Chapter 6

Service Monitoring

Requirement to Monitor Transit Service [FTA C4702.1A, V. 5.]

The revised FTA Circular 4702.1A requires that, to comply with Title VI, recipients must undertake periodic service-monitoring activities to compare the level and quality of service provided to predominantly minority and low-income areas with service provided in other areas. Although the circular requires that monitoring be conducted every three years at a minimum, the MBTA conducts annual monitoring to ensure that potential problems are found and rectified in a timely fashion. Tables 6-1 and 6-2 present the framework for the MBTA's Title VI monitoring procedures. The subsequent text reports the findings of the most recent Title VI data collection and analysis.

TABLE 6-1 MBTA Title VI Level-of-Service Monitoring

Service Indicator	Department(s) Responsible	Planned Frequency of Compliance Assessments	Even Year / Odd Year
1. Vehicle Load, Vehicle Headway, and On-Time Performance			
Bus	Service Planning	Every 2 years	Even
Heavy Rail & Light Rail	Subway Operations & Service Planning	Every 2 years	Even
Commuter Rail	Railroad Operations	Every 2 years	Even
2. Transit Access			
All Modes	Service Planning	Every 2 years	Even

TABLE 6-1 MBTA Title VI Level-of-Service Monitoring (cont.)			
Service Indicator	**Department(s) Responsible**	**Planned Frequency of Compliance Assessments**	**Even Year / Odd Year**
3. Distribution of Transit Amenities			
Bus Shelter	Operations and Services Development	Every 2 years	Even
Station Condition & Amenities	CTPS	Every 2 years	Odd
Neighborhood Maps	Operations and Services Development	Every 2 years	Odd
AFC Fare Gates, Fare Vending Machines, & Retail Sales Terminals	AFC	Annually	N/A
Variable Message Signs	Subway, Silver Line, & Railroad Operations	Every 2 years	Odd
Station Elevator and Escalator Location and Operability	Operations Support	Annually	N/A
Station Parking & Utilization	Planning & Development	Every 3 years	N/A
4. Vehicle Assignment			
Bus	Bus Operations	Annually	N/A
Heavy Rail & Light Rail	Subway Operations	Annually	N/A
Commuter Rail	Railroad Operations	Annually	N/A
5. Transit Security			
Callboxes	Transit Police	Every 3 years	N/A
Surveillance Cameras	Bus Operations & Transit Police	Every 3 years	N/A
Passenger Inspections	Transit Police	Annually	N/A

TABLE 6-2 MBTA Title VI Quality-of-Service Monitoring			
Travel Pattern Analysis	**Department Responsible**	**Planned Frequency of Compliance Assessments**	**Even/Odd**
All Modes	Service Planning	Every 2 years	Even

Level-of-Service Monitoring

For the Level-of-Service monitoring of MBTA services, all bus routes, rapid transit lines, and commuter rail lines must be designated as minority or nonminority and as low-income or non-low-income. In the previous circular (FTA C4702.1), a route was defined as minority if it had one-third of its route-miles in minority census tracts. Using this definition, some express bus routes and commuter rail lines were designated as minority even though they did not stop in the minority census tracts through which they passed. Therefore, the MBTA developed an alternative way of defining minority routes for these services: routes were designated as minority if one-third of the stops/stations were in minority census tracts.

Because the new circular does not specify exactly how routes should be defined as minority and low-income, CTPS explored methods that would avoid the problems encountered when using route-miles. The method selected is based on the percentage of boardings on a route that occur at stops/stations in minority and low-income census tracts. CTPS evaluated different ridership thresholds in several ways, including mapping the routes, comparing the new definitions with the route-mile definitions, relying on a good working knowledge of the system, and applying professional judgment to determine a new threshold. Using this new definition, for the purposes of this report, all bus routes, rapid transit lines, and commuter rail lines are defined as minority or low-income if 40 percent of boardings occur in minority or low-income census tracts, respectively. Appendix F lists all bus, rapid transit, and commuter rail lines and indicates their minority or low-income status.

Vehicle Load, Vehicle Headway, and On-Time Performance

Bus and Trackless Trolley

Through its regular service-planning process, the MBTA Service Planning Department evaluates the performance of all bus routes in relation to the Authority's Service Delivery Policy, which includes service standards for vehicle load, vehicle headway (frequency of service), and on-time performance (schedule adherence). In keeping with the Service Delivery Policy, minor service changes are made routinely in response to changes in service demand, whereas major changes can only be made through a Service Plan. Every two years, all bus routes (with the exception of those that were subject to major restructuring in the previous Service Plan) are evaluated through a comparative analysis for all of the service standards in the Service Delivery Policy. Based on this analysis, proposed changes to existing services, as well as suggestions for new services, are compiled into a Preliminary Service Plan. The goals of the Service Plan are to bring all routes into compliance with the service standards to meet changing demands for transit services.

The draft plan is presented to the public in a variety of ways, including public meetings and hearings. Based on public input, additional service changes may be made before the final recommendations are compiled, approved, and implemented. The MBTA Service Planning Department is currently developing the Preliminary 2010–2011 Service Plan.

Table 6-3 shows the current bus vehicle load and frequency of service performance that will be used in developing the Preliminary 2010–2011 Service Plan. Because all low-income routes are also minority routes, a separate analysis for routes that are both minority and low-income is not necessary.

TABLE 6-3 Bus – Vehicle Load and Frequency of Service

Route Classification	Vehicle Load: % of Routes Passing the Standard			Frequency of Service: % of Routes Passing the Standard		
	Weekday	Saturday	Sunday	Weekday	Saturday	Sunday
Minority	44.2%	54.7%	61.9%	71.6%	86.7%	77.8%
Nonminority	58.1%	75.5%	80.0%	54.1%	61.2%	54.3%
Low-income	22.7%	36.8%	58.8%	72.7%	94.7%	88.2%
Non-low-income	54.4%	67.6%	70.4%	62.6%	73.3%	65.4%
Systemwide	50.3%	62.9%	68.4%	63.9%	76.6%	69.4%

As can be seen in Table 6-3, on weekdays, Saturdays, and Sundays, the percentages of minority and low-income routes that pass the vehicle-load standard are lower than the respective percentages of nonminority and non-low-income routes that pass the standard. For frequency of service, the percentage of routes that pass the standard is higher for minority and low-income routes than for nonminority and non-low-income routes on all days of the week.

When developing the 2011 Service Plan, the MBTA will examine the routes that did not pass the vehicle load standard to look for opportunities to correct deficiencies in this area.

Historically, schedule adherence was determined through direct observation of all scheduled trips. Due to the size of the MBTA bus system, data for each route were collected on only one composite day every two or more years. The installation of a CAD/AVL system on buses allows the MBTA to collect data for each route on a daily basis at multiple timepoints. The Service Planning Department has been using this increased volume of data to refine current public timetables that better reflect actual running times along an entire route to improve the printed schedules used by customers.

The current schedule-adherence standard considers a bus route to perform on-time if 75 percent of all measured timepoints are on time.

Table 6-4 reports the current schedule-adherence performance of all bus routes, showing the percentage of timepoints at which buses were on time. These data will be used to help to identify the service improvements that will be proposed in the Preliminary 2010–2011 Service Plan. Because all low-income routes are also minority routes, a separate analysis for routes that are both minority and low-income is not necessary.

TABLE 6-4 Bus – On-Time Performance

Route Classification	Schedule Adherence: % of Timepoints at Which Routes Are On Time		
	Weekday	Saturday	Sunday
Minority	65.6%	67.1%	67.2%
Nonminority	63.9%	65.7%	64.1%
Low-income	68.3%	67.6%	69.7%
Non-low-income	63.9%	66.3%	64.7%
Systemwide	65.0%	66.7%	66.4%

As can be seen in Table 6-4, on weekdays, Saturdays, and Sundays, both minority and low-income routes outperform nonminority and non-low-income routes, respectively. Ongoing adjustments to the public timetables based on the CAD/AVL data, as well as service changes that will be implemented through the Service Plan, should improve vehicle loads and schedule adherence on all routes.

Heavy and Light Rail

For the purposes of Title VI, the MBTA's three heavy rail lines (Red Line, Blue Line, and Orange Line) are considered minority and non-low-income; therefore, comparative monitoring of minority vs. non-minority and of low-income vs. non-low-income service performance is not necessary.

However, the light rail system, which includes the four branches of the Green Line and the Mattapan High-Speed Line, shows variability in the minority and low-income status, with the Green Line B and E Branches being classified as both minority and low-income, and the C and D Branches being classified as neither minority nor low-income. The Green Line central subway and the Mattapan Line are minority, but are not low-income. Table 6-5 shows the minority and income status of the heavy and light rail lines.

TABLE 6-5 Heavy and Light Rail – Minority and Low-Income Status				
Line	**Branch**	**Minority**	**Low-Income**	**Both**
Light Rail				
Green	B	Y	Y	Y
	C	N	N	N
	D	N	N	N
	E	Y	Y	Y
Mattapan (Red)		Y	N	N
Heavy Rail				
Red		Y	N	N
Blue		Y	N	N
Orange		Y	N	N

To monitor the light rail system, Green Line trains were observed inbound at Copley Station between 6:00 AM and midnight on March 18, 2011, and outbound at Arlington Station between 6:00 AM and midnight on March 8, 2011. The Mattapan High-Speed Line was observed inbound and outbound at Ashmont Station on March 9, 2011.

Vehicle load standards for light rail, as defined in the Service Delivery Policy, allow for loads equal to 225 percent of the seated capacity in the Early AM, AM Peak, Midday School, and PM Peak periods. During all other time periods (Midday Base, Evening, Late Evening, Night/Sunrise, and Weekends), loads in the core area should not exceed 140 percent of seated capacity.

Using a five-point rating system, with "1" equal to an empty train and "5" equal to full crush load, the average observed load for all Green Line branches and the Mattapan High-Speed Line during the peak periods of both days combined was 2.5. During the off-peak period, the average load was 2.2.

Table 6-6 shows that, for minority branches, the average peak load was 2.5 and for low-income branches the average peak-load was 2.7, while for all branches it was 2.5. The average off-peak load for minority branches was 2.2, and the average off-peak load for low-income branches was 2.3, while the average load for all branches was 2.2. Since the 225 percent load factor allowed during peak periods equates roughly to an observed load rating of 4, and the 140 percent load factor allowed during the off-peak period equates roughly to an observed load rating of 3, none of the branches—neither the minority, the low-income, the nonminority, nor the non-low-income branches—exhibits violations of the vehicle load standard.

TABLE 6-6 Light Rail Vehicle Load Average Vehicle Load*		
Line Classification	**Peak Periods**	**Off-Peak Periods**
Minority	2.5	2.2
Nonminority	2.5	2.2
Low-income	2.7	2.3
Non-low-income	2.4	2.1
Systemwide	**2.5**	**2.2**
** Numbers shown are based on observations that use a rating scale of 1 to 5, where 1 equals an empty train and 5 equals full crush load.*		

With respect to scheduled headways, almost all light rail service meets the MBTA service standards for frequency of service. Those standards are headways of 10 minutes or less in the peak, and 15 minutes or less at all other times. The only light rail service that does not meet the frequency standards is the Mattapan High-Speed Line, a minority route. This route operates every 22 minutes on Sunday mornings before 10:00 AM, but is in compliance at all other times. The current headway is just shy of the 20-minute frequency standard, and represents an improvement from the prior 30-minute headway on the line. At this time, ridership levels do not justify the resources required to reduce the headway to 20 minutes. The MBTA will continue to monitor ridership levels to determine if and when adjustment to the headway becomes appropriate (if resources become available).

Schedule adherence policies for surface light rail call for 85 percent of all trips to operate at intervals less than or equal to 1.5 times the scheduled headway. All individual Green Line branches met the schedule-adherence policy based on observations from automatic vehicle identification systems. The Mattapan Line did not meet the schedule-adherence policy; based on pointchecks at Ashmont Station, 81 percent of the trips operated within 1.5 times the scheduled headway.

Schedule adherence policies for surface light rail call for 95 percent of all trips to operate within 5 minutes of the scheduled trip time over the entire service day. The Mattapan High-Speed Line passed the schedule-adherence standard. None of the Green Line branches passed the schedule-adherence standard.

The MBTA is evaluating various approaches to improving schedule adherence on the Mattapan Line and the Green Line branches, including signal changes and fare collection improvements. In addition, the MBTA is considering future initiatives with AVL to improve light rail schedule adherence.

Commuter Rail

As a part of its ongoing planning process, every six months Railroad Operations evaluates the performance of commuter rail services against the MBTA's standards for vehicle load, vehicle headway, and schedule adherence. Through contractual agreement, the commuter rail operating contractor, Massachusetts Bay Commuter Railroad Company (MBCR), provides the data used for this analysis. Based on the analysis, minor schedule changes are implemented to improve service in areas with a demonstrated need. Minor changes may also result from passenger suggestions and can be accomplished by, but are not limited to, one or more of the following: (1) adjusting schedule times, (2) increasing service with additional trips (e.g., express service), and (3) redistribution of equipment. Major service changes, such as service expansion or line extensions, require approval of the MBTA Board of Directors and capital funding prior to implementation.

For the purposes of Title VI monitoring, Railroad Operations completes compliance assessments for vehicle load, vehicle headway, and on-time performance (OTP) twice a year, before implementing the schedule changes that are made as a part of the regular planning process. If the assessment of the proposed changes demonstrates that service on minority routes does not comply with Title VI requirements, Railroad Operations develops, within the operating constraints of commuter rail, a solution that minimizes or eliminates Title VI noncompliance before changes are implemented.

Vehicle Load

The purpose of this assessment was to determine if the service provided for both minority and nonminority users is consistent with our equity policy objectives. The MBTA commuter rail load standard during peak periods, as indicated in the Service Delivery Policy, is 110 percent of the seating capacity. This standard was increased in December 2002, from 100 percent, for improved equity in the stated guidelines of the MBTA.

MBCR utilizes an electronic rail operations management system to provide consist information and ridership details, and to monitor performance. Passenger counts are reported by the train crews for each trip and are entered into the system, along with consist information. This information is independently verified twice annually, as required by the operating contract. This independent audit of passenger counts is generally considered more accurate and was used for this report. This information was summarized to develop vehicle-load percentages for each peak-period train.

The AM and PM peak-period information was collected for the purpose of this analysis. Table 6-7 shows the ratios of passengers to seats on all commuter rail lines. The commuter rail load standard allows up to 110 percent of a seated load during peak hours and assumes that all passengers will have a seat during off-peak. All of the minority and nonminority routes pass the load standard during the peak periods. None of the commuter rail lines is classified as low-income.

TABLE 6-7 Commuter Rail – Vehicle Load Percentage, Fall 2011

Providence Line

AM Peak Period			PM Peak Period		
Train	Arrive South Station	Load Factor	Train	Depart South Station	Load Factor
800	6:20 AM	39.52%	811	4:46 PM	80.38%
802	6:40 AM	48.54%	813	5:42 PM	86.51%
804	7:19 AM	81.86%	815	6:06 PM	93.81%
806	7:45 AM	74.05%	817	6:42 PM	97.70%
832	8:07 AM	71.27%	819	7:11 PM	63.65%
808	8:16 AM	96.03%			
810	8:51 AM	90.32%			
812	9:23 AM	79.53%			

Stoughton Line

AM Peak Period			PM Peak Period		
Train	Arrive South Station	Load Factor	Train	Depart South Station	Load Factor
902	7:04 AM	59.65%	917	4:45 PM	60.23%
904	7:33 AM	70.99%	919	5:30 PM	80.26%
906	8:32 AM	81.86%	921	6:01 PM	91.14%
908	9:03 AM	53.51%	923	6:26 PM	85.38%
			925	7:09 PM	30.06%

Franklin Line

AM Peak Period			PM Peak Period		
Train	Arrive South Station	Load Factor	Train	Depart South Station	Load Factor
702	6:50 AM	39.66%	715	5:02 PM	53.27%
704	7:09 AM	60.55%	717	5:25 PM	80.12%
706	7:41 AM	68.35%	737	5:22 PM	54.24%
708	7:59 AM	78.65%	719	6:19 PM	93.17%
732	8:40 AM	86.99%	721	6:51 PM	91.03%
710	8:54 AM	65.61%	723	7:20 PM	67.83%
734	9:25 AM	18.57%			

Fairmount Line

AM Peak Period			PM Peak Period		
Train	Arrive South Station	Load Factor	Train	Depart South Station	Load Factor
744	7:02 AM	9.65%	761	4:56 PM	3.49%
746	7:42 AM	1.02%	763	5:36 PM	15.19%
748	8:20 AM	16.37%	765	6:11 PM	10.53%
750	9:00 AM	11.26%	767	6:56 PM	5.41%

TABLE 6-7 Commuter Rail – Vehicle Load Percentage, Fall 2011 (cont.)

Needham Line

AM Peak Period			PM Peak Period		
Train	Arrive South Station	Load Factor	Train	Depart South Station	Load Factor
600	6:50 AM	33.04%	619	4:40 PM	23.95%
602	7:29 AM	74.42%	621	5:22 PM	45.78%
604	8:14 AM	66.24%	623	6:06 PM	73.63%
606	8:42 AM	69.15%	625	6:37 PM	72.37%
608	9:13 AM	28.27%	627	7:05 PM	38.01%

Worcester Line

AM Peak Period			PM Peak Period		
Train	Arrive South Station	Load Factor	Train	Depart South Station	Load Factor
500	6:31 AM	32.31%	519	5:24 PM	67.83%
502	7:08 AM	68.46%	521	5:25 PM	65.09%
504	7:46 AM	71.10%	523	6:20 PM	85.88%
506	8:11 AM	84.39%	525	6:13 PM	100.29%
508	8:23 AM	87.48%	527	7:13 PM	83.86%
510	8:56 AM	78.22%	529	7:34 PM	80.59%
512	9:08 AM	85.38%	531	7:28 PM	65.35%
514	9:35 AM	19.09%			

Old Colony Lines

AM Peak Period			PM Peak Period		
Train	Arrive South Station	Load Factor	Train	Depart South Station	Load Factor
002	6:15 AM	28.80%	017	4:41 PM	46.37%
032	6:25 AM	33.11%	043	5:24 PM	49.80%
004	6:55 AM	46.15%	019	5:38 PM	48.87%
034	7:13 AM	65.78%	045	5:56 PM	69.43%
006	7:56 AM	77.21%	021	6:10 PM	59.75%
036	8:12 AM	74.36%	047	6:34 PM	67.36%
008	8:21 AM	60.65%	023	6:55 PM	38.56%
038	8:36 AM	66.37%	049	7:10 PM	44.22%
010	9:06 AM	37.87%			
040	9:34 AM	25.51%			

Greenbush Line

AM Peak Period			PM Peak Period		
Train	Arrive South Station	Load Factor	Train	Depart South Station	Load Factor
070	6:38 AM	27.66%	081	4:58 PM	38.44%
072	7:36 AM	70.07%	083	5:50 PM	54.88%
074	8:03 AM	69.16%	085	6:18 PM	56.01%
076	8:49 AM	50.79%	087	6:43 PM	45.46%
078	9:49 AM	13.95%			

TABLE 6-7 Commuter Rail – Vehicle Load Percentage, Fall 2011 (cont.)

Fitchburg Line

AM Peak Period			PM Peak Period		
Train	Arrive North Station	Load Factor	Train	Depart North Station	Load Factor
404	6:47 AM	54.91%	467	4:00 PM	31.58%
406	7:34 AM	97.37%	425	4:40 PM	96.49%
408	7:50 AM	79.09%	427	4:50 PM	71.05%
410	8:22 AM	96.93%	429	5:20 PM	71.49%
412	8:54 AM	80.35%	431	5:40 PM	70.18%
454	9:32 AM	33.51%	433	6:25 PM	68.42%

Lowell Line

AM Peak Period			PM Peak Period		
Train	Arrive North Station	Load Factor	Train	Depart North Station	Load Factor
302	6:22 AM	40.50%	327	4:10 PM	76.49%
304	7:05 AM	85.09%	359	4:20 PM	17.02%
352	7:22 AM	42.98%	329	4:40 PM	74.56%
306	7:40 AM	74.06%	331	5:10 PM	86.40%
308	8:05 AM	92.25%	333	5:30 PM	82.46%
310	8:26 AM	86.99%	335	5:50 PM	111.93%
356	8:57 AM	21.80%	337	6:25 PM	59.50%
312	9:10 AM	59.12%			

Haverhill Line

AM Peak Period			PM Peak Period		
Train	Arrive North Station	Load Factor	Train	Depart North Station	Load Factor
202	6:14 AM	34.21%	227	4:30 PM	91.75%
204	6:50 AM	53.51%	279	4:49 PM	46.84%
206	7:25 AM	68.86%	231	5:15 PM	89.33%
208	7:48 AM	83.77%	233	5:35 PM	79.82%
258	8:00 AM	81.05%	281	5:55 PM	42.11%
260	8:30 AM	62.11%	235	6:20 PM	59.65%
212	8:39 AM	97.02%			
262	9:00 AM	29.39%			

Newburyport/Rockport Line

AM Peak Period			PM Peak Period		
Train	Arrive North Station	Load Factor	Train	Depart North Station	Load Factor
152	6:27 AM	37.37%	127	4:00 PM	54.39%
154	7:00 AM	79.65%	177	4:25 PM	66.96%
106	7:19 AM	67.19%	67	4:45 PM	46.32%
156	7:38 AM	84.80%	129	5:00 PM	85.96%
108	7:52 AM	93.23%	181	5:10 PM	93.16%
158	8:08 AM	74.81%	131	5:25 PM	79.45%
198	8:25 AM	67.54%	183	5:40 PM	81.83%
110	8:33 AM	105.09%	69	5:55 PM	51.05%
62	8:46 AM	55.96%	133	6:10 PM	79.30%
162	9:00 AM	77.89%	185	6:45 PM	71.93%

Vehicle Headway

All of the commuter rail lines pass the MBTA's frequency of service standard during peak and off-peak periods on weekdays. However, only three of the nonminority lines pass on Saturdays. All of the lines that fail the standard on Saturdays do so because the first trip in the morning does not arrive by 8:00 AM. The Fairmount Line does not have Saturday service. The MBTA commuter rail department will evaluate ways in which to ensure that all routes pass the standard on Saturdays, and will investigate adding Saturday service on the Fairmount Line if additional resources become available.

Schedule Adherence

The MBTA's Service Delivery Policy sets a schedule-adherence standard of 95 percent for all trains arriving at their final terminals within 5 minutes of scheduled arrival times. The Commuter Rail Operating Agreement specifies bench marks for different on-time performance, and subjects the contract operator to a penalty for any train that arrives at its final terminal more than 4 minutes and 59 seconds late when the on-time performance (OTP) for the line on which that train operated is less than 95 percent for that day.

MBCR collects and records the OTP data of all revenue trains on a daily basis and maintains it in the rail operations management system. Reports are generated that provide statistics on trains scheduled, trains operating on time, and OTP each day. Because this information is readily available, the data for the entire 2010 calendar year were reviewed.

As indicated in Table 6-8 below, only the Fairmount Line met or exceeded the schedule-adherence standard of 95 percent for that period. The MBTA will continue working with MBCR to upgrade and purchase equipment, and address mechanical and operational issues, in order to improve schedule adherence on all commuter rail lines.

TABLE 6-8 Commuter Rail – Schedule Adherence, January–December 2010

Status	Line	Percentage of Trips That Pass the Schedule Adherence Standard
Minority	Fairmount	98%
	Middleborough	89%
Nonminority	Rockport	86%
	Newburyport	82%
	Haverhill	81%

TABLE 6-8 Commuter Rail – Schedule Adherence, January–December 2010 (cont.)		
Status	**Line**	**Percentage of Trips That Pass the Schedule Adherence Standard**
Nonminority	Lowell	93%
	Fitchburg	86%
	Worcester	90%
	Needham	77%
	Franklin	89%
	Attleboro	79%
	Kingston	76%
	Stoughton	83%
	Greenbush	91%
Systemwide		**86%**

Silver Line, Washington Street – Vehicle Load and On-Time Performance

On May 29, 2001, the Washington Street Corridor Coalition filed a Title VI complaint with the FTA alleging that the MBTA did not fulfill its commitment to provide replacement service that was "equal to or better than" the original Orange Line, which served a significant minority area. As a result, the Authority has been required to submit quarterly reports regarding Silver Line vehicle loads, vehicle headways, and schedule adherence in the Washington Street corridor. The reports have been compiled quarterly based on pointcheck data collected in both directions at the peak load points (East Berkeley for inbound and Tufts Medical Center for outbound trips).

The vehicle load data for Silver Line Washington Street were evaluated against the MBTA's vehicle load standard, which is found in the Service Delivery Policy and is shown in Table 6-9.

TABLE 6-9 MBTA Bus Vehicle Load Standard		
Mode	**Time Period**	**Passengers / Seats**
Bus & BRT	Early AM, AM Peak, Midday School, & PM Peak	140%
	Midday Base, Evening, Late Evening, Night/Sunrise, & Weekends	100%

Compliance with the standards is calculated by averaging the loads on individual trips over a 30-minute segment during peak periods and over a 60-minute segment during off-peak periods. The time periods are defined in Table 6-10 below.

TABLE 6-10 MBTA Weekday Time Period Definitions	
Time Period	**Definition**
Early AM	6:00 AM – 6:59 AM
AM Peak	7:00 AM – 8:59 AM
Midday Base	9:00 AM – 1:29 PM
Midday School	1:30 PM – 3:59 PM
PM Peak	4:00 PM – 6:29 PM
Evening	6:30 PM – 9:59 PM
Late Evening	10:00 PM – 11:59 PM
Night/Sunrise	12:00 AM – 5:59 AM

The seated capacity of the 60-foot articulated compressed-natural-gas vehicles that operate on Silver Line Washington Street is 57. Therefore, the maximum allowable average load during off-peak periods is 57, and the maximum allowable average load during peak periods is 80 passengers (140% x 57). The overall performance of the Silver Line has consistently exceeded the MBTA vehicle load standards. Figures 6-1 and 6-2 show the average maximum load during the three time periods with the highest maximum loads in the inbound and outbound directions for each quarter since monitoring was initiated in 2007. As shown, the average maximum load never reached the seated capacity. This means that all passengers could find a seat on most trips throughout the day.

The current schedule-adherence standard considers the Silver Line to perform on time if 75 percent of all measured timepoints are on time. Table 6-11 reports the current schedule-adherence performance of the Silver Line Washington Street service, showing the percentage of timepoints at which buses were on time. As the table shows, the Silver Line Washington Street meets the schedule adherence standard.

Figure 6-1 Silver Line Inbound Quarterly Average Peak Load

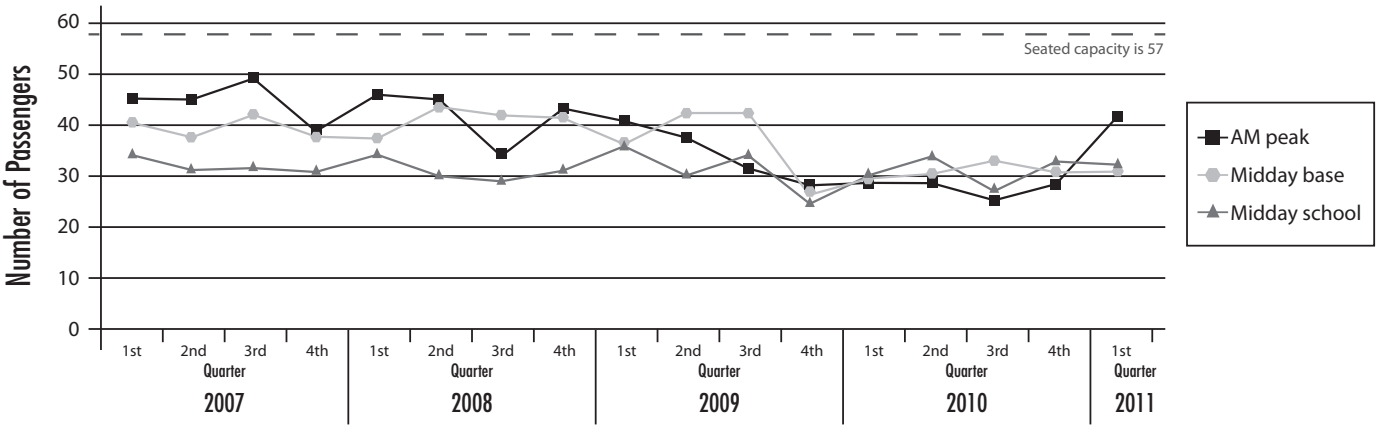

Figure 6-2 Silver Line Outbound Quarterly Average Peak Load

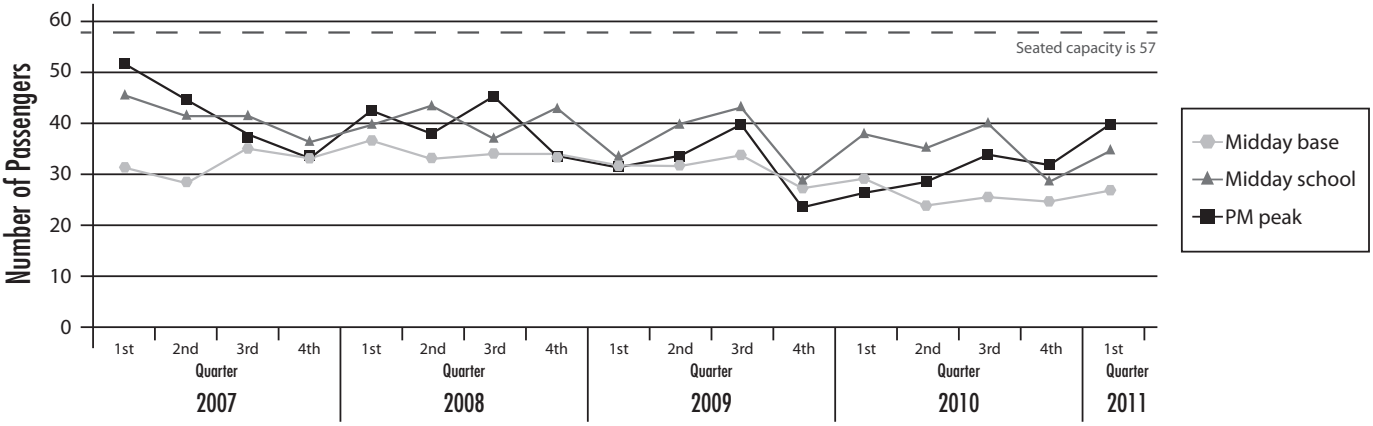

TABLE 6-11 Silver Line Washington Street – On-Time Performance	
Day	% of Timepoints at Which Routes Are On Time
Saturday	82%
Sunday	87%
Weekday	82%

Service Availability (Coverage)

To meet the MBTA's Transit Coverage guideline, in service areas with residential densities greater than 5,000 people per square mile, transit service—of any mode—should be accessible within one-quarter mile. The analysis for this report was completed by measuring one-quarter mile via the street network (rather than "as the crow flies") to realistically assess the distance that an individual might have to walk to access transit service at a bus stop or rail stop/station.

The service availability analysis shows more coverage in areas that are designated as minority and/or low-income than in those that are not so-designated. As can be seen in Table 6-12 below, for high-density census tracts within the Bus/Rapid Transit Service area, 84 percent of street-miles in minority areas meet the Transit Coverage guideline; however, only 67 percent of street miles in nonminority areas meet the coverage guideline. Likewise, 87 percent of street miles in low-income areas meet the coverage guideline, while only 72 percent of street-miles in non-low-income areas meet the guideline, and 88 percent of areas that are both minority and low-income meet the guideline, as compared to 67 percent of areas that are neither minority nor low-income.

Lack of transit coverage in some high-density MBTA service area communities is generally due to operational constraints imposed by street configurations or other physical barriers. Although some high-density nonminority census tracts, such as all of Winthrop and part of Medford, as well as one minority census tract in Milton, appear on the map (Figure 6-3) not to have access to local transit services, these areas are provided with coverage through private contract carriers that are subsidized by the MBTA. Because these routes are not coded in the analysis, the coverage numbers in Table 6-12 appear slightly lower than they should appear.

FIGURE 6-3
MBTA Title VI Report

Transit Accessibility:
Urban Fixed-Route Service Area

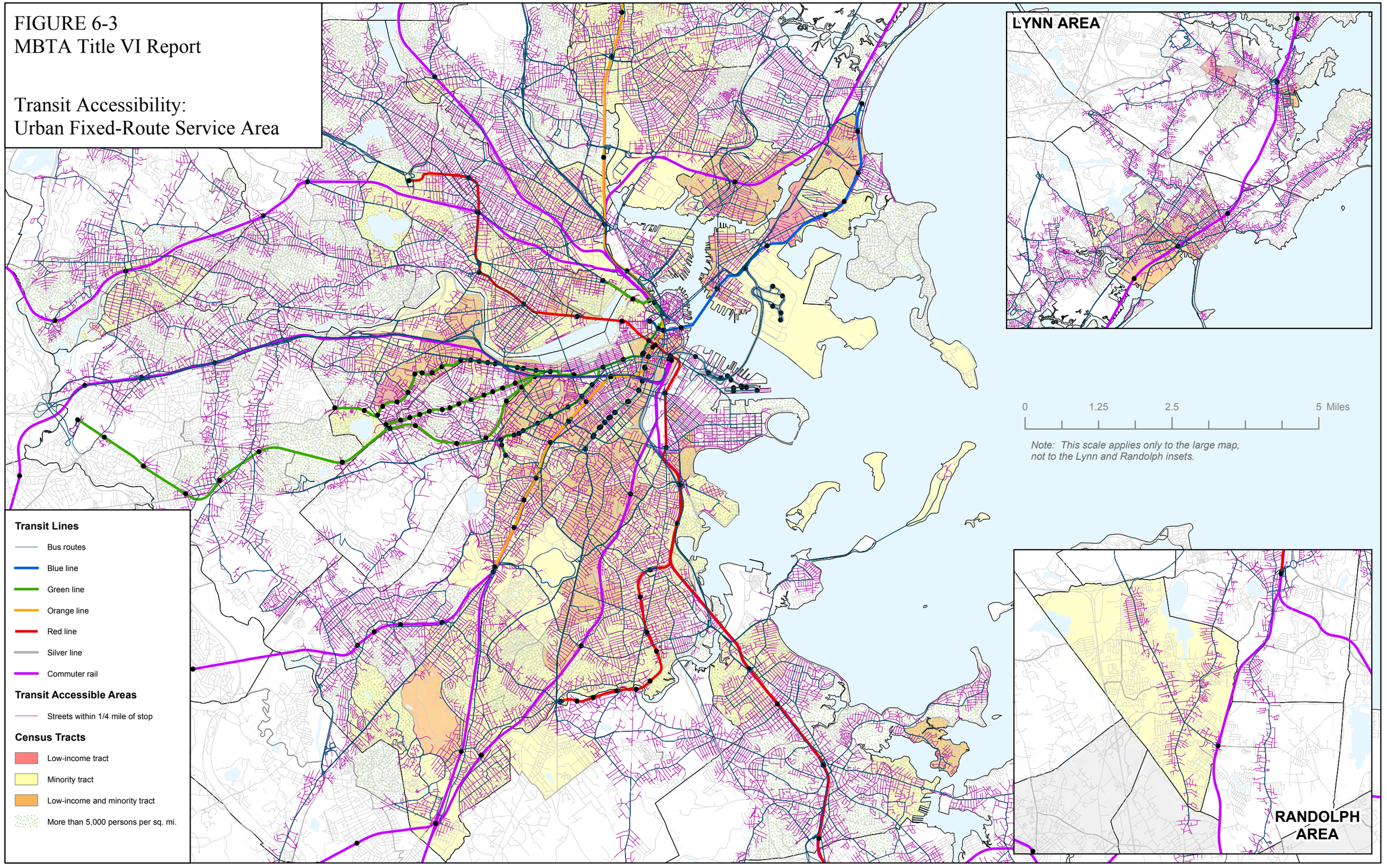

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TABLE 6-12 Transit Coverage within the Bus and Rapid Transit Service Area
Areas with > 5,000 People/Square Mile

Area Classification	Total Street Miles	Bus Market		Subway Market		Bus + Subway Market		Comm. Rail Market		Market - All Modes	
		Street Miles	Percent of Total	Street Miles	Percent of Total	Street Miles	Percent of Total	Street Miles	Percent of Total	Street Miles	Percent of Total
Minority	1,339	1,106	83%	151	11%	1,120	84%	41	3%	1,122	84%
Nonminority	1,867	1,229	66%	82	4%	1,247	67%	46	2%	1,253	67%
Low-income	362	312	86%	60	16%	313	87%	21	6%	314	87%
Non-low-income	2,844	2,024	71%	173	6%	2,054	72%	66	2%	2,060	72%
Both minority & low-income	340	295	87%	58	17%	297	87%	21	6%	298	88%
Not both	1,845	1,213	66%	80	4%	1,231	67%	46	2%	1,236	67%
Total	**3,206**	**2,336**	**73%**	**233**	**7%**	**2,367**	**74%**	**87**	**3%**	**2,375**	**74%**

Distribution of Transit Amenities

Bus Shelters

For the purposes of monitoring Title VI compliance, the Operations and Services Development Department is responsible for the level-of-service assessment for bus shelters. This assessment is completed on an annual basis to evaluate whether the distribution and condition of bus shelters in minority and low-income areas are commensurate with the distribution and condition of shelters in nonminority and non-low-income areas.

Bus Shelter Location

The Operations and Services Development Department maintains records on the location of existing bus shelters and tracks the installation of new ones, including those that are installed by the MBTA, JCDecaux (formerly Wall), and Cemusa. Both JCDecaux and Cemusa are private companies that install bus shelters that they purchase and maintain using revenues earned from the sale of advertising space on the shelters. JCDecaux shelters are located exclusively in the city of Boston, and Cemusa shelters are located in a number of other cities within the MBTA service area. MBTA shelters are sometimes installed at bus stops where advertising is not viable.

For this report, CTPS analyzed the shelter location data provided by Operations and Services Development to evaluate the distribution of shelters in minority areas, low-income areas, and areas that are both minority and low-income. The percentage of bus stops with shelters in each of these three areas is greater than outside the respective areas, and throughout the system as a whole. As shown in Table 6-13, the percent of bus stops with shelters in minority areas (15 percent) is higher than the percent in nonminority areas (5 percent); the percent of bus stops with shelters in low-income areas (22 percent) is higher than in non-low-income areas (7 percent); and the percent of bus stops in areas with shelters that are both minority and low-income (22 percent) is greater than in areas that are not both minority and low-income (7 percent). The locations of bus shelters in the urban fixed-route service area are shown in Figure 6-4.

Under the MBTA's shelter placement policy, any bus stop with average daily boardings greater than 60 is eligible for a new shelter placement. CTPS therefore analyzed data for shelters located at stops that meet this threshold. As can be seen in Table 6-13 below, at bus stops with the policy threshold of greater than 60 average daily boardings, the percentage of minority stops with shelters (36 percent) is higher than the percentage of nonminority stops with shelters (28 percent). Likewise, the percentage of low-income stops with shelters (37 percent) is higher than the percentage of non-low-income stops with shelters (32 percent), and the percentage of stops that are both low-income and minority with shelters (37 percent) is greater than the percentage of stops with shelters that are not both minority and low-income (32 percent).

TABLE 6-13 2011 Bus Shelter Locations – Bus Stops with Shelters

Location Classification	All Bus Stops			Stops with Average Daily Boardings >60		
	Total Stops	Stops with Shelters	% of Stops with Shelters	Total Stops	Stops with Shelters	% of Stops with Shelters
Minority	3,622	559	15%	744	296	36%
Nonminority	5,578	302	5%	346	113	28%
Low-income	989	232	22%	307	123	37%
Non-low-income	8,211	629	7%	783	286	32%
Both minority & low-income	961	227	22%	304	123	37%
Not both	8,239	634	7%	786	286	32%
Systemwide	9,200	861	9%	1,090	409	34%

FIGURE 6-4
MBTA Title VI Report

MBTA Bus Shelters:
Urban Fixed-Route Service Area

Boston

0 1,000 2,000 4,000 Feet

0 1 2 4 Miles

MBTA Bus Shelters by Location

- Not low-income or minority
- Low-income
- Minority
- Minority and low-income
- MBTA bus routes (2009)

Census Tracts

- Low-income tract
- Minority tract
- Low-income and minority tract
- Non-low-income, non-minority tract
- Outside MBTA core

BUS SHELTER LOCATIONS BY AREA DESIGNATION

Not minority or low-income:	201
Low-income:	5
Minority:	223
Minority and low-income:	163
TOTAL BUS STOPS WITH SHELTERS:	**592**

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Bus Shelter Condition

In addition to monitoring the location of bus shelters for the purpose of Title VI, the MBTA also monitors the condition of bus shelters.

JCDecaux and Cemusa inspect and clean their shelters twice a week and make repairs as needed. They both also respond to complaints that are submitted to the MBTA and address each problem within 24 hours. The MBTA assumes no responsibility for these shelters or their maintenance. However, the MBTA is responsible for the condition of shelters it owns. Inspection and maintenance of MBTA shelters occurs on a regular basis, and additional repairs and cleaning are performed by the MBTA in response to customer complaints and bus operator reports.

To ensure Title VI compliance for bus shelter condition, CTPS inspects all shelters annually, regardless of ownership. CTPS collected data throughout the year to evaluate shelters on the following characteristics: roof condition, condition of side panels, presence of graffiti/vandalism, and shelter cleanliness. For every shelter, each characteristic was given a rating of 1 to 3, with 1 representing a "good" condition and 3 representing a "poor" condition. A composite score was then assigned to each shelter based on its worst rating. Thus, if a shelter received ratings of 1 for roof and side-panel condition, 2 for vandalism, and 3 for shelter cleanliness, it would receive a composite score of 3.

As can be seen from the data displayed in Table 6-14, bus shelter conditions in minority, low-income, and both minority and low-income areas are similar for roof condition and graffiti/vandalism to shelters in areas not so designated. However, significant differences exist between minority and nonminority areas for sides condition and between low-income and non-low-income areas for sides condition and shelter cleanliness. Areas that are both minority and low-income also have significant differences for sides condition and shelter cleanliness compared to areas that are not both minority and low-income. These scores result in significant differences between the composite scores for minority compared to non-minority areas, low-income compared to non-low-income areas, and areas that are both minority and low-income compared to areas that are not both minority and low-income.

The MBTA is hiring a new contractor to clean bus shelters that are owned and maintained by the Authority (24 percent). The new contract includes a higher level of cleaning than the previous one. The MBTA will continue to monitor bus shelter conditions to ensure that there are no significant differences in condition between those found in minority, low-income, and both minority and low-income areas and those located in areas which are not minority, not low-income, or not both.

TABLE 6-14 2011 Bus Shelter Conditions – Average Scores for All Shelters					
Location Classification	**Roof Condition**	**Sides Condition**	**Graffiti/ Vandalism**	**Shelter Cleanliness**	**Composite Score**
Minority	1.06	1.17*	1.09	1.15	1.34*
Nonminority	1.04	1.05*	1.10	1.10	1.20*
Low-income	1.07	1.22*	1.09	1.21*	1.43*
Non-low-income	1.05	1.09*	1.09	1.10*	1.24*
Both minority & low-income	1.08	1.23*	1.09	1.21*	1.45*
Not both	1.05	1.09*	1.09	1.10*	1.24*
** Indicates that the difference is statistically significant.*					

Signs, Benches, Timetables, and Route Maps in Shelters

An additional metric of analysis for bus shelter condition is the percentage of shelters with certain amenity features; specifically, whether the following exist at the shelter location: a sign, a bench, a timetable, and a map, as well as whether the map and timetable are legible and current. CTPS collected data for each of these metrics and the results are presented in Table 6-15.

A higher percentage of the shelters in minority, low-income, and both minority and low-income areas had signs than in areas not so designated. There is little difference in the presence of benches in bus shelters in minority compared to nonminority areas. However, low-income and both minority and low-income areas had lower percentages of benches than areas that are not low-income or not both minority and low-income.

A higher percentage of the shelters in minority areas had timetables than those in nonminority areas, and a greater percentage of them were both legible and current than those in nonminority areas. Similarly, in areas designated as low-income and as both minority and low-income, a greater percentage of shelters had timetables than in areas that were not low-income or not both minority and low-income. However, of the timetables found in areas that are designated as low-income and as both minority and low-income, a lower percentage were legible and current than those found in areas that are not low-income or not both minority and low-income.

A higher percentage of the shelters in minority, low-income, and both minority and low-income areas had maps than in areas not so designated. Higher percentages of the maps found in shelters in minority, low-income, and both minority and low-income areas were legible and current than maps in shelters in other areas.

TABLE 6-15 2011 Bus Shelter Conditions – Average Percentages of Shelters								
Location Classification	Sign Exists	Bench Exists	Timetable			Map		
			Exists	Legible	Current	Exists	Legible	Current
Minority	64.1%	96.4%	46.7%	96.7%	53.3%	76.7%	95.6%	53.3%
Nonminority	42.0%	96.9%	38.2%	90.4%	47.9%	58.5%	88.8%	47.9%
Low-income	64.6%	94.4%	44.1%	93.1%	40.3%	77.0%	96.0%	40.3%
Non-low-income	53.5%	97.3%	43.8%	95.6%	56.4%	68.3%	92.7%	56.4%
Both minority & low-income	64.7%	94.3%	44.9%	93.0%	40.8%	76.9%	95.9%	40.8%
Not both	53.6%	97.4%	43.5%	95.6%	56.0 %	68.4%	92.8%	56.0%

Neighborhood Maps at Rapid Transit Stations

Through the neighborhood map program, maps that show bus connections are provided at rapid transit stations with bus service. Neighborhood maps are also generally installed at all new or renovated stations, regardless of the availability or lack of availability of bus service. As can be seen in Table 6-16, the percentage of minority stations that provide neighborhood maps is higher than the percentage of nonminority stations that have maps, and the percentage of low-income stations with maps is lower than the percentage of non-low-income stations in which maps have been placed. The MBTA will evaluate where additional maps can be placed to make the distribution at stations in low-income areas equitable with the distribution at non-low-income stations.

TABLE 6-16 Stations with Neighborhood Maps			
Station Classification	Stations	# with Maps	% with Maps
Minority	84	71	85%
Nonminority	56	40	71%
Low-income	32	23	72%
Non-low-income	108	88	81%
Systemwide	140	111	79%

Rapid Transit, Commuter Rail, and Commuter Boat Stations

Inspection, cleaning, and maintenance of MBTA stations occur on a regular basis. To ensure Title VI compliance for station condition reporting, CTPS collected data in 2009 to evaluate stations on the characteristics listed below for both the interior and the exterior of the stations. For every station, each characteristic was given a rating of 1 to 3, with 1 representing a "good" condition and 3 representing a "poor" condition.

- Exterior Characteristics:
  - Condition of the structure
  - Evidence of vandalism
  - Cleanliness
  - Signage (visibility and condition of station signs)
  - Condition of pedestrian access to the station
  - Condition of the parking facility, including surface, signage, and path from parking to the station

- Interior Characteristics:
  - Condition of the structure
  - Evidence of vandalism
  - Cleanliness
  - Signage
  - Condition of the platform
  - Lighting

In addition, stations were evaluated according to the presence of amenities, including trash receptacles, and the presence of schedules and transfer bus route timetables and maps and how current they are (when relevant).

This is the first time systemwide data has been collected on station conditions. The MBTA is using this data to ensure that station conditions and ammenities are consistent throughout the system, and will correct any deficiencies as resources become available.

Subway Rapid Transit Stations – Exterior Conditions

This section discusses only the underground rapid transit stations. Those that are on the surface are discussed in the following section.

Figure 6-5 and Table 6-17 show the scores for the various exterior station condition characteristics for the MBTA subway system. As can be seen, all stations, regardless of their minority or low-income status, received scores of 1.50 or less on all of the exterior condition characteristics, and there was little difference between the scores. Minority stations scored slightly better than nonminority stations on the structure, cleanliness, signage, and surface-of-the-parking-facility-condition characteristics, and they scored worse

on the vandalism, pedestrian-access, signage-at-the-parking-facility, and path-to-the-station-from-the-parking-facility characteristics. Low-income stations scored better on the cleanliness, signage, pedestrian-access, surface-of-the-parking-facility, and path-to-the-station-from-the-parking-facility characteristics; worse on the structure and vandalism characteristics; and significantly worse on the signage-at-the-parking-facility characteristic. All stations that are classified as low-income are also classified as minority, so it is unnecessary to compare stations that are both minority and low-income to those that are not both.

FIGURE 6-5 Subway Rapid Transit Stations – Exterior Conditions

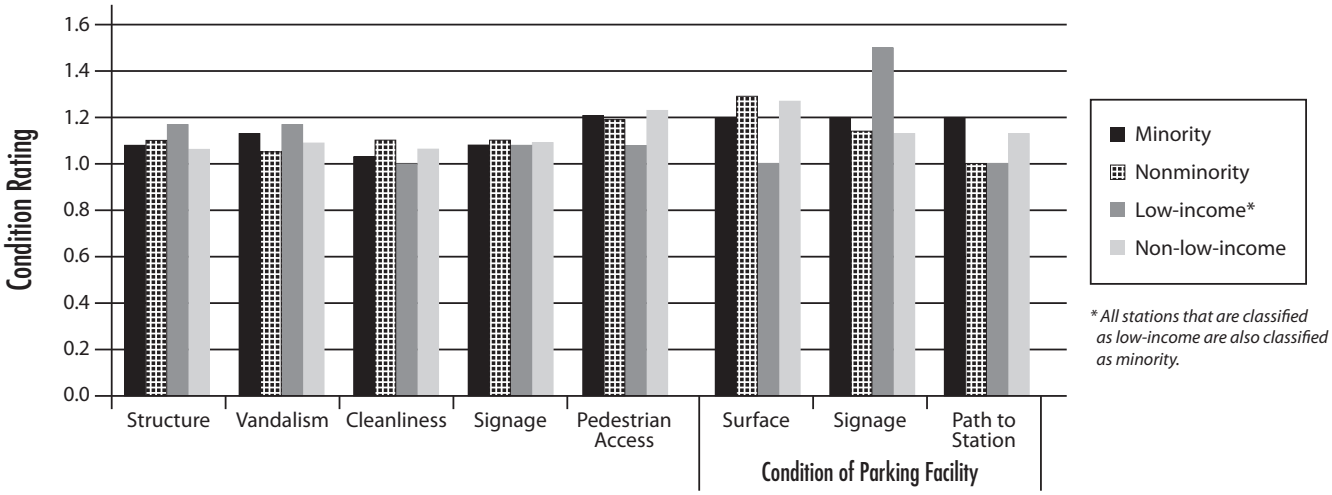


TABLE 6-17 Subway Rapid Transit Stations – Exterior Conditions

Station Classification	Structure	Vandalism	Cleanliness	Signage	Pedestrian Access	Condition of Parking Facility		
						Surface	Signage	Path to Station
Minority	1.08	1.13	1.03	1.08	1.21	1.20	1.20	1.20
Nonminority	1.10	1.05	1.10	1.10	1.19	1.29	1.14	1.00
Low-income*	1.17	1.17	1.00	1.08	1.08	1.00	1.50	1.00
Non-low-income	1.06	1.09	1.06	1.09	1.23	1.27	1.13	1.13

** All stations that are classified as low-income are also classified as minority.*

Subway Rapid Transit Stations – Interior Conditions

Figure 6-6 and Table 6-18 show the scores for the various interior station condition characteristics for the MBTA subway system. As can be seen, all categories of stations received good scores (1.29 or less) on all of the interior condition characteristics. Minority stations scored better than nonminority stations on all characteristics except platform condition and lighting (lights functioning so that there are no dark areas in the station). Low-income stations scored better on all characteristics except cleanliness.

FIGURE 6-6 Subway Rapid Transit Stations – Interior Conditions

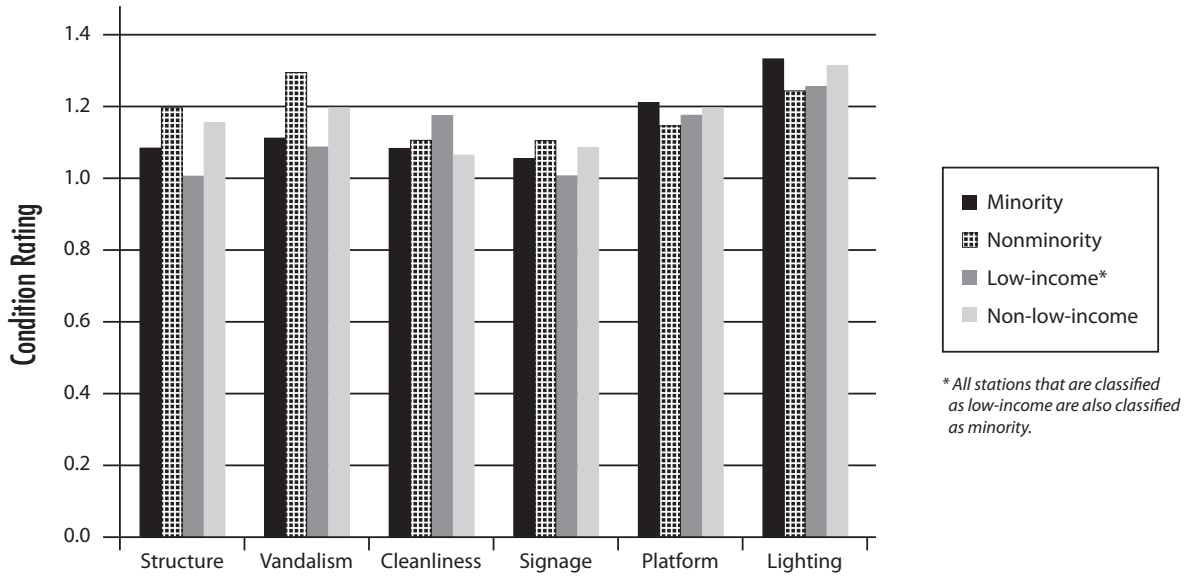


TABLE 6-18 Subway Rapid Transit Stations – Interior Conditions

Station Classification	Structure	Vandalism	Cleanliness	Signage	Platform	Lighting
Minority	1.08	1.11	1.08	1.05	1.21	1.33
Nonminority	1.19	1.29	1.10	1.10	1.14	1.24
Low-income*	1.00	1.08	1.17	1.00	1.17	1.25
Non-low-income	1.15	1.19	1.06	1.08	1.19	1.31

** All stations that are classified as low-income are also classified as minority.*

Subway Rapid Transit Stations – Interior Amenities

Figure 6-7 and Table 6-19 show the percentage of subway stations, by minority and low-income status, that offer various amenities, including benches, trash receptacles, and bus transfer timetables and route maps. They also show what percent of the timetables and maps are legible and current. As shown, a slightly smaller percentage of minority stations have benches, trash receptacles, timetables, and bus route maps than nonminority stations. Additionally, the percentage of timetables and maps that are legible and current is lower in minority stations than in nonminority stations. The percentage of stations that have benches and transfer bus route maps is higher for low-income stations than non-low-income stations, and the percentage of stations that have trash receptacles and timetables is lower for low-income stations than for non-low-income stations. The percentage of maps in low-income stations that are legible and current is higher than in non-low-income stations, and while the percentage of bus route maps that are legible is slightly higher in low-income stations than in non-low-income stations, the percentage that are current is lower.

FIGURE 6-7 Subway Rapid Transit Stations – Interior Amenities

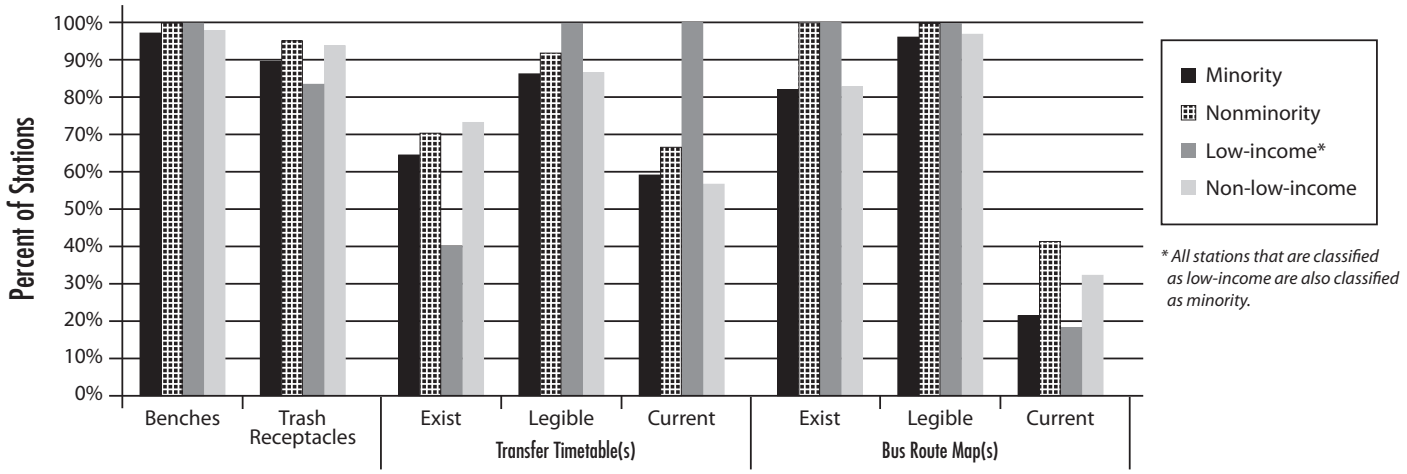


TABLE 6-19 Subway Rapid Transit Stations – Interior Amenities								
Station Classification	Benches	Trash Receptacles	Transfer Timetable(s)			Bus Route Map(s)		
			Exist	Legible	Current	Exist	Legible	Current
Minority	97%	90%	65%	86%	59%	82%	96%	21%
Nonminority	100%	95%	71%	92%	67%	100%	100%	41%
Low-income*	100%	83%	40%	100%	100%	92%	100%	18%
Non-low-income	98%	94%	73%	87%	57%	83%	97%	32%
** All stations that are classified as low-income are also classified as minority.*								

Surface Rapid Transit Stations – Exterior Conditions

Figure 6-8 and Table 6-20 show the scores for the various exterior station condition characteristics for the MBTA surface rapid transit system. As can be seen, all categories of surface rapid transit stations received good scores (1.38 or less) on all of the exterior station condition characteristics. All stations received the best possible score (1.00) for condition of the structure, cleanliness, and signage. Minority stations scored better than nonminority stations on the vandalism and pedestrian access characteristics. Since none of the surface rapid transit stations in minority areas have parking facilities, no comparison can be made for this characteristic. Low-income stations scored better than non-low-income stations on the vandalism and pedestrian access characteristics. Since none of the surface rapid transit stations in low-income areas have parking facilities, no comparison can be made for this characteristic. All stations that are classified as low-income are also classified as minority, so it is unnecessary to compare stations that are both minority and low-income to those that are not both.

FIGURE 6-8 Surface Rapid Transit Stations – Exterior Conditions

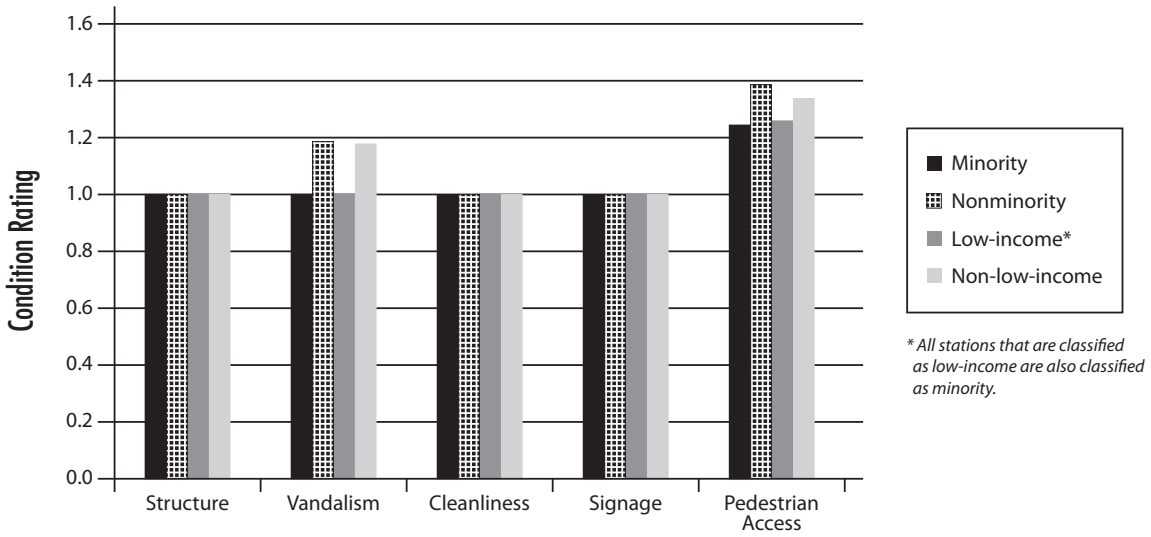


TABLE 6-20 Surface Rapid Transit Stations – Exterior Conditions								
Station Classification	Structure	Vandalism	Cleanliness	Signage	Pedestrian Access	Condition of Parking Facility		
						Surface	Signage	Path to Station
Minority	1.00	1.00	1.00	1.00	1.24	N/A	N/A	N/A
Nonminority	1.00	1.18	1.00	1.00	1.38	1.22	1.11	1.00
Low-income*	1.00	1.00	1.00	1.00	1.25	N/A	N/A	N/A
Non-low-income	1.00	1.17	1.00	1.00	1.33	1.22	1.11	1.00
** All stations that are classified as low-income are also classified as minority.*								

Surface Rapid Transit Stations – Interior Conditions

Figure 6-9 and Table 6-21 show the scores for the various interior station condition characteristics for the MBTA surface rapid transit system. As can be seen, all categories of stations received scores of 1.50 or less on all of the interior condition characteristics. All stations, regardless of category, received the highest score (1.00) on the condition of the structure, cleanliness, and signage characteristics. Minority stations scored better than nonminority stations on the vandalism and condition-of-platform characteristics. Low-income stations scored better than non-low-income stations on the vandalism characteristic, but slightly worse on the condition-of-platform characteristic.

FIGURE 6-9: Surface Rapid Transit Stations - Interior Conditions

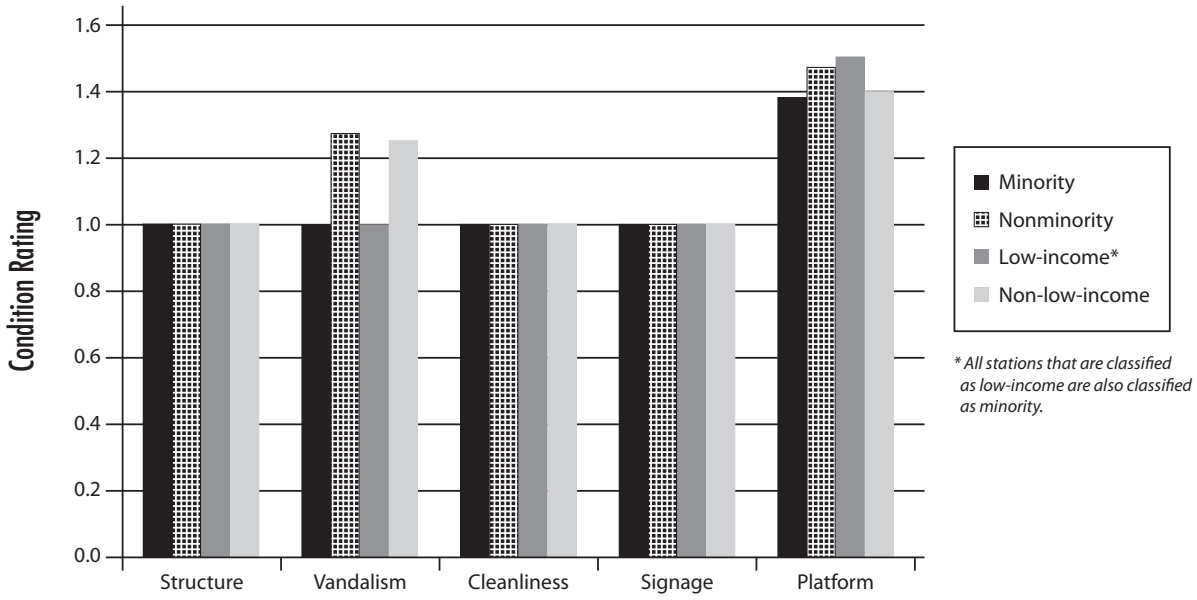


TABLE 6-21 Surface Rapid Transit Stations – Interior Conditions					
Station Classification	**Structure**	**Vandalism**	**Cleanliness**	**Signage**	**Platform**
Minority	1.00	1.00	1.00	1.00	1.38
Nonminority	1.00	1.27	1.00	1.00	1.47
Low-income*	1.00	1.00	1.00	1.00	1.50
Non-low-income	1.00	1.25	1.00	1.00	1.40
** All stations that are classified as low-income are also classified as minority.*					

Surface Rapid Transit Stations – Amenities

Figure 6-10 and Table 6-22 show the percentage of surface rapid transit stations, by minority and low-income status, that offer various amenities, including benches, trash receptacles, and bus transfer timetables and route maps. It also shows what percent of the timetables and maps are legible and current. Some of the surface rapid transit stations have physical constraints (they are located in a narrow strip in the center of a roadway) which prevent the placement of various amenities. As shown, a smaller percentage of minority stations have benches and trash receptacles, and a significantly larger percentage of minority stations have timetables and bus route maps, than nonminority stations. All timetables and maps in surface rapid transit stations are legible. The percentage of timetables that are current is lower in minority stations than in nonminority stations, and the percentage of maps that are current is higher in minority stations than nonminority stations. The percentage of stations that have transfer timetables and bus route maps is higher for low-income stations than non-low-income stations, and the percentage of stations that have benches and trash receptacles is lower for low-income stations than for non-low-income stations. The percentage of maps and timetables that are current is lower in low-income stations than in non-low-income stations.

Since the 2009 data on station condition was collected, the MBTA has added new shelters with benches and all other amenities at two stations that are classified as both minority and low-income.

FIGURE 6-10 Surface Rapid Transit Stations – Amenities

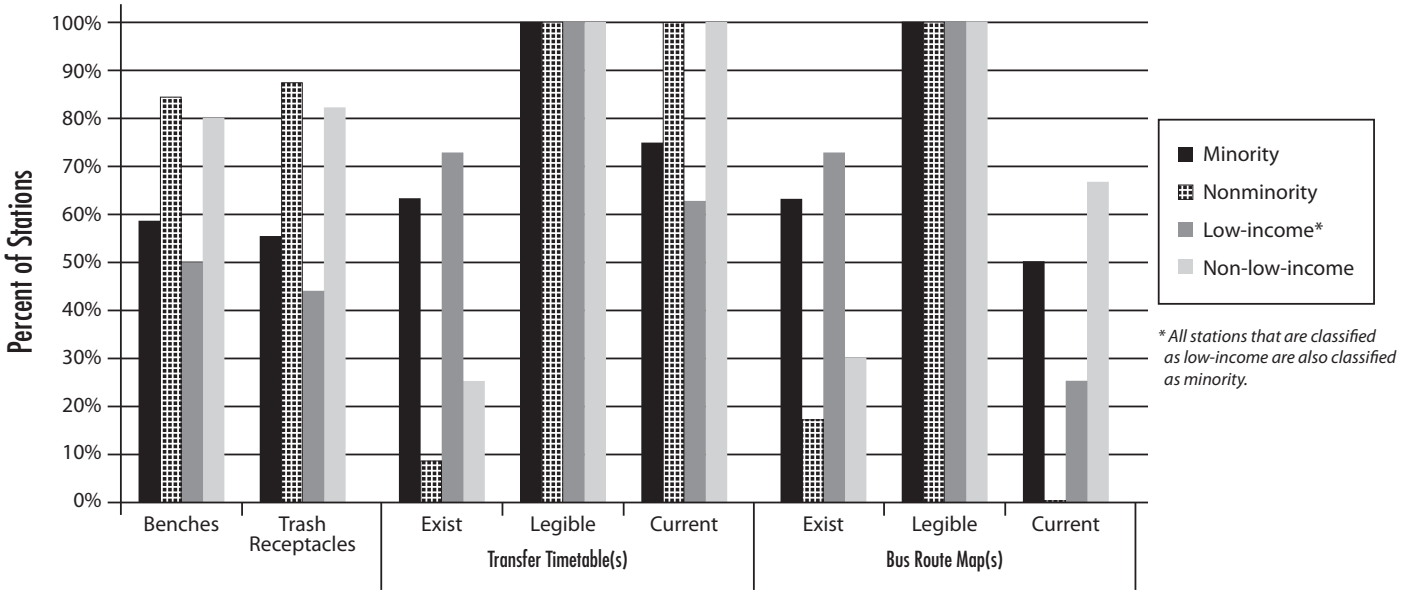


TABLE 6-22 Surface Rapid Transit Stations – Amenities

Station Classification	Benches	Trash Receptacles	Transfer Timetable(s)			Bus Route Map(s)		
			Exist	Legible	Current	Exist	Legible	Current
Minority	59%	55%	63%	100%	75%	63%	100%	50%
Nonminority	84%	88%	8%	100%	100%	17%	100%	0%
Low-income*	50%	44%	73%	100%	63%	73%	100%	25%
Non-low-income	80%	82%	25%	100%	100%	30%	100%	67%

** All stations that are classified as low-income are also classified as minority.*

Commuter Rail Stations – Exterior Conditions

Figure 6-11 and Table 6-23 show the scores for the various exterior station condition characteristics for the MBTA commuter rail network. As can be seen, commuter rail stations received mixed scores on the exterior station condition characteristics. Minority stations scored better than nonminority stations on the structure condition, cleanliness, signage, and pedestrian access characteristics, as well as the surface of the parking facility and the signage in the parking facility. Minority stations scored slightly worse than

nonminority stations on the vandalism and condition of the path from the parking facility to the station. Low-income stations scored better than non-low-income stations on all of the exterior station condition characteristics. All stations that are classified as low-income are also classified as minority, so it is unnecessary to compare stations that are both minority and low-income to those that are not both.

FIGURE 6-11 Commuter Rail Stations – Exterior Conditions

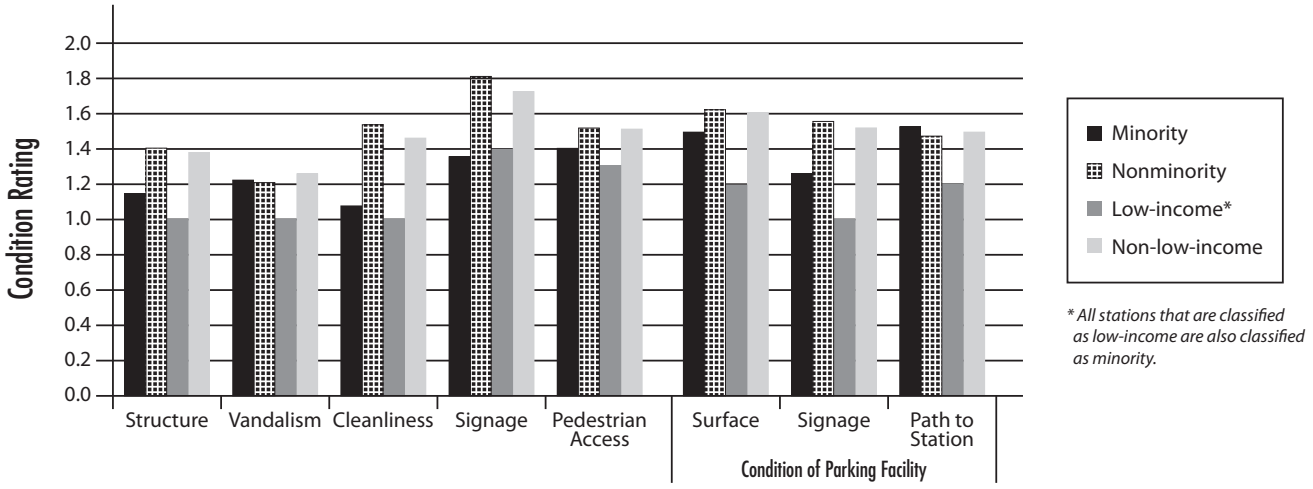


TABLE 6-23 Commuter Rail Stations – Exterior Conditions

Station Classification	Structure	Vandalism	Cleanliness	Signage	Pedestrian Access	Condition of Parking Facility		
						Surface	Signage	Path to Station
Minority	1.15	1.23	1.08	1.36	1.41	1.50	1.26	1.53
Nonminority	1.41	1.21	1.54	1.81	1.52	1.62	1.56	1.48
Low-income*	1.00	1.00	1.00	1.40	1.30	1.20	1.00	1.20
Non-low-income	1.38	1.26	1.46	1.73	1.51	1.61	1.52	1.50

** All stations that are classified as low-income are also classified as minority.*

Commuter Rail Stations – Interior Conditions

Figure 6-12 and Table 6-24 show the scores for the various interior station condition characteristics for the MBTA commuter rail network. As can be seen, minority stations received better scores than nonminority stations and low-income stations received better scores than non-low-income stations for all of the interior condition characteristics.

FIGURE 6-12 Commuter Rail Stations – Interior Conditions

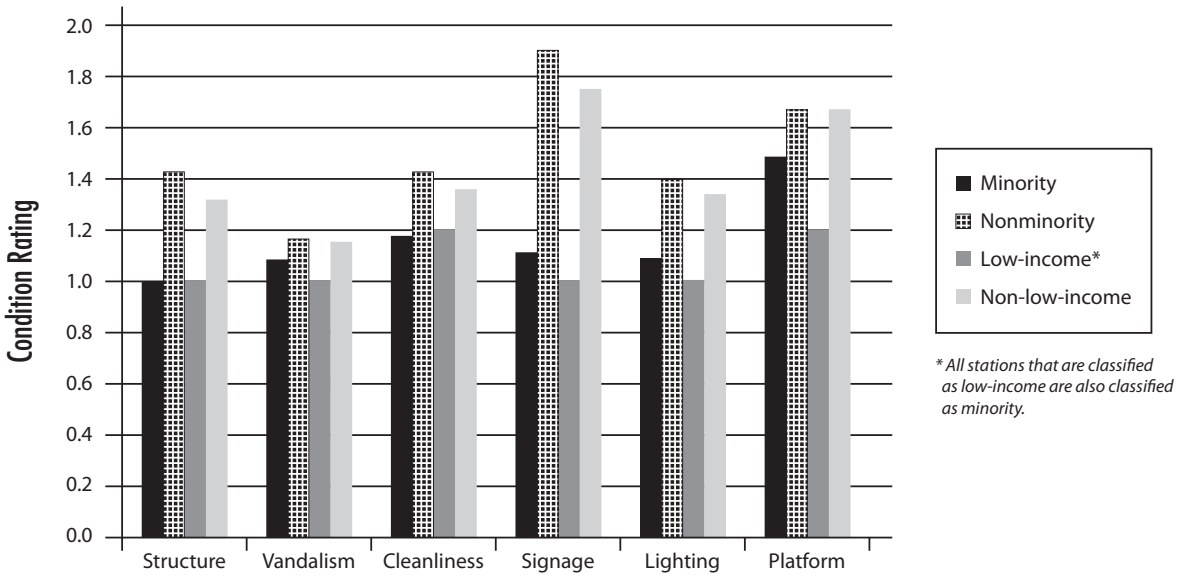


TABLE 6-24 Commuter Rail Stations – Interior Conditions

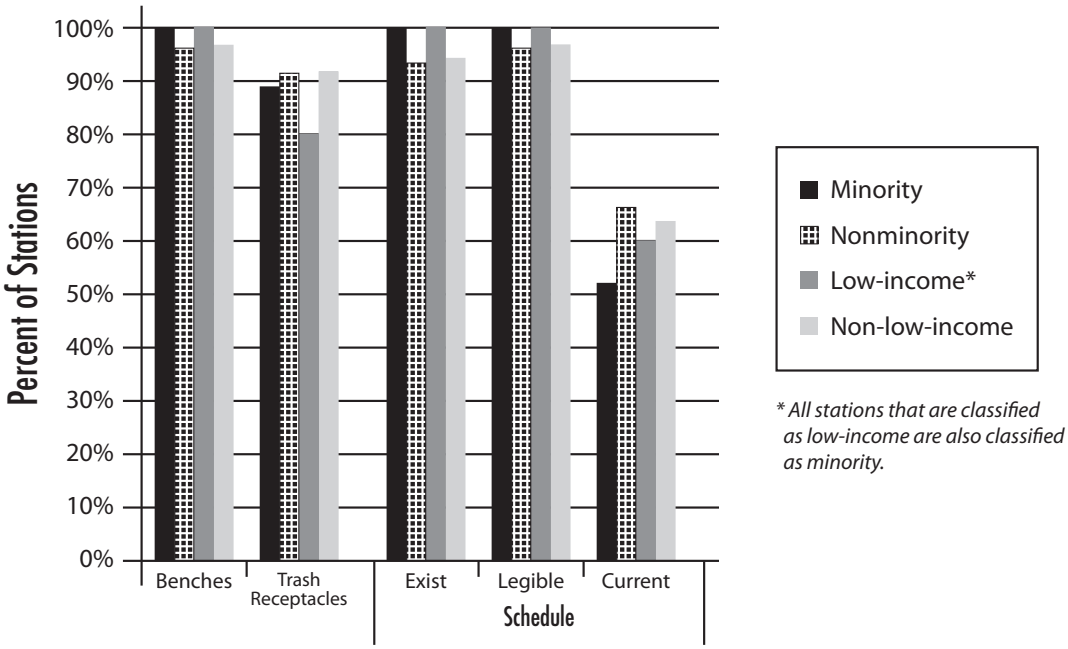
Station Classification	Structure	Vandalism	Cleanliness	Signage	Platform	Lighting
Minority	1.00	1.08	1.17	1.11	1.48	1.09
Nonminority	1.42	1.16	1.42	1.89	1.66	1.39
Low-income*	1.00	1.00	1.20	1.00	1.20	1.00
Non-low-income	1.31	1.15	1.35	1.74	1.66	1.33

** All stations that are classified as low-income are also classified as minority.*

Commuter Rail Stations – Amenities

Figure 6-13 and Table 6-25 show the percentage of commuter rail stations, by minority and low-income status, that offer various amenities, including benches, trash receptacles, and schedules. As shown, a larger percentage of minority stations have benches and schedules than nonminority stations, and a slightly smaller percentage of minority stations have trash receptacles than nonminority stations. The percentage of stations that have benches and schedules is higher for low-income stations than non-low-income stations, and the percentage of stations that have trash receptacles is lower for low-income stations than for non-low-income stations. The MBTA will work with MBCR and/or the appropriate municipality to add trash receptacles where needed.

FIGURE 6-13 Commuter Rail Stations – Amenities



** All stations that are classified as low-income are also classified as minority.*

TABLE 6-25 Commuter Rail Stations – Amenities					
Station Classification	Benches	Trash Receptacles	Schedule		
			Exist	Legible	Current
Minority	100%	89%	100%	100%	52%
Nonminority	96%	91%	93%	96%	66%
Low-income*	100%	80%	100%	100%	60%
Non-low-income	97%	92%	94%	96%	63%
** All stations that are classified as low-income are also classified as minority.*					

Commuter Boat Stations – Exterior Conditions

Figure 6-14 and Table 6-26 show the scores for the various exterior station condition characteristics for the MBTA commuter boat system. No commuter boat stations are classified as low-income, so it is unnecessary to compare stations that are low-income to those that are not or those that are both minority and low-income to those that are not both. As can be seen, all commuter boat stations—minority and nonminority—received the best possible score (1.00) on the exterior station condition characteristics.

FIGURE 6-14 Commuter Boat Stations – Exterior Conditions

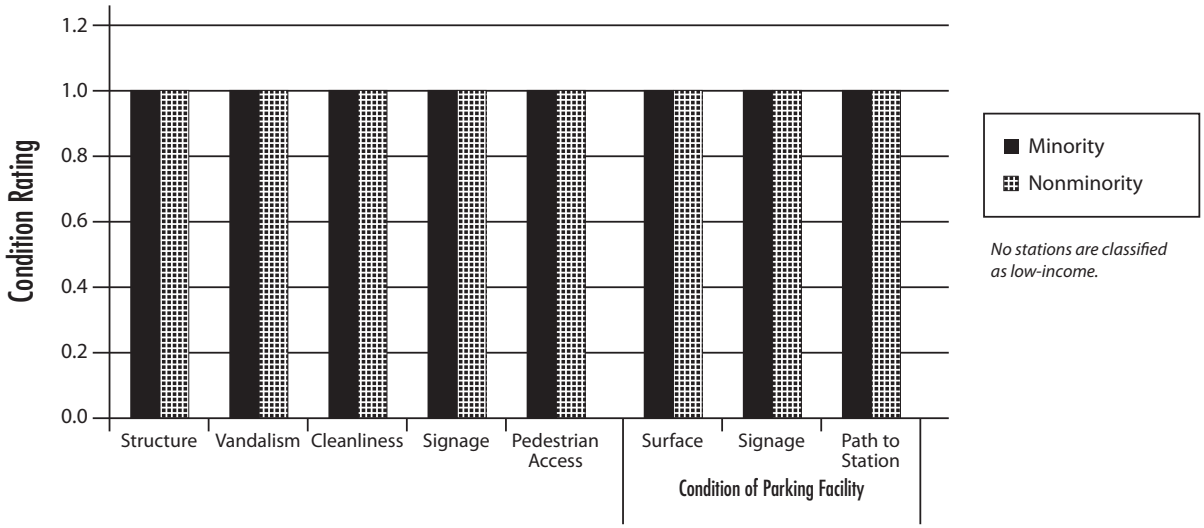


TABLE 6-26 Commuter Boat Stations – Exterior Conditions								
Station Classification*	Structure	Vandalism	Cleanliness	Signage	Pedestrian Access	Condition of Parking Facility		
						Surface	Signage	Path to Station
Minority	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Nonminority	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
**No stations are classified as low-income.*								

Commuter Boat Stations – Interior Conditions

Figure 6-15 and Table 6-27 show the scores for the various interior station condition characteristics for the MBTA commuter boat system. As can be seen, all stations received the best possible score for all of the interior condition characteristics.

FIGURE 6-15 Commuter Boat Stations – Interior Conditions

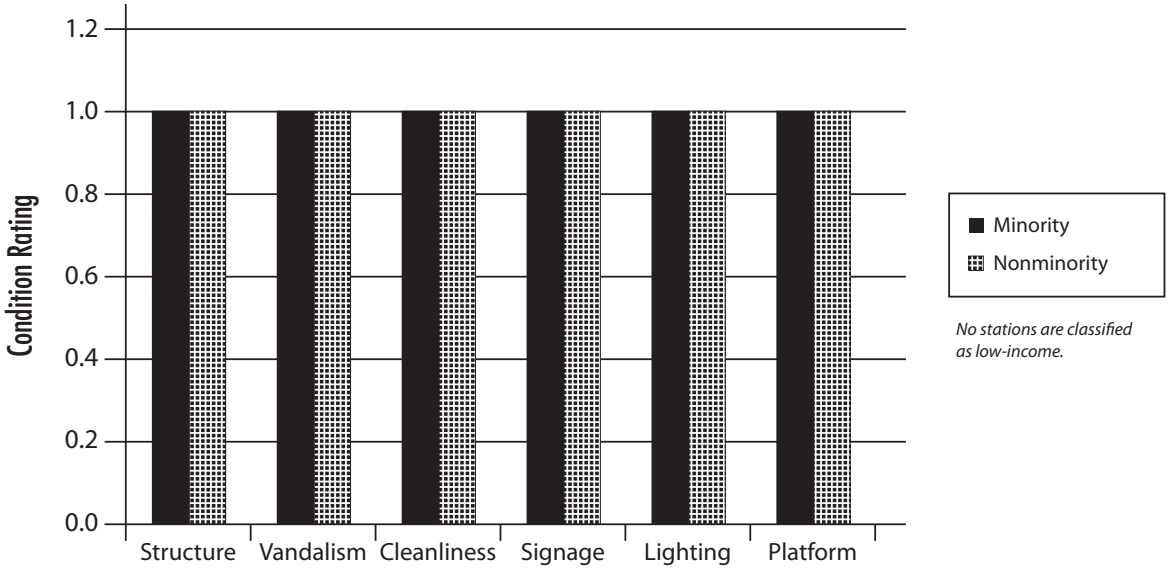


TABLE 6-27 Commuter Boat Stations – Interior Conditions						
Station Classification*	Structure	Vandalism	Cleanliness	Signage	Platform	Lighting
Minority	1.00	1.00	1.00	1.00	1.00	1.00
Nonminority	1.00	1.00	1.00	1.00	1.00	1.00
**No stations are classified as low-income.*						

Commuter Boat Stations – Amenities

Figure 6-16 and Table 6-28 show the percentage of commuter boat stations in each category that offer various amenities, including benches, trash receptacles, and schedules. As can be seen, all stations have benches. The percentage of stations that have trash receptacles is lower for minority stations than for nonminority stations.

FIGURE 6-16 Commuter Boat Stations – Amenities

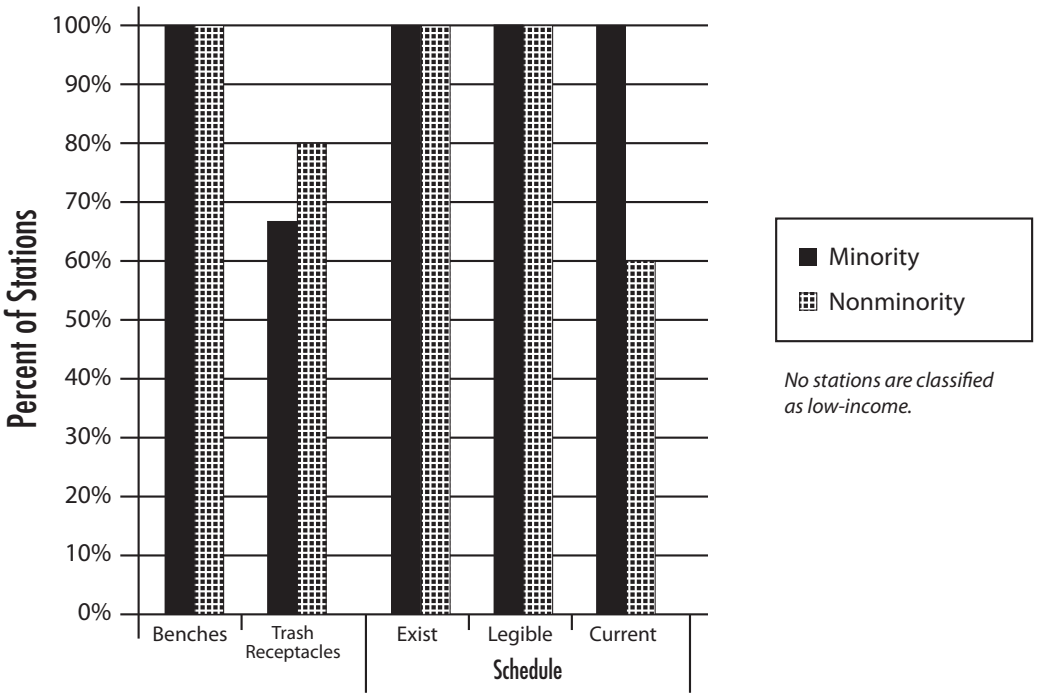


TABLE 6-28 Commuter Boat Stations – Amenities					
Station Classification*	Benches	Trash Receptacles	Schedule		
			Exists	Legible	Current
Minority	100%	67%	100%	100%	100%
Nonminority	100%	80%	100%	100%	60%
**No stations are classified as low-income.*					

Bicycle Parking Facilities

Using American Recovery and Reinvestment Act (ARRA) funding, the MBTA initiated a variety of programs to enhance and expand MBTA bicycle parking facilities. These programs include the construction of new "Pedal & Park" bike cages (enclosed and equipped with video cameras and controlled-door access for safety and security) at eight rapid transit stations, and "BikePorts" (covered bike parking) at 22 rapid transit and 19 commuter rail stations. Table 6-29 shows, by minority and low-income status, the number and percentage of rapid transit stations with each type of bicycle parking facility. As shown, the percentage of rapid transit stations with Pedal & Park facilities is higher in minority areas than in nonminority areas, the percentage of rapid transit stations with BikePort facilities is similar in minority areas to that in nonminority areas, and the percentage of rapid transit stations with either type of bicycle-parking facility is higher in minority areas than in nonminority areas. However, the percentage of rapid transit stations with either Pedal & Park or BikePort facilities is lower in low-income areas than in non-low-income areas.

TABLE 6-29 Bicycle Parking Facilities at Rapid Transit Stations						
Station Classification	Pedal and Park		BikePort		Total	
	Number	Percent	Number	Percent	Number	Percent
Minority	6	9%	12	18%	18	26%
Nonminority	2	4%	10	19%	11	21%
Low-income	1	4%	2	7%	3	11%
Non-low-income	7	8%	20	22%	26	28%

Table 6-30 shows the number and percentage of commuter rail stations in minority, nonminority, low-income, and non-low-income areas with BikePorts (only BikePorts are installed at commuter rail stations). As shown, the percentage of commuter rail stations with BikePorts is the same in minority areas and nonminority areas. However, the percentage of commuter rail stations with BikePorts is lower in low-income areas than in non-low-income areas.

TABLE 6-30 BikePorts at Commuter Rail Stations

Station Classification	Number	Percent
Minority	4	15%
Nonminority	15	15%
Low-income	1	10%
Non-low-income	18	15%

The bicycle parking facility locations were selected based on existing demand at stations and the physical limitations at stations. If additional resources become available, the MBTA will look to increase the number of stations with bicycle parking facilities.

Automated Fare Collection (AFC): Fare Gates and Fare-Vending Machines

All rapid transit stations are equipped with fare gates and fare vending machines (FVMs), and the MBTA has established the following performance metrics that are based on the availability for use of the fare gates and fare vending machines:

- The minimum acceptable device availability threshold is 95 percent.
- The device availability goal is 98 percent.

As can be seen in Table 6-31, the average percentage of device in-service time is lower than the minimum acceptable device availability at all stations for cashless FVM and full-service FVM. For cashless FVM, the average percentage of device in-service time in minority stations and nonminority stations is comparable, and in-service times in low-income and non-low-income stations are also comparable. For full-service FVM, the average percentage of device in-service time is slightly lower in minority than in nonminority stations, but is comparable in low-income and non-low-income stations. Because all low-income areas with cashless FVM are also minority, no additional analysis is necessary to compare the percentage of device in-service times in areas that are both minority and low-income with the percentage in areas that are not both. The average percentage of device in-service time has declined since the last Title VI report,

particularly for full-service FVMs. The MBTA will determine why the cashless FVM and full-service FVM are failing to meet the minimum acceptable device availability threshold, particularly at low-income and minority stations.

The average percentage of device in-service time for high-speed fare gates and ADA-compliant fare gates equals or exceeds the minimum acceptable device availability threshold at all stations, regardless of minority and low-income status. The availability of both of these types of fare gates either remained the same or improved in 2009 for all stations except minority, where the percentage of in-service ADA gates declined slightly in minority stations, and the percentage of in-service high-speed gates declined slightly in low-income stations.

TABLE 6-31 Fare Gate and Fare Vending Machine (FVM) Operability

Device Type	Station Classification	Total Devices	% In Service
Cashless FVM	Minority	111	92%
	Nonminority	46	91%
	Low-income*	45	93%
	Non-low-income	112	91%
	Systemwide	**157**	**92%**
Full-service FVM	Minority	209	82%
	Nonminority	100	86%
	Low-income*	70	83%
	Non-low-income	239	84%
	Systemwide	**309**	**83%**
ADA gates	Minority	93	97%
	Nonminority	39	98%
	Low-income*	36	99%
	Non-low-income	96	97%
	Systemwide	**132**	**97%**

TABLE 6-31 Fare Gate and Fare Vending Machine (FVM) Operability (cont.)			
Device Type	**Station Classification**	**Total Devices**	**% In Service**
High-speed gates	Minority	236	98%
	Nonminority	111	98%
	Low-income*	84	97%
	Non-low-income	263	98%
	Systemwide	**347**	**98%**
** All stations that are classified as low-income are also classified as minority.*			

AFC Retail Sales Terminals

As can be seen in Table 6-32, the percentage of Retail Sales Terminals (RST) in minority areas is higher than the percentage of RST in nonminority areas in both the urban fixed-route service area and the commuter rail service area. While the percentage of RST in low-income areas is lower than the percentage of RST in non-low-income areas, this distribution has improved slightly for the commuter rail service area (from 24 percent in 2009 to 26 percent in 2010). Because all low-income areas with RST are also minority, no additional analysis is necessary to compare the percentage of RST in areas that are both minority and low-income with the percentage in areas that are not both. The MBTA has a standing order for an additional 100 RST, to be sited in 2012. AFC staff will work with Planning/Development and Civil Rights staff to ensure Title VI compliance and that adequate facilities are included at low-income and minority areas. Figure 6-17 shows the distribution of RST in the urban fixed-route service area, and Figure 6-18 shows the distribution of RST in the commuter rail service area.

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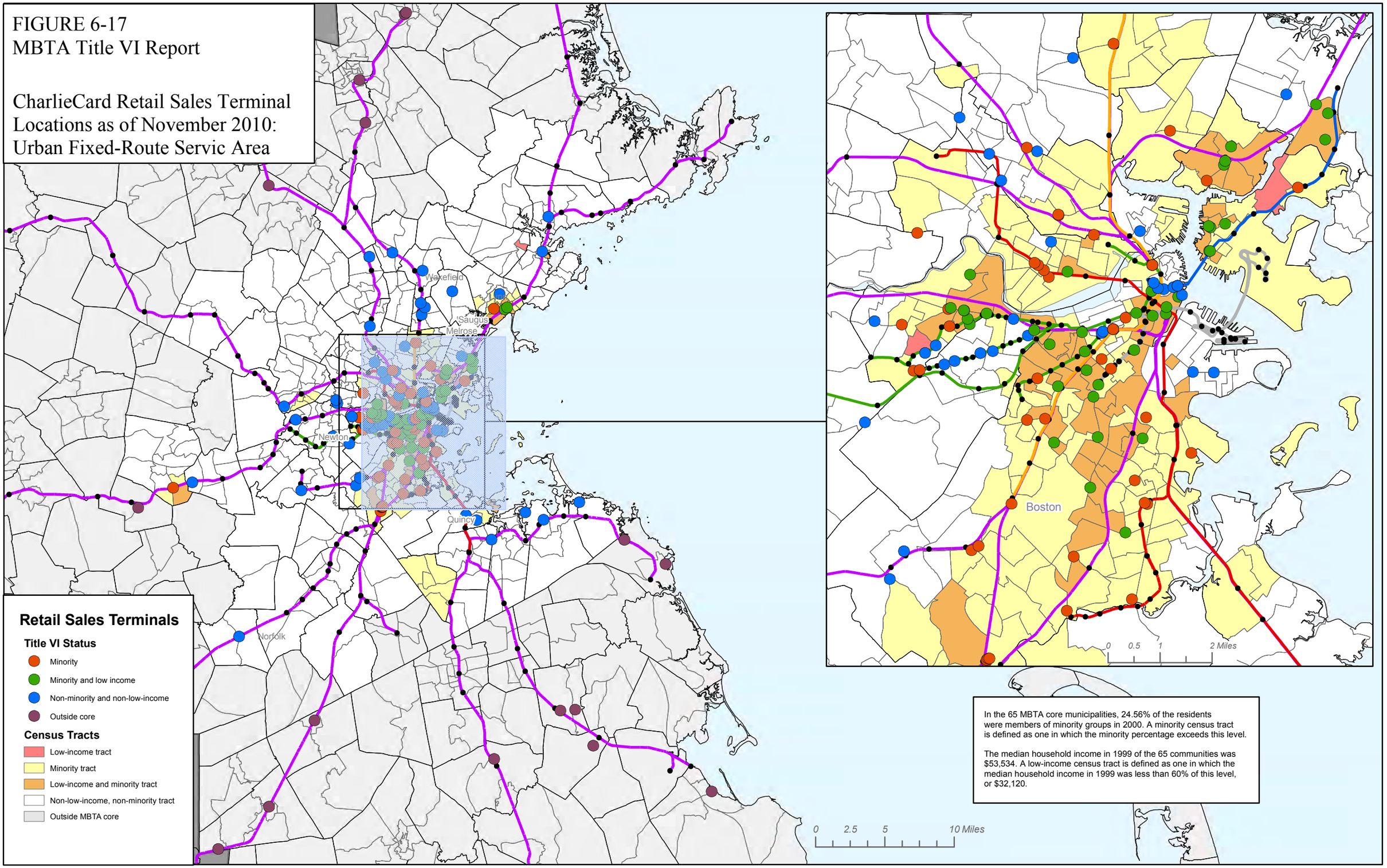
FIGURE 6-17
MBTA Title VI Report

CharlieCard Retail Sales Terminal Locations as of November 2010: Urban Fixed-Route Servic Area



In the 65 MBTA core municipalities, 24.56% of the residents were members of minority groups in 2000. A minority census tract is defined as one in which the minority percentage exceeds this level.

The median household income in 1999 of the 65 communities was $53,534. A low-income census tract is defined as one in which the median household income in 1999 was less than 60% of this level, or $32,120.

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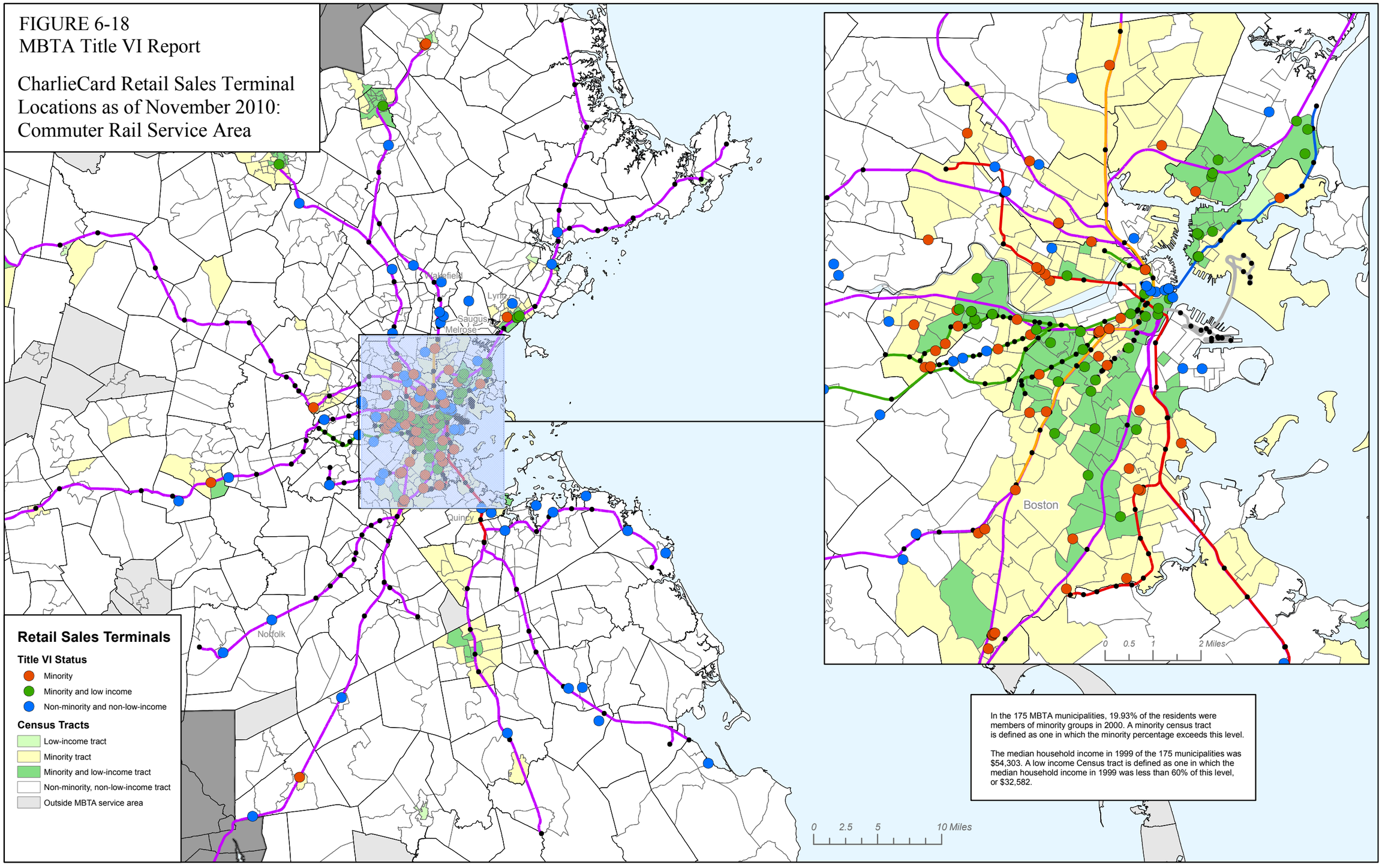
FIGURE 6-18
MBTA Title VI Report

CharlieCard Retail Sales Terminal Locations as of November 2010: Commuter Rail Service Area



Retail Sales Terminals

Title VI Status

- Minority
- Minority and low income
- Non-minority and non-low-income

Census Tracts

- Low-income tract
- Minority tract
- Minority and low-income tract
- Non-minority, non-low-income tract
- Outside MBTA service area

In the 175 MBTA municipalities, 19.93% of the residents were members of minority groups in 2000. A minority census tract is defined as one in which the minority percentage exceeds this level.

The median household income in 1999 of the 175 municipalities was $54,303. A low income Census tract is defined as one in which the median household income in 1999 was less than 60% of this level, or $32,582.

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TABLE 6-32 Distribution of Retail Sales Terminals (RST)				
Location Classification	Urban Fixed-Route Service Area		Commuter Rail Service Area	
	# of Locations with RST	% of Total RST Locations	# of Locations with RST	% of Total RST Locations
Minority	90	60%	105	63%
Nonminority	59	40%	63	38%
Low-income*	40	27%	43	26%
Non-low-income	109	73%	125	74%
Total RST locations	**149**		**168**	
** All routes that are classified as low-income are also classified as minority.*				

Variable Message Signs (VMS)

VMS: Bus and Bus Rapid Transit (BRT)

The BRT system in Boston consists of two Silver Line parts: Silver Line Washington Street and Silver Line Waterfront. Taken together, 66 percent of the stations/stops on the Silver Line are in minority census tracts, 28 percent are in low-income tracts, and 28 percent are in census tracts that are both minority and low-income. However, most of the stations that are classified as minority and low-income are on Silver Line Washington Street. In fact, all of the stations on Silver Line Washington Street are in minority census tracts, and half of these are also low-income. Further, the stations that are not classified as being in low-income tracts are directly adjacent to tracts that are low-income.

When taken as a whole, 60 percent of minority stations/stops on the Silver Line have VMS, 67 percent of low-income stations/stops have VMS, and 67 percent of stations/stops that are both minority and low-income are equipped with VMS.

There is one variable message sign in Bellingham Square in East Boston (which is classified as both minority and low-income), and large-format LED displays with bus information are installed in Ruggles Station (which is classified as both minority and low-income) and Back Bay Station (which is classified as minority).

VMS: Rapid Transit

With the exception of three stations that are either under construction or are scheduled to be under construction, all rapid transit stations on the Red Line, Blue Line, and Orange Line have variable-message signs that alert customers to the approach and arrival of trains. Therefore, 100 percent of minority and low-income stations will have VMS once construction is complete.

As is discussed in Chapter 4, the type of signal system used on the Green Line cannot trigger next-train information for display on VMS. However, signs showing public service information have been installed at stations in the Green Line central subway and on the D Branch. Due to the lack of power and communication connections to stations on the B, C, and E Branches of the Green Line, no VMS signs can be used at these stations in the near term.

Table 6-33 below shows minority and low-income analysis of VMS at all rapid transit stations (Red, Blue, Orange, and Green Line). The percentage of minority and low-income stations that have VMS is lower than the percentage of nonminority and non-low-income stations with VMS. However, due to the nature of the signal system on the Green Line, this cannot be resolved in the near term. The MBTA is looking for a long-term solution.

TABLE 6-33 Rapid Transit Stations with VMS

Station Classification	Total	# with VMS	% with VMS
Minority	72	45	63%
Nonminority	55	38	69%
Low-income	30	15	50%
Non-low-income	97	68	70%
Systemwide	**127**	**83**	**65%**

VMS: Commuter Rail

All commuter rail stations have VMS. Therefore, 100 percent of minority and low-income commuter rail stations are equipped with VMS.

Elevators and Escalators

For the purposes of monitoring Title VI compliance, the Operations Support Department is responsible for the Level-of-Service assessment of elevators and escalators. This is completed on an annual basis to evaluate whether the distribution and operability of station elevators and escalators in minority and low-income areas is commensurate with the distribution and operability of station elevators and escalators that are not in minority or low-income areas.

The complete maintenance, service testing, and inspection of all elevators and escalators in the transit system and in other MBTA facilities are outsourced to a private maintenance contractor. Elevator and escalator service requests are transmitted from the MBTA to the contractor, which dispatches maintenance personnel to perform repairs.

Elevator and Escalator Performance

On a daily basis, the Operations Support Department keeps records of station escalator and elevator maintenance activity and hours of operation. In an effort to determine the average length of time each elevator and escalator was out of service, CTPS examined the data provided by Operations Support on equipment failure service calls that were placed between April 1, 2010, and March 31, 2011. Equipment failures vary in cause and in the length of repair time required. Primary reasons for the length of time an elevator or escalator is out of service include the waiting time for specific replacement parts from manufacturers, the complexity of the repair, and the need for investigation due to an accident.

Tables 6-34 and 6-35 present data concerning elevator and escalator repair time, out-of-service time, and incident rates for minority compared to nonminority stations and for low-income compared to non-low-income stations. Because all stations that are in low-income areas are also minority, no additional analysis is necessary to compare the performance of elevators and escalators in areas that are both minority and low-income with the percentage in areas that are not both.

- The average repair time per incident (the total amount of revenue-hours between the out-of-service and return-to-service times[4] for each service call).

- The average number of incidents per elevator (or escalator) and per station.

- The average out-of-service time per elevator (or escalator) and per station. Out-of-service time differs from repair time in that it equals the total number of revenue-hours between the went-out-of-service and returned-to-service times for all overlapping groups of incidents, while repair time is a per-incident measure.[5] Average repair time is the appropriate measure on a per-incident basis, while average out-of-service time is the appropriate measure on a per-elevator or per-station basis.

- The median out-of-service time, to indicate the extent to which outliers affect the average (mean).

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[4] *Out-of-service time is defined as the total number of revenue-hours an elevator (or escalator) was out of service, meaning that it does not include the 4.5 hours of non-revenue time, from approximately 1:00 A.M. to 5:30 A.M.*

[5] *For example, if one elevator (or escalator) is out of service from 1:00 PM until 3:00 PM, and another elevator (or escalator) at the same station is out of service from 2:00 PM until 4:00 PM, the repair time for each incident is two hours, but the out-of-service time for the station is three hours (since the two incidents overlap each other).*

Elevators

Elevators in stations designated as minority had, on average, longer average repair times per incident than those at stations not so designated, and elevators in stations designated as low-income had shorter average repair times per incident than those at stations not so designated. Both minority and low-income stations had a higher average rate of incidents per elevator and per station than nonminority and non-low-income stations. As a result, both minority and low-income stations had higher average out-of-service times per elevator and per station. Figure 6-19 shows the "out-of-service" hours for elevators in the urban fixed-route service area.

TABLE 6-34 Elevators Out of Service – April 1, 2010, through March 31, 2011

Station Classification	Average # of Hours to Repair	Average # of Incidents		Average # of Hours Out of Service		Median # of Hours Out of Service
	Per Incident	Per Elevator	Per Station	Per Elevator	Per Station	Per Station
Minority	4.9	7.9	20.8	34.5	90.9	53.0
Nonminority	4.4	7.6	19.5	30.4	77.8	50.4
Low-income*	4.6	10.8	31.2	44.7	129.6	47.3
Non-low-income	4.8	6.7	17.7	28.7	75.7	53.0
All stations	4.7	7.6	20.4	32.1	86.3	53.0

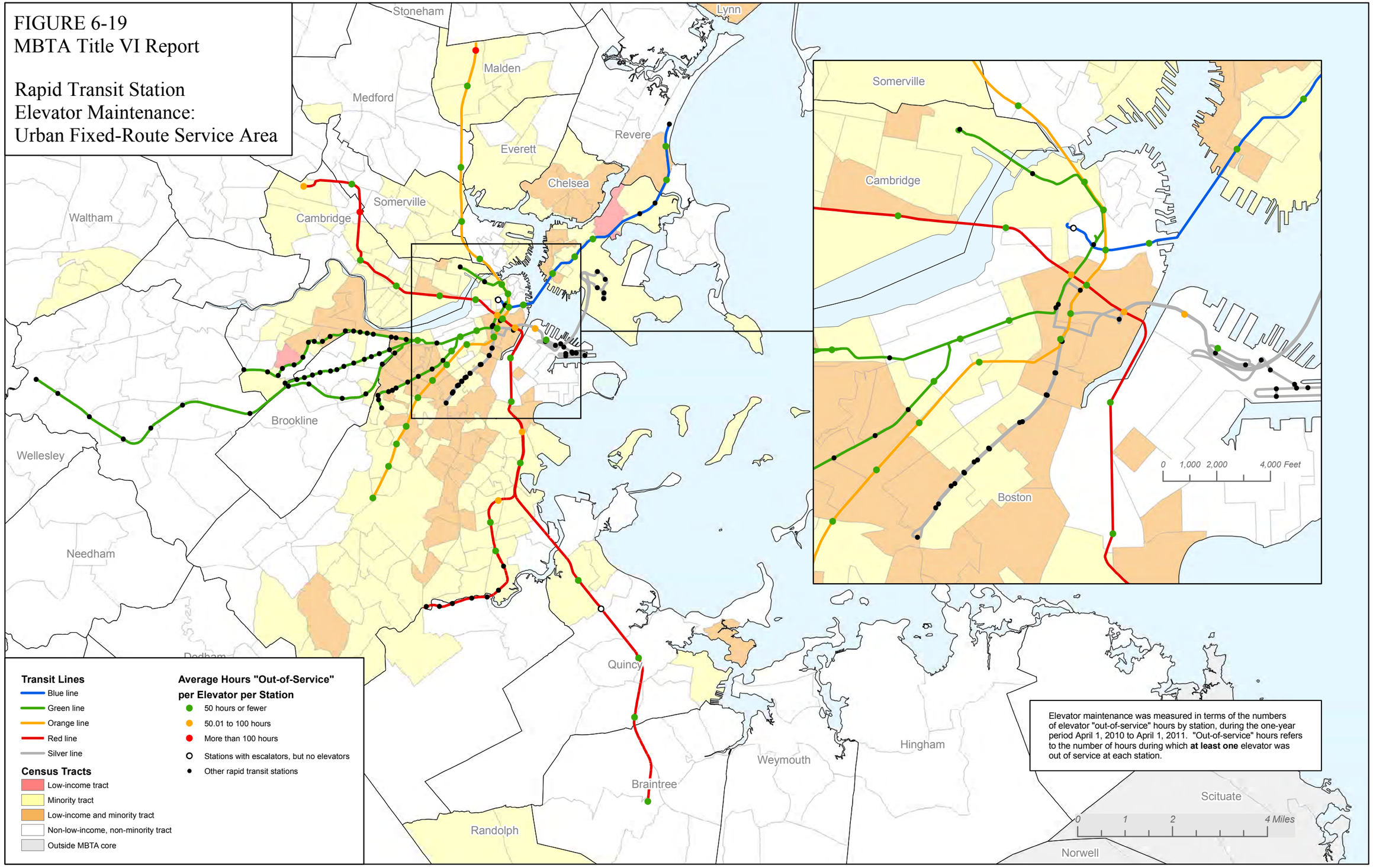
** All stations that are classified as low-income are also classified as minority.*

The five stations with the greatest rates of incidents per elevator were Porter (31.0), Park Street (26.0), Harvard (19.0), Davis (14.5), and Chinatown (14.0). Two of these stations are both minority and low-income (Park Street and Chinatown), and one is minority and non-low-income (Harvard). The median numbers of hours out-of-service per station are significantly less than the respective averages, indicating that these high station incident rates, particularly for Park Street, significantly raised the averages for the station classifications to which these stations belong.

In general, for all stations, repair and out-of-service times and incident rates worsened in comparison to the previous year. The MBTA will determine why the average repair time per incident at minority stations is longer than the average for nonminority stations, as well as why there are greater rates of incidents in minority and low-income elevators and stations than in other stations. The MBTA will endeavor to maintain the lower average repair times per incident at low-income stations. Over the past three years, the MBTA has had 99% operability of elevators systemwide and consequently has received few complaints about elevator unavailability. The MBTA is installing redundant elevators at key stations. The three stations with the highest incident rates (Porter, Park Street, and Harvard) are currently having redundant elevators installed.

FIGURE 6-19
MBTA Title VI Report

Rapid Transit Station
Elevator Maintenance:
Urban Fixed-Route Service Area



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Escalators

Escalators in stations designated as minority or low-income had, on average, longer repair times per incident than those at stations not so designated. Minority and low-income stations also both had higher average rates of incidents per escalator and per station, and longer average out-of-service times per escalator and per station. Figure 6-20 shows the "out-of-service" hours for escalators in the urban fixed-route service area.

TABLE 6-35 Escalators Out of Service – April 1, 2010, through March 31, 2011

Station Classification	Average # of Hours to Repair	Average # of Incidents		Average # of Hours Out of Service		Median # of Hours Out of Service
	Per Incident	Per Escalator	Per Station	Per Escalator	Per Station	Per Station
Minority	13.9	11.1	32.9	149.5	443.9	280.1
Nonminority	9.5	8.0	26.4	71.5	234.8	142.3
Low-income*	13.1	10.2	36.2	129.7	459.8	310.0
Non-low-income	12.2	9.7	28.9	113.5	337.8	245.9
All stations	12.4	9.8	30.4	117.3	326.6	256.4

** All stations that are classified as low-income are also classified as minority.*

The five stations with the greatest rates of incidents per escalator are North Station (75.0), Airport (27.75), Ashmont (26.0), Maverick (22.75), and Savin Hill (21.0). All of these stations are minority and non-low-income. The median out-of-service times per station are significantly less than the respective averages, indicating that these high station incident rates, significantly raised the averages for the station classifications to which these stations belong.

In general, for all stations, repair and out-of-service times and incident rates worsened in comparison to the previous year. The MBTA will determine why there are greater rates of incidents and longer average repair times for minority and low-income escalators and stations.

Over the past three years, the MBTA has had 99% operability of escalators systemwide and consequently has received few complaints about escalator unavailability.

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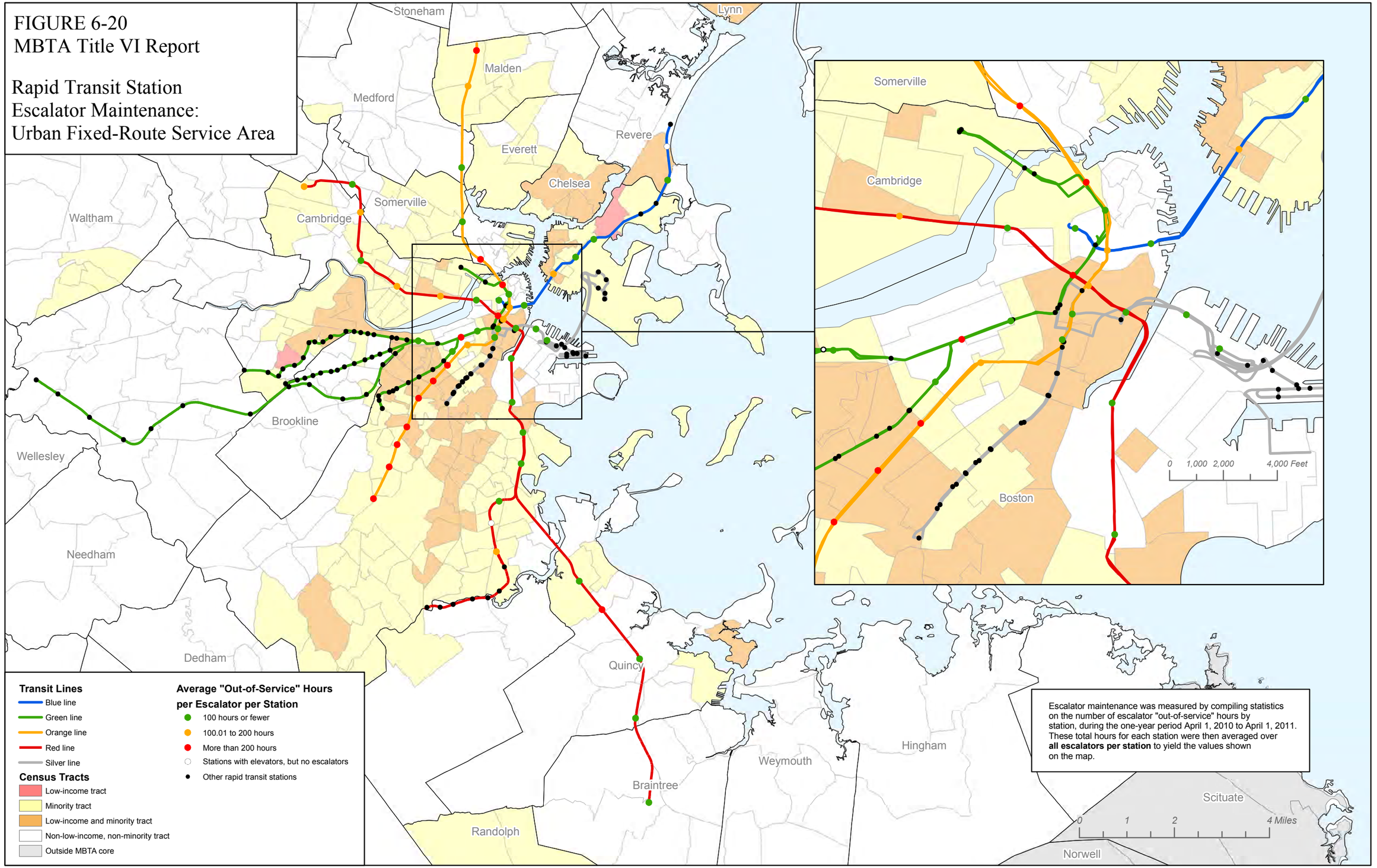
FIGURE 6-20
MBTA Title VI Report

Rapid Transit Station
Escalator Maintenance:
Urban Fixed-Route Service Area



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Station Parking Distribution and Utilization

For the purpose of monitoring Title VI compliance, the MBTA Development Department is responsible for the level-of-service assessment of station parking. This monitoring evaluates whether the distribution, utilization, and condition of station parking in minority areas is commensurate with the distribution, utilization, and condition of station parking throughout the system. If a disparity is found in the parking supply, the Title VI Working Group coordinates with Planning and other relevant MBTA departments to develop a plan for future remediation, taking into account numerous, spatial and other constraints at MBTA stations.

Parking at MBTA stations and terminals can benefit the community by making access to transit more convenient. Lack of parking or inadequate parking can make transit difficult to access, especially in nonurban communities, where population and housing densities do not allow most residents to access the MBTA by walking or bicycling. Conversely, parking can also negatively impact a community in terms of creating increased auto trips, which can contribute to congestion and air quality deterioration. The MBTA, in its capital planning, recognizes the need for a balanced parking program that takes into account demand, the variety of parking facility functions (regional collector, intercommunity, local/neighborhood, and urban central), environmental and neighborhood impacts, and the need to promote transit-access alternatives to the automobile. Across the entire MBTA system, according to the Program for Mass Transportation, 84 percent of transit users bike or walk to stations. Within the commuter rail system, 54 percent of users drive automobiles to stations and other transit services. Title VI analysis includes assessing how parking functions and supply are distributed throughout the service area and identifying whether there is an imbalance between the siting of parking facilities in low-income-minority and minority neighborhoods and the siting of parking in nonminority neighborhoods.

Parking Distribution

There have been no changes in the MBTA's station parking since the last Title VI report (2008), which demonstrated that there are no major differences in the quantity and types of parking facilities distributed throughout the MBTA system when considering the density of development and population in an area. Figure 6-21 shows the distribution of parking facilities in the urban fixed-route service area, and Figure 6-22 shows the distribution of parking facilities in the commuter rail service area.

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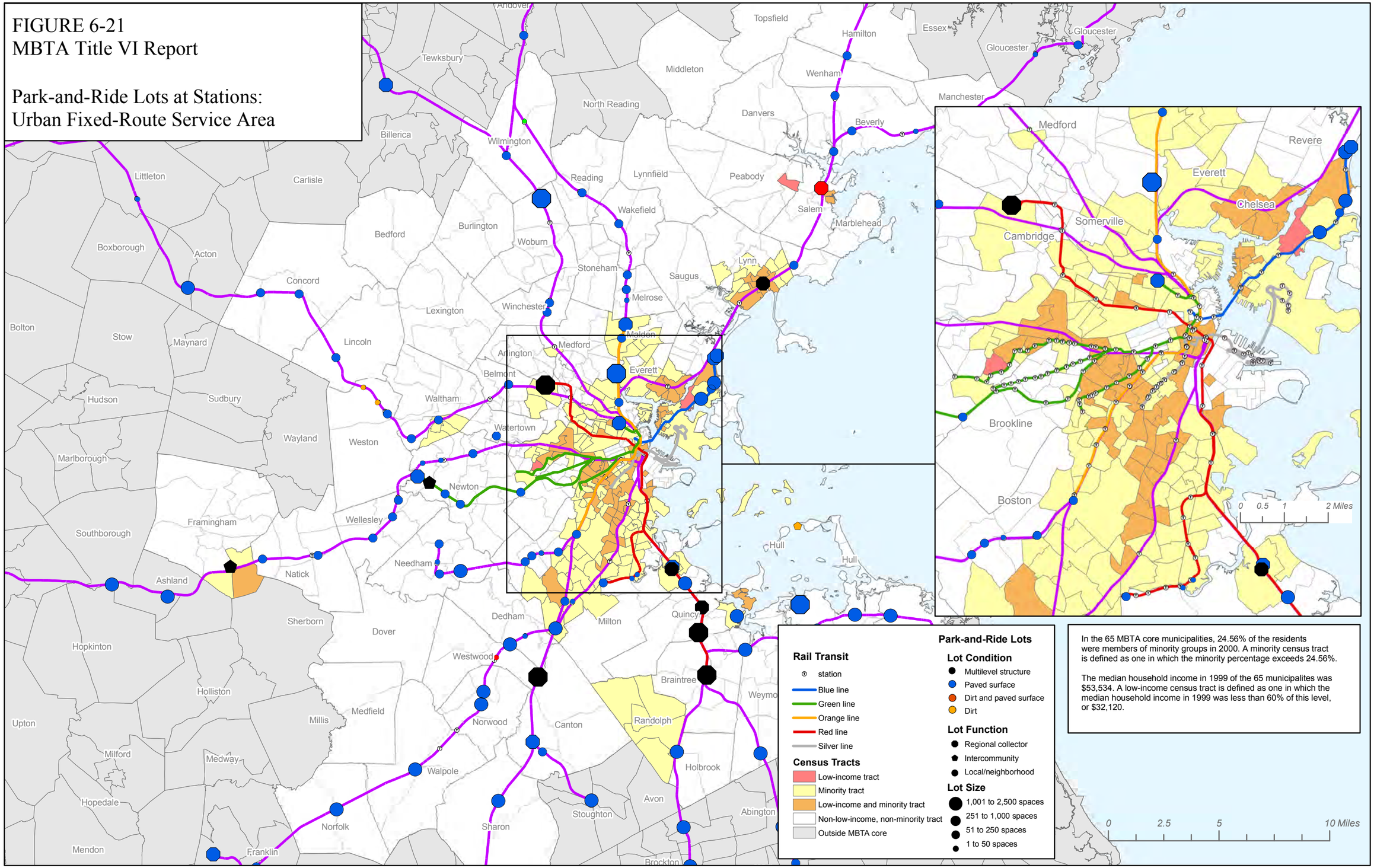
FIGURE 6-21
MBTA Title VI Report

Park-and-Ride Lots at Stations:
Urban Fixed-Route Service Area



In the 65 MBTA core municipalities, 24.56% of the residents were members of minority groups in 2000. A minority census tract is defined as one in which the minority percentage exceeds 24.56%.

The median household income in 1999 of the 65 municipalites was $53,534. A low-income census tract is defined as one in which the median household income in 1999 was less than 60% of this level, or $32,120.

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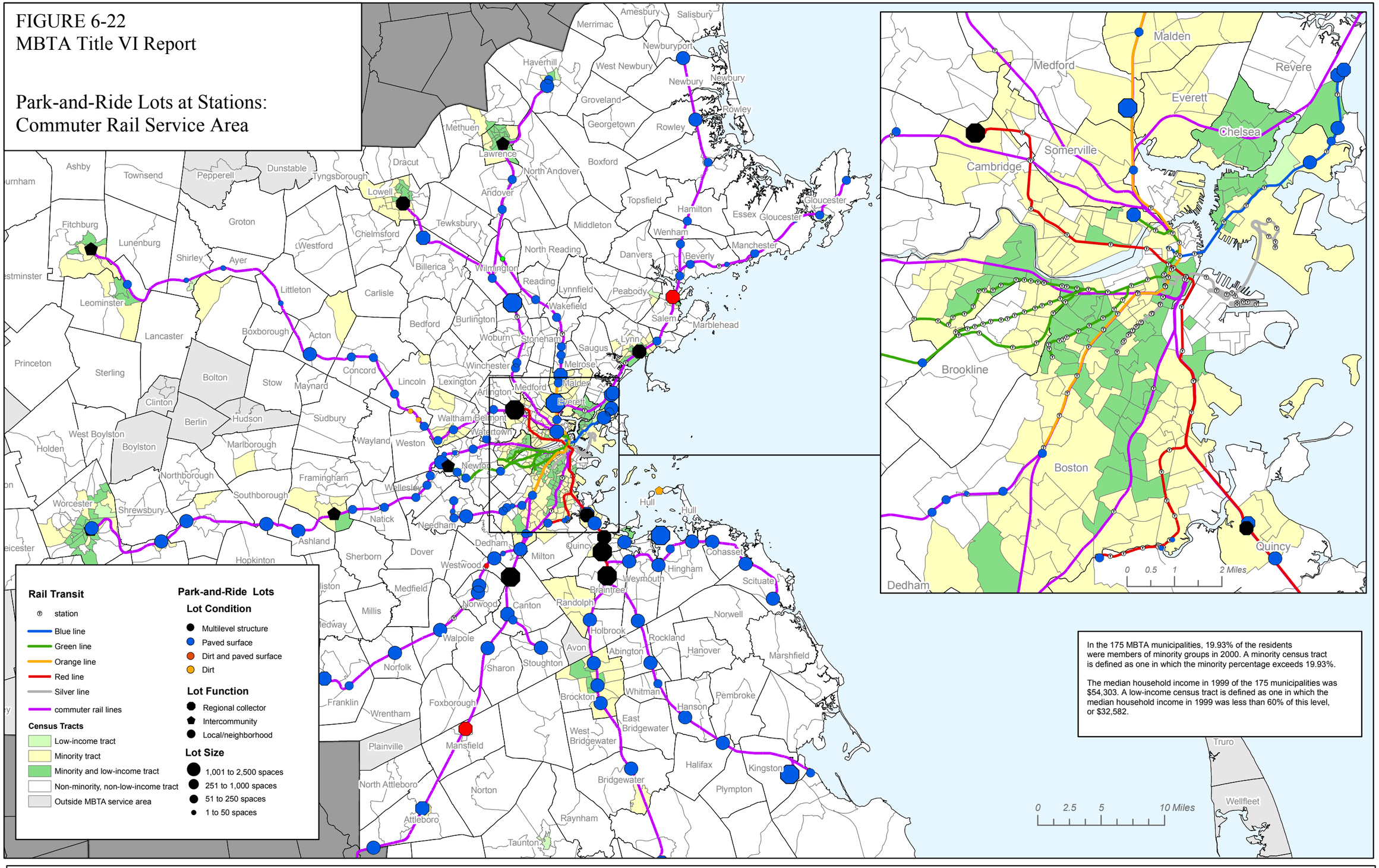
FIGURE 6-22
MBTA Title VI Report

Park-and-Ride Lots at Stations: Commuter Rail Service Area



In the 175 MBTA municipalities, 19.93% of the residents were members of minority groups in 2000. A minority census tract is defined as one in which the minority percentage exceeds 19.93%.

The median household income in 1999 of the 175 municipalities was $54,303. A low-income census tract is defined as one in which the median household income in 1999 was less than 60% of this level, or $32,582.

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Parking Utilization

The analysis of parking facility utilization is based on data collected by the MBTA Revenue Department for MBTA-owned and operated lots (100 of a total 143 lots), and by the MBTA Planning and Development Department, regional transit authorities, and host municipalities for facilities owned by other entities. Utilization rates of parking lots were compared to assess whether there were disparities between parking facilities in low-income and minority and non-low-income and nonminority neighborhoods, respectively, in terms of parking supply relative to parking needs. Facilities utilized at less than 50 percent of capacity are considered to have an excess of parking. Facilities with parking usage over 85 percent are considered to be approaching over-capacity. Table 6-36 shows the breakdown of parking facility utilization across the system.

TABLE 6-36 Parking Facility Utilization

Utilization Rate	Total		Low-Income*		Non-Low-Income		Minority		Nonminority	
	# of Facilities	% of Total Facilities	# of Facilities	% of Low-Income Facilities	# of Facilities	% of Non-Low-Income Facilities	# of Facilities	% of Minority Facilities	# of Facilities	% of Non-minority Facilities
Less than 50%	58	41%	3	38%	55	41%	2	29%	43	57%
50% to 85%	42	29%	4	50%	38	28%	3	43%	33	43%
Greater than 85%	43	30%	1	13%	42	31%	2	29%	0	0%

** All stations that are classified as low-income are also classified as minority.*

Analysis of utilization rates shows that 30 percent of all facilities systemwide are over 85 percent full. Only one of the facilities in low-income areas (13 percent) is over 85 percent full, while 31 percent in non-low-income areas are over 85 percent full; however, while no facilities in nonminority areas are over 85 percent full, 29 percent of facilities in minority areas are over 85 percent full.

Thirty-eight percent of all parking facilities in low-income areas have less than 50 percent utilization, compared to 41 percent in non-low-income areas, 29 percent in minority areas, 57 percent in nonminority areas, and 41 percent systemwide. Regardless of neighborhood classification, the percentage of facilities that were underutilized was much higher than the rates reported for 2008.

The average weekday utilization of parking facilities by mode is distributed as follows:

- 59 percent at commuter rail stations
- 87 percent at rapid transit stations
- 38 percent at commuter boat stations
- 46 percent at express bus stations

The utilization rates show that the parking supply is relatively constrained at rapid transit stations, while ample for the most part at commuter rail, commuter boat, and express bus facilities. It is likely that the economic recession and increased parking rates have contributed to the low utilization rates.

Vehicle Assignment

Bus Vehicle Assignment

For the purposes of monitoring Title VI compliance, the Bus Operations Department is responsible for the Level of Service assessment of bus vehicle assignment, which is performed on an annual basis. It involves evaluating the operational distribution of buses throughout the system based on vehicle age and the functionality of air-conditioning.

In general, buses are assigned to one of the eight MBTA bus storage and maintenance facilities, and operate only on routes served by that garage. Daily, within each garage, individual vehicles are not assigned to specific routes, but circulate among routes based on a number of operating constraints and equipment criteria.

To complete the annual bus vehicle assignment monitoring for Title VI, Bus Operations collects data on a summer day using bus pull-out and swing-on sheets, which display information pertaining to the operator, the bus, and the route number. These data are used to determine both the average age and the status of air-conditioning functionality of the vehicles assigned to each route. Analysis is then completed to compare the average age and proportion of air-conditioner failures on routes that serve minority areas and low-income areas with the data for routes that serve nonminority and non-low-income areas.

If the data demonstrate any adverse disparities between vehicle assignments on routes serving minority or low-income areas from those not serving those areas, data from two additional days of monitoring are collected and analyzed to determine whether the data for the first day are truly representative. If a disparity is again demonstrated, the Bus Operations Department reviews both the distribution of vehicles by facility and the manner in which vehicles are assigned within each facility to evaluate the source of the problem. Appropriate actions are then taken to modify either the distribution of vehicles to facilities or the route assignments of vehicles within each facility. Follow-up monitoring is conducted six months later to determine whether the disparity has been rectified.

For the purposes of this report, the Bus Operations Department collected vehicle assignment data on three unusually warm days (to ensure an accurate assessment of air-conditioner functionality) in the summer of 2010 (July 6, September 2, and September 3). To determine vehicle age, CTPS analyzed the pull-out data that identify (by vehicle number) which bus was assigned to each operator run to match the bus type to each trip operated on each route. An average vehicle age was then calculated for each route. In addition, CTPS examined maintenance logs for the same day to determine which buses had been flagged as having defective air-conditioning systems.

As shown in the Table 6-37, the average age for the entire bus fleet was 6.57 years, the average age for buses operating on minority routes was 6.57 years, and the average age for buses operating on low-income routes was 5.73 years; all of these are below the age of the MBTA policy's average age of the bus fleet of eight years or less. CTPS then determined, for each trip, if an assigned bus was equipped with air-conditioning (based on bus number) and, if so equipped, whether the air-conditioning system had been marked in the maintenance-reporting database as defective. It was found that 95 percent of buses on minority routes, 96 percent of buses on low-income routes, and 96 percent of buses on routes systemwide were identified as having working air-conditioning.

TABLE 6-37 Bus Vehicle Assignment

Route Classification	Average Vehicle Age (Years)	% of Buses with Functional A/C
Minority	6.57	95%
Nonminority	6.56	98%
Low-income*	5.73	96%
Non-low-income	6.78	96%
Systemwide	**6.57**	**96%**

** All routes that are classified as low-income are also classified as minority.*

Heavy Rail and Light Rail Vehicle Assignment

For the purposes of monitoring Title VI compliance, Subway Operations is responsible for the Level-of-Service assessment of vehicle assignments on light and heavy rail routes. This is completed on an annual basis to evaluate the distribution of rail vehicles throughout the system based on vehicle age.

Each of the three heavy rail lines (Red Line, Blue Line, and Orange Line) operates with dedicated equipment, meaning that the equipment on one line is not interchangeable with equipment on any of the other lines. In addition, all three heavy rail lines are defined as minority and as non-low-income routes under Title VI guidelines. Therefore, an analysis of minority compared to nonminority routes or low-income compared to non-low-income routes is not possible for the heavy rail system.

Light rail consists of the Green Line and the Mattapan High-Speed Line. The Mattapan Line operates as a short, stand-alone, light-rail extension of the Red Line's Ashmont Branch, with a dedicated fleet; its equipment cannot be used elsewhere in the system. The Green Line, however, is an extensive light-rail system, with four branches (B, C, D, and E) that feed into a core service. For Title VI, the B and E Branches are defined as both minority and low-income routes, and the C and D Branches are defined as both nonminority and non-low-income. The Mattapan Line is minority, but is not low-income. Periodic Title VI monitoring is therefore necessary for vehicle assignment on light rail.

To complete the annual light-rail vehicle assignment monitoring for Title VI, Subway Operations collects data on at least one sample spring weekday. If analysis of these data shows disparities between light-rail vehicle assignments on routes that serve minority areas and assignments for all light rail lines, Subway Operations works in conjunction with Service Planning to resolve them, and a subsequent analysis is completed six months later in order to monitor whether the remediation eliminated the problem.

For the purposes of this report, CTPS analyzed Green Line vehicle assignments by branch, using data provided by Subway Operations for a randomly chosen day in March 2011. The age of each car for each trip on all four Green Line branches was calculated. An average age was then calculated for those lines considered minority and low-income (Green Line Branches B and E) and those considered nonminority and non-low-income (Green Line Branches C and D).

Table 6-38 shows that the average age per car-trip of light-rail equipment operated on minority and low-income Green Line routes was 13.6 years, and the average age for all Green Line routes was 13.7 years.

TABLE 6-38 Light Rail Vehicle Assignment	
Line Classification	**Average Vehicle Age (Years)**
Minority and Low-income	13.6
Nonminority and Non-low-income	13.8
Minority and Low-income	13.6
Nonminority and Non-low-income	13.8
Systemwide	**13.7**

The Mattapan High-Speed line vehicles were not included in the Green Line vehicle assignment analysis because the Mattapan Line is an isolated light-rail service and its equipment cannot be used elsewhere in the system. The Mattapan fleet consists of 10 historic President's Conference Committee (PCC) cars that were built in 1945 and extensively rebuilt between 1999 and 2005. The 10 PCC cars were also equipped with air-conditioning systems in 2008.

Commuter Rail Vehicle Assignment

For the purposes of monitoring Title VI compliance, Railroad Operations is responsible for the Level-of-Service assessment of vehicle assignments on commuter rail routes. This assessment is completed on an annual basis to evaluate the distribution of commuter rail vehicles throughout the system based on vehicle age.

Vehicle assignments are developed to correspond with specific characteristics of commuter rail service. These characteristics include minimum seating requirements for each scheduled trip, one functioning toilet car in each trainset, a train length consistent with infrastructure constraints, and modified equipment for a specific operating environment, such as the power doors on the Old Colony trains. In order to optimize coach utilization and the requirements for the train characteristics stated above, the bilevel coaches are operated on trains with the largest volume of ridership.

All coaches in the commuter rail fleet are equipped with similar amenities (such as air-conditioning), with the primary variation among coaches being age. To determine the average age of a trainset, Railroad Operations looks at a sample of consist utilization summary reports. Within the operating constraints of the commuter rail system, Railroad Operations works to alleviate any Title VI vehicle-assignment disparities found in the analysis.

For this report, Railroad Operations collected consist data for every train that operated on each line on March 30, 2011. CTPS then developed a consist summary report to determine the average age of the equipment by line. The data are summarized in Table 6-39. It should be noted that no commuter rail line is classified as low-income. Therefore, only a comparison of minority with nonminority is reported.

TABLE 6-39 Commuter Rail Vehicle Assignment

Line Classification	Line	Average Coach Age (years)
Minority	Middleborough	19.55
	Fairmount	23.64
Nonminority	Kingston	18.26
	Providence	19.83
	Greenbush	20.46
	Stoughton	20.74
	Franklin	21.27
	Worcester	22.13
	Needham	22.83
	Rockport	23.58
	Fitchburg	23.68
	Newburyport	23.77
	Lowell	24.58
	Haverhill	24.78
Average Age: Minority Routes		**21.59**
Average Age: Nonminority Routes		**22.06**
Average Age: All Routes		**22.08**

The analysis shows that newer vehicles are generally assigned to the South Side operation, where all the minority routes are located. All commuter rail coaches purchased since 1991 are high-capacity, bilevel coaches. These coaches are utilized on the South Side lines, as they have the heaviest ridership in the system, and also because several tracks at South Station can only accommodate six-car trains. The average age of the coaches on one of the two minority lines (the Middleborough/Lakeville Line) is less than or equal to the average age for the system, as bilevel equipment must be used on the Middleborough/Lakeville Line to accommodate both heavy demand and track constraints at South Station. Only one minority line, Fairmount, exceeded the average age for nonminority lines. This is consistent with the present allocation of equipment, as the Fairmount Line (like the North Side lines) has lower ridership and therefore utilizes more of the lower-capacity single-level coaches, which are older than the high-capacity, bilevel cars.

Transit Security

Placement of Callboxes at Stations

As discussed in Chapter 4, the MBTA has placed emergency callboxes in its stations in accordance with its program on crime prevention through environmental design. Table 6-40 shows an analysis of the number and percentage of callboxes at minority, nonminority, low-income, and non-low-income stations. As can be seen in the table, the percentage of callboxes at minority stations is higher than at nonminority stations, and the percentage of callboxes is also higher at low-income stations than at non-low-income stations.

TABLE 6-40 Placement of Callboxes at Stations

Station Classification	Stations	# of Stations with Callboxes	% of Stations with Callboxes
Minority	84	49	58%
Nonminority	56	15	27%
Low-income	32	16	50%
Non-low-income	108	48	44%
Systemwide	140	64	46%

Placement of Surveillance Cameras on Buses

Currently, 375 buses at five MBTA garages are equipped with surveillance cameras, as shown in Table 6-41. The MBTA plans to add 90 more on-board cameras to buses this coming year.

TABLE 6-41 Surveillance Cameras on MBTA Buses		
Garage	**Buses with Cameras**	**Total Buses at Garage**
Quincy	64	82
Lynn	69	88
Charlestown	141	225
Cabot	66	200
Southampton	25	118
Total	**365**	**713**

There are no cameras on the 615 buses at the other four MBTA bus garages: Albany, Arborway, Fellsway, and North Cambridge.

Some routes that serve minority and low-income areas operate out of each of the above garages. Due to the way in which bus vehicle assignments occur (see Chapter 4), all or most minority and low-income routes will have buses with cameras operating on them some of the time. Upon request, the vehicles with cameras can, and have been, assigned to routes with high crime rates.

Station Security Inspections

The MBTA conducts periodic, random station inspections in which passengers' handbags, briefcases, and other carry-on items are searched to deter passengers from carrying explosives or other weapons onto MBTA vehicles. The analysis shown in Table 6-42 indicates that a higher percentage of all station inspections has occurred at minority stations than at nonminority stations, and a lower percentage of all station inspections has occurred at low-income stations than at stations that are classified as non-low-income. The rate of inspection (the number of inspections divided by the number of stations) is significantly higher at minority stations (52 percent) than nonminority stations (27 percent). Also, while the percentage of total inspections at low-income stations is lower than at non-low-income stations, since only 16 percent of all stations are low-income, the rate of inspection at low-income stations (42 percent) is higher than the rate at non-low-income stations (36 percent). Because all stations that are in low-income areas are also minority, no additional analysis is necessary to compare the rate of security inspections in areas that are both minority and low-income with the percentage in areas that are not both.

TABLE 6-42 Station Security Inspections, July 2010				
Station Classification	**# of Station Inspections**	**% of Total Station Inspections**	**% of Total Stations**	**Inspection Rate (% of stations in classification)**
Minority	58	57%	41%	52%
Nonminority	44	43%	59%	27%
Low-income*	19	19%	16%	42%
Non-low-income	83	81%	84%	36%
Systemwide	**102**			**37%**
** All stations that are classified as low-income are also classified as minority.*				

Quality-of-Service Monitoring

The quality-of-service analysis entails comparison of travel times, number of transfers required, cost, and cost per mile for both peak and off-peak trips from census tracts representing a cross-section of the service-area population to the three most-frequently traveled destinations. In order to conduct the quality-of-service assessment, trip origins were selected from the 10 most densely populated minority census tracts and the 10 most densely populated nonminority census tracts in the MBTA service area. Table 6-43 shows the 10 minority and 10 nonminority origins and indicates whether each is also low-income.

TABLE 6-43 Quality-of-Service Origins					
Minority Neighborhood			**Nonminority Neighborhood**		
Tract	**Origin**	**Low-Income?**	**Tract**	**Origin**	**Low-Income?**
90100	Grove Hall (Dorchester)	Y	60300	South Boston	N
101102	Wellington Hill (Dorchester)	Y	30100	North End	N
70200	Chinatown	Y	20100	Beacon Hill	N
91800	Bowdoin/Geneva (Dorchester)	N	350400	Somerville Powderhouse Square	N

TABLE 6-43 Quality-of-Service Origins (cont.)					
Minority Neighborhood			Nonminority Neighborhood		
Tract	Origin	Low-Income?	Tract	Origin	Low-Income?
81200	Mission Hill	Y	400500	Brookline Washington Square	N
81300	Eggleston Square (Roxbury)	Y	352900	Mid-Cambridge	N
160100	Chelsea (East Side)	Y	70600	South End (North of Tremont)	N
50300	East Boston Central Square	Y	401	Brighton Center	Y
110401	Roslindale Square	N	354500	Cambridge Avon Hill	N
354900	Cambridge Rindge Towers	N	351000	Somerville Spring Hill	N

The three census tracts with the highest densities of work-trip attractions were selected for the trip destinations, with the stipulation that the tracts would be in three different neighborhoods. Two additional major regional employment destinations were included in the analysis—Logan Airport and the South Shore Plaza. Logan was selected because of the large and varied number of services it provides, and the South Shore Plaza was selected based on its suburban location and its role as a regional trip generator. Table 6-44 shows the five destinations and indicates the minority and income status of each.

TABLE 6-44 Quality-of-Service Destinations			
Tract	Destinations	Minority?	Low-Income?
30300	State Station	N	N
10700	Copley Square	N	N
81000	Longwood Medical Area	Y	Y
51200	Logan Airport	Y	N
419100	South Shore Plaza	N	N

While the selection methodology for destination zones was designed to be unbiased, one might expect some differences between the work trips attracted to these five selected zones, given that three of the zones—Longwood Medical Area, Logan Airport, and the South Shore Plaza—are likely to contain a higher proportion of lower-income jobs.

The quality-of-service analysis was completed using the MBTA's Web-based trip-planning tool to measure individual transit-trip times, transfers, and costs.[6] The results of the quality-of-service analysis for peak-period trips are shown in Table 6-45, and the results of the quality-of-service analysis for off-peak-period trips are shown in Table 6-46.

For trips taken during the peak time period, minority areas have longer travel times and shorter trip lengths, resulting in slower travel speeds compared to nonminority areas; this difference is statistically significant at the 95 percent confidence level. The difference between minority and nonminority areas is also statistically significant for the number of transfers per trip and per mile, with minority areas having greater transfer rates. While minority areas have higher trip fares than nonminority areas, this difference is not statistically significant. When trip cost is normalized for distance, the trip cost/mile is slightly lower for minority areas.

The only difference between minority and nonminority areas for trips taken during the off-peak time period that is statistically significant is for travel speeds, which are slower for the minority areas.

For trips taken during the peak time period, the differences between low-income and non-low-income areas for quality-of-service measures are similar to those between minority and nonminority areas. None of the differences are statistically significant at the 95 percent confidence level, however, except for the number of transfers per mile, which are greater for low-income areas. For trips not taken during the peak time period, while the differences between low-income and non-low-income areas are similar to those between minority and nonminority areas, none of these differences are statistically significant at the 95 percent confidence level.

All neighborhoods designated as low-income are also designated as minority, meaning that a separate analysis for trips that are from neighborhoods designated as both minority and low-income is not necessary.

The MBTA will look at demand for all destinations as it develops the 2011 Service Plan, to see where transfers can be reduced by using strategies such as route interlining. In addition, the MBTA is using the systemwide AFC data to study where transfers are required to complete a trip. This information will be used in the future to modify route designs to reduce transfers as resources become available. The MBTA Key Bus Route Improvement Program is designed to improve service quality by improving service reliability, offering faster trip times, and providing better amenities. Of the 15 Key Bus Routes, 12 are designated minority and 7 are designated as both minority and low-income.

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6 *The current AFC equipment allows only one free transfer; passengers making trips that require more than one transfer are charged additional fares*

TABLE 6-45 Average Peak-Period Quality-of-Service Measures							
Average Performance	Travel Time (min.)	Trip Length (mi.)	Travel Speed (mph)	Transfers / Trip	Transfers / Mile	Trip Cost	Trip Cost / Mile
Minority	50.43	7.48	8.29	1.50	0.22	$1.91	$0.33
Nonminority	44.65	7.81	9.90	1.10	0.14	$1.77	$0.34
Difference	+5.78	-0.34	-1.61*	+0.40*	+0.08*	+$0.14	-$0.01
Low-income	47.83	7.34	8.40	1.43	0.21	$1.87	$0.35
Non-low-income	43.89	7.43	9.50	1.13	0.15	$1.78	$0.36
Difference	+3.94	-0.08	-1.10	+0.30	+0.07*	+$0.10	-$0.01
** Indicates that difference is statistically significant.*							

TABLE 6-46 Average Off-Peak-Period Quality-of-Service Measures							
Average Performance	Travel Time (min.)	Trip Length (mi.)	Travel Speed (mph)	Transfers / Trip	Transfers / Mile	Trip Cost	Trip Cost / Mile
Minority	50.81	7.53	8.30	1.42	0.19	$1.76	$0.31
Non-minority	44.65	7.44	9.45	1.14	0.15	$1.79	$0.36
Difference	+6.16	+0.08	-1.15*	+0.28	+0.04	-$0.03	-$0.05
Low-income	48.00	7.42	8.45	1.31	0.17	$1.68	$0.32
Non-low-income	43.89	7.25	9.30	1.13	0.15	$1.79	$0.37
Difference	+4.11	+0.16	-0.86	+0.18	+0.01	-$0.11	-$0.05
** Indicates that difference is statistically significant.*							

Title VI Analysis of Customer Survey

In 2008–09 the Central Transportation Planning Staff (CTPS) conducted a systemwide survey of Massachusetts Bay Transportation Authority (MBTA) riders. The most recent comparable systemwide passenger survey was conducted during 1993–2000. Surveys of the Silver Line Washington Street and Silver Line Waterfront bus rapid transit services had been conducted in 2005 and 2006, respectively; therefore, the new survey omitted that mode. It covered bus (including trackless trolley), heavy rail (the Blue, Red, and Orange Lines), light rail (the Green Line and the Mattapan High-Speed Line), commuter rail, and boat. The characteristics of the survey respondents were presented in Chapter 2.

This section of the report provides a summary of the customer responses to questions concerning the following aspects of service quality:

- Reliability (on-time performance)
- Safety and security
- Cleanliness/condition of vehicles
- Courtesy of drivers/train crews
- Announcement of stops/stations
- Availability of seating on buses/trains
- Frequency of service
- Travel time/speed
- Parking availability
- Stop/station amenities
- Fare collection system (bus and rapid transit)
- Signage on vehicles (bus)

Customers were asked to rate each of these factors on a scale from 1 to 5 (with 1 representing poor and 5 representing excellent). As with all surveys of this nature, the responses to these questions are subjective, as are the individuals' opinions of the value for each rating level.

Table 6-47 compares the average ratings for each factor from bus customers who identify themselves as minority to those who do not; those who identify themselves as low-income (household income is less than $30,000) to those who do not; and those who identify themselves as both minority and low-income to those who do not. As shown in Table 6-47, minority passengers rated most of the measures of service quality lower than nonminority passengers, and they rated parking availability and stop amenities the same as nonminority passengers. Low-income passengers rated 7 of the 12 measures of service quality lower than non-low-income passengers, three of the measures (stop announcements, service frequency, and travel time) the same as non-low-income passengers, and two of the measures (parking availability and stop amenities) higher than non-low-income passengers. Passengers who identified themselves as both minority and low-income rated all of the measures of service quality (with the exception of service frequency) lower than passengers who did not identify themselves as both minority and low-income; both categories of passengers rated the frequency of service 2.9.

TABLE 6-47 MBTA Bus Customer Survey – Service Quality Ratings						
Service Quality Factor	Minority	Nonminority	Low-Income	Non-Low-Income	Minority & Low-Income	Nonminority & Non-Low-Income
Reliability	2.8	3.0	2.9	3.0	2.8	3.0
Safety & security	3.5	3.8	3.5	3.7	3.4	3.9
Vehicle cleanliness/ condition	3.0	3.3	3.1	3.2	2.9	3.3
Courtesy of drivers	3.1	3.6	3.3	3.4	3.1	3.6
Stop announcements	3.6	3.7	3.7	3.7	3.6	3.7
Seating availability	3.1	3.4	3.2	3.3	3.1	3.3
Frequency of service	2.8	2.9	2.9	2.9	2.9	2.9
Travel time/speed	3.2	3.4	3.3	3.3	3.2	3.4
Parking availability	3.1	3.1	3.2	3.0	3.2	3.0
Stop amenities	2.7	2.7	2.8	2.7	2.8	2.7
Fare collection system	3.4	3.7	3.4	3.6	3.3	3.8
Vehicle signage	3.5	3.7	3.5	3.6	3.4	3.7

Table 6-48 compares the average ratings for each factor from rapid transit customers who identify themselves as minority to those who do not; those who identify themselves as low-income (household income is less than $30,000) to those who do not; and those who identify themselves as both minority and low-income to those who do not. As shown in Table 6-48, minority passengers rated most of the measures of service quality lower than nonminority passengers, but they rated frequency of service and parking availability the same as nonminority passengers, and they rated seating availability and station amenities higher. Low-income passengers rated 4 of the 11 measures of service quality (station announcements, seating availability, parking availability, and station amenities) lower than non-low-income passengers, 4 of the measures (vehicle cleanliness, safety and security, service frequency, and travel time) the same as

non-low-income passengers, and 3 of the measures (reliability, courtesy of the crew, and fare collection system) higher than non-low-income passengers. Passengers who identified themselves as both minority and low-income rated 5 of the measures of service quality (reliability, safety and security, vehicle cleanliness, and crew courtesy) lower than passengers who did not identify themselves as both minority and low-income; both categories of passengers had the same ratings for the frequency of service and travel time; and passengers who identified themselves as both minority and low-income rated 4 of the measures (station announcements, seating availability, parking availability, and station amenities) higher than passengers who did not identify themselves as both minority and low-income.

TABLE 6-48 MBTA Rapid Transit Customer Survey – Service Quality Ratings

Service Quality Factor	Minority	Nonminority	Low-Income	Non-Low-Income	Minority & Low-Income	Nonminority & Non-Low-Income
Reliability	3.1	3.2	3.1	3.2	3.1	3.2
Safety & security	3.5	3.7	3.6	3.6	3.6	3.7
Vehicle cleanliness/ condition	3.0	3.1	3.1	3.0	3.0	3.1
Courtesy of train crews	3.2	3.3	3.3	3.3	3.2	3.3
Station announcements	3.5	3.4	3.6	3.4	3.7	3.4
Seating availability	3.0	2.9	3.0	3.0	3.1	2.9
Frequency of service	3.1	3.1	3.0	3.1	3.1	3.1
Travel time/speed	3.2	3.3	3.3	3.3	3.3	3.3
Parking availability	2.9	2.9	2.9	2.9	3.0	2.9
Station amenities	2.8	2.6	2.8	2.6	2.9	2.6
Fare collection system	3.5	3.6	3.5	3.6	3.4	3.6

Table 6-49 compares the average ratings for each factor from commuter rail customers who identify themselves as minority to those who do not; those who identify themselves as low-income (household income is less than $30,000) to those who do not; and those who identify themselves as both minority and low-income to those who do not. As shown in Table 6-49, minority passengers rated most of the measures of service higher than nonminority passengers, but they rated crew courtesy and parking availability the same as nonminority passengers, and they rated frequency of service and travel time lower. Low-income passengers rated all of the measures of service quality higher than non-low-income passengers. Passengers who identified themselves as both minority and low-income rated all of the measures of service quality higher than passengers who did not identify themselves as both minority and low-income, except travel time, which they rated the same.

TABLE 6-49 MBTA Commuter Rail Customer Survey – Service Quality Ratings

Service Quality Factor	Minority	Nonminority	Low-Income	Non-Low-Income	Minority & Low-Income	Nonminority & Non-Low-Income
Reliability	3.4	3.3	3.8	3.3	3.7	3.3
Safety & security	4.0	3.9	4.2	3.9	4.1	3.9
Vehicle cleanliness/ condition	3.4	3.1	3.5	3.2	3.6	3.1
Courtesy of train crews	3.9	3.9	4.1	3.9	4.0	3.9
Station announcements	3.2	3.1	3.4	3.1	3.5	3.1
Seating availability	3.4	3.3	3.8	3.3	3.8	3.3
Frequency of service	3.1	3.2	3.3	3.2	3.4	3.3
Travel time/speed	3.6	3.7	3.9	3.7	3.7	3.7
Parking availability	3.4	3.4	3.5	3.4	3.5	3.4
Station amenities	2.7	2.6	2.9	2.6	2.9	2.6

The MBTA is taking numerous steps to improve the rider experience systemwide. Reliability issues are being addressed on several fronts. Data from the CAD/AVL system on buses is being used to refine public timetables to better reflect actual running times along routes and improve the printed schedules used by customers. The MBTA has released real-time and schedule data, and developers have built numerous innovative applications that make riding the system easier. The Key Bus Route Improvement Program is directed at improving overall service, including reliability, on these routes. As resources allow, the MBTA will look to make similar improvements on other heavily traveled bus routes.

The MBTA has instituted a mandatory training program for employees – "How Can I Help You Today?" – that focuses on courtesy and sensitivity. MBCR (the MBTA's commuter rail contractor) employees are also required to participate in this training. In addition, the MBTA has undercover monitors who ride the system to check on vehicle signage, announcement of stops, and employee courtesy. Furthermore, the MBTA solicits customer feedback by telephone (including TTY), U.S. mail, and the MBTA website.

The MBTA has several initiatives to improve safety and security. Safety Department officials are constantly in the field inspecting stations, buses, subways, trains, rails, and boats to ensure the safest possible environment. All stations and vehicles have direct communication lines to the MBTA's Operations Control Center, and stations are getting upgraded with modernized public address systems and closed-circuit television camera systems. MBTA personnel are thoroughly trained in emergency response and the Authority's Safety Program (coordinated with local, state, and federal law enforcement agencies, as well as the MBTA Police) includes a rigorous schedule of simulated emergency response exercises geared toward achieving state-of-the-art emergency response techniques. The MBTA has a "See Something, Say Something" campaign, designed to encourage passengers who observe activities or things that seem out of place or out of the ordinary to report such instances to MBTA employees or call the MBTA Police. The MBTA is also installing an additional 90 cameras on buses, and has initiated a pilot program to install cameras on Orange Line cars.

Over the past year, the MBTA General Manager has solicited feedback from customers through "Join the GM" sessions at T stations throughout the system. During these sessions, the General Manager and management staff have interacted with customers and listened to their concerns and their recommendations on how to improve service. Customer feedback about service, vehicle and station cleanliness, employee courtesy, and other issues has enabled T staff to make adjustments to service, address station maintenance concerns, and improve the overall customer experience on the system. The MBTA continues to make every effort to provide the highest quality service to all of its customers, regardless of minority or income status.

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