1864	1994.48	34	56	22
21.8	Wellesley Hills	66	58	1988	2127.16	36	60	24
20.3	Wellesley Farms	49	64	2101	2248.07	38	63	25
16.9	Auburndale	88	67	2256	2413.92	41	68	27
15.2	West Newton	47	65	2368	2533.76	43	71	28
13.3	Newtonville	53	65	2486	2660.02	45	74	29
7.5	Boston Landing	175	55	2716	2906.12	49	79	30
6.2	West Station	47	55	2818	3015.26	51	infill	infill
4.0	Yawkey	80	55	2953	3159.71	53	84	31
2.1	Back Bay	99	55	3107	3324.49	56	89	33
0	South Station	98	0	3205	3429.35	58	94	36
			25s dwell at each stop; remaining time is acceleration penalty if I understand Alon correctly					

Simulated 90th %ile passenger loading, 8/8/4 tph, zone express, based on 2018 CTPS boardings

Train ID	X300	X308	X315	X323	X330	X338	X345	X353	X360	X368	X375	X383	X390	X398	X405	X413	X420	X425	X435	X440	X450	X455	X465	X470	X480	X485	X495	X500	X510
depart WUS		4:10		4:25		4:40		4:55		5:10		5:25		5:40		5:55		6:15		6:30		6:45		7:00		7:15		7:30	
depart FRA	4:27		4:42		4:57		5:12		5:27		5:42		5:57		6:12		6:27		6:37		6:57		7:12		7:27		7:42		7:57
Worcester Union		0		0		0		0		14		28		34		28		50		54		57		58		66		97	
Grafton		0		0		0		0		20		40		47		39		91		95		99		101		115		159	
Westborough		0		0		0		0		23		51		62		51		124		131		148		162		187		279	
Southborough		0		0		0		0		29		62		78		63		152		161		187		209		236		351	
Ashland		0		0		0		0		34		80		112		89		200		212		236		258		295		460	
Framingham	0	0	0	0	0	0	0	0	0	34	9	87	10	120	12	99	10	228	22	245	18	263	19	287	19	365	45	536	44
West Natick	0	0	0	0	0	0	0	0	0	35	26	101	35	141	38	111	16	277	54	305	33	285	39	322	38	399	79	618	86
Natick Center	0	0	0	0	0	0	0	0	0	35	29	104	46	152	52	118	23		62		67		74		93		145		193
Wellesley Square	0	0	0	0	0	0	0	0	0	35	30	106	47	153	53	122	37		76		98		102		131		193		259
Wellesley Hills	0	0	0	0	0	0	0	0	0	35	32	107	49	155	56	126	48		86		112		117		150		218		297
Wellesley Farms	0	0	0	0	0	0	0	0	0	35	32	107	49	155	56	131	59		99		140		148		178		244		337
Auburndale	0	0	0	0	0	0	0	0	0	35	33	108	50	155	57	132	63		102		160		168		198		261		355
West Newton	0	0	0	0	0	0	0	0	0	35	33	108	50	155	57	132	67		106		177		185		223		292		382
Newtonville	0	0	0	0	0	0	0	0	0	35	35	110	54	157	59	137	76		116		199		210		261		345		429
Boston Landing	0	0	0	0	0	0	0	0	0	35	35	110	54	157	59	140	79	284	119	311	205	297	217	335	266	416	356	637	439
Yawkey	0	0	0	0	0	0	0	0	0	35	35	110	54	157	59	140	79	284	119	311	205	297	217	335	266	416	356	637	439
Back Bay	0	0	0	0	0	0	0	0	0	35	35	110	54	157	59	140	79	284	119	311	205	297	217	335	266	416	356	637	439
Arrive South Sta.	5:00	5:08	5:15	5:23	5:30	5:38	5:45	5:53	6:00	6:08	6:15	6:23	6:30	6:38	6:45	6:53	7:00	7:05	7:10	7:20	7:30	7:35	7:45	7:50	8:00	8:05	8:15	8:20	8:30
Units required	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	2	1	2	1	2	1	2	2	2	2	3	2

Train ID	X515	X525	X530	X540	X545	X555	X560	X570	X585	X600	X615	X630	X645	X660	X675	X690	X705	X720	X735	X750	X765	X780	X795	X810	X825	X840	X855	X870	X885
depart WUS	7:45		8:00		8:15		8:30		8:47		9:17		9:47		10:17		10:47		11:17		11:47		12:17		12:47		13:17		13:47
depart FRA		8:12		8:27		8:42		8:57		9:27		9:57		10:27		10:57		11:27		11:57		12:27		12:57		13:27		13:57	
Worcester Union	98		83		60		96		113		48		27		27		25		22		22		24		24		15		0
Grafton	159		106		76		123		146		61		34		34		31		25		26		28		27		18		0
Westborough	280		154		99		162		191		79		44		44		38		27		28		31		32		20		0
Southborough	355		175		107		174		206		86		52		51		43		30		30		33		34		22		0
Ashland	461		247		177		270		267		107		60		59		50		32		33		35		38		23		0
Framingham	555	65	295	14	197	14	292	32	289	25	121	8	65	8	65	8	55	5	35	4	36	4	39	7	44	8	29	2	0
West Natick	626	94	324	26	220	26	312	59	310	46	132	13	69	12	70	13	60	8	37	7	37	6	40	10	46	11	32	3	0
Natick Center		220		53		52		79	324	62	141	17	72	16	74	17	63	10	38	8	38	8	41	12	48	13	34	3	0
Wellesley Square		295		73		72		100	347	86	154	21	76	21	77	22	67	14	41	11	41	11	44	14	50	16	37	4	0
Wellesley Hills		338		80		80		109	355	94	160	23	78	23	79	24	69	16	44	14	44	14	47	16	51	17	37	4	0
Wellesley Farms		382		88		87		115	359	99	162	25	79	25	80	25	70	17	44	14	44	14	47	16	51	17	37	4	0
Auburndale		399		106		105		124	363	102	164	26	81	26	82	27	72	17	44	14	44	15	48	16	52	17	38	4	0
West Newton		421		128		128		137	370	110	168	26	81	27	83	28	72	18	45	15	45	15	48	17	52	17	38	4	0
Newtonville		458		164		164		158	378	117	174	29	85	30	85	30	76	19	45	15	45	15	48	18	54	19	40	5	0
Boston Landing	679	507	365	171	231	169	324	172	387	127	179	31	86	32	86	30	76	19	45	15	45	15	48	18	54	19	40	5	0
Yawkey	679	507	365	171	231	169	324	172	387	127	179	31	86	32	86	30	76	19	45	15	45	15	48	18	54	19	40	5	0
Back Bay	679	507	365	171	231	169	324	172	387	127	179	31	86	32	86	30	76	19	45	15	45	15	48	18	54	19	40	5	0
Arrive South Sta.	8:35	8:45	8:50	9:00	9:05	9:15	9:20	9:30	9:45	10:00	10:15	10:30	10:45	11:00	11:15	11:30	11:45	12:00	12:15	12:30	12:45	13:00	13:15	13:30	13:45	14:00	14:15	14:30	14:45
Units required	3	2	2	1	1	1	2	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0

Simulated 90th %ile passenger loading, 6/6/4 tph, zone express, based on 2018 CTPS boardings

	X300	X310	X320	X330	X340	X350	X360	X370	X380	X390	X400	X410	X420	X428	X440	X448	X460	X468	X480	X488	X500	X508	X520	X528
depart WUS		4:12		4:32		4:52		5:12		5:32		5:52		6:18		6:38		6:58		7:18		7:38		7:58
depart FRA	4:27		4:47		5:07		5:27		5:47		6:07		6:27		6:47		7:07		7:27		7:47		8:07	
Worcester Union		0		0		0		22		44		42		68		72		76		106		127		105
Grafton		0		0		0		32		60		60		125		128		132		176		208		144
Westborough		0		0		0		39		79		78		173		185		213		297		365		206
Southborough		0		0		0		49		98		97		211		231		277		382		464		239
Ashland		0		0		0		58		139		138		274		297		340		486		604		343
Framingham	0	0	0	0	0	0	0	62	11	149	13	151	17	314	32	331	28	376	36	574	68	694	97	420
West Natick	0	0	0	0	0	0	0	72	33	176	46	172	34	385	83	360	55	419	64	631	135	791	147	460
Natick Center	0	0	0	0	0	0	0	74	38	191	63	184	42		110		101		137		223		314	
Wellesley Square	0	0	0	0	0	0	0	75	40	193	66	189	60		138		139		190		285		423	
Wellesley Hills	0	0	0	0	0	0	0	76	42	197	69	194	73		154		161		220		320		483	
Wellesley Farms	0	0	0	0	0	0	0	76	42	197	69	197	88		183		200		259		356		548	
Auburndale	0	0	0	0	0	0	0	77	43	197	69	199	93		197		226		284		379		570	
West Newton	0	0	0	0	0	0	0	77	43	197	70	200	98		210		249		317		419		600	
Newtonville	0	0	0	0	0	0	0	78	46	199	73	205	109		232		282		371		485		649	
Boston Landing	0	0	0	0	0	0	0	78	46	199	73	207	116	393	237	375	292	433	384	655	502	819	718	515
Yawkey	0	0	0	0	0	0	0	78	46	199	73	207	116	393	237	375	292	433	384	655	502	819	718	515
Back Bay	0	0	0	0	0	0	0	78	46	199	73	207	116	393	237	375	292	433	384	655	502	819	718	515
Arrive South Sta.	5:00	5:10	5:20	5:30	5:40	5:50	6:00	6:10	6:20	6:30	6:40	6:50	7:00	7:08	7:20	7:28	7:40	7:48	8:00	8:08	8:20	8:28	8:40	8:48
290-pax EMUs	0	0	0	0	0	0	0	1	1	1	1	1	1	2	1	2	2	2	2	3	2	3	3	2

	X540	X548	X560	X575	X590	X605	X620	X635	X650	X665	X680	X695	X710	X725	X740	X755	X770	X785	X800	X815	X830	X845	X860	X875
depart WUS		8:18		8:37		9:07		9:37		10:07		10:37		11:07		11:37		12:07		12:37		13:07		13:37
depart FRA	8:27		8:47		9:17		9:47		10:17		10:47		11:17		11:47		12:17		12:47		13:17		13:47	
Worcester Union		101		111		77		27		27		28		22		22		23		24		22		0
Grafton		130		142		97		35		35		35		25		26		26		28		26		0
Westborough		171		189		126		44		44		44		27		29		28		33		30		0
Southborough		185		205		138		50		51		51		30		31		31		35		32		0
Ashland		308		274		178		59		59		58		32		33		34		37		34		0
Framingham	21	334	37	297	24	199	11	64	8	65	8	64	8	35	4	36	4	36	5	44	8	40	7	0
West Natick	40	362	72	318	46	219	17	69	12	70	13	68	12	37	7	38	7	37	7	46	11	43	10	0
Natick Center	75		97	333	61	233	22	73	16	72	17	71	16	38	8	39	8	38	9	48	13	45	11	0
Wellesley Square	101		117	357	85	257	30	76	21	76	21	75	20	41	11	42	11	41	12	51	16	48	14	0
Wellesley Hills	113		124	365	94	266	33	78	23	79	24	78	22	44	14	45	14	44	15	51	17	48	15	0
Wellesley Farms	121		131	369	99	270	35	80	24	80	25	80	23	44	14	45	14	44	15	52	17	48	15	0
Auburndale	144		150	373	102	273	36	81	26	81	26	81	25	45	15	45	14	45	16	52	17	49	15	0
West Newton	173		171	383	111	281	37	82	26	82	27	81	25	45	16	46	15	46	16	52	17	49	15	0
Newtonville	222		206	393	120	289	41	84	29	84	30	84	28	45	16	46	15	46	16	55	19	51	17	0
Boston Landing	232	375	225	402	129	298	43	86	31	87	30	84	28	45	16	46	15	46	16	55	19	51	17	0
Yawkey	232	375	225	402	129	298	43	86	31	87	30	84	28	45	16	46	15	46	16	55	19	51	17	0
Back Bay	232	375	225	402	129	298	43	86	31	87	30	84	28	45	16	46	15	46	16	55	19	51	17	0
Arrive South Sta.	9:00	9:08	9:20	9:35	9:50	10:05	10:20	10:35	10:50	11:05	11:20	11:35	11:50	12:05	12:20	12:35	12:50	13:05	13:20	13:35	13:50	14:05	14:20	14:35
290-pax EMUs	1	2	1	2	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0

Equipment required for zone express service with 6 tph peak and 4 tph off-peak (based on 2018 loading and 290-seat EMUs)

Train	from	plt	departs	transit	to	plt	arrives	layover	becomes	units	equipment	notes
												<u>Equipment used in Framingham-Boston service</u>
X300	FRA		4:27	33m	BOS	1	5:00	12m	Y312	2	M001+M002	Stored overnight at Nevins
Y312	BOS	1	5:12	33m	FRA		5:45	22m	X400	2	M001+M002	
X320	FRA		4:47	33m	BOS	1	5:20	12m	Y332	3	M003+M004+M005	Stored overnight at Nevins
Y332	BOS	1	5:32	33m	FRA		6:05	22m	X420	3	M003+M004+M005	
X340	FRA		5:07	33m	BOS	1	5:40	12m	Y352	1	M006	Stored overnight at Nevins
Y352	BOS	1	5:52	33m	FRA		6:25	22m	X440	1	M006	
X360	FRA		5:27	33m	BOS	1	6:00	12m	Y372	2	M007+M008	Stored overnight at Nevins
Y372	BOS	1	6:12	33m	FRA		6:45	22m	X460	2	M007+M008	
X380	FRA		5:47	33m	BOS	1	6:20	12m	Y392	2	M009+M010	Stored overnight at Nevins
Y392	BOS	1	6:32	33m	FRA		7:05	22m	X480	2	M009+M010	
X400	FRA		6:07	33m	BOS	1	6:40	12m	Y412	2	M001+M002	
Y412	BOS	1	6:52	33m	FRA		7:25	22m	X500	2	M001+M002	
X420	FRA		6:27	33m	BOS	1	7:00	12m	Y432	3	M003+M004+M005	
Y432	BOS	1	7:12	33m	FRA		7:45	22m	X520	3	M003+M004+M005	
X440	FRA		6:47	33m	BOS	1	7:20	12m	Y452	1	M006	
Y452	BOS	1	7:32	33m	FRA		8:05	22m	X540	1	M006	
X460	FRA		7:07	33m	BOS	1	7:40	12m	Y472	2	M007+M008	
Y472	BOS	1	7:52	33m	FRA		8:25	22m	X560	2	M007+M008	
X480	FRA		7:27	33m	BOS	1	8:00	12m	Y492	2	M009+M010	Stored midday at Southampton
Y492	BOS	1	8:12	33m	FRA		8:45		OOS	2	M009+M010	Riders served by Y482, Y502 Worcester locals
X500	FRA		7:47	33m	BOS	1	8:20	12m	Y512	2	M001+M002	
Y512	BOS	1	8:32	33m	FRA		9:05	12m	X590	2	M001+M002	
X520	FRA		8:07	33m	BOS	1	8:40	12m	Y532	3	M003+M004+M005	Break on platform; M004+M005 stored midday at Southampton

Train	from	plt	departs	transit	to	plt	arrives	layover	becomes	units	equipment	notes
Y532	BOS	1	8:52	33m	FRA		9:25	22m	X620	1	M003	
X540	FRA		8:27	33m	BOS	1	9:00	12m	OOS	1	M006	Stored midday at Southampton
Y552	BOS	4	9:12	33m	FRA		9:45		OOS	4	M006	Riders served by Y542, Y562 Worcester locals
X560	FRA		8:47	33m	BOS	1	9:20	12m	Y572	2	M007+M008	Break on platform; M008 becomes Y602 (42 minute layover)
Y572	BOS	1	9:32	33m	FRA		10:05	12m	X650	1	M007	
X590	FRA		9:17	33m	BOS	3	9:50	12m	OOS	2	M001+M002	Stored midday at Southampton
Y602	BOS	1	10:02	33m	FRA		10:35	12m	X680	1	M008	
X620	FRA		9:47	33m	BOS	1	10:20	12m	Y622	1	M003	
Y622	BOS	1	10:32	33m	FRA		11:05	12m	X710	1	M003	
X650	FRA		10:17	33m	BOS	1	10:50	12m	Y662	1	M007	
Y662	BOS	1	11:02	33m	FRA		11:35	12m	X740	1	M007	
X680	FRA		10:47	33m	BOS	1	11:20	12m	Y692	1	M008	
Y692	BOS	1	11:32	33m	FRA		12:05	12m	X770	1	M008	
X710	FRA		11:17	33m	BOS	1	11:50	12m	Y722	1	M003	
Y722	BOS	1	12:02	33m	FRA		12:35	12m	X800	1	M003	
X740	FRA		11:47	33m	BOS	1	12:20	12m	Y752	1	M007	
Y752	BOS	1	12:32	33m	FRA		13:05	12m	X830	1	M007	
X770	FRA		12:17	33m	BOS	1	12:50	12m	Y782	1	M008	
Y782	BOS	1	13:02	33m	FRA		13:35	12m	X860	1	M008	
X800	FRA		12:47	33m	BOS	1	13:20	12m	Y812	1	M003	
Y812	BOS	1	13:32	33m	FRA		14:05		evening	1	M003	
X830	FRA		13:17	33m	BOS	1	13:50	12m	Y842	1	M007	
Y842	BOS	1	14:02	33m	FRA		14:35		evening	1	M007	
X860	FRA		13:47	33m	BOS	1	14:20	12m	Y872	1	M008	
Y872	BOS	1	14:32	33m	FRA		15:05		evening	1	M008	
												10 units required to operate service

Train	from	plt	departs	transit	to	plt	arrives	layover	becomes	units	equipment	notes
												10 units stored overnight at Nevins, 7 units stored midday at Southampton
												<u>Equipment used in Worcester-Boston service</u>
X310	WUS		4:12	58m	BOS	2	5:10	14m	Y324	2	M011+M012	Run skipped to reduce storage requirements at Worcester
Y324	BOS	2	5:24	58m	WUS		6:22	16m	X448	2	M011+M012	Stored overnight at Readville
X330	WUS		4:32	58m	BOS	2	5:30	14m	Y344	2	M013+M014	Run skipped to reduce storage requirements at Worcester
Y344	BOS	2	5:44	58m	WUS		6:42	16m	X468	2	M013+M014	Stored overnight at Readville
X350	WUS		4:52	58m	BOS	2	5:50	14m	Y364	3	M015+M016+M017	Run skipped to reduce storage requirements at Worcester
Y364	BOS	2	6:04	58m	WUS		7:02	16m	X488	3	M015+M016+M017	Stored overnight at Readville
X370	WUS		5:12	58m	BOS	2	6:10	14m	Y384	3	M018+M019+M020	Stored overnight at Worcester
Y384	BOS	2	6:24	58m	WUS		7:22	16m	X508	3	M018+M019+M020	
X390	WUS		5:32	58m	BOS	2	6:30	14m	Y404	2	M021+M022	Stored overnight at Worcester
Y404	BOS	2	6:44	58m	WUS		7:42	16m	X528	2	M021+M022	
X410	WUS		5:52	58m	BOS	2	6:50	14m	Y424	2	M023+M024	Stored overnight at Worcester
Y424	BOS	2	7:04	58m	WUS		8:02	16m	X548	2	M023+M024	
X428	WUS		6:18	50m	BOS	2	7:08	14m	Y442	2	M025+M026	Stored overnight at Worcester
Y442	BOS	2	7:22	58m	WUS		8:20	17m	X575	2	M025+M026	
X448	WUS		6:38	50m	BOS	2	7:28	14m	Y462	2	M011+M012	
Y462	BOS	2	7:42	58m	WUS		8:40	27m	X605	2	M011+M012	
X468	WUS		6:58	50m	BOS	2	7:48	14m	Y482	2	M013+M014	
Y482	BOS	2	8:02	58m	WUS		9:00		OOS	2	M013+M014	Stored midday at Worcester or deadhead to Nevins
X488	WUS		7:18	50m	BOS	2	8:08	14m	Y502	3	M015+M016+M017	
Y502	BOS	2	8:22	58m	WUS		9:20	17m	X635	3	M015+M016+M017	
X508	WUS		7:38	50m	BOS	2	8:28	14m	Y522	3	M018+M019+M020	
Y522	BOS	2	8:42	58m	WUS		9:40	27m	X665	3	M018+M019+M020	

Train	from	plt	departs	transit	to	plt	arrives	layover	becomes	units	equipment	notes
X528	WUS		7:58	50m	BOS	2	8:48	14m	Y542	2	M021+M022	
Y542	BOS	2	9:02	58m	WUS		10:00		OOS	2	M021+M022	Stored midday at Worcester or deadhead to Nevins
X548	WUS		8:18	50m	BOS	2	9:08	14m	Y562	2	M023+M024	
Y562	BOS	2	9:22	58m	WUS		10:20	17m	X695	2	M023+M024	
X575	WUS		8:37	58m	BOS	2	9:35	14m	Y589	2	M025+M026	Break on platform; M026 to Southampton
Y589	BOS	2	9:49	58m	WUS		10:47	20m	X725	1	M025	
X605	WUS		9:07	58m	BOS	2	10:05	14m	Y619	2	M011+M012	Break on platform; M012 to Southampton
Y619	BOS	2	10:19	58m	WUS		11:17	20m	X755	1	M011	
X635	WUS		9:37	58m	BOS	2	10:35	14m	Y649	3	M015+M016+M017	Break on platform; M016+M017 to Southampton
Y649	BOS	2	10:49	58m	WUS		11:47	20m	X785	1	M015	
X665	WUS		10:07	58m	BOS	2	11:05	14m	Y679	3	M018+M019+M020	Break on platform; M019+M020 to Southampton
Y679	BOS	2	11:19	58m	WUS		12:17	20m	X815	1	M018	
X695	WUS		10:37	58m	BOS	2	11:35	14m	Y709	2	M023+M024	Break on platform; M024 to Southampton or stored on platform
Y709	BOS	2	11:49	58m	WUS		12:47	20m	X845	1	M023	
X725	WUS		11:07	58m	BOS	2	12:05	14m	Y739	1	M025	
Y739	BOS	2	12:19	58m	WUS		13:17	20m	X875	1	M025	
X755	WUS		11:37	58m	BOS	2	12:35	14m	Y769	1	M011	
Y769	BOS	2	12:49	58m	WUS		13:47		evening	1	M011	
X785	WUS		12:07	58m	BOS	2	13:05	14m	Y799	1	M015	
Y799	BOS	2	13:19	58m	WUS		14:17		evening	1	M015	
X815	WUS		12:37	58m	BOS	2	13:35	14m	Y829	1	M018	
Y829	BOS	2	13:49	58m	WUS		14:47		evening	1	M018	
X845	WUS		13:07	58m	BOS	2	14:05	14m	Y859	1	M023	
Y859	BOS	2	14:19	58m	WUS		15:17		evening	1	M023	
X875	WUS		13:37	58m	BOS	2	14:35	14m	Y889	1	M025	
Y889	BOS	2	14:49	58m	WUS		15:47		evening	1	M025	
												16 units required

Train	from	plt	departs	transit	to	plt	arrives	layover	becomes	units	equipment	notes
												7 units stored overnight at Readville; 9 units (2400 feet) overnight at Worcester
												4 units stored midday at Worcester or Nevins; 9 units midday at Southampton/Readville/Allston (or left in service)

Full schedule, "peak-only zone express" 8/8/4 tph scenario, inbound trips only

	X300	X308	X315	X323	X330	X338	X345	X353	X360	X368	X375	X383	X390	X398	X405	X413	X420	X425	X435	X440	X450	X455	X465
Worcester Union		4:10		4:25		4:40		4:55		5:10		5:25		5:40		5:55		6:15		6:30		6:45	
Biotech Park		4:13		4:28		4:43		4:58		5:13		5:28		5:43		5:58		6:18		6:33		6:48	
Grafton		4:20		4:35		4:50		5:05		5:20		5:35		5:50		6:05		6:25		6:40		6:55	
Westborough		4:24		4:39		4:54		5:09		5:24		5:39		5:54		6:09		6:29		6:44		6:59	
Southborough		4:28		4:43		4:58		5:13		5:28		5:43		5:58		6:13		6:33		6:48		7:03	
Ashland		4:32		4:47		5:02		5:17		5:32		5:47		6:02		6:17		6:37		6:52		7:07	
Framingham	4:27	4:35	4:42	4:50	4:57	5:05	5:12	5:20	5:27	5:35	5:42	5:50	5:57	6:05	6:12	6:20	6:27	6:40	6:42	6:55	6:57	7:10	7:12
West Natick	4:30	4:38	4:45	4:53	5:00	5:08	5:15	5:23	5:30	5:38	5:45	5:53	6:00	6:08	6:15	6:23	6:30	6:43	6:45	6:58	7:00	7:13	7:15
Natick Center	4:33	4:40	4:48	4:55	5:03	5:10	5:18	5:25	5:33	5:40	5:48	5:55	6:03	6:10	6:18	6:25	6:33		6:48		7:03		7:18
Wellesley Square	4:36	4:44	4:51	4:59	5:06	5:14	5:21	5:29	5:36	5:44	5:51	5:59	6:06	6:14	6:21	6:29	6:36		6:51		7:06		7:21
Wellesley Hills	4:38	4:46	4:53	5:01	5:08	5:16	5:23	5:31	5:38	5:46	5:53	6:01	6:08	6:16	6:23	6:31	6:38		6:53		7:08		7:23
Wellesley Farms	4:40	4:48	4:55	5:03	5:10	5:18	5:25	5:33	5:40	5:48	5:55	6:03	6:10	6:18	6:25	6:33	6:40		6:55		7:10		7:25
Auburndale	4:43	4:51	4:58	5:06	5:13	5:21	5:28	5:36	5:43	5:51	5:58	6:06	6:13	6:21	6:28	6:36	6:43		6:58		7:13		7:28
West Newton	4:45	4:53	5:00	5:08	5:15	5:23	5:30	5:38	5:45	5:53	6:00	6:08	6:15	6:23	6:30	6:38	6:45		7:00		7:15		7:30
Newtonville	4:47	4:55	5:02	5:10	5:17	5:25	5:32	5:40	5:47	5:55	6:02	6:10	6:17	6:25	6:32	6:40	6:47		7:02		7:17		7:32
Boston Landing	4:51	4:59	5:06	5:14	5:21	5:29	5:36	5:44	5:51	5:59	6:06	6:14	6:21	6:29	6:36	6:44	6:51	6:56	7:06	7:11	7:21	7:26	7:36
West Station	4:53	5:01	5:08	5:16	5:23	5:31	5:38	5:46	5:53	6:01	6:08	6:16	6:23	6:31	6:38	6:46	6:53	6:58	7:08	7:13	7:23	7:28	7:38
Yawkey	4:55	5:03	5:10	5:18	5:25	5:33	5:40	5:48	5:55	6:03	6:10	6:18	6:25	6:33	6:40	6:48	6:55	7:00	7:10	7:15	7:25	7:30	7:40
Back Bay	4:58	5:06	5:13	5:21	5:28	5:36	5:43	5:51	5:58	6:06	6:13	6:21	6:28	6:36	6:43	6:51	6:58	7:03	7:13	7:18	7:28	7:33	7:43
South Station	5:00	5:08	5:15	5:23	5:30	5:38	5:45	5:53	6:00	6:08	6:15	6:23	6:30	6:38	6:45	6:53	7:00	7:05	7:15	7:20	7:30	7:35	7:45
	Trips continue every 30 minutes from Framingham and Worcester through 4 PM making all local stops																						

	X470	X480	X485	X495	X500	X510	X515	X525	X530	X540	X545	X555	X560	X570	X585	X600	X615	X630	X645	X660	X675	X690	X705
Worcester Union	7:00		7:15		7:30		7:45		8:00		8:15		8:30		8:47		9:17		9:47		10:17		10:47
Biotech Park	7:03		7:18		7:33		7:48		8:03		8:18		8:33		8:50		9:20		9:50		10:20		10:50
Grafton	7:10		7:25		7:40		7:55		8:10		8:25		8:40		8:57		9:27		9:57		10:27		10:57
Westborough	7:14		7:29		7:44		7:59		8:14		8:29		8:44		9:01		9:31		10:01		10:31		11:01
Southborough	7:18		7:33		7:48		8:03		8:18		8:33		8:48		9:05		9:35		10:05		10:35		11:05
Ashland	7:22		7:37		7:52		8:07		8:22		8:37		8:52		9:09		9:39		10:09		10:39		11:09
Framingham	7:25	7:27	7:40	7:42	7:55	7:57	8:10	8:12	8:25	8:27	8:40	8:42	8:55	8:57	9:12	9:27	9:42	9:57	10:12	10:27	10:42	10:57	11:12
West Natick	7:28	7:30	7:43	7:45	7:58	8:00	8:13	8:15	8:28	8:30	8:43	8:45	8:58	9:00	9:15	9:30	9:45	10:00	10:15	10:30	10:45	11:00	11:15
Natick Center		7:33		7:48		8:03		8:18		8:33		8:48		9:03	9:17	9:33	9:47	10:03	10:17	10:33	10:47	11:03	11:17
Wellesley Square		7:36		7:51		8:06		8:21		8:36		8:51		9:06	9:21	9:36	9:51	10:06	10:21	10:36	10:51	11:06	11:21
Wellesley Hills		7:38		7:53		8:08		8:23		8:38		8:53		9:08	9:23	9:38	9:53	10:08	10:23	10:38	10:53	11:08	11:23
Wellesley Farms		7:40		7:55		8:10		8:25		8:40		8:55		9:10	9:25	9:40	9:55	10:10	10:25	10:40	10:55	11:10	11:25
Auburndale		7:43		7:58		8:13		8:28		8:43		8:58		9:13	9:28	9:43	9:58	10:13	10:28	10:43	10:58	11:13	11:28
West Newton		7:45		8:00		8:15		8:30		8:45		9:00		9:15	9:30	9:45	10:00	10:15	10:30	10:45	11:00	11:15	11:30
Newtonville		7:47		8:02		8:17		8:32		8:47		9:02		9:17	9:32	9:47	10:02	10:17	10:32	10:47	11:02	11:17	11:32
Boston Landing	7:41	7:51	7:56	8:06	8:11	8:21	8:26	8:36	8:41	8:51	8:56	9:06	9:11	9:21	9:36	9:51	10:06	10:21	10:36	10:51	11:06	11:21	11:36
West Station	7:43	7:53	7:58	8:08	8:13	8:23	8:28	8:38	8:43	8:53	8:58	9:08	9:13	9:23	9:38	9:53	10:08	10:23	10:38	10:53	11:08	11:23	11:38
Yawkey	7:45	7:55	8:00	8:10	8:15	8:25	8:30	8:40	8:45	8:55	9:00	9:10	9:15	9:25	9:40	9:55	10:10	10:25	10:40	10:55	11:10	11:25	11:40
Back Bay	7:48	7:58	8:03	8:13	8:18	8:28	8:33	8:43	8:48	8:58	9:03	9:13	9:18	9:28	9:43	9:58	10:13	10:28	10:43	10:58	11:13	11:28	11:43
South Station	7:50	8:00	8:05	8:15	8:20	8:30	8:35	8:45	8:50	9:00	9:05	9:15	9:20	9:30	9:45	10:00	10:15	10:30	10:45	11:00	11:15	11:30	11:45

Full schedule, “peak-only zone express” 6/6/4 tph scenario, inbound trips only

	X300	X310	X320	X330	X340	X350	X360	X370	X380	X390	X400	X410	X420	X428	X440	X448	X460	X468	X480
Worcester Union		4:12		4:32		4:52		5:12		5:32		5:52		6:18		6:38		6:58	
Biotech Park		4:15		4:35		4:55		5:15		5:35		5:55		6:21		6:41		7:01	
Grafton		4:22		4:42		5:02		5:22		5:42		6:02		6:28		6:48		7:08	
Westborough		4:26		4:46		5:06		5:26		5:46		6:06		6:32		6:52		7:12	
Southborough		4:30		4:50		5:10		5:30		5:50		6:10		6:36		6:56		7:16	
Ashland		4:34		4:54		5:14		5:34		5:54		6:14		6:40		7:00		7:20	
Framingham	4:27	4:37	4:47	4:57	5:07	5:17	5:27	5:37	5:47	5:57	6:07	6:17	6:27	6:43	6:47	7:03	7:07	7:23	7:27
West Natick	4:30	4:40	4:50	5:00	5:10	5:20	5:30	5:40	5:50	6:00	6:10	6:20	6:30	6:46	6:50	7:06	7:10	7:26	7:30
Natick Center	4:33	4:42	4:53	5:02	5:13	5:22	5:33	5:42	5:53	6:02	6:13	6:22	6:33		6:53		7:13		7:33
Wellesley Square	4:36	4:46	4:56	5:06	5:16	5:26	5:36	5:46	5:56	6:06	6:16	6:26	6:36		6:56		7:16		7:36
Wellesley Hills	4:38	4:48	4:58	5:08	5:18	5:28	5:38	5:48	5:58	6:08	6:18	6:28	6:38		6:58		7:18		7:38
Wellesley Farms	4:40	4:50	5:00	5:10	5:20	5:30	5:40	5:50	6:00	6:10	6:20	6:30	6:40		7:00		7:20		7:40
Auburndale	4:43	4:53	5:03	5:13	5:23	5:33	5:43	5:53	6:03	6:13	6:23	6:33	6:43		7:03		7:23		7:43
West Newton	4:45	4:55	5:05	5:15	5:25	5:35	5:45	5:55	6:05	6:15	6:25	6:35	6:45		7:05		7:25		7:45
Newtonville	4:47	4:57	5:07	5:17	5:27	5:37	5:47	5:57	6:07	6:17	6:27	6:37	6:47		7:07		7:27		7:47
Boston Landing	4:51	5:01	5:11	5:21	5:31	5:41	5:51	6:01	6:11	6:21	6:31	6:41	6:51	6:59	7:11	7:19	7:31	7:39	7:51
West Station	4:53	5:03	5:13	5:23	5:33	5:43	5:53	6:03	6:13	6:23	6:33	6:43	6:53	7:01	7:13	7:21	7:33	7:41	7:53
Yawkey	4:55	5:05	5:15	5:25	5:35	5:45	5:55	6:05	6:15	6:25	6:35	6:45	6:55	7:03	7:15	7:23	7:35	7:43	7:55
Back Bay	4:58	5:08	5:18	5:28	5:38	5:48	5:58	6:08	6:18	6:28	6:38	6:48	6:58	7:06	7:18	7:26	7:38	7:46	7:58
South Station	5:00	5:10	5:20	5:30	5:40	5:50	6:00	6:10	6:20	6:30	6:40	6:50	7:00	7:08	7:20	7:28	7:40	7:48	8:00

	X488	X500	X508	X520	X528	X540	X548	X560	X575	X590	X605	X620	X635	X650	X665	X680	X695	X710
Worcester Union	7:18		7:38		7:58		8:18		8:37		9:07		9:37		10:07		10:37	
Biotech Park	7:21		7:41		8:01		8:21		8:40		9:10		9:40		10:10		10:40	
Grafton	7:28		7:48		8:08		8:28		8:47		9:17		9:47		10:17		10:47	
Westborough	7:32		7:52		8:12		8:32		8:51		9:21		9:51		10:21		10:51	
Southborough	7:36		7:56		8:16		8:36		8:55		9:25		9:55		10:25		10:55	
Ashland	7:40		8:00		8:20		8:40		8:59		9:29		9:59		10:29		10:59	
Framingham	7:43	7:47	8:03	8:07	8:23	8:27	8:43	8:47	9:02	9:17	9:32	9:47	10:02	10:17	10:32	10:47	11:02	11:17
West Natick	7:46	7:50	8:06	8:10	8:26	8:30	8:46	8:50	9:05	9:20	9:35	9:50	10:05	10:20	10:35	10:50	11:05	11:20
Natick Center		7:53		8:13		8:33		8:53	9:07	9:23	9:37	9:53	10:07	10:23	10:37	10:53	11:07	11:23
Wellesley Square		7:56		8:16		8:36		8:56	9:11	9:26	9:41	9:56	10:11	10:26	10:41	10:56	11:11	11:26
Wellesley Hills		7:58		8:18		8:38		8:58	9:13	9:28	9:43	9:58	10:13	10:28	10:43	10:58	11:13	11:28
Wellesley Farms		8:00		8:20		8:40		9:00	9:15	9:30	9:45	10:00	10:15	10:30	10:45	11:00	11:15	11:30
Auburndale		8:03		8:23		8:43		9:03	9:18	9:33	9:48	10:03	10:18	10:33	10:48	11:03	11:18	11:33
West Newton		8:05		8:25		8:45		9:05	9:20	9:35	9:50	10:05	10:20	10:35	10:50	11:05	11:20	11:35
Newtonville		8:07		8:27		8:47		9:07	9:22	9:37	9:52	10:07	10:22	10:37	10:52	11:07	11:22	11:37
Boston Landing	7:59	8:11	8:19	8:31	8:39	8:51	8:59	9:11	9:26	9:41	9:56	10:11	10:26	10:41	10:56	11:11	11:26	11:41
West Station	8:01	8:13	8:21	8:33	8:41	8:53	9:01	9:13	9:28	9:43	9:58	10:13	10:28	10:43	10:58	11:13	11:28	11:43
Yawkey	8:03	8:15	8:23	8:35	8:43	8:55	9:03	9:15	9:30	9:45	10:00	10:15	10:30	10:45	11:00	11:15	11:30	11:45
Back Bay	8:06	8:18	8:26	8:38	8:46	8:58	9:06	9:18	9:33	9:48	10:03	10:18	10:33	10:48	11:03	11:18	11:33	11:48
South Station	8:08	8:20	8:28	8:40	8:48	9:00	9:08	9:20	9:35	9:50	10:05	10:20	10:35	10:50	11:05	11:20	11:35	11:50

	X725	X740	X755	X770	X785	X800	X815	X830	X845	X860	X875
Worcester Union	11:07		11:37		12:07		12:37		13:07		13:37
Biotech Park	11:10		11:40		12:10		12:40		13:10		13:40
Grafton	11:17		11:47		12:17		12:47		13:17		13:47
Westborough	11:21		11:51		12:21		12:51		13:21		13:51
Southborough	11:25		11:55		12:25		12:55		13:25		13:55
Ashland	11:29		11:59		12:29		12:59		13:29		13:59
Framingham	11:32	11:47	12:02	12:17	12:32	12:47	13:02	13:17	13:32	13:47	14:02
West Natick	11:35	11:50	12:05	12:20	12:35	12:50	13:05	13:20	13:35	13:50	14:05
Natick Center	11:37	11:53	12:07	12:23	12:37	12:53	13:07	13:23	13:37	13:53	14:07
Wellesley Square	11:41	11:56	12:11	12:26	12:41	12:56	13:11	13:26	13:41	13:56	14:11
Wellesley Hills	11:43	11:58	12:13	12:28	12:43	12:58	13:13	13:28	13:43	13:58	14:13
Wellesley Farms	11:45	12:00	12:15	12:30	12:45	13:00	13:15	13:30	13:45	14:00	14:15
Auburndale	11:48	12:03	12:18	12:33	12:48	13:03	13:18	13:33	13:48	14:03	14:18
West Newton	11:50	12:05	12:20	12:35	12:50	13:05	13:20	13:35	13:50	14:05	14:20
Newtonville	11:52	12:07	12:22	12:37	12:52	13:07	13:22	13:37	13:52	14:07	14:22
Boston Landing	11:56	12:11	12:26	12:41	12:56	13:11	13:26	13:41	13:56	14:11	14:26
West Station	11:58	12:13	12:28	12:43	12:58	13:13	13:28	13:43	13:58	14:13	14:28
Yawkey	12:00	12:15	12:30	12:45	13:00	13:15	13:30	13:45	14:00	14:15	14:30
Back Bay	12:03	12:18	12:33	12:48	13:03	13:18	13:33	13:48	14:03	14:18	14:33
South Station	12:05	12:20	12:35	12:50	13:05	13:20	13:35	13:50	14:05	14:20	14:35

Summary schedule, “zone express” scenario, outbound trips only

	Y312	Y320	Y327	Y335	Y342	Y357	Y365	Y372	Y380	Y387	Y395	Y402	Y410	Y417	Y423	Y432	Y437	Y447	Y452	Y462	Y467	Y477	Y482
South Station	5:12	5:20	5:27	5:35	5:42	5:57	6:05	6:12	6:20	6:27	6:35	6:42	6:50	6:57	7:03	7:12	7:17	7:27	7:32	7:42	7:47	7:57	8:02

Framingham	5:45	5:53	6:00	6:08	6:15	6:30	6:38	6:45	6:53	7:00	7:08	7:15	7:23	7:30	7:36	7:45	7:50	8:00	8:05	8:15	8:20	8:30	8:35

Worcester		6:18		6:33			7:03		7:18		7:33		7:48		8:01		8:15		8:30		8:45		9:00
																					OOS		

	Y492	Y497	Y507	Y512	Y522	Y537	Y542	Y552	Y557	Y567	Y572	Y582	Y597	Y612	Y627	Y642	Y657	Y672	Y687	Y702	Y717
South Station	8:12	8:17	8:27	8:32	8:42	8:57	9:02	9:12	9:17	9:27	9:32	9:42	9:57	10:12	10:27	10:42	10:57	11:12	11:27	11:42	11:57

Framingham	8:45	8:50	9:00	9:05	9:15	9:30	9:35	9:45	9:50	10:00	10:05	10:15	10:30	10:45	11:00	11:15	11:30	11:45	12:00	12:15	12:30
***		OOS	OOS			OOS			OOS	OOS											
Worcester				9:30			10:00				10:30		10:55		11:25		11:55		12:25		12:55

Inbound Framingham/Worcester Line EMU times per Alon Levy, express service from West Natick to Boston Landing

km	station	time from prev (s)	station time (s)	total time (s)	time with 7% pad	minute	time ahead	current P504
71.3	Worcester Union			0				
68.8	Biotech Park	103	55	158	169.06	3	0	infill
58.7	Grafton	276	72	506	541.42	10	0	13
51.5	Westborough	166	75	747	799.29	14	0	17
44.2	Southborough	172	68	987	1056.09	18	0	26
39.0	Ashland	144	65	1196	1279.72	22	0	30
34.3	Framingham	131	67	1394	1491.58	25	0	40
32.1	West Natick	57	68	1519	1625.33	28	0	46
28.5	Natick Center	93	0	1612	1724.84	29	2	
23.8	Wellesley Square	121	0	1733	1854.31	31	3	
21.8	Wellesley Hills	66	0	1799	1924.93	33	4	
20.3	Wellesley Farms	49	0	1848	1977.36	33	5	
16.9	Auburndale	88	0	1936	2071.52	35	6	
15.2	West Newton	47	0	1983	2121.81	36	7	
13.3	Newtonville	53	0	2036	2178.52	37	9	
7.5	Boston Landing	175	55	2266	2424.62	41	9	
6.2	West Station	47	55	2368	2533.76	43	9	
4.0	Yawkey	80	55	2503	2678.21	45	9	69
2.1	Back Bay	99	55	2657	2842.99	48	9	74
0	South Station	98	0	2755	2947.85	50	9	80
			assumes 25s dwell at each stop; remaining time is acceleration					

Inbound Framingham/Worcester Line EMU times per Alon Levy, superexpress service from Worcester to Boston Landing

km	station	time from prev (s)	station time (s)	total time (s)	time with 7% pad	minute	time ahead	current P552
71.3	Worcester Union			0				
68.8	Biotech Park	103	55	158	169.06	3	0	infill
58.7	Grafton	276	0	434	464.38	8	2	
51.5	Westborough	166	0	600	642	11	3	
44.2	Southborough	172	0	772	826.04	14	4	
39.0	Ashland	144	0	916	980.12	17	5	
34.3	Framingham	131	67	1114	1191.98	20	5	
32.1	West Natick	57	0	1171	1252.97	21	7	
28.5	Natick Center	93	0	1264	1352.48	23	8	
23.8	Wellesley Square	121	0	1385	1481.95	25	9	
21.8	Wellesley Hills	66	0	1451	1552.57	26	10	
20.3	Wellesley Farms	49	0	1500	1605	27	11	
16.9	Auburndale	88	0	1588	1699.16	29	12	
15.2	West Newton	47	0	1635	1749.45	30	14	
13.3	Newtonville	53	0	1688	1806.16	31	15	
7.5	Boston Landing	175	55	1918	2052.26	35	15	
6.2	West Station	47	55	2020	2161.4	37	15	infill
4.0	Yawkey	80	55	2155	2305.85	39	15	55
2.1	Back Bay	99	55	2309	2470.63	42	15	60
0	South Station	98	0	2407	2575.49	43	15	66
			assumes 25s dwell at each stop; remaining time is acceleration					

Inbound Framingham/Worcester Line EMU times per Alon Levy, infill stations omitted, Framingham short-turn

km	station	time from prev (s)	station time (s)	total time (s)	time with 7% pad	minute	current P512	savings			
71.3	Worcester Union										
68.8	Biotech Park										
58.7	Grafton										
51.5	Westborough										
44.2	Southborough										
39.0	Ashland										
34.3	Framingham	0	0	0	0	0	41	41			
32.1	West Natick	57	68	125	133.75	3	46	43			
28.5	Natick Center	93	68	286	306.02	6	51	45			
23.8	Wellesley Square	121	63	470	502.9	9	56	47			
21.8	Wellesley Hills	66	58	594	635.58	11	60	49			
20.3	Wellesley Farms	49	64	707	756.49	13	63	50			
16.9	Auburndale	88	67	862	922.34	16	68	52			
15.2	West Newton	47	65	974	1042.18	18	71	53			
13.3	Newtonville	53	65	1092	1168.44	20	74	54			
7.5	Boston Landing	175	55	1322	1414.54	24	79	55			
6.2	West Station	47	55	1424	1523.68	26	infill	infill			
4.0	Yawkey	80	55	1559	1668.13	28	84	56			
2.1	Back Bay	99	55	1713	1832.91	31	89	58			
0	South Station	98	0	1811	1937.77	33	94	61			
		25s dwell at each stop; remaining time is acceleration penalty if I understand Alon correctly									

Inbound Framingham/Northborough service, via Ag Branch, simulated 59 mi/h speed limit and EMUs

km	station	time from prev (s)	station time (s)	total time (s)	time with 7% pad	minute
60	Northboro/290			0		
57.9	Northboro Center		25	101	108.07	2
52.3	Marlboro/495		25	297	317.79	6
45.1	Southborough		25	541	578.87	10
41.2	Tech Park		25	692	740.44	13
37.3	Framingham Center		25	840	898.8	15
34.3	South Framingham	126	25	991	1060.37	18
32.1	West Natick	57	68	1116	1194.12	20
28.5	Natick Center	93	68	1277	1366.39	23
23.8	Wellesley Square	121	63	1461	1563.27	27
21.8	Wellesley Hills	66	58	1585	1695.95	29
20.3	Wellesley Farms	49	64	1698	1816.86	31
16.9	Auburndale	88	67	1853	1982.71	34
15.2	West Newton	47	65	1965	2102.55	36
13.3	Newtonville	53	65	2083	2228.81	38
7.5	Boston Landing	175	55	2313	2474.91	42
6.2	West Station	47	55	2415	2584.05	44
4.0	Yawkey	80	55	2550	2728.5	46
2.1	Back Bay	99	55	2704	2893.28	49
0	South Station	98	0	2802	2998.14	50
		blend of Alon's and my models, which compute stop times differently				

Inbound Framingham/Worcester Line EMU times per Alon Levy, infill stations omitted, Riverside Jct. short-turn

km	station	time from prev (s)	station time (s)	total time (s)	time with 7% pad	minute					
71.3	Worcester Union										
68.8	Biotech Park										
58.7	Grafton										
51.5	Westborough										
44.2	Southborough										
39.0	Ashland										
34.3	Framingham										
32.1	West Natick										
28.5	Natick Center										
23.8	Wellesley Square										
21.8	Wellesley Hills										
20.3	Wellesley Farms										
16.9	Auburndale	0	0	0	0	0					
15.2	West Newton	47	65	112	119.84	2					
13.3	Newtonville	53	65	230	246.1	5					
7.5	Boston Landing	175	55	460	492.2	9					
6.2	West Station	47	55	562	601.34	11					
4.0	Yawkey	80	55	697	745.79	13					
2.1	Back Bay	99	55	851	910.57	16					
0	South Station	98	0	949	1015.43	17					
		25s dwell at each stop; remaining time is acceleration penalty if I understand Alon correctly									

2018 CTPS F/W inbound net boardings, by arrival time at South Station

km	departing station	6:18	6:35	6:58	7:10	7:33	7:45	8:10	8:20	8:44	8:55	9:06	9:39	10:24	12:06
71.3	Worcester Union	23	68		108		118		203		56	262		74	54
58.7	Grafton	11	28		94		94		139		89			24	9
51.5	Westborough	8	32		81		136		266		133			29	6
44.2	Southborough	12	34		66		107		169		44			22	7
39.0	Ashland	10	76		110		109		242		196		93	27	8
34.3	Framingham	15	24	17	77	32	73	76	176	127	92		62	34	15
32.1	West Natick	33	68	12	135	19	88	35	189	61	93		58	29	11
28.5	Natick Center	8	36	16		82		146		143	71		43	23	8
23.8	Wellesley Square	9		30		68		101		92	54		66	25	15
21.8	Wellesley Hills	11		23		37		57		56	24		26	14	16
20.3	Wellesley Farms	-4		27		74		58		59	19		14	8	1
16.9	Auburndale	2		8		47		40		63			8	11	2
15.2	West Newton	1		8		43		68		79			25	3	4
13.3	Newtonville	12		22		59		114		128			23	20	0
7.5	Boston Landing			23		46		70		110	49		28	6	
4.0	Yawkey	-15	-48	-21	-90	-70	-72	-91	-121	-80	-65	-33	-46	-93	-18
2.1	Back Bay	-99	-118	-83	-183	-180	-221	-219	-463	-297	-224	-80	-154	-113	-49