



MBTA TITLE VI REPORT

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MBTA Title VI Report

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Chapter 1: Introduction

PURPOSE OF THIS REPORT

This Title VI report has been prepared by the Massachusetts Bay Transportation Authority (MBTA) in compliance with the United States Department of Transportation (USDOT) Title VI regulations, 49 CFR Section 21.9 (b), and with Federal Transit Administration (FTA) Circular 4702.1B guidelines, titled “*Title VI Requirements and Guidelines for Federal Transit Administration Recipients*,” issued October 1, 2012 (sometimes referred to as “Circular” or “FTA guidance”).

The purpose of this report is to demonstrate the MBTA’s commitment to respecting the rights of minority and low-income individuals and communities, by actively monitoring, evaluating, and applying solutions to eliminate the risk of discrimination in its programs, services, and activities. The policies, practices, and analyses presented in this document show how the MBTA meets its civil rights obligations and complies with Title VI of the Civil Rights Act of 1964, 42 U.S.C. § 2000d et seq., and related federal and state laws and regulations.

ABOUT THE MBTA

The MBTA is the fifth largest and oldest public transportation system in the United States, providing a variety of transit services and more than 1.3 million trips on an average weekday. The MBTA maintains and operates 183 bus routes, four of which are bus rapid transit lines; three heavy rail lines (Red, Orange, and Blue Line); five branches of light rail service (Green Line B, C, D, and E, and Mattapan-Ashmont); three trackless trolley lines; 13 commuter rail lines; and three commuter ferry routes. The MBTA is overseen by two governing bodies—the Massachusetts Department of Transportation (MassDOT) Board and the Fiscal and Management Control Board (FMCB). The FMCB was created in 2015 to serve for a period of three to five years; their mission is to rein in costs and ensure that the MBTA operates effectively.

The MBTA general manager, as chief executive officer, has overall responsibility for providing assurance to the FTA of the MBTA's commitment to comply with Title VI, which includes this triennial program submission. MassDOT's Office of Diversity and Civil Rights (ODCR) has the delegated responsibility of coordinating Title VI program procedures, overseeing implementation, and monitoring and reporting on how the MBTA is meeting its Title VI compliance obligation. The Title VI requirements apply to all MBTA operations, and all MBTA managers, supervisors, and employees share the responsibility for conducting all programs, services, and activities in a nondiscriminatory manner.

WHAT IS TITLE VI OF THE CIVIL RIGHTS ACT OF 1964, AND HOW DOES IT APPLY TO THE MBTA?

Title VI of the Civil Rights Act of 1964 requires that “no person in the United States shall, on the ground of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination under any program or activity receiving federal financial assistance.”

Moreover, Title VI requires that that public funds not be “spent in any fashion which encourages, entrenches, subsidizes, or results in racial discrimination.”¹ The United States Department of Justice (USDOJ) is authorized to apply the provisions of Title VI to each program or activity by issuing applicable rules, regulations, or requirements in order to accomplish the purpose and spirit of Title VI. Under this authority, USDOT has delegated responsibility to its operating and

¹ See H.R. Misc. Doc. No. 124, 88th Cong., 1st Sess. 3, 12 (1963) (A message from President Kennedy on Civil Rights and Job Opportunities, June 19, 1963).

administrative agencies, including the FTA, to effectuate the provisions of Title VI and issue guidance for recipients, including the MBTA, to ensure compliance with this civil rights requirement.²

RELATED FEDERAL AND STATE NONDISCRIMINATION REQUIREMENTS

The MBTA also complies with and incorporates related federal and state nondiscrimination authorities into its policies and practices. The additional federal prohibitions respected by the MBTA include those against discrimination based on sex, age, and disability. On the state level, the MBTA incorporates standards under the Massachusetts Public Accommodation Law, M.G.L c272 §§ 92a, 98, 98a, and Governor's Executive Order 526, Section 4, which require that access to programs, services, and benefits be provided without regard to religion, creed, sexual orientation, gender identity or expression, veteran's status, and/or ancestry.

ADDITIONAL PROTECTIONS FOR LOW-INCOME, MINORITY, AND LIMITED-ENGLISH-PROFICIENCY INDIVIDUALS

In addition to the Title VI protections, and those provided by related federal and state laws and regulations, the MBTA also complies with two presidential executive orders designed to remove obstacles for and harmful effects on persons who are low-income, minority, and/or have limited English proficiency. In 1994, former President Bill Clinton signed Executive Order 12898 to address adverse health and environmental effects on minority and low-income populations, and to provide minority and low-income communities access to public information and public participation opportunities. Protections under this executive order refer to ensuring "environmental justice." Although low-income populations are not designated a protected class of individuals under Title VI, FTA guidance requires that transit providers evaluate whether a service or fare change will have a disproportionate or adverse impact on low-income communities.

In 2000, former President Bill Clinton signed Executive Order 13166, requiring federal agencies and recipients of federal financial assistance to provide meaningful access to persons who, as a result of their national origin, have limited English proficiency. To help government agencies meet this requirement and to avoid the risk of discrimination on the basis of national origin under Title

² 49 CFR part 21.1

VI, the USDOJ issued guidance for federal agencies and recipients of federal funds to ensure that any program or activity provided in English is also available to persons with limited English proficiency. The standards that apply in this area are also governed by the decision of the United States Supreme Court in the case of *Lau v. Nichols*, 414 U.S. 563 (1974), which connected the failure to address a language barrier in a public education context as a violation of Title VI.

HOW CAN NONDISCRIMINATION REQUIREMENTS UNDER TITLE VI BE VIOLATED?

There are two ways an agency can be in violation of Title VI — by actions resulting in “disparate treatment” or “disparate impact.” *Disparate treatment* occurs when a policy or practice denies an opportunity to or otherwise adversely impacts a person within a protected class (including race, color, or national origin) because of their protected characteristic. *Disparate impact* occurs when an otherwise facially neutral policy or decision, i.e., one that on its surface does not make a discriminatory distinction, results in a discriminatory effect on a protected class. An analytical approach is often required to determine if a disparate impact occurs as a result of a facially neutral policy or decision. Such analysis compares the benefits or burdens received by those who are members of a protected class to the benefits or burdens received by those who are not members of the protected class. This type of analytical approach is applied when determining the impacts of a fare change or major transit service change, and when monitoring transit performance relative to a transit operator’s systemwide service standards and policies.

However, a decision or policy that is considered to result in disparate treatment or a disparate impact can be determined non-discriminatory if there is a substantial legitimate, nondiscriminatory justification or reason for the decision or policy, and if no alternative means of achieving the legitimate policy objective exist. If there is an alternative means of achieving the policy objective that would reduce the degree of disparate impacts, that alternative should be adopted.

DEFINITIONS

Terminology and definitions used in this report are drawn from the FTA Title VI Circular 4702.1B. A list of those definitions is provided in Appendix 1-A.

REPORT SUMMARY

This report constitutes the MBTA's Title VI Program, adopted with the approval of former General Manager Luis Ramírez and the FMCB (see Appendix 1-B for a copy of the FMCB's approval). It has been prepared in accordance with FTA Circular 4702.1B and incorporates the reporting requirements set forth therein.

Chapter 2 addresses the MBTA's general reporting requirements. This chapter includes a summary of the MBTA's notice to the public regarding protection under Title VI and a description of the locations where the notice is posted; a description of the MBTA's procedures for filing civil rights complaints; a list of Title VI investigations, complaints, and lawsuits; a summary of the MBTA's public participation plan; and a narrative description of the MBTA's efforts to ensure that subrecipients are complying with Title VI. The appendices to Chapter 2 include the notice to the public regarding protection under Title VI, the Title VI complaint form, the MBTA's public participation plan, a summary of public engagement activities since the last submission, the MBTA's language assistance plan, the MBTA's service delivery policy, and the MBTA's subrecipient monitoring checklist and review procedures.

Chapters 3 through 7 address the MBTA's requirements as a fixed route transit provider. Chapter 3 includes several maps that show the MBTA's extensive transit-service network and the locations of minority and low-income areas, along with charts that summarize this information. Chapter 4 presents passenger survey data regarding customer demographics and travel patterns. Chapter 5 describes the service policies and standards under which the MBTA operates to ensure high-quality and safe service to the public. Chapter 6 analyzes the extent to which the MBTA has met its service standards, and it compares the levels and quality of service provided to the various communities served by the MBTA. Finally, Chapter 7 presents the service and fare equity analyses that have been conducted by the MBTA since the last Title VI submission.

The MBTA developed this report with technical support for data collection and analysis from the Central Transportation Planning Staff (CTPS) of the Boston Region Metropolitan Planning Organization. CTPS was also responsible for the layout and production of the document. Any questions or comments about the content of this program can be addressed to the MassDOT and MBTA Office of Diversity and Civil Rights, 10 Park Plaza, Boston, MA 02116, 857-368-8580, MBTA.civilrights@mbta.com.





Chapter 2: General Reporting Requirements

INTRODUCTION

This chapter presents the MBTA's Title VI general reporting requirements (FTA C 4702.1B, III), including:

1. Title VI Notice to the Public
2. Title VI Complaint Procedures
3. List of Title VI Investigations, Complaints, and Lawsuits
4. Public Participation Plan
5. Language Assistance Plan
6. Board Membership and Recruitment Efforts
7. Monitoring of Subrecipients
8. Equity Analyses for Locations of Constructed Facilities

TITLE VI NOTICE TO THE PUBLIC (FTA C 4702.1B, III-4.A.(1))

The MBTA takes proactive steps to inform members of the public of their rights under Title VI. The goal is not only to ensure that customers are aware of their legal protections, but also to ensure they know how to request information on the MBTA's nondiscrimination obligations and how they can file a complaint alleging possible discrimination.

The MBTA disseminates its Title VI Notice to its customers in multiple ways. Each version of the Notice is designed to include the following elements:

- A statement that the Authority operates its programs without regard to race, color, or national origin
- A description of the steps members of the public can take to request additional information about the MBTA's Title VI obligations
- A description of the steps members of the public can take to file a Title VI discrimination complaint relating to the programs, services, and activities managed by the MBTA

Notice Posting Locations

The MBTA's strategy for disseminating the Title VI Notice includes posting it in the following locations:

1. MBTA website (<https://www.mbtta.com/policies/title-vi>)
2. Transit stations (subject to Green Line and trolley station limitations)
3. Ferry vessels, docks, and ticketing offices
4. Public-facing offices at the MBTA, including the Office of Diversity and Civil Rights, Human Resources, and the Office of the Secretary of Transportation

A complete list of transit stations where the notice is posted is included in Appendix 2-A.

Status of Ongoing Notice Dissemination Efforts

The MBTA's Title VI Notice is currently posted in stations across all modes, where practicable. This includes the entirety of the fixed-route rapid transit rail network,

except for ten subway stations¹ and the above-ground stations on the Green Line where no physical infrastructure exists for such postings. All remaining rapid transit stations are on target to receive Title VI Notice posters by the end of 2018, including all Green Line stations between Lechmere and Kenmore, which covers key transfer stations that reach the majority of Green Line passengers. The MBTA is currently exploring two possible ways to post notices at the outlying Green Line stops: either incorporating the Notice into electronic tablets at the stations, or posting a shorter version of the Notice on the posts that will be needed for mounting the tablets. These strategies will be tested during the winter of 2018-2019 to assess resiliency and effectiveness. Results of the testing period will be evaluated and a determination will be made as to the long term viability of this technology. If the equipment is permanently deployed, the MBTA will consider this approach for Title VI Notice posting.

Bus passengers are reached by posting the Notice in all major bus transfer stations. Similarly, ferry passengers are provided with Title VI Notice at all ferry docks in the network. Lastly, Commuter Rail passengers can find the Keolis-branded Title VI Notice (which mirrors the MBTA's full Notice) at all outlying platforms and stations throughout the network, in addition to the Boston locations: South Station, North Station, Back Bay and Ruggles.

The Notice is also disseminated electronically on the MBTA's website, included with major publications, posted at public meetings, and incorporated into system maps and other printed materials.

MBTA Basic Title VI Notice

The MBTA's basic Title VI Notice is intentionally written as briefly as possible so that it can be used in a wide variety of space-limited situations, including station notices, vehicle notices, and on existing publications such as maps and schedules. The following is the text of the MBTA's basic Title VI notice:

¹ Lechmere, Park Street, Arlington, Hynes, Kenmore, Fenway, Brookline Hills, Government Center, Maverick, and Aquarium.

Under Title VI of the Civil Rights Act of 1964, the MBTA does not discriminate against any person in its programs, services, and activities based on race, color, or national origin. To learn more about your civil rights or to file a complaint, please contact:

MBTA Title VI Specialist
Office of Diversity and Civil Rights
10 Park Plaza
Boston, MA 02116
(617)-222-3200
Email: MBTACivilRights@mbta.com
Website: www.mbta.com/TitleVI

The MBTA also maintains a long-form Title VI Notice which includes much more detail on additional Civil Rights protections for customers and complaint filing procedures. The full text of the MBTA's Title VI/Nondiscrimination Notice is presented in Appendix 2-B.

MBTA TITLE VI COMPLAINT FORM (FTA C 4702.1B, III-4.A.(2))

The MBTA's Title VI Complaint Form is included at Appendix 2-C.

MBTA TITLE VI COMPLAINT PROCEDURES (FTA C 4702.1B, III-4.A.(2))

This section details the MBTA's procedures for processing Title VI discrimination complaints (on the basis of race, color, or national origin, including limited English proficiency). Federal law and regulations governing Title VI of the Civil Rights Act of 1964 (Title VI) places the overall coordination authority for the investigation of civil rights complaints with the United States Department of Justice (US DOJ), which works collaboratively with federal agencies that carry out this responsibility. In the transportation sector, this investigative authority rests with the US Department of Transportation (US DOT) and its agencies for the different modes of transportation, including the Federal Transit Administration (FTA). In coordination with USDOT requirements, FTA has established regulations and guidance that require recipients and subrecipients of financial assistance, through FTA, to establish procedures for processing Title VI complaints filed with these organizations.

The procedures described below, modeled on recommended complaint procedures promulgated by the US DOJ, are designed to provide a fair opportunity for addressing complaints that respect due process for both complainants and respondents. In addition to the formal complaint resolution

process detailed here, the MBTA takes affirmative steps to pursue informal resolution of any and all Title VI complaints, when possible.

The Complaint Process

1. Who can file a complaint?

Any member of the public, along with all MBTA customers, applicants, contractors, or subrecipients who believe that they themselves, a third party, or a class of persons were mistreated or treated unfairly because of their race, color, or national origin (including limited English proficiency) in violation of Title VI of the Civil Rights Act of 1964, related federal and state laws and executive orders, or the MBTA's Anti-Discrimination Harassment Prevention (ADHP) Policy. Retaliation against a member of the public on the basis of race, color, or national origin is also prohibited under Title VI and the ADHP policy.

2. Where do I file a complaint?

The MBTA Title VI Specialist

Massachusetts Bay Transportation Authority
Office of Diversity and Civil Rights
Attention: Title VI Specialist
10 Park Plaza, Suite 3800, Boston, MA 02116
Phone: (857) 368-8580 or 7-1-1 for Relay Service
Email: MBTACivilRights@mbta.com

The MBTA Customer Call Center

Customers may also contact the MBTA's Call Center regarding a discrimination concern by calling 617-222-3200. The Call Center staff will seek to obtain basic information about the matter from the caller, and details of the call will be forwarded to the Office of Diversity and Civil Rights for processing according to these procedures.

The Federal Transit Administration

Complaints may also be filed directly with the FTA:
Federal Transit Administration
Office of Civil Rights
Attention: Complaint Team
East Building, 5th Floor - TCR
1200 New Jersey Avenue, SE
Washington, DC 20590

Please note: when FTA receives a Title VI complaint regarding the MBTA, a subrecipient, or a contractor, the FTA may request the matter be investigated by the MBTA.

3. What do I need to include in a complaint?

A complaint form is available electronically on the MBTA Title VI website (www.mbta.com/titlevi) or in hardcopy from the MBTA Title VI Specialist, identified above.

Alternatively, a complainant may submit correspondence in an alternative format that should include:

1. Contact information

Please note: Complaints can be filed anonymously. However, doing so may make it more difficult for MBTA investigators to look into the allegations as they may not be able to obtain additional and/or clarifying information from the complainant as the investigation progresses.

2. The basis for the alleged discrimination (e.g. race, color, national origin, limited English proficiency, etc.)

3. The person or group injured by the alleged discrimination, as well as the person, agency, organization, or institution alleged to have discriminated

4. An explanation of the alleged discrimination, including the name and contact information of any witnesses

- A. In cases where the complainant is unable to provide a written statement, a verbal complaint may be made. Please call or visit the MBTA Office of Diversity and Civil Rights and request assistance to file a verbal complaint.

Massachusetts Bay Transportation Authority
Office of Diversity and Civil Rights
Attention: Title VI Specialist
10 Park Plaza, Suite 3800, Boston, MA 02116
Phone: (857) 368-8580 or 7-1-1 for Relay Service
Email: MBTACivilRights@mbta.com

- B. All complaints should be signed by the complainant.

- C. Complaints will be accepted in any recognized language. Multilingual complaint forms are available.

4. How long do I have to file a complaint?

- A. A complaint alleging violation of Title VI and/or the MBTA's ADHP policy must be filed no later than one hundred and eighty (180) days from the date of the alleged violation.
- B. Complaints alleging violations of state or federal law must be filed within the time frames established by statute, regulation, or case law.

5. How will my complaint be handled?

When a complaint is received, it is assigned to a Civil Rights Investigator (CRI). The CRI will determine jurisdiction based on whether the complaint:

- A. Involves a statement or conduct that violates:
 - 1. The MBTA's legal obligation and commitment to prevent discrimination, harassment or retaliation on the basis of a protected characteristic with regard to any aspect of the Authority's service to the public; or
 - 2. The commitment made by subrecipients and contractors working with MBTA to adhere to MBTA policies; AND
- B. Is filed within 180 days.

If the CRI determines that the MBTA has jurisdiction over the complaint, the CRI will:

- A. Acknowledge receipt of the complaint and describe outcome of jurisdictional determination within ten (10) business days of receipt of the complaint.

If the CRI determines that any complaint does not have the potential to establish a civil rights violation, then the CRI shall notify the complainant and Title VI Specialist in writing of its finding and the matter shall be closed.

- B. Conduct a thorough investigation of the allegations contained in the complaint in accordance with the MBTA Internal Complaint Procedures.
- C. Complainants will be interviewed by a Civil Rights Investigator (CRI).

6. What happens after the investigation?

At the conclusion of the investigation, the CRI will transmit to the complainant and the respondent one of the following three letters based on the findings:

- A. A letter of resolution that explains the steps the respondent has taken or will take to comply with Title VI and/or the ADHP policy
- B. A letter of finding that is issued when the respondent is found to be in compliance with Title VI and/or the ADHP policy. This letter will include an explanation of why the respondent was found to be in compliance, and provide notification of the complainant's appeal rights. A finding of compliance may still include recommendations from the CRI to further avoid the risk of Title VI and/or ADHP policy violations
- C. A letter of finding that is issued when the respondent is found to be in noncompliance. This letter will include each violation referenced as to the applicable regulations, a brief description of findings/recommendations, the consequences of failure to achieve voluntary compliance, and an offer of assistance in devising a remedial plan for compliance, if appropriate.

7. How can I appeal a Finding?

If a complainant or respondent does not agree with the findings of the CRI then he/she/they may appeal to the Assistant Secretary of Diversity & Civil Rights. The appealing party must provide any new information that was not readily available during the course of the original investigation that would lead the MBTA to reconsider its determinations. The request for an appeal and any new information must be submitted within sixty (60) days of the date the letter of the finding was transmitted. After reviewing this information, the MBTA will respond either by issuing a revised letter of resolution or by informing the appealing party that the original letter of resolution or finding remains in force. To file a request for an appeal, please contact:

Massachusetts Bay Transportation Authority
Office of Diversity and Civil Rights
Attention: Assistant Secretary for Civil Rights
10 Park Plaza, Suite 3800, Boston, MA 02116
Phone: (857) 368-8580 or 7-1-1 for Relay Service
Email: MBTACivilRights@mbta.com

8. Definitions:

Complainant – A person who files a complaint with the MBTA alleging a violation of Title VI, the ADHP Policy, or related nondiscrimination obligation.

Complaint – Written, verbal, or electronic statement concerning an allegation of discrimination based on race, color, or national origin (including limited English proficiency). Where a person with a disability or a person with limited English proficiency files a complaint, the term complaint encompasses alternative formats and languages other than English.

Discrimination – An act or inaction, which can be either intentional or unintentional, through which a person or group of persons has been subjected to unequal treatment or disparate impact on the basis of race, color, or national origin (including limited English proficiency).

Respondent – The person, agency, institution, or organization alleged to have engaged in behavior that violates Title VI, the ADHP Policy, or related nondiscrimination obligations.

TITLE VI INVESTIGATIONS, COMPLAINTS, AND LAWSUITS (FTA C 4702.1B, III-4.A.(3))

Title VI complaints are investigated by the Office of Diversity and Civil Rights (ODCR) Investigations Unit. The investigator assigned to a complaint determines whether or not there is sufficient evidence to find that there is a violation of Title VI. All Title VI complaints that are investigated will result in a finding of either “Cause” or “No Cause.” At the conclusion of the investigation, regardless of outcome, the decision (or “finding”) is referred to the appropriate MBTA Area for remedial or corrective action, as necessary. An MBTA Area is the garage, transportation line, repair shop, or department where the Respondent works. If further investigation is conducted by the Area, it will only relate to “non-civil rights” issues raised in the complaint or during the investigation. These issues could include customer service concerns, courtesy rule violations or safety issues. In some instances, Title VI complaints with “No Cause” findings result in discipline to the employee for non-civil rights rules and policy violations. In some cases, the Area works in consultation with Labor Relations, Human Resources or ODCR’s Training and Mediation Unit.

Table 2-1 presents a list of Title VI complaints, lawsuits, and investigations between 2014 and 2017.

Table 2-1
Title VI Complaints, Lawsuits, and Investigations

(CSA = Customer Service Agent)

Date	Basis	Action Taken	Summary	Status
4/11/2014	Race	Referral to Area	A passenger alleged that bus service in the Germantown neighborhood of Quincy is inferior to service in other parts of Quincy because Germantown is a minority neighborhood.	Closed
4/25/2014	Race	Referral to Area	A third-party complainant claimed that a bus operator laughed in the face of a minority passenger and refused to stop at the passenger's requested stop. Denied by operator. Insufficient evidence.	Closed
4/30/2014	Race	Referral to Area	A minority bus rider alleged that a bus operator changed the route of a bus in order to avoid picking her up. The rider also alleged that the operator intentionally bypasses other minority riders. Denied by operator. No video available. Insufficient evidence.	Closed
5/1/2014	Race	Referral to Area	A rider alleged that a bus operator used a racial slur against her baby. Denied by operator. Insufficient evidence.	Closed
5/9/2014	Race	Referral to Area	A customer alleged that a bus operator told her to get off the bus due to her race. Denied by operator. Insufficient evidence.	Closed

(Table 2-1 Cont.)

Date	Basis	Action Taken	Summary	Status
5/19/2014	Race	Referral to Area	A customer alleged that a trolley operator bypassed her and daughter due to race. Denied by operator. Insufficient evidence.	Closed
5/20/2014	Race	Referral to Area	A customer alleged that a bus operator bypassed her and daughter due to their race and that the operator is rude to minority passengers. Denied by operator. Insufficient evidence.	Closed
5/25/2014	National Origin	Referral to Area	A third-party complainant claimed that a bus operator yelled a slur at a friend based on limited English proficiency. Denied by operator. Insufficient evidence.	Closed
6/23/2014	National Origin	Referral to Area	A customer alleged that a CSA was rude to her regarding her children's behavior due to her accent. Video reviewed. Denied by representative. Insufficient evidence.	Closed
6/25/2014	Color	Referral to Area	A customer alleged that a CSA allowed another customer to enter a station without paying because of the other customer's race. CSA denied allegations. No video evidence to support customer. Insufficient evidence.	Closed

(Table 2-1 Cont.)

Date	Basis	Action Taken	Summary	Status
6/26/2014	National Origin	Referral to Area	A customer alleged that a bus operator rudely told her to go to the back of the bus because she was talking to her friend in Spanish. Operator denied allegations. Insufficient evidence.	Closed
7/14/2014	Race	Re-training of bus operator	A customer alleged she was charged extra on her usual route due to her race. The operator said he was not aware of new fare rules and denied discriminatory intent. Insufficient evidence.	Closed
7/14/2014	National Origin	Referral to Area	A customer alleged that a bus operator was rude to her family because of their limited English proficiency, told them that they shouldn't be on her bus, and took their Charlie Card. Operator denies. Insufficient evidence.	Closed
7/17/2014	National Origin	Bus operator sent to training	A third-party complainant reported that a bus operator made a derogatory remark to a customer regarding the customer's limited English proficiency. Operator denied allegation. Insufficient evidence.	Closed
7/21/2014	Race	Referral to Area	A customer alleged that a bus inspector referred to him as "you people." Denied by operator. Insufficient evidence.	Closed

(Table 2-1 Cont.)

Date	Basis	Action Taken	Summary	Status
7/22/2014	Race	Referral to Area	A customer alleged that a bus operator made racist statements about another operator known to both parties. Denied by operator. Insufficient evidence.	Closed
7/24/2014	Race	Operator sent to training	A customer alleged that a bus operator made a derogatory statement based on her race. Denied by operator. Insufficient evidence.	Closed
7/28/2014	Race	Operator counselled on job performance	A customer alleged that a bus operator refused to pick her up based on her race and then stopped to pick up passengers of other races. Denied by operator. Insufficient evidence.	Closed
8/1/2014	Race	Inspector sent for re-training	A customer was assaulted on a subway train, and then both the customer and the assailant were removed from the train. The customer alleged discriminatory treatment based on race. The inspector denied that the removal of the victim was due to race. Insufficient evidence.	Closed
9/7/2014	Race	Referral to Area	A customer alleged that she was called a racial slur. Inspector denied allegation. Insufficient evidence.	Closed
9/21/2014	Race	Referred to Area for rules violation	Customers alleged that a bus operator made racist comments to them. Denied by operator. Insufficient evidence.	Closed

(Table 2-1 Cont.)

Date	Basis	Action Taken	Summary	Status
9/22/2014	Race	Referral to Area	A customer alleged that a subway CSA used a racial slur towards them. Denied by CSA. Insufficient evidence.	Closed
9/27/2014	Race	Referral to Area	A passenger alleged that a bus operator made a racially hateful remark. Denied by operator. Insufficient evidence.	Closed
10/10/2014	Race	Referral to Area	A third-party complainant alleged that a subway CSA allowed a passenger who had left their pass at home to pass through the fare gates for free and then required a passenger of a different race to pay when their pass didn't work. Denied by CSA and Inspector. Insufficient evidence.	Closed
10/10/2014	National Origin	Referral to Area	A bus operator was alleged to have asked a customer with limited English proficiency whether he was from China. Denied by operator. Insufficient evidence.	Closed
10/14/2014	National Origin	Referral to Area	A bus operator was alleged to have been rude to a Spanish-speaking passenger but not to English-speaking passengers. Denied by operator. Insufficient evidence.	Closed
11/6/2014	Race	Referral to Area	A bus operator called police to have a mother and her teenage son thrown off a bus. The operator alleged to have been assaulted by the teenager and denied calling police due to race. Insufficient evidence.	Closed

(Table 2-1 Cont.)

Date	Basis	Action Taken	Summary	Status
11/9/2014	Race	Referral to Area	A bus operator was alleged to have made racist comments three weeks in a row. Denied by operator. Insufficient evidence.	Closed
11/14/2014	National Origin	Referral to Area	A CSA was alleged to have mocked a customer's accent and provided poor service. Denied by CSA. Insufficient evidence.	Closed
11/20/2014	National Origin	Referral to Area	Customer said that bus operator called her names due to her race. Claim denied by CSA, and a witness statement supported the operator. Insufficient evidence.	Closed
12/1/2014	Race	Close Letters to complainant	A bus operator was alleged to have refused to board a customer on the basis of his race and was alleged to have called him a racial slur. Operator denied. Insufficient evidence.	Closed
12/5/2014	Race	Referral to Area	A bus operator was alleged to have called customers racial slurs. Denied by operator. Insufficient evidence.	Closed
12/14/2014	Race	Referral to Area	A third-party complainant said that a bus operator was hostile to an autistic customer due to his race. Operator denied allegations. Insufficient information.	Closed

(Table 2-1 Cont.)

Date	Basis	Action Taken	Summary	Status
12/19/2014	Race	Referral to Area	A customer claimed that the Route 19 bus from Fields Corner, which serves a minority neighborhood, frequently has three dropped trips during the morning rush hour. The customer compared it to service on Route 34E, which serves a nonminority neighborhood and which the customer claims does not frequently have dropped trips.	Closed
1/23/2015	Race	Referral to Area	A bus operator was alleged to have made certain customers disembark through front door based on their race. Denied by operator. Insufficient evidence.	Closed
1/30/2015	Race	Referral to Area	A bus operator was alleged to have made a passenger with his hands full put his link pass in the fare machine due to his race. Denied by operator. Insufficient evidence.	Closed
2/19/2015	Color	Referral to Area	A customer claimed she was arrested by MBTA Police after bumping into another customer due to color of her skin. Police deny. Video inconclusive. Insufficient evidence.	Closed
2/23/2015	National Origin	Referral to Area	A bus operator was alleged to have made derogatory comments to customer about being an immigrant. Denied by operator. Insufficient evidence.	Closed

(Table 2-1 Cont.)

Date	Basis	Action Taken	Summary	Status
3/1/2015	National Origin	Referral to Area	A bus operator was alleged to have called a woman he almost hit on the road an “immigrant.” Denied by operator. Video evidence inconclusive. Insufficient evidence.	Closed
3/5/2015	National Origin	Referral to Area	A bus operator was alleged to have told a passenger who was speaking Spanish on the phone to get off or go to back of the bus. Denied by operator. Insufficient evidence.	Closed
3/10/2015	Race	Referral to Area	A bus operator was alleged to have used a racial slur against a person who was driving nearby. Denied by operator. Video inconclusive. Insufficient evidence.	Closed
3/26/15	Race	Referral to Area	The Fairmount Line, a minority line, was alleged to have had its fare reduced. In contrast, the lines that serve West Roxbury and Roslindale, which are nonminority areas, are alleged to have not had their fares reduced.	Closed
4/8/2015	Race	Referral to Area	A bus operator was alleged to have mistreated a customer due to her race. Denied by operator. Insufficient evidence.	Closed
4/18/2015	National Origin	Referral to Area	A bus operator was alleged to have told a customer to learn English if he wants to be in the United States. Denied by operator. Insufficient evidence.	Closed

(Table 2-1 Cont.)

Date	Basis	Action Taken	Summary	Status
5/2/2015	Race	Referral to Area	A bus operator was alleged to have bypassed a customer at a stop due to the customer's race. Denied by operator. Video inconclusive. Insufficient evidence.	Closed
5/8/2015	Race	Referral to Area	A trolley operator was alleged to have refused to open the door for one customer and then to have opened it for a customer of a different race. Denied by operator. Insufficient evidence.	Closed
5/22/2015	Color	Referral to Area	A customer reported that a bus operator charged him but did not charge customers of other races. Denied by operator. Insufficient evidence.	Closed
5/22/2015	Race	Referral to Area	A customer claimed that a woman was questioned about a discounted pass but two women of a different race were permitted to board for free. Denied by operator. No video available. Insufficient evidence.	Closed
5/26/2015	National Origin	Referral to Area	A bus operator was alleged to have rudely told a customer speaking Spanish to stop talking on their phone. Denied by operator. Insufficient evidence.	Closed
5/28/2015	National Origin	Referral to Area	A CSA at a customer service center was alleged to have sighed constantly and to have not been helpful to a customer. Denied by CSA. Insufficient evidence.	Closed

(Table 2-1 Cont.)

Date	Basis	Action Taken	Summary	Status
6/1/2015	National Origin	Referral to Area	A bus operator was alleged to have made racist comments about Spanish-speaking customers. Denied by operator. Insufficient evidence.	Closed
6/4/2015	Race	Referral to Area	A bus operator was alleged to have bypassed a customer due to their race. Denied by operator. Insufficient evidence.	Closed
6/6/2015	Race	Referral to Area	A bus operator was alleged to have been rude and disrespectful to a customer due to their race or lack of English proficiency. Denied by operator. Insufficient evidence.	Closed
6/10/2015	Race	Referral to Area	The Route 30 bus was alleged to have had its 6:30 PM trip dropped for several weeks because the route serves a minority community.	Closed
6/16/2015	Race	Referral to Area	A third-party complainant reported a bus operator allegedly harassing another customer due to race. Denied by operator. Insufficient evidence.	Closed
6/17/2015	Race	Referral to Area	The Route 30 bus was alleged to have had its 4:50 PM trip dropped for several weeks because the route serves a minority community.	Closed

(Table 2-1 Cont.)

Date	Basis	Action Taken	Summary	Status
6/24/2015	Race	Close Letters to Respondent	A subway CSA was alleged to have allowed a customer to enter the fare gates for free and then to have denied entry to a different customer based on race. Denied by CSA. Video supports CSA. Insufficient evidence.	Closed
7/9/2015	Race	Referral to Area	A subway CSA was alleged to have used a racial slur against a family. Denied by operator. Insufficient evidence.	Closed
7/17/2015	Race	Referral to Area	A subway inspector was alleged to have stopped one woman with stroller out of a group of passengers to verify her pass because of her race. Inspector denies due to race. Insufficient evidence.	Closed
7/24/2015	Race	CSA Suspended 3 days and re-trained	A subway CSA was alleged to have called a customer a racial slur. Witnesses provided testimony to support a Cause finding.	Closed
7/27/2015	Race	Referral to Area	A bus inspector was alleged to have screamed at one customer but was then kind to a customer of a different race. Inspector denied race was factor. Insufficient evidence.	Closed
7/28/2015	Race	Referral to Area	A customer claimed to have been bypassed due to his race. Denied by operator. Insufficient evidence.	Closed

(Table 2-1 Cont.)

Date	Basis	Action Taken	Summary	Status
7/30/2015	Race	Referral to Area	A third-party complainant alleged that a bus operator called the police on one customer who swore while on their phone but did not call the police on customers of a different race who swore. Denied by operator. Insufficient evidence.	Closed
8/6/2015	Race	Referral to Area	A customer claimed to have been bypassed due to his race. Denied by operator. Video does not support customer. Insufficient evidence.	Closed
9/5/2015	Race	Referral to Area. Operator sent to training.	A bus operator was alleged to have been unhelpful to a customer and then kicked the customer off the bus. Denied by operator. Insufficient evidence.	Closed
9/18/2015	National Origin	Referral to Area	A bus operator was alleged to harass and discriminate against Spanish speakers. Denied by operator. Insufficient evidence.	Closed
9/26/2015	Race	Referral to Area	A third-party complainant claimed that a bus operator made racial slurs at people on the street. Denied by operator. Insufficient evidence.	Closed
10/7/2015	Race	Referral to Area	A bus operator was alleged to have targeted a student and insulted him while allowing students of a different race to ride the bus for free. Denied by operator. Video shows no one boarded bus for free. Insufficient evidence.	Closed

(Table 2-1 Cont.)

Date	Basis	Action Taken	Summary	Status
10/7/2015	National Origin	Referral to Area	A bus operator was alleged to have made derogatory comment about immigrants. Denied by operator. Insufficient evidence.	Closed
10/7/2015	National Origin	Referral to Area for other rules violation	A bus operator was alleged to have made a derogatory remark to passengers based on their limited English proficiency. Denied by operator. Insufficient evidence.	Closed
10/8/2015	National Origin	Referral to Area	A bus operator was alleged to have made a derogatory remark to passengers based on their limited English proficiency. Denied by operator. Insufficient evidence.	Closed
10/13/2015	Color	Referral to Area	A bus operator was alleged to have physically threatened a customer due to her race. Denied by operator. Insufficient evidence.	Closed
10/13/2015	National Origin	Referral to Area	A bus operator was alleged to have humiliated customer and to have made a derogatory statement about her language skills. Denied by operator. Insufficient evidence.	Closed
10/14/2015	Race	Referral to Area	A bus operator was alleged to have called a customer racial slurs. Denied by operator. Insufficient evidence.	Closed
10/19/2015	Race	Referral to Area	A bus operator was alleged to have called a customer a racial slur. Denied by operator. Insufficient evidence.	Closed

(Table 2-1 Cont.)

Date	Basis	Action Taken	Summary	Status
10/24/2015	Race	Referral to Area	A bus operator was alleged to have physically attacked a customer due to his race. Denied by operator. Insufficient evidence.	Closed
11/9/2015	Race	Referral to Area	A third-party complainant reported a bus operator making racial slurs and screaming at a customer. Denied by operator. Insufficient evidence.	Closed
11/24/2015	Race	Referral to Area	Customers alleged that they were denied service at Charlie Card store based on their race. They alleged to have been confused with earlier customers of the same race, and the customers said that staff claimed that they had exceeded transaction limits. Denied by CSA. There was a recent change in policy regarding transactions handled by store. Insufficient evidence.	Closed
12/7/2015	Race	Referral to Area	A bus operator was alleged to have told a customer to sit down because of his race. Denied by operator. Insufficient evidence.	Closed
12/14/2015	Race	Referral to Area	A bus operator was alleged to have kicked a group of passengers off the bus due to their race. The operator claimed to have kicked them off the bus because they had argued about initially having been bypassed. Video showed they were bypassed because they were smoking and not at the bus stop. Insufficient evidence.	Closed

(Table 2-1 Cont.)

Date	Basis	Action Taken	Summary	Status
12/16/2015	National Origin	Referral to Area	A bus operator was alleged to have made a derogatory remark to passengers based on their limited English proficiency. Operator denies. Insufficient evidence.	Closed
12/23/2015	Race	Referral to Area	A bus operator allegedly asked a customer to tap his pass twice due to his race. Denied by operator. Insufficient evidence.	Closed
12/24/2015		Referral to Area	A person claimed that service was being reduced and that late night service was being eliminated without an analysis of how service reductions would affect customers.	Closed
12/29/2015	Race	Referral to Area	A bus operator was alleged to have told a Spanish-speaking customer to get off the phone. Operator reported it was due to proximity of customer to operator resulting in a safety issue. Insufficient evidence.	Closed
1/8/2016	Race	Referral to Area	A bus operator was alleged to have used a racial slur towards a customer. Denied by operator. Insufficient evidence.	Closed
1/20/2016	Race	Referral to Area	A trolley operator was alleged to have mistreated a customer due to their race. Denied by operator. Insufficient evidence.	Closed
1/21/2016	National Origin	Referral to Area	A bus operator was alleged to have had a conversation with a passenger that included derogatory statements about immigrants. Denied by operator. Insufficient evidence.	Closed

(Table 2-1 Cont.)

Date	Basis	Action Taken	Summary	Status
1/22/2016	National Origin	Referral to Area	A bus operator was alleged to have made a derogatory statement about a customer's national origin. Denied by operator. Insufficient evidence.	Closed
1/23/2016	National Origin	Referral to Area	A bus operator was alleged to have threatened with deportation a customer who was taking pictures of the bus. Denied by operator. Insufficient evidence.	Closed
1/25/2016	National Origin	Referral to Area	A bus operator was alleged to have removed an immigrant customer who did not understand him. Denied by operator. Insufficient evidence.	Closed
2/26/2016	Race	Referral to Area	A third-party complainant reported that a bus operator used a racial slur against teenage customers. Denied by operator. Insufficient evidence.	Closed
3/1/2016	Race	Referral to Area	A bus operator was alleged to have used a racial slur against a student on the bus. Denied by operator. Insufficient evidence.	Closed
3/19/2016	National Origin	Referral to Area	A bus operator was alleged to have mistreated a customer due to his national origin or ethnicity. Denied by operator. Insufficient evidence.	Closed
3/30/2016	Race	Referral to Area	A bus operator was alleged to have made a derogatory comment about a customer's race. Denied by operator. Insufficient evidence.	Closed

(Table 2-1 Cont.)

Date	Basis	Action Taken	Summary	Status
3/30/2016	Race	Referral to Area	A bus operator was alleged to have called a customer a racial slur. Denied by operator. Insufficient evidence.	Closed
4/7/2016	Race	Referral to Area	A CSA was alleged to have used a racial slur against a customer. Denied by CSA. Insufficient evidence.	Closed
4/17/2016	National Origin	Referral to Area	A third-party complainant reported that a bus operator yelled at a customer due to her inability to speak English. Denied by operator. Insufficient evidence.	Closed
4/24/2016	National Origin	Referral to Area	A caller claimed there are never enough Green Line trolleys on the B Line compared to the other branches of the Green Line due to xenophobia related to the large number of immigrants on the B Line.	Closed
4/28/2016	Race	Referral to Area	A bus operator was alleged to have made a racially derogatory comment. Denied by operator. Insufficient evidence.	Closed
5/5/2016	Race	Referral to Area	A bus operator was alleged to have bypassed people of color. Denied by operator. Insufficient evidence.	Closed
5/5/2016	Race	Referral to Area	A bus operator was alleged to have opened the rear door for one passenger but not for a passenger of a different race. Denied by operator. Video inconclusive. Insufficient evidence.	Closed

(Table 2-1 Cont.)

Date	Basis	Action Taken	Summary	Status
5/13/2016	Race	Referral to Area	A caller claimed that the Route 44 bus regularly has a dropped 5:15 AM trip because the route serves a minority community.	Closed
5/20/2016	National Origin	Referral to Area	A passenger alleged that a bus operator took his pass and that subway CSAs were not allowing him to enter the subway without his pass due to his national origin. Denied by operator. Insufficient evidence.	Closed
5/27/2016	Race	Referral to Area	A person alleged that Red Line trains to Braintree, a nonminority line, are given preference over Red Line trains to Ashmont, a minority line, at JFK/UMass Station.	Closed
6/3/2016	Race	Referral to Area	A third-party complainant reported that a bus operator called a customer a racially derogatory term. Denied by operator. Insufficient evidence.	Closed
6/4/2016	Race	Referral to Area	A CSA was alleged to have called a customer a racial slur. Denied by CSA. Insufficient evidence.	Closed
6/6/2016	National Origin	Referral to Area	A third-party complainant reported that a bus operator told Spanish-speaking passengers to shut up or that he would remove them from the bus. Denied by operator. Insufficient evidence.	Closed

(Table 2-1 Cont.)

Date	Basis	Action Taken	Summary	Status
6/13/2016	Race	Referral to Area	A bus operator was alleged to have picked up one customer and then to have pulled away from a customer of a different race. Denied by operator. Insufficient evidence.	Closed
7/1/2016	Race	Referral to Area	A caller claimed to have had to wait for one hour for a bus on Route 23, a minority route, but that the wait for a bus in nonminority communities would not have been as long.	Closed
7/3/2016	Race	Referral to Area	A bus operator was alleged to have used a racial slur against a customer. Denied by operator. Insufficient evidence.	Closed
7/23/2016	National Origin	Referral to Area	A bus operator was alleged to have mocked a passenger's accent. Denied by operator. Insufficient evidence.	Closed
7/26/2016	Minority and Low-Income	Closed	A person alleged that the MBTA failed to perform an equity analysis related to elimination of late-night service. FTA investigation concluded the MBTA had properly conducted the necessary analysis.	Closed
8/15/2016	Race	Referral to Area	A bus operator was alleged to have used a racial slur against a customer. Denied by operator. Insufficient evidence.	Closed
8/22/2016	Race	Referral to Area	A subway CSA was alleged to have used a racial slur against a customer and to have threatened to call the police on him. Denied by CSA. Insufficient evidence.	Closed

(Table 2-1 Cont.)

Date	Basis	Action Taken	Summary	Status
8/30/2016	Race	Referral to Area	A bus operator was alleged to have called a customer a racial slur and to have told the customer to leave the bus. Denied by operator. Video inconclusive. Insufficient evidence.	Closed
9/9/2016	National Origin	Referral to Area	A bus operator was alleged to have been rude to a customer and then to have contacted the police to have her removed. Denied by operator. Insufficient evidence.	Closed
9/15/2016	Race	Referral to Area	A bus operator was alleged to have bypassed a customer and his daughter due to their race. Denied by operator. Video unavailable. Insufficient evidence.	Closed
10/3/2016	National Origin	Referral to Area	A bus operator was alleged to have made derogatory statements about Spanish-speaking customers. Operator denies. Witness also reported not hearing derogatory statements. Insufficient evidence.	Closed
10/6/2016	Race	Operator disciplined: 3-day suspension and re-training.	A bus operator was alleged to have made derogatory statements about a customer's race. Acknowledged by bus operator. Cause Finding.	Closed
10/10/2016	Race	Referral to Area	A third-party complainant reported that a bus operator used a racial slur against three teenagers on a bus. Denied by operator. Insufficient evidence.	Closed

(Table 2-1 Cont.)

Date	Basis	Action Taken	Summary	Status
11/2/2016	Race	Referred to Area	A caller claimed that insufficient service on Route 111 amounts to institutional racism. The caller reported that bus customers wait for hours due to their skin color.	Closed
11/7/2016	Race	Referred to Area	A trolley operator was alleged to have made derogatory remarks about the racial composition of the neighborhood where he works. Operator denies. Insufficient evidence.	Closed
11/20/2016	Race	Referred to Area	A trolley operator was alleged to have used a racial slur against a customer. Operator denies. Insufficient evidence.	Closed
11/21/2016	Minority and Low-Income	Keolis developed new cancellation policy to minimize risk of disparities; Keolis Diversity Officer now tracks cancellations.	A person alleged that cancellations on the Fairmount Line had a disparate impact on minority and low-income riders. FTA investigation found no Title VI violation. Keolis developed a new cancellation policy to minimize the risk of disparities. The Keolis Diversity Officer now tracks cancellations.	Closed
11/30/2016	Race	Referral to Area	A bus operator was alleged to have used a racial slur against customer. Denied by operator. Insufficient evidence.	Closed
12/2/2016	Race	Referral to Area	A third-party complainant told a customer that a bus operator called her a racial slur. Denied by operator. Insufficient evidence.	Closed

(Table 2-1 Cont.)

Date	Basis	Action Taken	Summary	Status
12/20/2016	Race	Referral to Area	A bus operator was alleged to have been rude and disrespectful to a customer due to race. Denied by operator. Insufficient evidence.	Closed
12/29/16	Race	Referral to Area	A bus operator was alleged to have used a racial slur against a customer. Denied by operator. Insufficient evidence.	Closed
1/23/2017	Race	Referral to Area	A caller claimed to have observed higher frequency on the Braintree Line (a nonminority line) than on the Ashmont Line (a minority line). The caller described the disparity as racist.	Closed
1/25/2017	Race	Referral to Area	A bus operator was alleged to have been rude to a customer due to race and to have closed the doors on him, resulting in injury. Denied by operator. Insufficient evidence.	Closed
1/26/2017	Race	Referral to Area	A caller claimed to have waited over an hour in Codman Square for a Route 23 bus. The caller claimed that service is worse in minority neighborhoods than it is in nonminority neighborhoods.	Closed
1/27/2017	Race	Referral to Area	A bus operator was alleged to have used a racial slur against a customer. Denied by operator. Insufficient evidence.	Closed

(Table 2-1 Cont.)

Date	Basis	Action Taken	Summary	Status
1/31/2017	Race	Referral to Area	A bus operator was alleged to have used a racial slur against a customer. Denied by operator. Insufficient evidence.	Closed
1/31/2017	Race	Referral to Area for courtesy rule violation.	A subway operator was alleged to have harshly questioned a customer about whether they had paid based on their race and to have not questioned passengers of a different race. Operator denies questioning due to race. Insufficient evidence.	Closed
2/7/2017	Race	Referral to Area	A bus operator was alleged to have bypassed customers based on their race and to have been rude to riders based on their race. Denied by operator. Insufficient evidence.	Closed
2/8/2017	National Origin	Referral to Area	A third-party complainant reported that a bus operator shoved a jar of food under the noses of minority passengers boarding the bus and made a derogatory remark. Operator stated he showed the food to a specific family. Insufficient evidence.	Closed
2/8/2017	National Origin	Operator disciplined: 3-day suspension and re-training.	A bus operator was alleged to have mocked a customer for her limited English proficiency and to have chased her into a train station. Cause Finding.	Closed

(Table 2-1 Cont.)

Date	Basis	Action Taken	Summary	Status
2/13/2017	National Origin	Referral to Area	A third-party complainant reported that a bus operator yelled a derogatory remark at the driver of another vehicle. Denied by operator. Insufficient evidence.	Closed
2/23/2017	Race	Referral to Area	A third-party complainant reported that a bus operator allowed customers of a certain race to board without paying and was difficult with customers of other races who had insufficient fare. Denied by operator. Insufficient evidence.	Closed
2/28/2017	Race	Referral to Area	A third-party complainant reported that a bus operator used a racial slur against a customer. Denied by operator. Insufficient evidence.	Closed
3/2/2017	Race	Referral to Area	A bus operator was alleged to have refused to board a customer due to race. Denied by operator. Insufficient evidence.	Closed
3/10/2017	Color	Referral to Area	A bus operator was alleged to have made derogatory statements to a family and to have closed the door on one person, causing injury. Denied by operator. Insufficient evidence that the incident was based on color.	Closed
3/10/2017	Race	Referral to Area	A third-party complainant reported that a bus operator was hostile to customer based on race. Denied by operator. Insufficient evidence.	Closed

(Table 2-1 Cont.)

Date	Basis	Action Taken	Summary	Status
4/5/2017	Race	Referral to Area	A bus operator was alleged to have refused to board customer based on race. Denied by operator. Insufficient evidence.	Closed
4/15/2017	Race	Referral to Area	A bus operator was alleged to have refused to stop the bus for a family to disembark based on their race and that the bus continued four or five stops beyond their desired stop. Video evidence did not support allegation. Denied by operator. Insufficient evidence.	Closed
4/19/2017	Race	Referral to Area	A bus operator was alleged to have treated boarding passengers differently based on race. Denied by operator. Video evidence was inconclusive. Maintenance report shows faulty fare box. Insufficient evidence.	Closed
4/25/2017	Race	Referral to Area for courtesy rule violation. Reinstruction to operator.	A customer was allegedly denied access to a bathroom by a CSA allegedly due to race. CSA denied it was due to race. Erroneously claimed that discretion is theirs. Insufficient evidence of denial due to race.	Closed
4/26/2017	Race	Referral to Area	A bus operator was alleged to have closed the door and pulled away before a customer arrived due to race. Denied by operator. Insufficient evidence.	Closed
4/27/2017	Race	Referral to Area	A person claimed that buses on Route 23 (a minority route) are “overcrowded, raggedy, and old” and that these buses are only used on minority routes.	Closed

(Table 2-1 Cont.)

Date	Basis	Action Taken	Summary	Status
5/10/2017	Race	Referral to Area	A bus operator was alleged to have used a racial slur against a passenger. Denied by operator. No available video angles show bus operator. Insufficient evidence.	Closed
5/11/2017	Race	Referral to Area. Operator issued written warning for courtesy rule violation.	A bus operator was alleged to have made a racially derogatory remark. Denied by operator. Insufficient evidence.	Closed
5/11/2017	Race	Referral to Area	A bus operator was alleged to have screamed at a customer and then to have spoken in Spanish to an English-speaking customer. Denied by operator. Insufficient evidence.	Closed
6/6/2017	Race	Referral to Area	A bus operator was alleged to have called a customer a racial slur. Denied by operator. Insufficient evidence.	Closed
6/13/2017	Race	Referral to Area	A bus operator was alleged to have been rude to a customer and to have denied him the opportunity to pay, saying that his money was no good on the basis of his race. Denied by operator. Insufficient evidence.	Closed
6/29/2017	Race	Referral to Area	A bus operator was alleged to have violently taken money out of child's hand to put into the fare box and to have called the child's mother a racial slur. Denied by operator. Conflicting witness statements made. Operator denies slurs and negative comments. Insufficient evidence.	Closed

(Table 2-1 Cont.)

Date	Basis	Action Taken	Summary	Status
7/23/2017	Race	Referral to Area	A bus operator was alleged to have allowed customers of his race to board for free while denying free rides to passengers of other races. Denied by operator. Insufficient evidence.	Closed
7/27/2017	Color	Referral to Area	A complainant reported that a trolley operator on the C Line allowed other passengers to board but not complainant due to skin color. Denied by operator. Insufficient evidence.	Closed
8/7/2017	National Origin	Referral to Area	A bus operator allegedly made derogatory comments to two passengers who were short on fare. Denied by operator. Insufficient evidence.	Closed
9/12/2017	National Origin	Referral to Area. Operator disciplined for courtesy rule violation.	A third-party complainant observed a CSA being hostile to a customer who did not speak English. Denied by operator. Video unable to show offensive statements referencing national origin. Does show CSA moving customer out of the way from fare box.	Closed
9/22/2017	Race	Referral to Area	A passenger alleged that he was denied boarding a D Line trolley due to race. Denied by operator. Witness statement supports operator. Passenger had climbed over fence to board trolley. Was eventually permitted to ride trolley.	Closed

MBTA/MASSDOT PUBLIC PARTICIPATION PLAN (FTA C 4702.1B, III-4.A.(4))

Overview

The MBTA's Public Participation Plan (PPP) is an Authority-wide guide that promotes flexible methods and tools to ensure broad and diverse representation in transit-related decision-making processes. The PPP is included as Appendix 2-D. The MBTA's PPP adopted elements from the MassDOT Title VI Program PPPs for the Highway Division and the FTA-funded, state-managed Rail and Transit Programs. This "shared" structure was approved by FTA and FHWA in February 2014 and was subsequently adopted, with Authority-specific modifications, by the MBTA within its April 2014 triennial Title VI Report. The guidelines, techniques, and reference information used in the MBTA's PPP derive from research as well as past and current practices, which successfully help staff plan and organize inclusive and accessible public meetings.

In this triennial cycle, the MBTA is working to revise the PPP to address changes in the MBTA business model while retaining the essential philosophy, guidance, and standards that were established in 2014. The MBTA will also incorporate language that supports the Authority's aggressive work to address fiscal and infrastructure challenges.

A significant element that runs across all public facing departments is the implementation of strategies designed to ensure inclusive public participation. The results these efforts have been captured in Appendix 2-E within a snapshot of key departmental public engagement efforts obtained by ODCR's Title VI team. This work has provided the Title VI team with insights and opportunities to provide further support to individual units, such as the Capital Delivery department, which has both internal engagement protocols and the PPP compliance obligation in connection with project development processes. ODCR has also developed a strong relationship with the Customer Experience department, including outreach and engagement of all frequently contacted Safe Harbor groups and ensuring compliance with other elements of the Title VI program, including public participation and subrecipient support on customer facing initiatives.

In any instance where modifications to PPP protocols are considered necessary to meet the robust public engagement goal of the MBTA, the Office of Diversity and Civil Rights and the Office of Systemwide Accessibility should be contacted to provide advice and guidance on alternate means to address the need for inclusion and access.

MBTA Public Engagement Process and Outreach Tools

The MBTA employs a variety of methods to disseminate vital information to the public depending on how customers best receive information. The MBTA works to ensure the inclusion of minority and low-income community members at project locations and throughout the MBTA service area. The MBTA typically communicates to the general public through one or more of the following methods:

- Notices in newspapers and on the radio and television, including outlets geared towards minority and low-income communities
- Authority website
- Mobile phone apps with real-time vehicle location data
- Twitter posts, T-alerts via text message or email, and other electronic service notifications
- Press releases, posters, flyers, and mailings
- Printed schedule cards for buses, trains, and ferries
- GovDelivery email blast
- Signs and handouts available inside vehicles and stations
- Community meetings
- Grassroots outreach
- Information tables at local events

The MBTA hosts public/community meetings and workshops to share project information and/or solicit input from the community on important policy matters. These meetings are publicized through press releases, mailings, and/or distribution of informational meeting flyers. The MBTA distributes accessible informational material in multiple languages, as appropriate, starting with the top seven languages most prevalent in the service area, and then others based on request.

Public/community meetings are planned and publicized as early as possible and made available on the MBTA website. It is the responsibility of the Community Relations Department staff and/or the MBTA department coordinating a public meeting to ensure diverse outreach, including translating materials, offering free interpretation/accommodation assistance and ensuring accessible meeting locations. Key departments at the MBTA frequently contact ODCR for help in

reaching out to minority and low-income communities, particularly with regard to complex or challenging projects and initiatives. These engagements rely on ODCR's experience and support to ensure meaningful public participation that is in compliance with Title VI principles.

For individuals with disabilities who need accommodation to participate at a public/community meeting, support is in place or made available upon request, including room set-up for access (seating, listening devices), alternate formats of handouts, and American Sign Language (ASL) interpreters. All meeting planners are given a checklist that helps ensure that the meeting locations are accessible. These forms are also used to update the online resources that the MBTA uses to identify accessible meeting locations. The Office of System-Wide Accessibility (SWA) helps the MBTA achieve its goal of improving accessibility to public transportation, and ensuring that public meetings are accessible to persons of all abilities. SWA proactively assesses meeting locations throughout the MBTA service area by using a checklist to ensure that they meet ADA requirements. Once a location is identified as meeting the required accessibility standards, SWA will store the information in its database and share it with other departments. The MBTA/MassDOT updated checklist is included in the Public Participation Plan in Appendix 2-D.

ODCR's Title VI unit and MassDOT's Planning Department have developed an innovative online public engagement tool called Engage to support departments that are planning a public meeting or staff who are interested in learning more about a particular community for an upcoming project. This unique tool is designed to simplify the planning of public meetings by giving MassDOT/MBTA staff ready access to information on languages spoken by geocoded location, more than 5,000 community organizations statewide that are downloadable to the Microsoft Office suite, and more than 300 accessible meeting locations.

Further, Engage has been enhanced to provide additional data concerning bus stops, route definitions, train stations, and transit-related projects to make it a more viable resource for MBTA staff when planning a public meeting. As part of planned assessments of individual public-facing departments at the MBTA, ODCR will be adapting training tools developed within MassDOT's Title VI work to support MBTA managers and staff in departments with public-facing responsibilities on using the PPP and Engage for future public participation activities.

Plan to Engage Minority and Limited-English-Proficient Populations

Background — Recent Experiences That Have Informed Outreach Planning

During this triennial cycle, the MBTA conducted public outreach to inform minority and limited-English-proficient members of the public about Title VI and to solicit input about their transit needs and concerns, including those with respect to civil rights matters. A great deal of this effort was led by ODCR, in collaboration with other public-facing MBTA departments. This Outreach Plan builds on that positive experience, and on the MBTA's commitment to strong communication with our customers and the general public.

Shortly after the MBTA hired its first Title VI Specialist, ODCR met with Transportation 4 Massachusetts, a diverse coalition of community-based organizations working to create safe, convenient, and affordable transportation. During this conversation, we 1) introduced the MBTA team members responsible for Title VI oversight; 2) provided an explanation of Title VI and the FTA Title VI Circular; 3) shared copies of the 2014 Title VI Report, and 4) provided ample opportunity for questions and answers. This conversation helped initiate relationships and ensured that local advocates had an equal footing in understanding the obligation and commitment to civil rights at the MBTA. In this discussion, we were particularly aware of recognizing community concerns raised in response to difficult fiscal and infrastructure decisions that the MBTA had made, including elimination of late-night service.

ODCR learned from this discussion that there was great value in building understanding that could lead to trust in sharing our belief in the importance of community input and public involvement in transportation policy, project programming, and transit decision-making. This discussion led ODCR to invite members of this group as key community stakeholders when we revised the MBTA's Disparate Impact/Disproportionate Burden and Service Delivery policies.

Outreach Planning toward Minorities and Others under the PPP

The following language included in the MBTA's PPP relates to outreach to minority, low-income, and other vulnerable communities that we serve and sets the tone for our plan to conduct related outreach over the upcoming triennial cycle:

Many people in minority and low-income communities, as well as those with low literacy and/or limited English proficiency (LEP), have traditionally been underserved by conventional outreach methods. Outreach to traditionally underserved groups helps ensure that all constituents have opportunities to affect the decision-making process. It sets the tone for subsequent project activities and promotes a spirit of inclusion. The greater the consensus among all community members, the more likely the position agreed upon will aid in decision making for the plan, program, or project. Inclusive outreach efforts are particularly useful because they:

- Provide fresh perspectives to project planners and developers
- Give MassDOT/MBTA firsthand information about community-specific issues and concerns
- Allow MassDOT/MBTA to understand potential controversies
- Provide feedback to MassDOT/MBTA on how to get these communities involved
- Ensure that the solutions ultimately selected will be those that best meet all of the communities' needs

To achieve these reasonable objectives, MassDOT/MBTA staff should strive to understand the full range of a community's needs in order to create more responsive and more innovative plans. By interacting with community members, MassDOT/MBTA staff will gain insight into the reasons why they agree or disagree with proposed plans or projects.

MassDOT/MBTA staff should recognize that traditional techniques are not always the most effective with these populations. Staff and managers employ a variety of public involvement techniques when working with underserved populations and communicates with community leaders to determine the best techniques for working with a particular group (e.g., which approaches to use, where and when to hold events, how to recruit people, and what to avoid doing).

Outreach Plan

Over the next three years, the MBTA will advance strategies to build upon the community engagement work for Title VI that we achieved during the 2014–17 triennial period. We will coordinate our work with ODCR and the Customer Experience Department to ensure that the MBTA has a strong profile for building connectivity to Title VI-protected individuals and other communities we serve. For example, the Customer Experience Department has launched an initiative to provide Customer Service Agents and Transit Ambassadors with the resources and support necessary to help all riders navigate the system. The impact of this initiative and the identification of any service delivery barriers that Operators, Customer Service Agents, and Inspectors encounter will be studied to recommend remediating approaches for engaging with riders, including those who are members of minority or limited-English-proficient groups.

During the first year, a key strategy is traveling across the MBTA service area to speak with riders, front-line staff, and community representatives about their experiences when interacting with the MBTA system. This Outreach Plan will therefore be designed to increase visibility, identify concerns, and gauge the attitudes and experiences of riders, with emphasis on those who rely on the MBTA for social and economic mobility. In addition, the Title VI Unit will continue to 1) meet with local community-based organizations that advocate on transit matters, 2) introduce the MBTA's Title VI Program, and 3) respond to concerns and advise on how these groups can participate in the decision-making process.

Year One Elements:

- In collaboration with the Customer Experience Department, ride the system to meet people and connect with key community agencies to learn more about how LEP and minority group members interface with the programs, services, and activities at the MBTA
- Meet with key transportation advocacy groups to provide updates on activities and share information on the MBTA and its approach to public participation, including available resources
- Develop the internal Title VI Working Group and establish a subcommittee on public participation to work with the data compiled from field visits, and collaborate with key public-facing departments on strategies to improve community engagement
- Structure and initiate assessments of public-facing departments to learn about work models, identify potential Title VI risk factors for non-compliance, and strategize about new approaches to engagement with affected communities

- Develop strategies to use civil rights complaint data to identify trends that reflect impacts on minority and low-income communities which may or may not involve bias, but indicate practices that could be improved

Year Two Elements:

- Learn from the first year experiences of how the Customer Experience Department assisted the travelling public, with focus on how Customer Experience initiatives are being deployed in communities with significant Title VI representation and low-income populations
- Compile report on experiences and lessons learned from travelling across the MBTA system, to incorporate into Title VI Working Group public engagement agenda
- Share input and recommendations with affected departments and MBTA leadership for approval to turn ideas into action
- Present recommendations and other indicators of efforts to improve engagement with the public to build faith in the MBTA's intention to make continuing improvements

Year Three Elements:

- Build strategies to capitalize on efforts to increase awareness and build trust with underrepresented community members, which might include a signature event or a structure to give voice to communities across the service area
- Build reporting streams from individual public-facing departments to document efforts to improve public engagement as a means to create institutional knowledge concerning the positive benefits of inclusive public engagement
- Identify and incorporate achievements into Title VI Triennial Report
- Develop strategy for continuing the work into the 2020–23 triennial cycle

Summary of Department-Level Public Engagement Activities

A summary of MBTA department-level public engagement activities is included as Appendix 2-E. A list of public meetings that the MBTA held between 2014 and 2017 is provided in Appendix 2-F.

LANGUAGE ASSISTANCE PLAN (FTA C 4702.1B, III-4.A.(5))

The MBTA's Language Assistance Plan is provided in Appendix 2-G.

MINORITY REPRESENTATION ON PLANNING AND ADVISORY BODIES (FTA C 4702.1B, III-4.A.(6))

From 2015 to 2017 the MBTA undertook a process to revise its Service Delivery Policy (Appendix 2-H). To support this work, a technical committee and a policy committee were formed, each of which was made up of MBTA staff members (internal members) and members of the community (external members). Internal members were chosen based on job function. External members were solicited in order to provide a balanced representation of stakeholders from the business community, municipalities, and riders, including minorities and people with disabilities. In order to encourage minority participation, the former General Manager and other MBTA leaders developed a list of potential invitees, including advocacy groups, minority community organizations, and other stakeholders who have interest in the MBTA and its services. Similarly, MBTA leaders also worked to include representatives from the disability community.

Table 2-2 shows how many minority and nonminority community members served on each committee. Among external members, the technical committee membership was 27 percent minority and the policy committee membership was 23 percent minority.

Table 2-2
Advisory Committee Membership

Advisory Committee Membership	Internal Members	External Members	Total Members	Number of Minority External Members	Percentage of Minority External Members	Minority Percentage in MBTA Service Area
Technical Committee	14	11	25	3	27%	26.2%
Policy Committee	11	13	24	3	23%	26.2%

SUBRECIPIENT ASSISTANCE AND MONITORING (FTA C 4702.1B, III-4.A.(7))

The MBTA's Title VI Subrecipient Monitoring Procedure is included at Appendix 2-I.

TITLE VI EQUITY ANALYSIS FOR DETERMINATION OF LOCATION OF CONSTRUCTED FACILITIES (FTA C 4702.1B, III-4.A.(8))

As part of the MBTA's Wachusett Extension Project, a new Fitchburg Line layover facility was built in Westminister, replacing the existing layover facility in Lunenburg. The new facility is located approximately 1.5 miles west of Wachusett Station in the Westminister Business Park and contains six train storage tracks, an employee parking area, a maintenance building, and an electrical substation. The siting of the Westminister layover facility was determined through the National Environmental Policy Act (NEPA) process, which resulted in a Finding of No Significant Impact (FONSI). The MBTA also completed a Service Equity Analysis for the Wachusett Extension Project, which can be found in Appendix 7-J.



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Chapter 3: Demographic and Service Profile Maps and Charts

For each Title VI triennial program update, the MBTA provides maps and charts depicting the demographics of the service area, using the most recently available US census data (FTA C 4702.1B, IV-5.a). These materials are used to identify neighborhoods and municipalities that have higher concentrations of minority and low-income populations, and their spatial relationship in reference to the location of MBTA transit services, transit facilities, and planned system improvements.

The MBTA uses the Federal Transit Administration's (FTA) Title VI guidelines for defining a minority person as one who identifies as any of the following:

- American Indian and Alaska Native, which refers to people having origins in any of the original peoples of North and South America (including Central America), and who maintain tribal affiliation or community attachment.
- Asian, which refers to people having origins in any of the original peoples of the Far East, Southeast Asia, or the Indian subcontinent, including, for example, Cambodia, China, India, Japan, Korea, Malaysia, Pakistan, the Philippine Islands, Thailand, and Vietnam.
- Black or African American, which refers to people having origins in any of the Black racial groups of Africa.

- Hispanic or Latino, which includes persons of Cuban, Mexican, Puerto Rican, South or Central American, or other Spanish culture or origin, regardless of race.
- Native Hawaiian or Other Pacific Islander, which refers to people having origins in any of the original peoples of Hawaii, Guam, Samoa, or other Pacific Islands.

As encouraged by FTA's Title VI guidelines, the MBTA uses a locally developed threshold for defining a low-income individual. Since the cost of living in Massachusetts is much higher than the national average, the MBTA defines a low-income individual as one who resides in a household that has a combined income less than two times the federal poverty level, determined using the US Department of Health and Human Services' (HHS) poverty guidelines.

To identify neighborhoods that have higher concentrations of minority and/or low-income populations on each demographic map, the FTA requires transit operators to shade in census tracts where the percentage of the minority and/or low-income population exceeds the average minority and/or low-income percentage of the population for the service area as a whole. Since the MBTA provides different modes of service that primarily serve distinct geographic areas with different demographics, the MBTA has defined two separate service areas: one for the urban fixed-route transit, or core, service area, and a second for the commuter rail system.

- **Core service area:** The core service area is comprised of the 65 municipalities that have access to MBTA bus and rapid transit services. Using data from the 2010 US Census, 31.3 percent of the population in the core service area are members of minority groups, and a minority census tract is defined as one in which the minority percentage of the population exceeds 31.3 percent. Using data from the 2010–14 American Community Survey (ACS) five-year estimates, 24.7 percent of the population in the core service area resides in households that have a combined income less than two times the federal poverty level, and a low-income census tract is defined as one in which the percent of the population residing in households that have a combined income less than two times the federal poverty level exceeds 24.7 percent.
- **Commuter rail service area:** The commuter rail service area is comprised of the 175 municipalities that have access to MBTA commuter rail service. Using data from the 2010 US Census, 26.2 percent of the population in the commuter rail service area are members of minority groups, and a minority census tract is defined as one in which the

minority percentage of the population exceeds 26.2 percent. Using data from the 2010–14 ACS five-year estimates, 23.3 percent of the population in the commuter rail service area resides in households that have a combined income less than two times the federal poverty level, and a low-income census tract is defined as one in which the percent of the population residing in households that have a combined income less than two times the federal poverty level exceeds 23.3 percent.

The remainder of this chapter contains a set of demographic maps that shows the location of MBTA transit services, transit facilities, major transit trip generators, major streets and highways, and planned system improvements. Each map has a version “a” that references the extent of the 175-municipality commuter rail service area and a version “b” that references the extent of the 65-municipality core service area. Accompanying each map is a description of the distribution of the items that are depicted.

Figures 3-1a and 3-1b show MBTA services and fixed transit facilities (parking lots; transit routes, lines, and stations; and bus shelters) in relation to the minority and low-income populations in each of the MBTA service areas.

Figure 3-1a shows that while the majority of census tracts served by the MBTA commuter rail outside of the core service area are neither minority nor low-income, most of the minority and/or low-income areas outside of the core are either directly served by or are near commuter rail service. Tables 3-1, 3-2, and 3-3 summarize the distribution of commuter rail and boat stations and commuter rail and boat parking lots across minority and low-income census tracts in the commuter rail service area.

Table 3-1
Distribution of Commuter Rail and Boat Transit Facilities:
Number and Percentage of Facilities by Tract Classification

Facility	Total Number of Facilities	Number of Facilities in Minority Tracts	Number of Facilities in Low-Income Tracts	Percentage of Facilities in Minority Tracts	Percentage of Facilities in Low-Income Tracts
Commuter rail/boat station	146	41	47	28%	32%
Commuter rail/boat parking	118	22	28	19%	24%

Note: For tracts in the MBTA commuter rail service area. A line improvement was counted as benefitting a station upstream or downstream of the improvement if the improvement enhanced service or reliability for riders accessing the system via that station. South Coast Rail was omitted because proposed station locations are located outside of the current commuter rail service area.

Table 3-2
Distribution of Commuter Rail and Boat Transit Facilities:
Number of Facilities per 100 Tracts, by Tract Classification

Facility	Number of Facilities in Minority Tracts, per 100 Minority Tracts	Number of Facilities in Nonminority Tracts, per 100 Nonminority Tracts	Number of Facilities in Low-Income Tracts, per 100 Low- Income Tracts	Number of Facilities in Non-Low-Income Tracts, per 100 Non- Low-Income Tracts
Commuter rail/ boat station	10	16	11	16
Commuter rail/ boat parking	5	15	7	14

Note: For tracts in the MBTA commuter rail service area. A line improvement was counted as benefitting a station upstream or downstream of the improvement if the improvement enhanced service or reliability for riders accessing the system via that station. South Coast Rail was omitted because proposed station locations are located outside of the current commuter rail service area.

Table 3-3
Distribution of Commuter Rail and Boat Transit Facilities:
Percentage of Tracts with Facility, by Tract Classification

Facility	Percentage of Minority Tracts with Facility	Percentage of Nonminority Tracts with Facility	Percentage of Low-Income Tracts with Facility	Percentage of Non-Low-Income Tracts with Facility
Commuter rail/ boat station	9%	14%	10%	14%
Commuter rail/ boat parking	5%	14%	6%	13%

Note: For tracts in the MBTA commuter rail service area. A line improvement was counted as benefitting a station upstream or downstream of the improvement if the improvement enhanced service or reliability for riders accessing the system via that station. South Coast Rail was omitted because proposed station locations are located outside of the current commuter rail service area.

Figure 3-1b shows that much of the core service area is classified as minority and/or low income, and that more bus and rapid transit facilities are located in minority and/or low-income areas than are not. Tables 3-4, 3-5, and 3-6 summarize the distribution of bus shelters, rapid transit stations, and rapid transit parking lots across minority and low-income census tracts in the core service area.

Table 3-4
Distribution of Bus and Rapid Transit Facilities:
Number and Percentage of Facilities by Tract Classification

Facility	Total Number of Facilities	Number of Facilities in Minority Tracts	Number of Facilities in Low-Income Tracts	Percentage of Facilities in Minority Tracts	Percentage of Facilities in Low-Income Tracts
Bus shelter	747	495	531	66%	71%
Rapid transit station	119	64	77	54%	65%
Rapid transit parking	25	16	15	64%	60%

Note: For tracts in the MBTA commuter rail service area. A line improvement was counted as benefitting a station upstream or downstream of the improvement if the improvement enhanced service or reliability for riders accessing the system via that station. South Coast Rail was omitted because proposed station locations are located outside of the current commuter rail service area.

Table 3-5
Distribution of Bus and Rapid Transit Facilities:
Number of Facilities per 100 Tracts, by Tract Classification

Facility	Number of Facilities in Minority Tracts, per 100 Minority Tracts	Number of Facilities in Nonminority Tracts, per 100 Nonminority Tracts	Number of Facilities in Low-Income Tracts, per 100 Low-Income Tracts	Number of Facilities in Non-Low-Income Tracts, per 100 Non-Low-Income Tracts
Bus shelter	205	71	202	65
Rapid transit station	27	16	29	13
Rapid transit parking	7	3	6	3

Note: For tracts in the MBTA commuter rail service area. A line improvement was counted as benefitting a station upstream or downstream of the improvement if the improvement enhanced service or reliability for riders accessing the system via that station. South Coast Rail was omitted because proposed station locations are located outside of the current commuter rail service area.

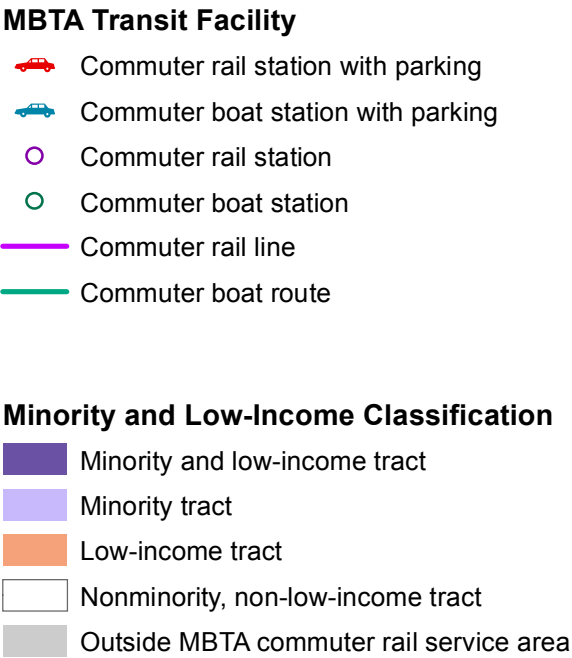
Table 3-6
Distribution of Bus and Rapid Transit Facilities:
Percentage of Tracts with Facility, by Tract Classification

Facility	Percentage of Minority Tracts with Facility	Percentage of Nonminority Tracts with Facility	Percentage of Low-Income Tracts with Facility	Percentage of Non-Low-Income Tracts with Facility
Bus shelter	76%	46%	77%	43%
Rapid transit station	18%	8%	17%	8%
Rapid transit parking	6%	3%	5%	3%

Note: For tracts in the MBTA commuter rail service area. A line improvement was counted as benefitting a station upstream or downstream of the improvement if the improvement enhanced service or reliability for riders accessing the system via that station. South Coast Rail was omitted because proposed station locations are located outside of the current commuter rail service area.

FIGURE 3-1a
MBTA 2017 Title VI Report

MBTA Fixed Transit
Facilities: Commuter
Rail Service Area



In the 175 municipalities of the MBTA commuter rail service area, 26.2% of the residents were members of minority groups in 2010. A minority census tract is defined as one in which the minority percentage exceeds 26.2%.

In the 175 municipalities of the MBTA commuter rail service area, 23.3% of the residents lived in households with incomes below two times the federal poverty level in 2014. A low-income census tract is defined as one in which the percentage of residents living in households with incomes below two times the federal poverty level exceeds 23.3%.



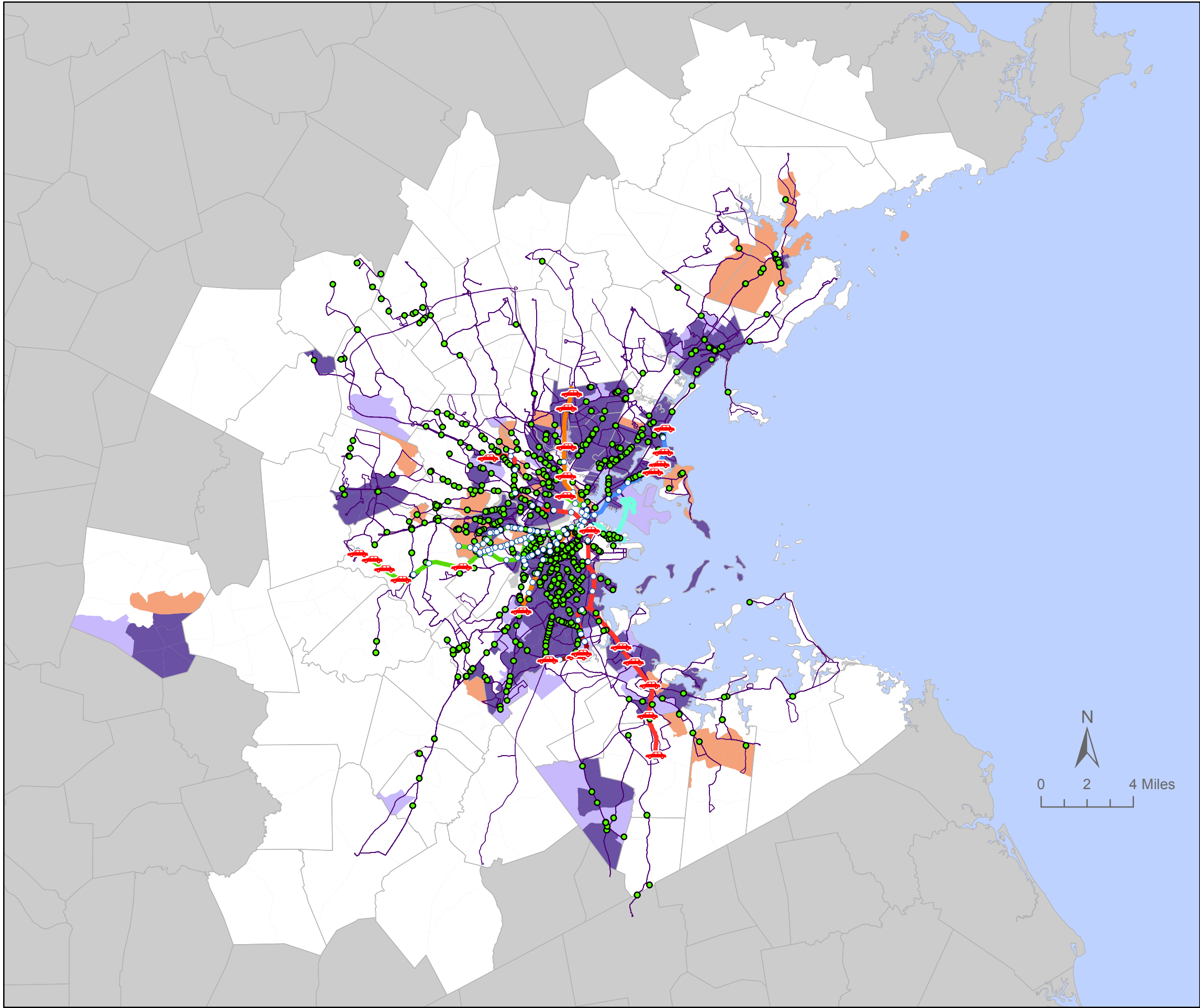
FIGURE 3-1b
MBTA 2017 Title VI Report

MBTA Fixed Transit
Facilities: Core
Service Area

- MBTA Transit Facility**
 - Rapid transit station with parking
 - Rapid transit station
 - Bus shelter
 - Blue Line
 - Green Line
 - Orange Line
 - Red Line
 - Mattapan Line
 - Silver Line
 - Bus route
- Minority and Low-Income Classification**
 - Minority and low-income tract
 - Minority tract
 - Low-income tract
 - Nonminority, non-low-income tract
 - Outside MBTA core service area

In the 65 municipalities of the MBTA core service area, 31.3% of the residents were members of minority groups in 2010. A minority census tract is defined as one in which the minority percentage exceeds 31.3%.

In the 65 municipalities of the MBTA core service area, 24.7% of the residents lived in households with incomes below two times the federal poverty level in 2014. A low-income census tract is defined as one in which the percentage of residents living in households with incomes below two times the federal poverty level exceeds 24.7%.





Figures 3-2a and 3-2b show MBTA operational facilities (remote layover facilities, maintenance facilities, offices, yards, and shops) in relation to the minority and low-income populations in each of the MBTA service areas.

Figure 3-2a shows that the majority of tracts served by the MBTA commuter rail outside of the core service area are neither minority nor low-income, and a majority of the remote layover facilities are located at or near the ends of commuter rail lines in census tracts that are neither minority nor low-income. Tables 3-7, 3-8, and 3-9 summarize the distribution of commuter rail layover facilities and maintenance facilities across minority and low-income census tracts in the commuter rail service area.

Table 3-7
Distribution of Commuter Rail Operational Facilities:
Number and Percentage of Facilities by Tract Classification

Facility	Total Number of Facilities	Number of Facilities in Minority Tracts	Number of Facilities in Low-Income Tracts	Percentage of Facilities in Minority Tracts	Percentage of Facilities in Low-Income Tracts
Layover facility	11	2	3	18%	27%
Maintenance facility	5	3	2	60%	40%

Note: For tracts in the MBTA commuter rail service area. A line improvement was counted as benefitting a station upstream or downstream of the improvement if the improvement enhanced service or reliability for riders accessing the system via that station. South Coast Rail was omitted because proposed station locations are located outside of the current commuter rail service area.

Table 3-8
Distribution of Commuter Rail Operational Facilities:
Number of Facilities per 100 Tracts, by Tract Classification

Facility	Number of Facilities in Minority Tracts, per 100 Minority Tracts	Number of Facilities in Nonminority Tracts, per 100 Nonminority Tracts	Number of Facilities in Low-Income Tracts, per 100 Low-Income Tracts	Number of Facilities in Non-Low-Income Tracts, per 100 Non-Low-Income Tracts
Layover facility	<1	1	<1	1
Maintenance facility	<1	<1	<1	<1

Note: For tracts in the MBTA commuter rail service area. A line improvement was counted as benefitting a station upstream or downstream of the improvement if the improvement enhanced service or reliability for riders accessing the system via that station. South Coast Rail was omitted because proposed station locations are located outside of the current commuter rail service area.

Table 3-9
Distribution of Commuter Rail Operational Facilities:
Percentage of Tracts with Facility, by Tract Classification

Facility	Percentage of Minority Tracts with Facility	Percentage of Nonminority Tracts with Facility	Percentage of Low-Income Tracts with Facility	Percentage of Non-Low-Income Tracts with Facility
Layover facility	<1%	1%	<1%	1%
Maintenance facility	<1%	<1%	<1%	<1%

Note: For tracts in the MBTA commuter rail service area. A line improvement was counted as benefitting a station upstream or downstream of the improvement if the improvement enhanced service or reliability for riders accessing the system via that station. South Coast Rail was omitted because proposed station locations are located outside of the current commuter rail service area.

Figure 3-2b shows that much of the core service area is classified as minority and/or low-income, and that more MBTA offices and operational facilities are located in census tracts that are minority and/or low-income than are not. There are clusters of facilities both north and south of downtown Boston in non-residential areas. The rapid transit facilities are generally located at or near the ends of the lines, and the bus facilities are distributed throughout the core service area. Most of the MBTA offices are located in the city of Boston. Tables 3-10,

3-11, and 3-12 summarize the distribution of MBTA offices and bus and rapid transit garages, yards, and shops across minority and low-income census tracts in the core service area.

Table 3-10
Distribution of Bus and Rapid Transit Operational Facilities:
Number and Percentage of Facilities by Tract Classification

Facility	Total Number of Facilities	Number of Facilities in Minority Tracts	Number of Facilities in Low-Income Tracts	Percentage of Facilities in Minority Tracts	Percentage of Facilities in Low-Income Tracts
MBTA office	9	8	7	89%	78%
Garage, yard, or shop	33	13	12	39%	36%

Note: For tracts in the MBTA commuter rail service area. A line improvement was counted as benefitting a station upstream or downstream of the improvement if the improvement enhanced service or reliability for riders accessing the system via that station. South Coast Rail was omitted because proposed station locations are located outside of the current commuter rail service area.

Table 3-11
Distribution of Bus and Rapid Transit Operational Facilities:
Number of Facilities per 100 Tracts, by Tract Classification

Facility	Number of Facilities in Minority Tracts, per 100 Minority Tracts	Number of Facilities in Nonminority Tracts, per 100 Nonminority Tracts	Number of Facilities in Low-Income Tracts, per 100 Low-Income Tracts	Number of Facilities in Non-Low-Income Tracts, per 100 Non-Low-Income Tracts
MBTA office	3	<1	3	<1
Garage, yard, or shop	5	6	5	6

Note: For tracts in the MBTA commuter rail service area. A line improvement was counted as benefitting a station upstream or downstream of the improvement if the improvement enhanced service or reliability for riders accessing the system via that station. South Coast Rail was omitted because proposed station locations are located outside of the current commuter rail service area.



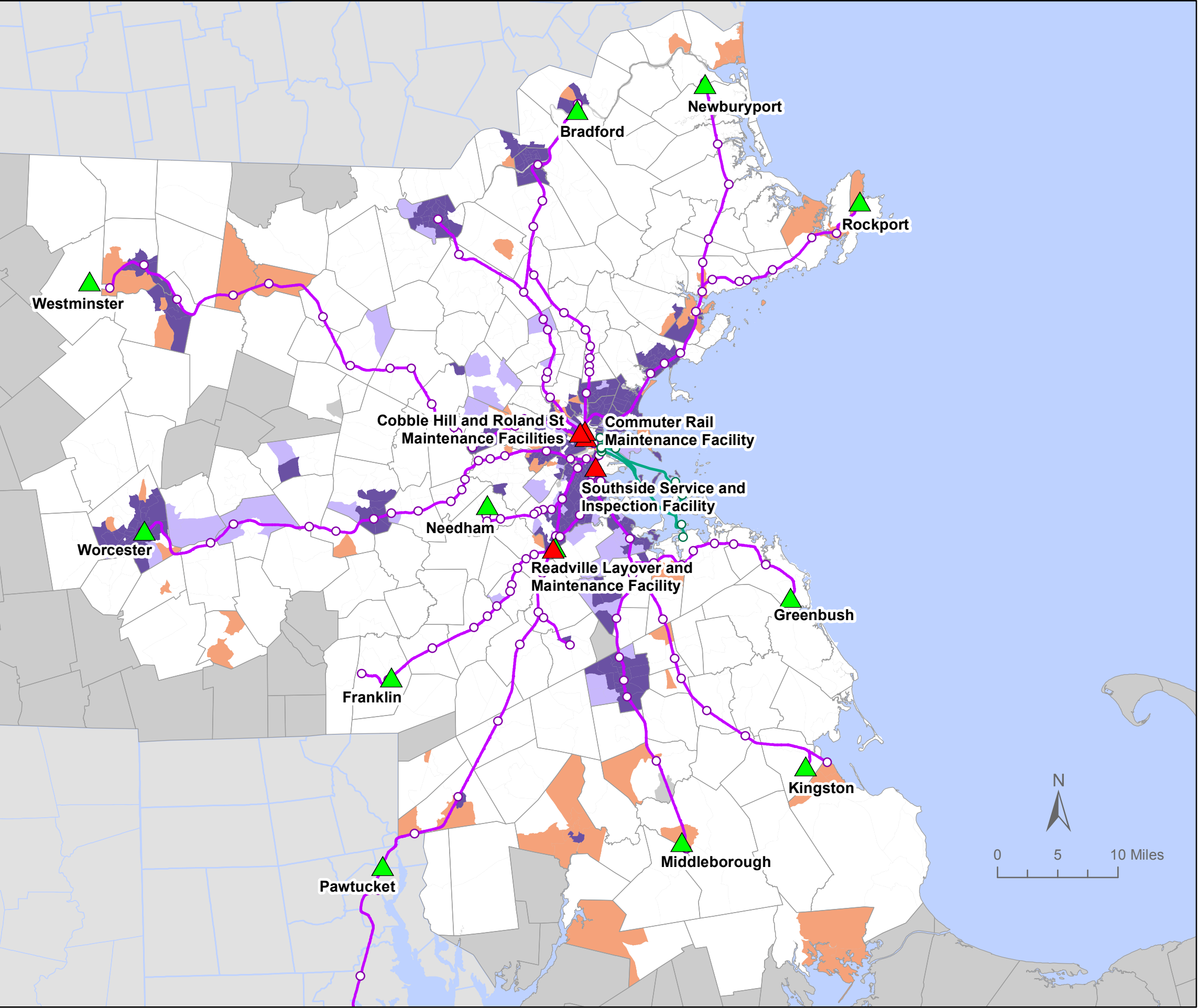


FIGURE 3-2a
MBTA 2017 Title VI Report

MBTA Operational
Facilities: Commuter Rail
Service Area

- MBTA Operational Facility**
- Maintenance facility
 - Remote layover facility
- MBTA Transit Facility**
- Commuter rail station
 - Commuter boat station
 - Commuter rail line
 - Commuter boat route
- Minority and Low-Income Classification**
- Minority and low-income tract
 - Minority tract
 - Low-income tract
 - Nonminority, non-low-income tract
 - Outside MBTA commuter rail service area

In the 175 municipalities of the MBTA commuter rail service area, 26.2% of the residents were members of minority groups in 2010. A minority census tract is defined as one in which the minority percentage exceeds 26.2%.

In the 175 municipalities of the MBTA commuter rail service area, 23.3% of the residents lived in households with incomes below two times the federal poverty level in 2014. A low-income census tract is defined as one in which the percentage of residents living in households with incomes below two times the federal poverty level exceeds 23.3%.



FIGURE 3-2b
MBTA 2017 Title VI Report

MBTA Operational
Facilities: Core
Service Area

MBTA Facility

- ▲ MBTA garage, yard, or shop
- MBTA office

MBTA Transit

- Rapid transit station
- Bus route
- Blue Line
- Green Line
- Orange Line
- Red Line
- Mattapan Line
- Silver Line

Minority and Low-Income Classification

- Minority and low-income tract
- Minority tract
- Low-income tract
- Nonminority, non-low-income tract
- Outside MBTA core service area

In the 65 municipalities of the MBTA core service area, 31.3% of the residents were members of minority groups in 2010. A minority census tract is defined as one in which the minority percentage exceeds 31.3%.

In the 65 municipalities of the MBTA core service area, 24.7% of the residents lived in households with incomes below two times the federal poverty level in 2014. A low-income census tract is defined as one in which the percentage of residents living in households with incomes below two times the federal poverty level exceeds 24.7%.

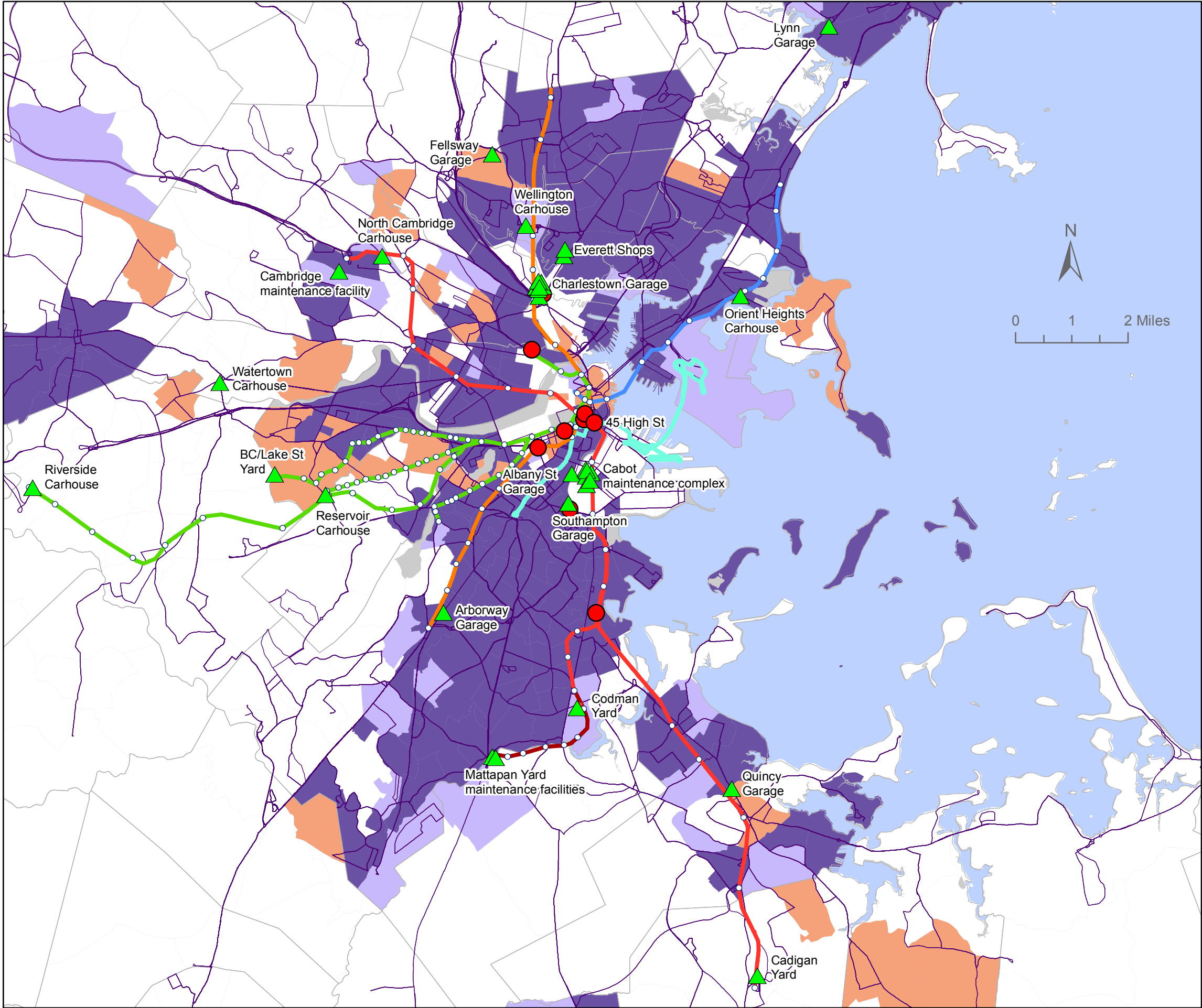




Table 3-12
Distribution of Bus and Rapid Transit Operational Facilities:
Percentage of Tracts with Facility, by Tract Classification

Facility	Percentage of Minority Tracts with Facility	Percentage of Nonminority Tracts with Facility	Percentage of Low-Income Tracts with Facility	Percentage of Non-Low-Income Tracts with Facility
MBTA office	2%	<1%	3%	<1%
Garage, yard, or shop	5%	3%	4%	3%

Note: For tracts in the MBTA commuter rail service area. A line improvement was counted as benefitting a station upstream or downstream of the improvement if the improvement enhanced service or reliability for riders accessing the system via that station. South Coast Rail was omitted because proposed station locations are located outside of the current commuter rail service area.

Figures 3-3a and 3-3b show major transit trip generators (colleges and universities, high schools, hospitals, libraries, and town halls) in relation to the minority and low-income populations in each of the MBTA service areas.

Figure 3-3a shows that while the majority of census tracts served by the MBTA commuter rail outside of the core service area are neither minority nor low-income, most of the minority and/or low-income areas outside of the core are either directly served by or are near commuter rail service. While the major trip generators are spread throughout the commuter rail service area, many of the locations with higher concentrations of transit trip generators are located in urban areas that are served by commuter rail. In many areas where commuter rail service is not offered, regional transit authorities and local transit services provide access to the trip generators.

Figure 3-3b shows that much of the core service area is classified as minority and/or low-income, and that the major transit trip generators are spread throughout the entire core service area along with the MBTA bus and rapid transit network. The one noticeable area with minority and low-income census tracts not served by the MBTA bus and rapid transit network is in Framingham, which is served by the MetroWest Regional Transit Authority (MWRTA). Therefore any perceived “gap” in MBTA service in this minority and low-income community is in fact mitigated by the service provided by another regional transit authority (RTA) that provides local service in and around Framingham, including connections to the MBTA network should MWRTA riders from Framingham seek to travel elsewhere in the MBTA service area.



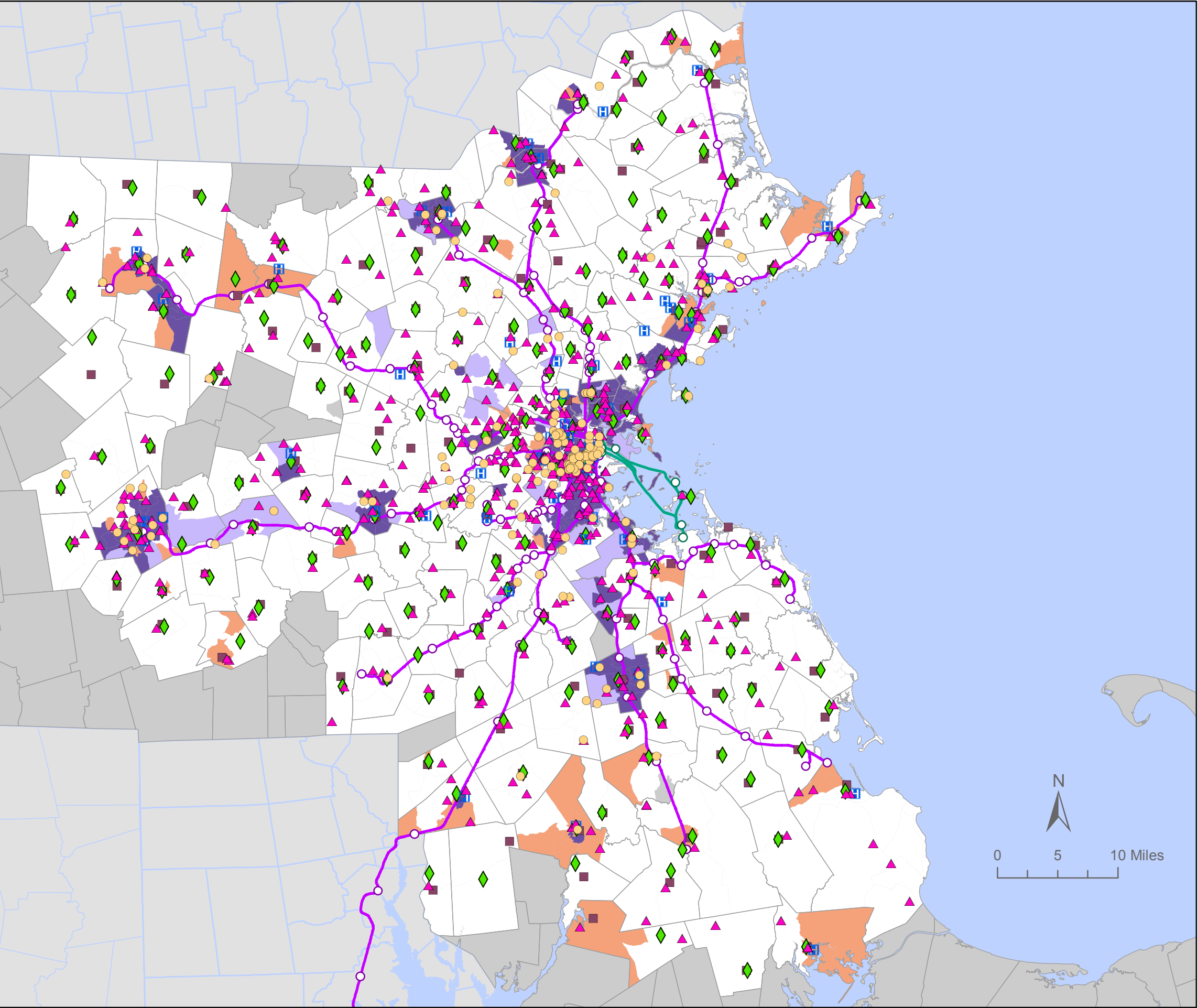


FIGURE 3-3a
MBTA 2017 Title VI Report

Major Transit Trip
Generators: Commuter
Rail Service Area

Trip Generator

- College or university
- High school
- Hospital
- Library
- Town hall

MBTA Transit Facility

- Commuter rail station
- Commuter boat station
- Commuter rail line
- Commuter boat route

Minority and Low-Income Classification

- Minority and low-income tract
- Minority tract
- Low-income tract
- Nonminority, non-low-income tract
- Outside MBTA commuter rail service area

In the 175 municipalities of the MBTA commuter rail service area, 26.2% of the residents were members of minority groups in 2010. A minority census tract is defined as one in which the minority percentage exceeds 26.2%.

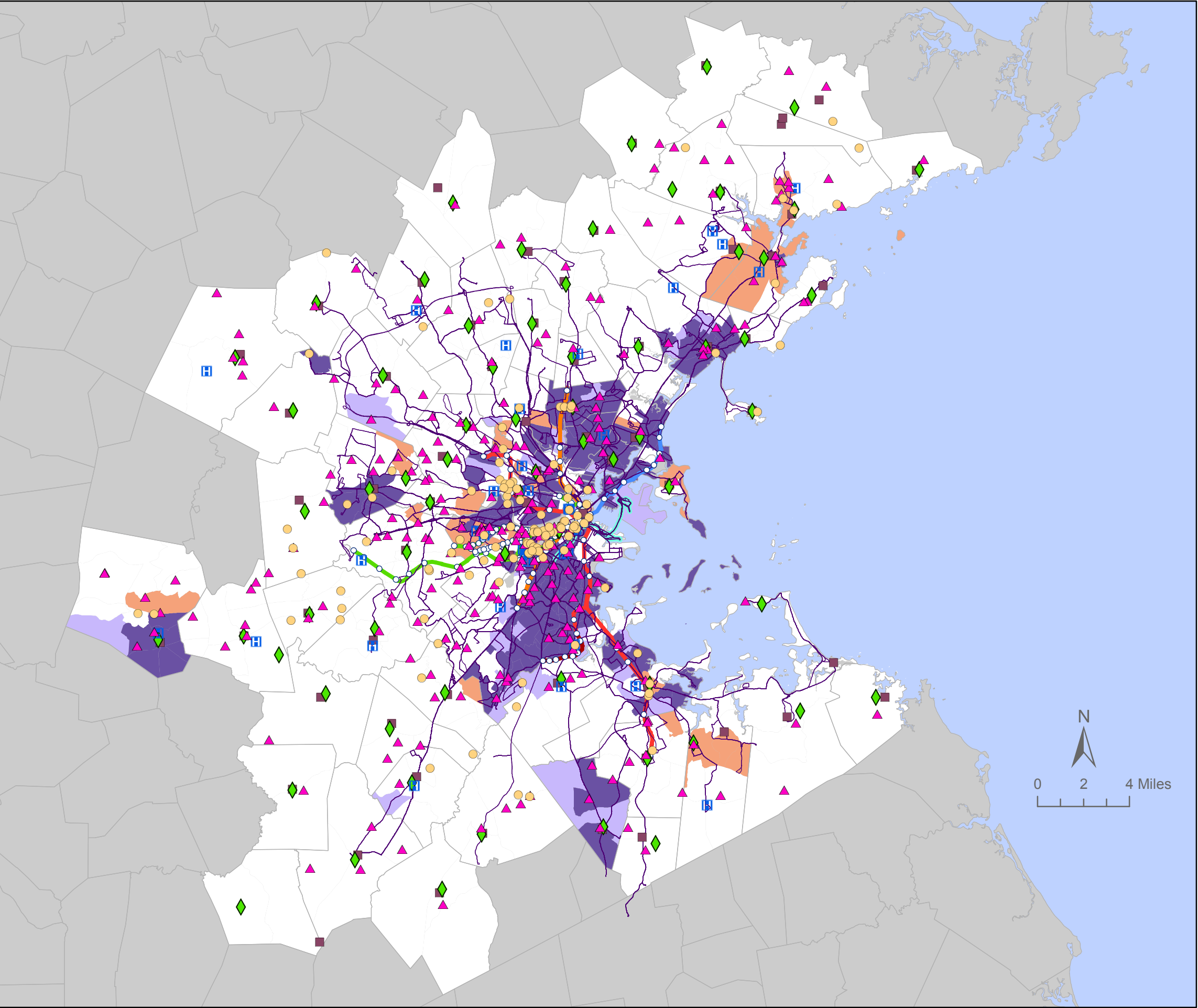
In the 175 municipalities of the MBTA commuter rail service area, 23.3% of the residents lived in households with incomes below two times the federal poverty level in 2014. A low-income census tract is defined as one in which the percentage of residents living in households with incomes below two times the federal poverty level exceeds 23.3%.



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FIGURE 3-3b
MBTA 2017 Title VI Report

Major Transit Trip
Generators:
Core Service Area



Trip Generator

- College or university
- High school
- Hospital
- Library
- Town hall

MBTA Transit

- Rapid transit station
- Bus route
- Blue Line
- Green Line
- Orange Line
- Red Line
- Mattapan Line
- Silver Line

Minority and Low-Income Classification

- Minority and low-income tract
- Minority tract
- Low-income tract
- Nonminority, non-low-income tract
- Outside MBTA core service area

In the 65 municipalities of the MBTA core service area, 31.3% of the residents were members of minority groups in 2010. A minority census tract is defined as one in which the minority percentage exceeds 31.3%.

In the 65 municipalities of the MBTA core service area, 24.7% of the residents lived in households with incomes below two times the federal poverty level in 2014. A low-income census tract is defined as one in which the percentage of residents living in households with incomes below two times the federal poverty level exceeds 24.7%.



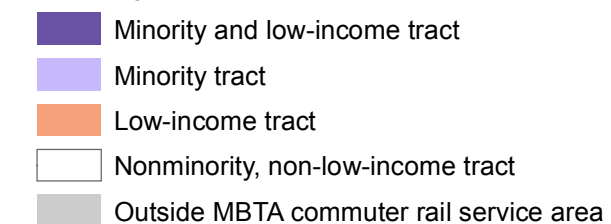
Figures 3-4a and 3-4b show the major streets and highways in relation to the MBTA network and the minority and low-income populations in each of the MBTA service areas.

Figure 3-4a shows that while the majority of census tracts served by the MBTA commuter rail outside of the core service area are neither minority nor low-income, most of the minority and/or low-income areas outside of the core are either directly served by or are near commuter rail service, and that the commuter rail service provided by the MBTA provides access to and from Boston similar to that provided by the region's highway system.

Figure 3-4b shows that much of the core service area is classified as minority and/or low-income, and that most of the tracts in the core service area that are classified as minority and/or low-income are served by the bus and rapid transit network, which provides similar access across the metropolitan area to that of the major street and highway network.



Major Streets and Highways: Commuter Rail Service Area



In the 175 municipalities of the MBTA commuter rail service area, 23.3% of the residents lived in households with incomes below two times the federal poverty level in 2014. A low-income census tract is defined as one in which the percentage of residents living in households with incomes below two times the federal poverty level exceeds 23.3%.



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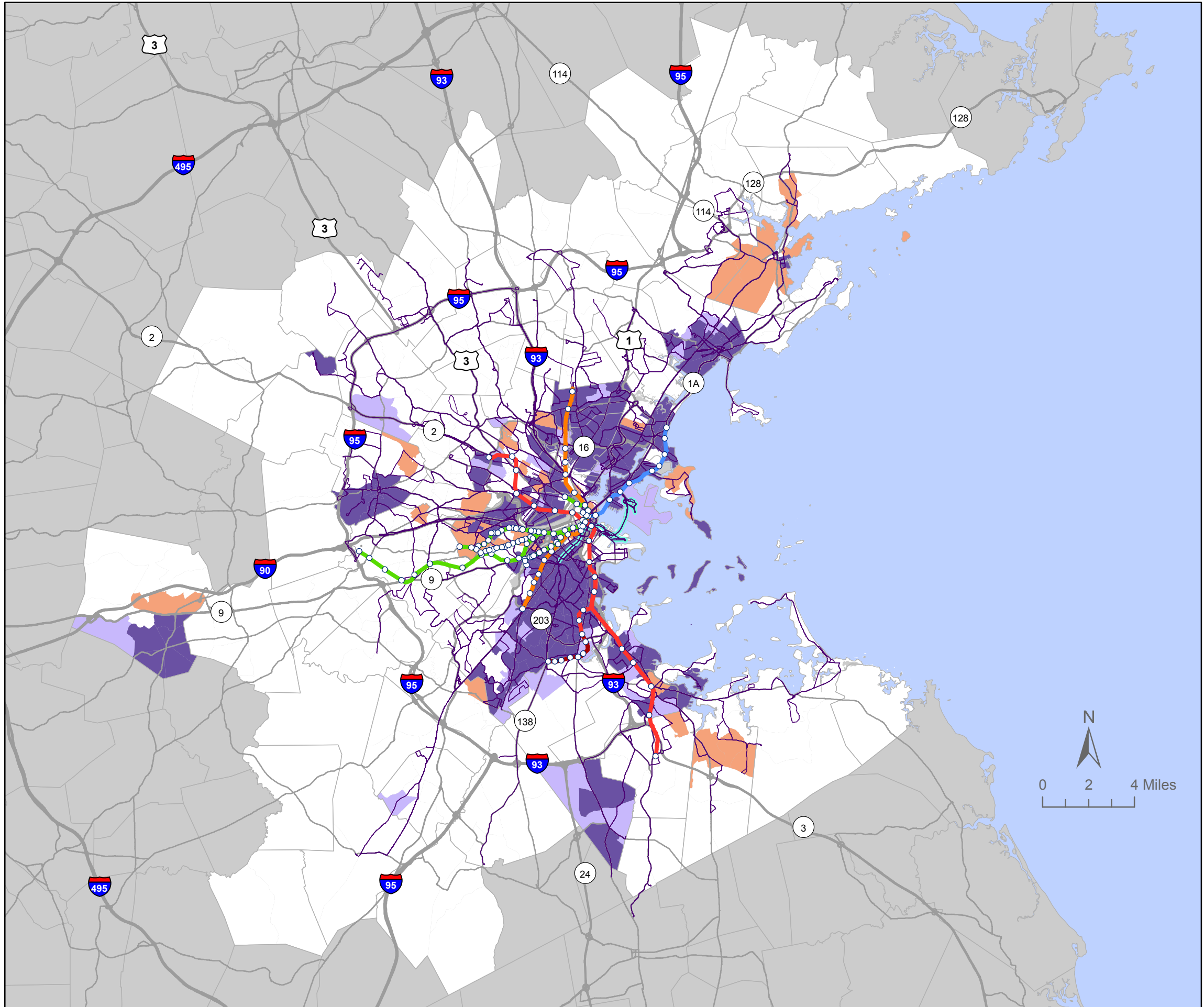


FIGURE 3-4b
MBTA 2017 Title VI Report

**Major Streets and
 Highways: Core
 Service Area**

- Road Network**
- Interstate
 - Principal arterial
 - Other arterial
- MBTA Transit**
- Rapid transit station
 - Bus route
 - Blue Line
 - Green Line
 - Orange Line
 - Red Line
 - Mattapan Line
 - Silver Line
- Minority and Low-Income Classification**
- Minority and low-income tract
 - Minority tract
 - Low-income tract
 - Nonminority, non-low-income tract
 - Outside MBTA core service area

In the 65 municipalities of the MBTA core service area, 31.3% of the residents were members of minority groups in 2010. A minority census tract is defined as one in which the minority percentage exceeds 31.3%.

In the 65 municipalities of the MBTA core service area, 24.7% of the residents lived in households with incomes below two times the federal poverty level in 2014. A low-income census tract is defined as one in which the percentage of residents living in households with incomes below two times the federal poverty level exceeds 24.7%.



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Figures 3-5a and 3-5b show the MBTA projects from the Capital Improvement Plan (2018–22) in relation to the minority and low-income populations in each of the MBTA service areas.

Figure 3-5a shows that while the majority of census tracts served by the MBTA commuter rail outside of the core service area are neither minority nor low-income, most of the MBTA commuter rail projects outside the core area of greatest significance are improvements along rail lines that serve minority and low-income areas. Tables 3-13, 3-14, and 3-15 summarize the distribution of commuter rail line improvements and station and facility improvements across minority and low-income census tracts in the commuter rail service area.

Table 3-13
Distribution of Commuter Rail Improvements:
Number and Percentage of Improvements by Tract Classification

Improvement Type	Total Number of Imps.	Number of Imps. Serving Minority Tracts	Number of Imps. Serving Low-Income Tracts	Percentage of Imps. Serving Minority Tracts	Percentage of Imps. Serving Low-Income Tracts
Line	44	10	12	23%	27%
Station or facility	27	9	7	33%	26%

Imps. = improvements

Note: For tracts in the MBTA commuter rail service area. A line improvement was counted as benefitting a station upstream or downstream of the improvement if the improvement enhanced service or reliability for riders accessing the system via that station. South Coast Rail was omitted because proposed station locations are located outside of the current commuter rail service area.

Table 3-14
Distribution of Commuter Rail Improvements:
Number of Improvements per 100 Tracts, by Tract Classification

Facility	Number of Imps. Serving Minority Tracts, per 100 Minority Tracts	Number of Imps. Serving Nonminority Tracts, per 100 Nonminority Tracts	Number of Imps. Serving Low-Income Tracts, per 100 Low- Income Tracts	Number of Imps. Serving Non-Low- Income Tracts, per 100 Non-Low-Income Tracts
Line	2	5	3	5
Station or facility	2	3	2	3

Imps. = improvements

Note: For tracts in the MBTA commuter rail service area. The number of line improvements was counted at the station level, as stations that benefited from the segment of line that was improved. South Coast Rail was omitted because proposed station locations are located outside of the current commuter rail service area.

Table 3-15
Distribution of Commuter Rail Improvements:
Percentage of Tracts with Improvement, by Tract Classification

Facility	Percentage of Minority Tracts Served by Imps.	Percentage of Nonminority Tracts Served by Imps.	Percentage of Low-Income Tracts Served by Imps.	Percentage of Non-Low- Income Tracts Served by Imps.
Line	2%	5%	3%	5%
Station or facility	1%	2%	1%	3%

Imps. = improvements

Note: For tracts in the MBTA commuter rail service area. The number of line improvements was counted at the station level, as stations that benefited from the segment of line that was improved. South Coast Rail was omitted because proposed station locations are located outside of the current commuter rail service area.

Figure 3-5b shows that much of the core service area is classified as minority and/or low-income, and that most of MBTA bus and rapid transit projects are located in census tracts that are classified as minority and/or low-income. Tables 3-16, 3-17, and 3-18 summarize the distribution of rapid transit line and station improvements and bus and rapid transit facility improvements across minority and low-income census tracts in the core service area.

Table 3-16
Distribution of Bus and Rapid Transit Improvements:
Number and Percentage of Improvements by Tract Classification

Improvement Type	Total Number of Imps.	Number of Imps. Serving Minority Tracts	Number of Imps. Serving Low-Income Tracts	Percentage of Imps. Serving Minority Tracts	Percentage of Imps. Serving Low-Income Tracts
Line	22	17	15	77%	68%
Station or facility	41	25	24	61%	59%

Imps. = improvements

Note: For tracts in the MBTA core service area. The number of line improvements was counted at the station level, as stations that benefited from the segment of line that was improved.

Table 3-17
Distribution of Bus and Rapid Transit Improvements:
Number of Improvements per 100 Tracts, by Tract Classification

Facility	Number of Imps. Serving Minority Tracts, per 100 Minority Tracts	Number of Imps. Serving Nonminority Tracts, per 100 Nonminority Tracts	Number of Imps. Serving Low-Income Tracts, per 100 Low-Income Tracts	Number of Imps. Serving Non-Low-Income Tracts, per 100 Non-Low-Income Tracts
Line	7	<1	3	1
Station or facility	10	5	9	5

Imps. = improvements

Note: For tracts in the MBTA core service area. The number of line improvements was counted at the station level, as stations that benefited from the segment of line that was improved.

Table 3-18
Distribution of Bus and Rapid Transit Improvements:
Percentage of Tracts with Improvement, by Tract Classification

Facility	Percentage of Minority Tracts Served by Imps.	Percentage of Nonminority Tracts Served by Imps.	Percentage of Low-Income Tracts Served by Imps.	Percentage of Non- Low-Income Tracts Served by Imps.
Line	4%	<1%	2%	<1%
Station or facility	7%	2%	4%	2%

Imps. = improvements

Note: For tracts in the MBTA core service area. The number of line improvements was counted at the station level, as stations that benefited from the segment of line that was improved.

FIGURE 3-5a
MBTA 2017 Title VI Report

MBTA Improvements:
Commuter Rail Service
Area

Improvement Type

- Ongoing improvement
- Future improvement

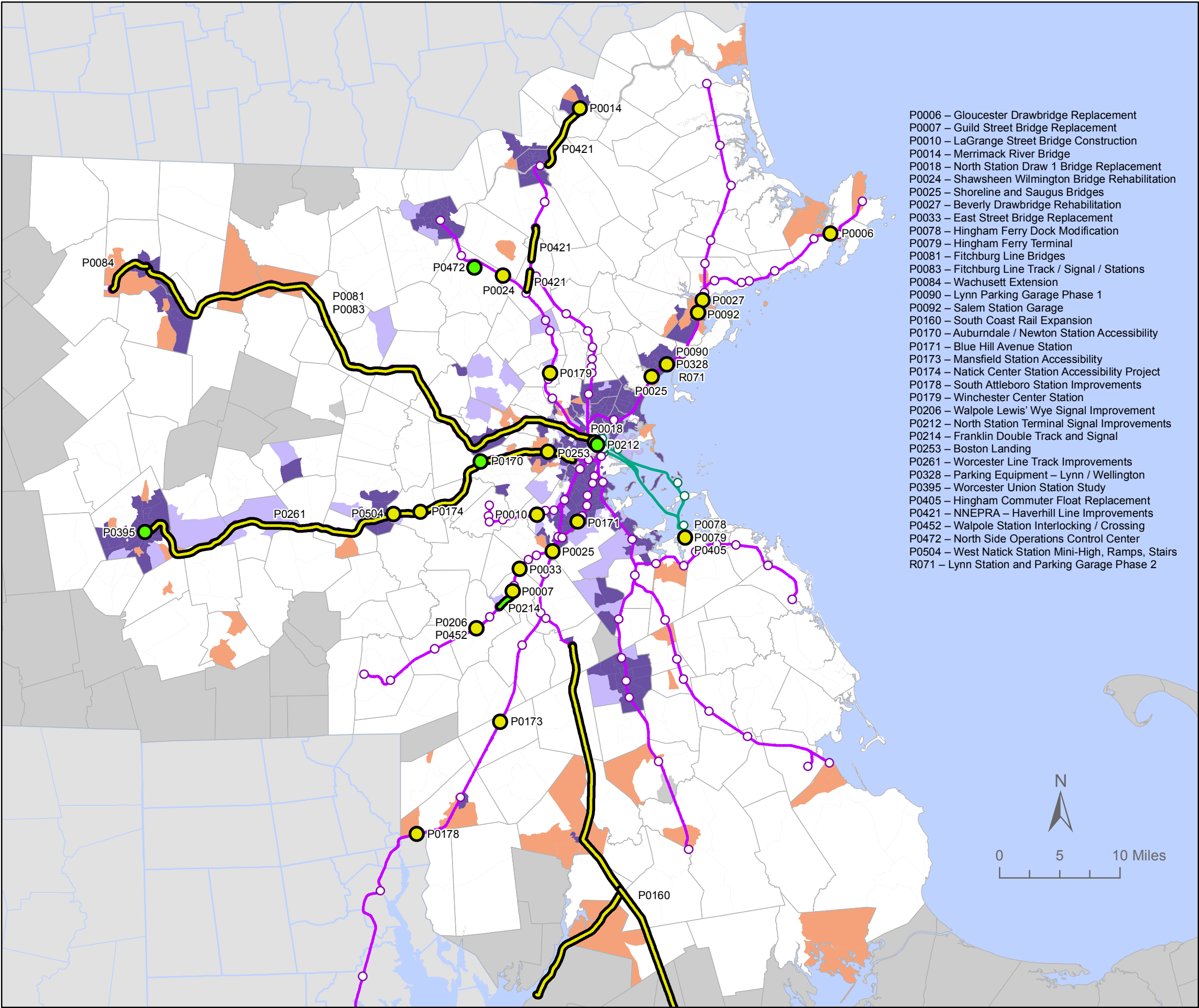
MBTA Transit Facility

- Commuter rail station
- Commuter boat station
- Commuter rail line
- Commuter boat route

Minority and Low-Income Classification

- Minority and low-income tract
- Minority tract
- Low-income tract
- Nonminority, non-low-income tract
- Outside MBTA commuter rail service area

- P0006 – Gloucester Drawbridge Replacement
- P0007 – Guild Street Bridge Replacement
- P0010 – LaGrange Street Bridge Construction
- P0014 – Merrimack River Bridge
- P0018 – North Station Draw 1 Bridge Replacement
- P0024 – Shawsheen Wilmington Bridge Rehabilitation
- P0025 – Shoreline and Saugus Bridges
- P0027 – Beverly Drawbridge Rehabilitation
- P0033 – East Street Bridge Replacement
- P0078 – Hingham Ferry Dock Modification
- P0079 – Hingham Ferry Terminal
- P0081 – Fitchburg Line Bridges
- P0083 – Fitchburg Line Track / Signal / Stations
- P0084 – Wachusett Extension
- P0090 – Lynn Parking Garage Phase 1
- P0092 – Salem Station Garage
- P0160 – South Coast Rail Expansion
- P0170 – Auburndale / Newton Station Accessibility
- P0171 – Blue Hill Avenue Station
- P0173 – Mansfield Station Accessibility
- P0174 – Natick Center Station Accessibility Project
- P0178 – South Attleboro Station Improvements
- P0179 – Winchester Center Station
- P0206 – Walpole Lewis' Wye Signal Improvement
- P0212 – North Station Terminal Signal Improvements
- P0214 – Franklin Double Track and Signal
- P0253 – Boston Landing
- P0261 – Worcester Line Track Improvements
- P0328 – Parking Equipment – Lynn / Wellington
- P0395 – Worcester Union Station Study
- P0405 – Hingham Commuter Float Replacement
- P0421 – NNEPRA – Haverhill Line Improvements
- P0452 – Walpole Station Interlocking / Crossing
- P0472 – North Side Operations Control Center
- P0504 – West Natick Station Mini-High, Ramps, Stairs
- R071 – Lynn Station and Parking Garage Phase 2



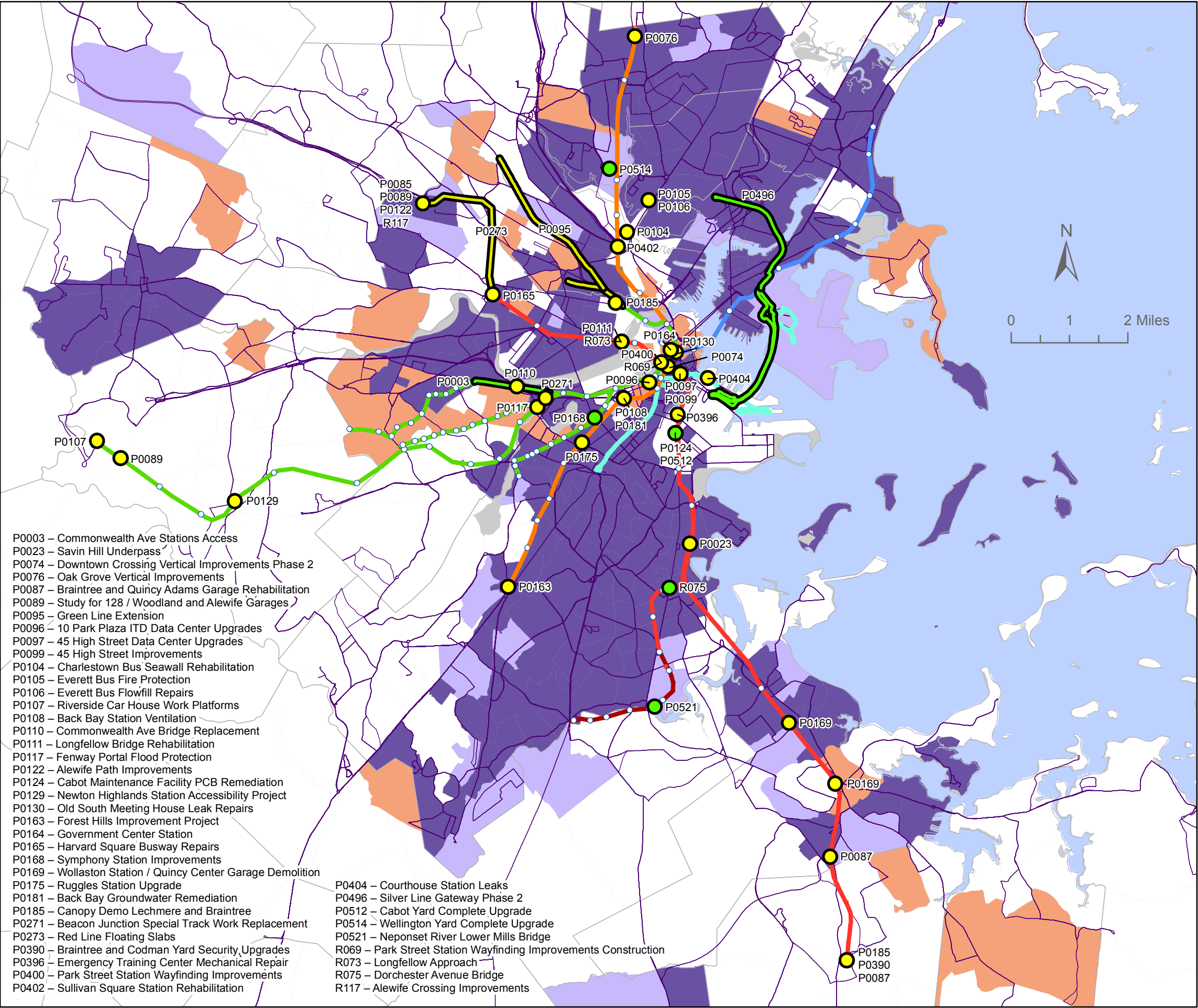
In the 175 municipalities of the MBTA commuter rail service area, 26.2% of the residents were members of minority groups in 2010. A minority census tract is defined as one in which the minority percentage exceeds 26.2%.

In the 175 municipalities of the MBTA commuter rail service area, 23.3% of the residents lived in households with incomes below two times the federal poverty level in 2014. A low-income census tract is defined as one in which the percentage of residents living in households with incomes below two times the federal poverty level exceeds 23.3%.



FIGURE 3-5b
MBTA 2017 Title VI Report

MBTA Improvements:
Core Service Area



In the 65 municipalities of the MBTA core service area, 31.3% of the residents were members of minority groups in 2010. A minority census tract is defined as one in which the minority percentage exceeds 31.3%.

In the 65 municipalities of the MBTA core service area, 24.7% of the residents lived in households with incomes below two times the federal poverty level in 2014. A low-income census tract is defined as one in which the percentage of residents living in households with incomes below two times the federal poverty level exceeds 24.7%.



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Chapter 4: Demographic Ridership and Travel Patterns

The Federal Transit Administration (FTA) requires the MBTA to create demographic profiles based on customer surveys that compare minority and nonminority riders' trips and fare usage by fare type (FTA C 4702.1B, IV-5.b). The FTA also requires a profile of fare use by fare type for low-income riders. The MBTA Systemwide Passenger Survey conducted between October 2015 and May 2017 was used to create the profiles in this chapter, which are presented by mode.¹ While the FTA only requires presentation of the analysis of these data in tabular format, the MBTA has elected to include some graphical representations of the data.

The systemwide survey elicited responses from riders on all five of the MBTA's public transit modes: bus, rail rapid transit (including subway and light rail), commuter rail, bus rapid transit (Silver Line), and commuter ferry. However, because there was a low response rate on commuter ferry services, including no minority responses on one of the routes, survey results for this mode are not presented in this analysis.

¹ The MBTA systemwide surveys were distributed on all modes and asked about each respondent's most recent one-way MBTA trip. The results were tabulated for each mode used in each reported trip.

This chapter includes analyses comparing the following characteristics of minority and nonminority riders:

- Modal use
- Fare usage by fare type
- Frequency of use
- Transfer rates
- Estimation of transit dependency as represented by possession of a driver's license and household vehicle ownership

This chapter also includes an analysis of fare usage by fare type for low-income and non-low-income riders, as required by the FTA for fare equity analyses. The chapter concludes with an analysis of the languages in which the survey was taken and the languages in which survey respondents prefer to receive information about the MBTA.

SURVEY DEPLOYMENT BACKGROUND

The MBTA survey distribution plan was designed to minimize the cost and length of time needed to obtain statistically significant results at the route and station level required for Title VI analysis. This resulted in a two-phased approach, where the survey was initially administered online (from October 2015 through February 2016) and, when the response rate to the online survey slowed, it was distributed on paper forms at stations, stops, and vehicles. This method reduced the expense of printing, postage, and labor for survey distribution and data entry. The MBTA and CTPS made extensive efforts throughout the MBTA service area to publicize the availability of the online form. There was only one survey with two response options—online or on paper forms. The content of both versions was identical.

On both the paper form and the online survey, instructions at the beginning of the survey emphasized that respondents should only complete the survey once. Because the paper survey distribution began several months after the survey was launched online, the instructions on the paper survey emphasized that the survey should be completed once, either online or on paper.

The marketing and outreach materials were consistent in style and message throughout the survey period. Marketing materials were displayed throughout the MBTA system in two phases. The first set of materials advertised the online survey website. The second wave of materials, which were displayed once paper survey distribution had begun, directed people to fill out the survey either online or on paper if they had not already completed a survey.

The online survey was also available during the remainder of the survey-distribution period as an option for respondents who did not want to complete and mail back the paper survey form, but it was only advertised in conjunction with the paper form.

Survey Validity

To determine required sample sizes for valid results for Title VI analyses, CTPS separated MBTA services into various units to determine the statistical requirements for a 90 percent confidence level with a 10 percent confidence interval. The survey service units for heavy rail rapid transit and the Green Line Central Subway were individual stations. For surface Green Line, Silver Line, and commuter rail segments, the service units were individual stops or groups of adjoining stops, depending on passenger volumes. For buses, the service units were routes or groups of routes serving the same neighborhood. For ferries, the service units were routes.

Using the most recent ridership counts, CTPS calculated target numbers of completed surveys needed from each service unit to meet, at minimum, the statistical requirements for a 90 percent confidence level with a 10 percent confidence interval. Based on the response rates to past surveys, CTPS devised plans for survey distribution for each service unit to obtain the target number of responses.

The survey form called for the respondent to report all routes and stations used on the respondent's most recent MBTA trip. This allowed each survey form to be used as part of the response total for each of the service units reported on it.

During the first five months when only the online survey forms were available, CTPS tracked the responses received for each service unit and compared them with the initial target response totals for these units. The preliminary plans for paper survey distribution determined the number of forms that would need to be distributed on each service unit if there were no online responses. These targets were revised throughout the paper survey distribution phase to account for the number of responses already received either online or on paper. Distribution of

paper surveys on each service unit was discontinued when the target number of responses was reached. Conversely, if the initial distribution plan was not generating the number of target responses from a service unit, survey distribution was intensified.

The distributors of the paper surveys were assigned to work at specific stations or on specific routes each day. (Surveys were not distributed on major holidays, during the summer, or during school vacation weeks.) The distributors handed survey forms to passengers but did not conduct interviews. Except for supplemental distribution on service units with low initial response rates, survey distribution for any one service unit took place during only a short segment of the overall distribution span from March 2016 to May 2017. The distribution span reflects the amount of time it takes to collect enough data based on the size of our system and the number of stations and routes for which we need to obtain statistically significant results.

To reduce the risk of receiving multiple responses from a single rider, the survey form included a directive that passengers who had already filled out a survey form not fill out another one. Because this was not an opinion survey and took some time to complete, there was little motivation for passengers to fill out more than one survey form intentionally.

Because the online form was no longer independently publicized during the paper survey distribution phase, most of the online responses received starting in March 2016 were probably from passengers who had received paper forms but chose to respond using the online option included in the paper form instructions.

As a further safeguard against individuals completing multiple forms, the IP addresses of the online forms were checked for duplications. Additional checks were made for forms with identical information in all or most of the survey fields. Forms determined to be duplicates from the same respondent were excluded.

MODAL USE

An analysis of the survey data shows that the proportion of minority riders varied by mode. The percentage of nonminority survey respondents was greater than the percentage of minority respondents for all modes. The highest proportion of minority respondents was on bus and the Silver Line followed by subway or light rail, and then commuter rail. Figure 4-1 and Table 4-1 show the use of each mode by minority status.

Figure 4-1
Modal Use by Minority Status

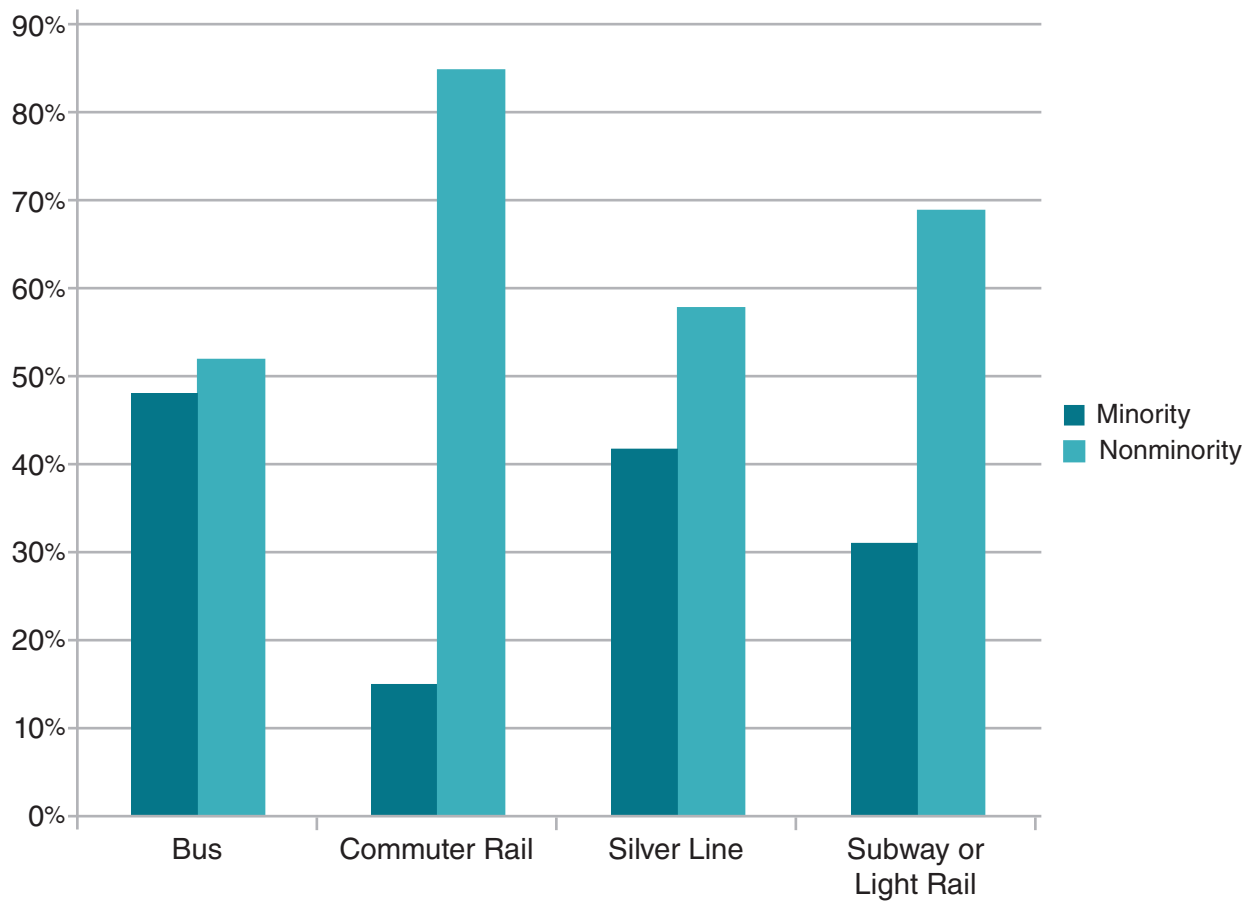


Table 4-1
Modal Use by Minority Status

Mode	Minority	Nonminority
Bus	48%	52%
Commuter Rail	15%	85%
Silver Line	42%	58%
Subway or Light Rail	31%	69%

FARE TYPE USAGE

Figure 4-2 and Table 4-2 show the results of the analysis of fare usage by fare type and mode for minority and nonminority riders. Figure 4-3 and Table 4 3 show the results of the analysis of fare usage by fare type and mode for low-income and non-low-income riders. For all riders on the four modes analyzed, monthly pass usage accounted for the majority of fare product use.

As shown in Figure 4-2 and Table 4-2, minority riders were more likely than nonminority riders to use reduced-fare monthly passes or 7-Day Passes on all modes on which they are valid. Minority riders were less likely than nonminority riders to use adult monthly passes on bus and subway, but more likely to use them on commuter rail and the Silver Line.

Figure 4-2
Fare Type by Mode and Minority Status

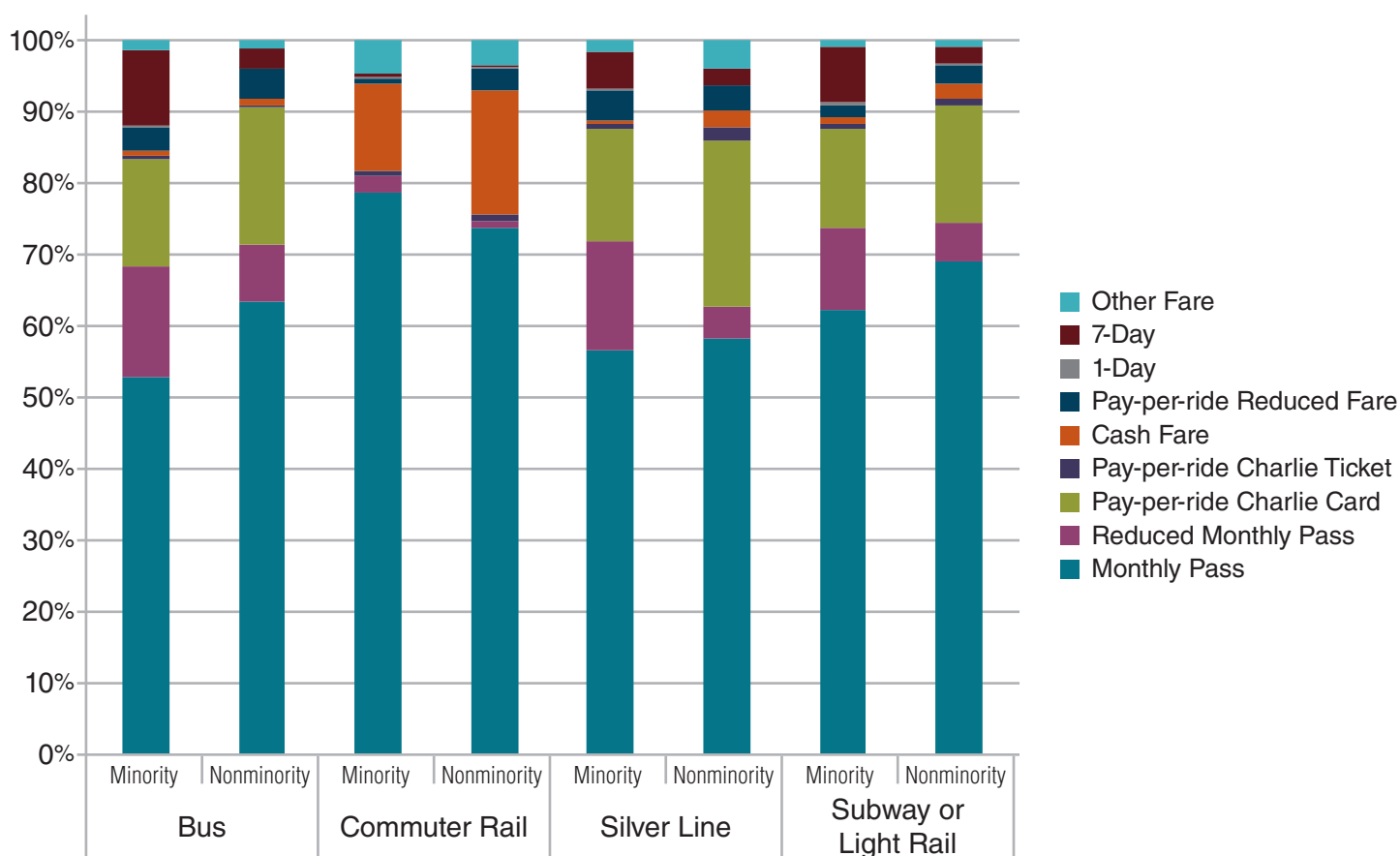


Table 4-2
Fare Type by Mode and Minority Status

Mode and Income Status	Monthly Pass	Reduced Monthly Pass	Pay-per-ride CharlieCard	Pay-per-ride CharlieTicket	Cash Fare	Pay-per-ride Reduced Fare	1-Day	7-Day	Other Fare
Bus - Minority	53%	16%	15%	0%	1%	3%	0%	11%	1%
Bus - Nonminority	63%	8%	19%	0%	1%	4%	0%	3%	1%
Commuter Rail - Minority	79%	2%	0%	1%	12%	1%	0%	0%	5%
Commuter Rail - Nonminority	74%	1%	0%	1%	17%	3%	0%	0%	3%
Silver Line - Minority	57%	15%	16%	1%	0%	4%	0%	5%	2%
Silver Line - Nonminority	58%	5%	23%	2%	2%	4%	0%	2%	4%
Subway or Light Rail - Minority	62%	12%	14%	1%	1%	2%	0%	8%	1%
Subway or Light Rail - Nonminority	69%	5%	16%	1%	2%	3%	0%	2%	1%

For low-income riders, fare product usage patterns differ significantly from those of non-low-income riders. On all modes, low-income riders are much less likely than non-low-income riders to use adult monthly passes, but are more likely to use reduced-fare passes or 7-Day Passes. Low-income riders are also less likely than minority riders to use monthly passes on all modes.

Figure 4-3
Fare Type by Mode and Low-Income Status

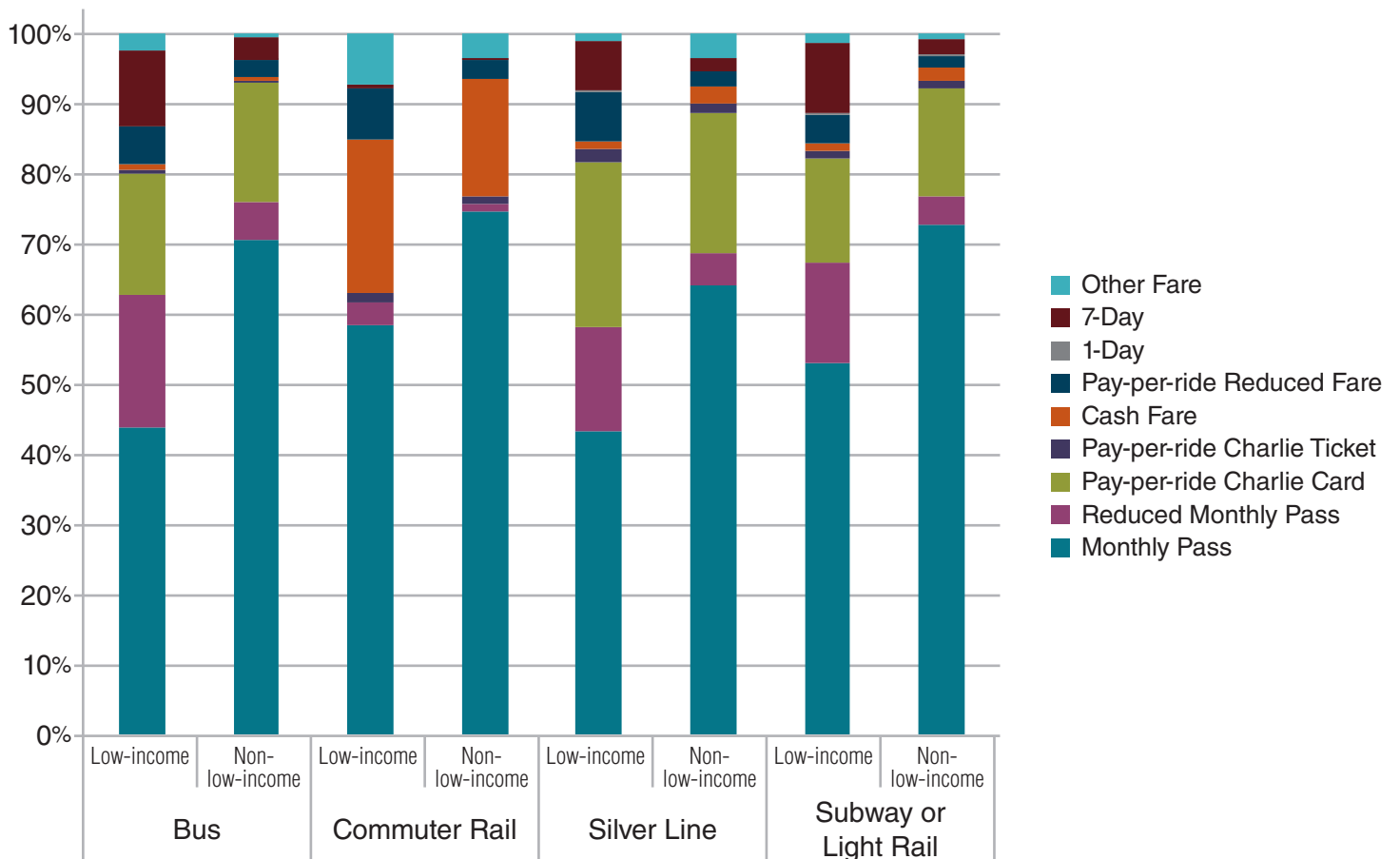


Table 4-3
Fare Type by Mode and Low-Income Status

Mode and Minority Status	Monthly Pass	Reduced Monthly Pass	Pay-per-ride CharlieCard	Pay-per-ride CharlieTicket	Cash Fare	Pay-per-ride Reduced Fare	1-Day	7-Day	Other Fare
Bus - Low-income	44%	19%	17%	1%	1%	5%	0%	11%	2%
Bus - Non-low-income	71%	5%	17%	0%	1%	2%	0%	3%	0%
Commuter Rail - Low-income	58%	3%	0%	1%	22%	7%	0%	1%	7%
Commuter Rail - Non-low-income	75%	1%	0%	1%	17%	3%	0%	0%	3%
Silver Line - Low-income	43%	15%	24%	2%	1%	7%	0%	7%	1%
Silver Line - Non-low-income	64%	5%	20%	1%	2%	2%	0%	2%	3%
Subway or Light Rail - Low-income	53%	14%	15%	1%	1%	4%	0%	10%	1%
Subway or Light Rail - Non-low-income	73%	4%	15%	1%	2%	2%	0%	2%	1%

FREQUENCY OF USE

Overall, most riders made their reported trip using the MBTA at least five days per week regardless of minority status. The most “traditional” commuter use occurs on the commuter rail; approximately 70 percent of commuter rail riders report that they use the MBTA five days per week.

A higher percentage of minority riders than of nonminority riders report using the MBTA six or seven days per week, across all modes. In addition, more minority riders than nonminority riders report using the MBTA more than four days per week.

Figure 4-4
Frequency of Use by Mode and Minority Status

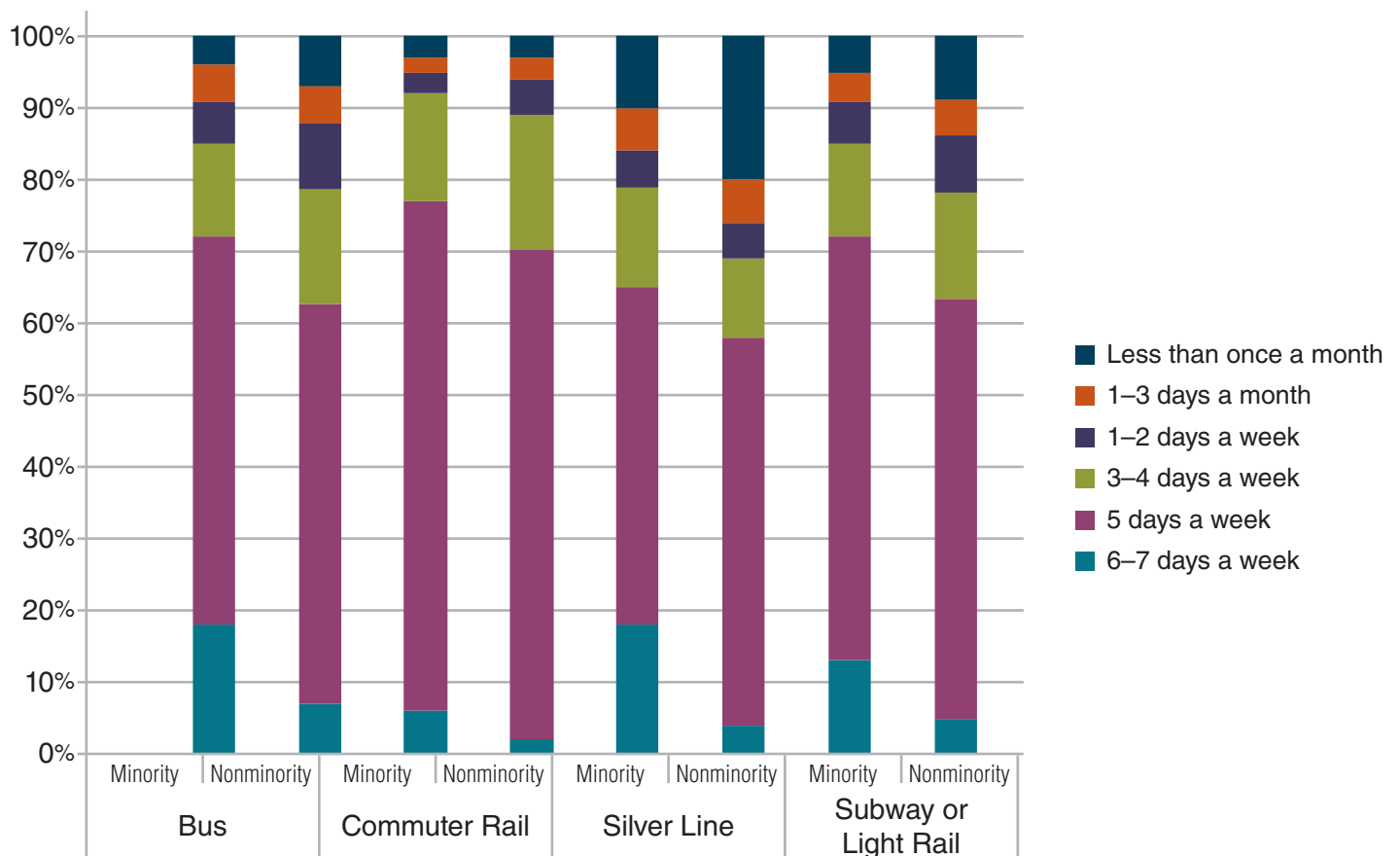


Table 4-4
Frequency of Use by Mode and Minority Status

Mode and Minority Status	6-7 days a week	5 days a week	3-4 days a week	1-2 days a week	1-3 days a month	Less than once a month
Bus - Minority	18%	54%	13%	6%	5%	4%
Bus - Nonminority	7%	55%	16%	9%	5%	7%
Commuter Rail - Minority	6%	71%	15%	3%	2%	3%
Commuter Rail - Nonminority	2%	69%	19%	5%	3%	3%
Silver Line - Minority	18%	47%	14%	5%	6%	10%
Silver Line - Nonminority	4%	54%	11%	5%	6%	20%
Subway or Light Rail - Minority	13%	59%	13%	6%	4%	5%
Subway or Light Rail - Nonminority	5%	59%	15%	8%	5%	9%

TRANSFER RATES

Transfer rate refers to the percentage of riders who must transfer between MBTA services to complete a one-way trip. The survey showed a significant difference between minority and nonminority riders in this measure. Overall, 47 percent of riders made at least one transfer. For minorities the rate was 59 percent, compared with 42 percent for nonminorities. This finding is partly a reflection of the high percentage of minority trips that begin or end on local bus routes and that require the rider to transfer to a subway line to reach downtown Boston.

TRANSIT DEPENDENCY

Transit dependency is an important factor to consider in analyses for fare and service changes. The responses to two questions on the MBTA Systemwide Passenger Survey were used to compare the estimated level of transit dependency of minority and nonminority riders: the survey asked whether the respondent has a valid driver's license, and the number of usable vehicles in the respondent's household.

The majority of all survey respondents, regardless of mode used and minority status, reported that they possess a driver's license. However, across all modes, minority riders are less likely to possess a driver's license than are nonminority riders. Further, bus, Silver Line, and rail rapid transit riders are less likely to possess a driver's license than are commuter rail riders, who are predominantly nonminority.

Similar patterns were noted for household vehicle ownership; minority riders have fewer vehicles per household than nonminority riders, and bus, Silver Line, and rail rapid transit riders have fewer vehicles per household than commuter rail riders. Figure 4-5 and Table 4-5 show the percentage of riders who possess a valid driver's license by mode and minority status. Figure 4-6 and Table 4-6 show the percentage of riders by mode and minority status who have zero, one, two, or "three or more" vehicles in their households.

Figure 4-5
Riders Possessing a Driver's License by Mode and Minority Status

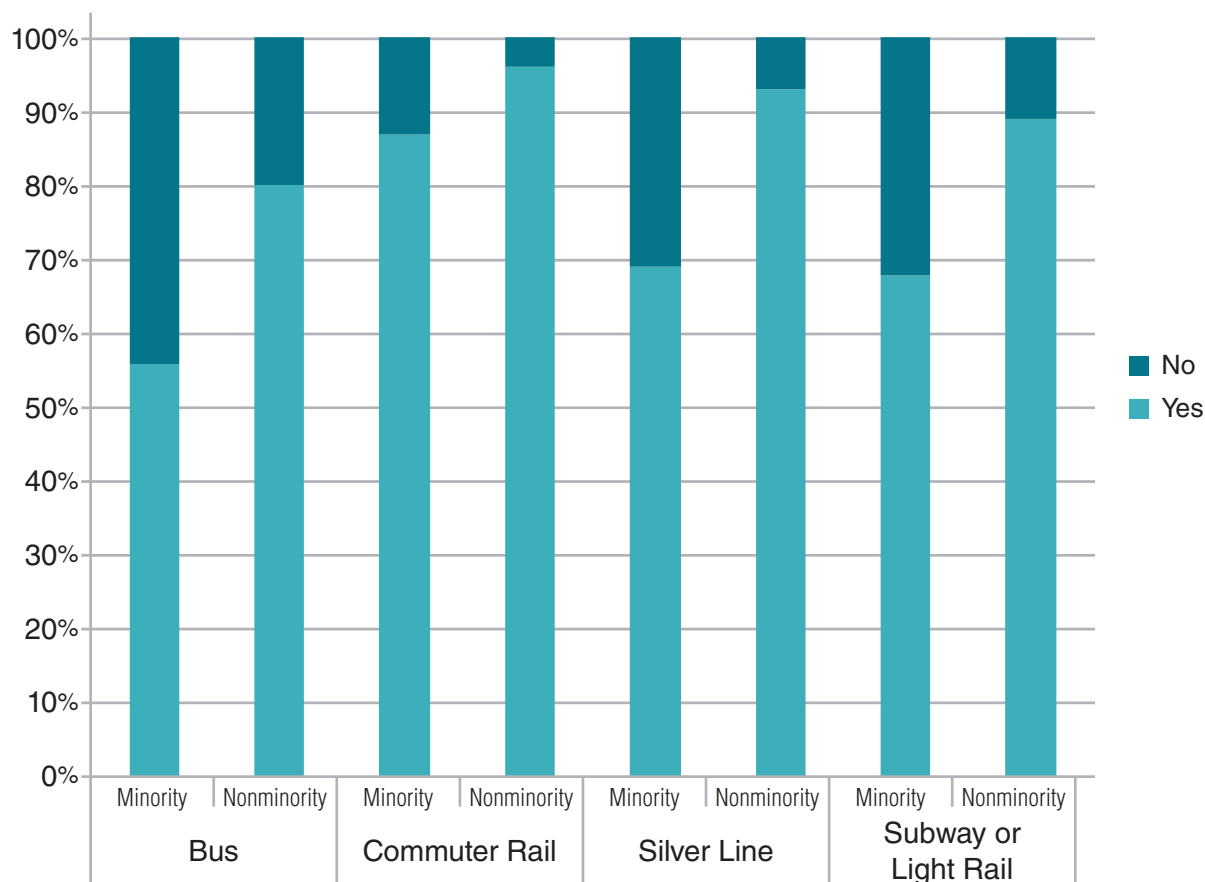


Table 4-5
Riders Possessing a Driver's License by Mode and Minority Status

Mode and Minority Status	Yes	No
Bus - Minority	56%	44%
Bus - Nonminority	80%	20%
Commuter Rail - Minority	87%	13%
Commuter Rail - Nonminority	96%	4%
Silver Line - Minority	69%	31%

(Table 4-5 Cont.)

Mode and Minority Status	Yes	No
Silver Line - Nonminority	93%	7%
Subway or Light Rail - Minority	68%	32%
Subway or Light Rail - Nonminority	89%	11%

Figure 4-6
Vehicles per Household by Mode and Minority Status

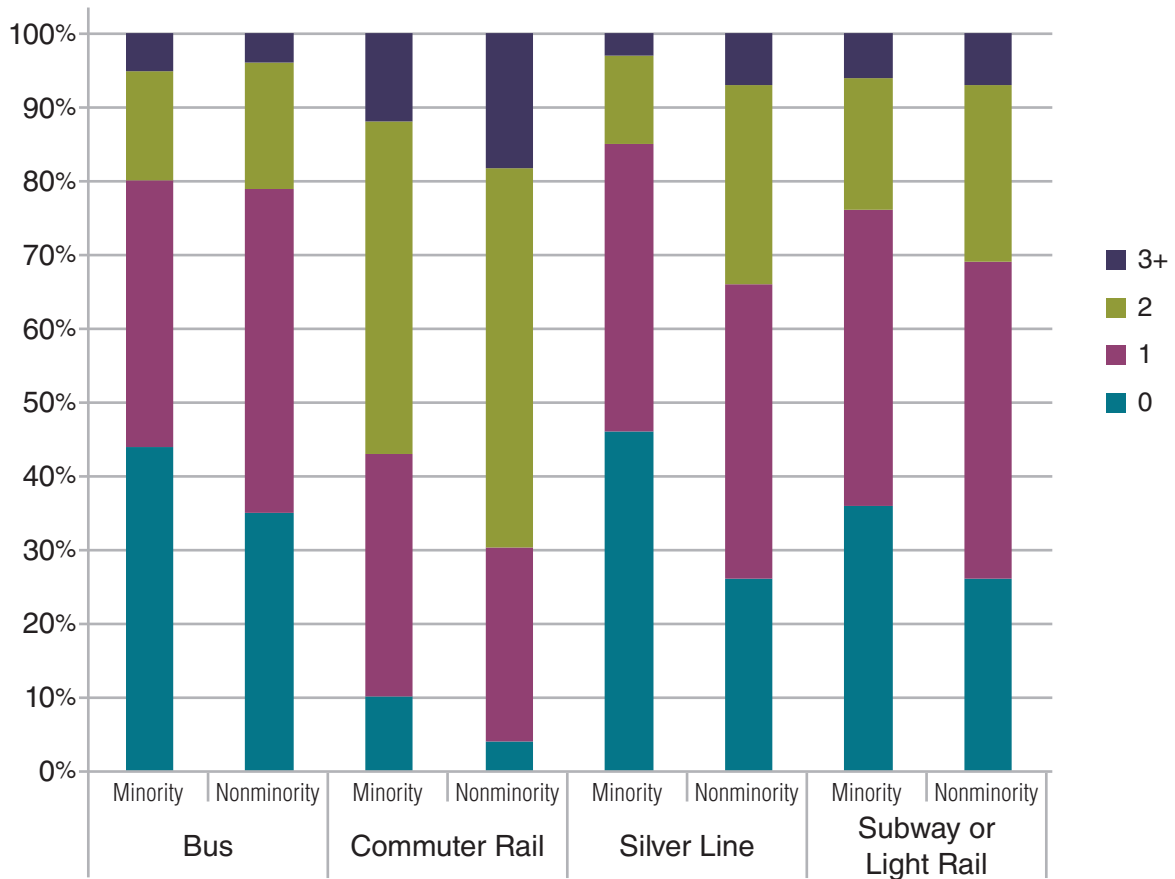


Table 4-6
Vehicles per Household by Mode and Minority Status

Mode and Minority Status	0	1	2	3+
Bus - Minority	44%	36%	15%	5%
Bus - Nonminority	35%	44%	17%	4%
Commuter Rail - Minority	10%	33%	45%	12%
Commuter Rail - Nonminority	4%	26%	51%	18%
Silver Line - Minority	46%	39%	12%	3%
Silver Line - Nonminority	26%	40%	27%	7%
Subway or Light Rail - Minority	36%	40%	18%	6%
Subway or Light Rail - Nonminority	26%	43%	24%	7%

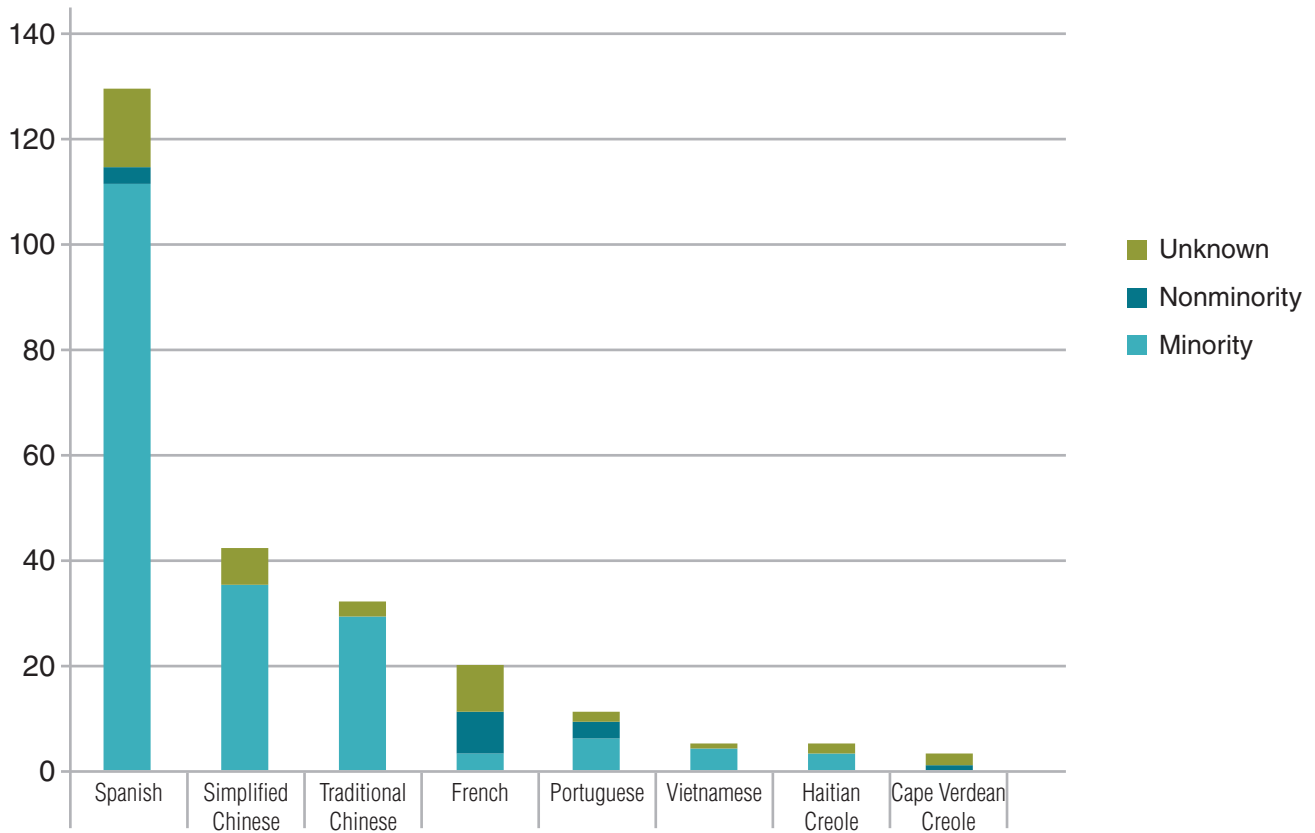
SURVEY LANGAUGES AND PREFERRED LANGAUGES FOR INFORMATION

The survey form was available in eight languages in addition to English.² The majority of returned surveys (99.3 percent) used the English version. The Spanish version accounted for 0.37 percent, and the Simplified Chinese version for 0.12 percent. The Traditional Chinese, French, Portuguese, Vietnamese, Haitian Creole, and Cape Verdean Creole versions each accounted for less than 0.1 percent.

Figure 4-7 shows the number of surveys returned in languages other than English by minority status. As shown in the figure, most of the non-English surveys were completed by minority riders.

² Haitian Creole was only available online because most adult Haitians read French (French was the language of instruction in schools until 1978, when Haitian Creole was introduced as the language of instruction in the first four grades) but speak Haitian Creole, and the online version accommodated screenreaders.

Figure 4-7
Number of Surveys Returned in Languages Other Than English by Minority Status



All versions of the survey form asked respondents whether they preferred to receive information about riding the MBTA in English or in another language and, if the latter, to specify which language they prefer. The percent of respondents who expressed a preference for English (98.6 percent) was slightly lower than the percent who used the English form (99.3 percent). The most preferred other languages were Spanish (0.7 percent) and Chinese (0.2 percent). Of 38 other languages specified, only seven were identified as preferable by five or more respondents: French, Portuguese, Haitian Creole, Russian, Arabic, Vietnamese, and German.



Chapter 5: Service Standards and Policies

To guard against discrimination resulting from service design or operation, the Federal Transit Administration (FTA) requires that the MBTA adopt systemwide service standards and policies for each fixed-route mode of service.

SYSTEMWIDE SERVICE STANDARDS (FTA C 4702.1B, IV-4.A)

FTA requires transit providers that operate fixed-route service to set quantitative systemwide service standards for vehicle load, vehicle headway, on-time performance, and service availability. Standards for these four performance indicators are found in the MBTA's Service Delivery Policy (see Appendix 2-H). This policy, first adopted in 1996, sets how the MBTA evaluates service quality and allocates transit service to meet the needs of the Massachusetts Bay region. It is consistent with the MBTA's enabling legislation and other external mandates, such as Title VI of the Civil Rights Act of 1964 and the Americans with Disabilities Act of 1990 (ADA). Since 1996, the Service Delivery Policy has been revised six times: in 2002, 2004, 2006, 2008, 2010, and most recently in 2017. The 2017 Service Delivery Policy:

- Establishes the aspects that define service availability and sets parameters for levels of provided service
- Establishes objectives that define the key performance characteristics of quality transit services

- Identifies quantifiable standards that are used to measure whether the MBTA's transit services achieve their objectives, within the context of federal, state, and local regulations
- Outlines a service planning process that applies the service standards in an objective, uniform, and accountable manner
- Sets the priorities for the service planning process by setting minimum levels and targets for the service standards
- Involves the public in the service planning process in a consistent, fair, and thorough manner

Once all data streams are fully established, the 2017 Service Delivery Policy will take advantage of the capabilities offered by new technologies to collect and analyze data and to take the first steps towards creating standards from a passenger perspective. To this end, the MBTA worked with two committees to produce the document: 1) a policy advisory committee tasked with developing the service objectives, and 2) a technical advisory committee tasked with establishing standards, metrics, and thresholds designed to address the service objectives. These committees included staff from the MBTA, the Massachusetts Department of Transportation (MassDOT), and the Central Transportation Planning Staff (CTPS), along with members of academia, and various planning and advocacy groups. In addition, the MBTA engaged members of the public through a series of workshops held throughout the region, an online survey, and public meetings.

The Service Delivery Policy is intended to be updated regularly as the MBTA expands its ability to collect and analyze data, build out metrics, and define service parameters and targets. In addition, as priorities for service change, the policy can be updated to reflect new priorities. Future updates will have a public input component and must be adopted by the MBTA governing board.

The 2017 Service Delivery Policy sets the quantifiable standards used to measure the MBTA's service objectives, including the four FTA-required standards for vehicle load, vehicle headway, on-time performance, and service availability; and four additional standards for span of service, platform accessibility, vehicle accessibility, and service operated. The standards are divided into two categories: *service planning standards* used in the service planning process to evaluate and allocate service, and *accessibility standards* that fall outside the service planning process. The service planning standards are evaluated in the Service Monitoring portion of the MBTA's Title VI Program.

Each standard has a number of components. The definition of each standard describes what conditions are considered passing for that standard. Within a single standard, the definition changes depending on the type of service or time period. The pass/fail condition is measured at different levels of aggregation depending on the standard. For example, on-time performance of a bus is measured at each time point on the route.

All standards are designed such that 100 percent is considered perfect performance. Improvement is always measured by an increase in the percentage. Depending on the standard, performance can be measured at the route, mode, or network level.

Vehicle Load (FTA C 4702.1B, IV-4.a.(1))

The MBTA assesses vehicle load using a set of passenger comfort standards. Passenger comfort is influenced by the number of people on the vehicle and whether or not a seat is available to each rider for all or most of the trip. The passenger comfort standards, which vary by mode and time of day, establish the maximum number of passengers that can be on a vehicle so that the ride is safe and comfortable. The MBTA's passenger comfort standards are detailed pages 25 to 28 of the Service Delivery Policy (Appendix 2-H).

Rail Service

The MBTA currently has limited data on the vehicle load of its subway, light rail, and Commuter Rail service due to the present lack of passenger counting mechanisms. To address this limitation, Automated Passenger Counters (APCs) are being installed on all Commuter Rail coaches. APCs will also be built into the Green Line Type 9 cars starting service in 2018, Orange Line cars starting service in 2019, and Red Line cars starting service in 2020. Though it will take some time to replace the totality of vehicles used in these fleets, once compiled, this overall data will allow the MBTA to update its standards for vehicle load to represent the distribution of customer experiences by trip or by rail car rather than using simplified averages that can mask uncomfortable experiences.

The vehicle loads referenced in Appendix B of the Service Delivery Policy are a capture of actual vehicle capacity and reflect the policy loads for planning purposes rather than measurements taken. The policy does not contain a standard for rail service because the MBTA does not currently have sufficient data to measure it. These policy loads, such as how many people fit in a train car in regular conditions and in busy conditions, are used for planning purposes such as egress studies for stations to safely evacuate or estimates of the theoretical

capacity of a service. As noted above, train vehicle loads will be measured once APC data is available.

Bus Service

APCs are currently installed on MBTA buses, so there is no data gap for assessing vehicle load for this mode. Bus passenger comfort standards are different for high-volume and low-volume periods.

High-Volume Time Periods

The maximum comfortable passenger-to-seat ratio for high-volume travel periods is 140 percent. All passengers are considered comfortable on buses with loads up to 140 percent of seated capacity, and no passengers are considered comfortable when the vehicle load exceeds 140 percent of seated capacity.

Low-Volume Time Periods

The maximum comfortable passenger-to-seat ratio for low-volume travel periods is 125 percent. All passengers are considered comfortable on buses with loads up to 125 percent of seated capacity. Seated passengers are considered comfortable when loads are between 125 percent and 140 percent of seated capacity. No passengers are considered comfortable when the vehicle load exceeds 140 percent of seated capacity.

Vehicle Headway (FTA C 4702.1B, IV-4.a.(2))

To ensure that customers have reasonable waiting times when accessing the transportation network, the MBTA establishes expected frequency of service levels for each mode, by time of day. The following provides a summary of the MBTA's frequency of service standards that are detailed in the 2017 Service Delivery Policy (p. 13-15).

The MBTA's frequency of service standards are measured using either headway (minutes between trips) or frequency (trips per time period), as summarized in Table 5-1. If Table 5-1 does not specify an expected frequency for a mode or time period, then there is no respective standard, and frequencies for these services are set based on demand.

Table 5-1
Service Frequency

Mode	Weekday Time Periods	Expected Frequency or Headway
Bus – Local and Community	AM and PM Peak	Every 30 minutes
	All other periods	Every 60 minutes
	Saturday and Sunday	Every 60 minutes
Bus – Commuter	AM Peak	3 trips in the peak direction
	PM Peak	3 trips in the peak direction
Bus – Key Bus Routes	AM and PM Peak	Every 10 minutes
	Early AM and Midday Base/School	Every 15 minutes
	Evening and Late Evening	Every 20 minutes
	Saturday and Sunday	Every 20 minutes
Rapid Transit	AM and PM Peak	Every 10 minutes
	All other periods	Every 15 minutes
	Saturday and Sunday	Every 15 minutes
Commuter Rail	AM Peak	3 trips in the peak direction
	PM Peak	4 trips in peak direction
	All other periods	Every 3 hours in each direction
	Saturday	Every 3 hours in each direction
Boat	AM and PM Peak	3 trips in the peak direction
	Off-peak periods	Every 3 hours

Note: There is no frequency standard during the Sunrise or Night times or for supplemental bus service. AM Peak and PM Peak are defined differently for commuter rail service.

Source: Table 5 in the 2017 Service Delivery Policy.

The MBTA counts passenger trips taken on services that operate at least at the expected frequency as “passing” and trips taken on services that operate at less than the expected frequency as “failing.” This measure is weighted by ridership in each time period, which prioritizes meeting the expected frequency at peak periods and on routes and services with high ridership.

On-Time Performance (FTA C 4702.1B, IV-4.a.(3))

Reliability standards vary by mode and provide tools to evaluate the on-time performance of individual MBTA lines and routes. Reliability standards also vary based on frequency of service; passengers using high-frequency services generally are more interested in regular vehicle arrivals than in strict adherence to published timetables, whereas passengers who use less-frequent services expect arrivals and departures to occur as published. The following provides a summary of the MBTA’s reliability service standards that are detailed in the 2017 Service Delivery Policy (p. 20-25).

Bus

To determine whether a bus is on time at an individual timepoint, such as the beginning of a route, end of a route, or a scheduled point in between, the MBTA uses two different tests based on the scheduled frequency of the service:

- **Scheduled-Departure Service:** A trip is considered to provide scheduled-departure service when it operates with a headway longer than 15 minutes. For scheduled-departure services, passengers generally time their arrivals at bus stops to correspond with the specific published departure times.
- **Frequent Service:** A trip is considered to provide frequent service when it operates with a headway of 15 minutes or less. For frequent service, passengers can arrive at a stop without looking at a schedule and expect a reasonably short wait. Key Bus Routes, whose passengers use the services as if they were frequent services despite occasional longer than 15 minute headways, are always evaluated using the frequent service definition even when their headways exceed 15 minutes.

Routes other than Key Bus Routes might operate entirely with frequent service, entirely with scheduled-departure service, or with a combination of both throughout the day. Because any given route may have both types of service, each trip is considered individually to determine whether it represents scheduled-departure service or frequent service, and each timepoint crossed on that trip is measured accordingly.

On-Time Test for Scheduled-Departure Timepoints

To be considered on time at a timepoint, any trip evaluated using the scheduled-departure standard must meet the applicable condition cited below.

- **Origin timepoint:** The trip must depart its origin timepoint between zero minutes before and three minutes after its scheduled departure time.
- **Mid-route timepoint:** The trip must leave the mid-route timepoint(s) between one minute before and six minutes after its scheduled departure time.
- **Destination timepoint:** The trip must arrive at its destination timepoint no later than five minutes after its scheduled arrival time.

On-Time Test for Timepoints on Frequent Services

To be considered on time at a timepoint, any trip evaluated using the frequent service standard must meet the applicable condition cited below.

- **Origin or mid-route timepoint:** A trip must leave its origin timepoint or mid-route timepoint no later than the scheduled headway plus three minutes after the previous trip departed that timepoint.
- **Destination timepoint:** The actual run time from the origin timepoint to the destination timepoint must be no more than 120 percent of the scheduled run time for the trip to be considered on time at the destination timepoint.

Bus Route Test

Bus reliability for a specific route is calculated as the percentage of the route that passes the on-time tests at timepoints.

Heavy and Light Rail

As with frequent bus services, passengers on light rail and heavy rail do not rely on printed schedules; rather, they expect trains to arrive at consistent headways. Therefore, schedule adherence for light rail and heavy rail is measured as the proportion of a line's passengers who wait the amount of time of the scheduled headway, or less, for a train to arrive. For passengers boarding on the trunk section of the Green Line, the headway is defined as three minutes. Regarding on-time performance, until recently, the MBTA did not have an automated data collection system to measure this as it pertains to the Mattapan light-rail trolley, though resource-intensive manual counts were used on occasion. Since the submission of the 2017 Title VI report, the MBTA has finished installing a vehicle tracking system on the trolley cars for the Mattapan Line. The On-Time Performance is now being calculated and the service monitoring analysis will be conducted for future reports.

Commuter Rail

Commuter rail passengers expect to arrive at their destination station at the time posted in the schedule. Therefore, schedule adherence for commuter rail is measured as the number of trains that arrive at the destination terminal no later than five minutes after the time published in the schedule.

Commuter Boat

Commuter boat passengers expect to arrive at their destination dock at the time posted in the schedule. Therefore, schedule adherence for commuter boat is measured as the number of boats that arrive at the destination terminal no later than five minutes after the time published in the schedule.

Service Availability (FTA C 4702.1B, IV-4.a.(4))

An important aspect of providing the region with adequate access to transit services is the system's geographic coverage. The following provides a summary of the MBTA's coverage standards that are detailed in the 2017 Service Delivery Policy (p. 15-28).

The MBTA recognizes that coverage means different things to different markets. To address these different groups, the MBTA measures coverage in three ways:

- Base coverage
- Frequent service in dense areas coverage
- Low-income household coverage

The MBTA prioritizes high-frequency service in high-density areas and service to areas with high proportions of low-income households, while maintaining an acceptable level of base coverage. While the MBTA monitors the effect of proposed service modifications on all three components of the coverage standard as part of its service planning process, only the base-coverage standard is evaluated for Title VI service monitoring.

To monitor its base level of coverage, the MBTA measures the percentage of the population that lives no more than 0.5 miles from a bus stop, rapid transit station, commuter rail station, or boat dock in the municipalities in the MBTA's service area, excluding municipalities that are members of another regional transit authority.

Span of Service

Span of service refers to the hours during which service is available. The MBTA has established span-of-service standards that define the expected hours that any given service will operate. The following provides a summary of the MBTA's span-of-service standards that are detailed in the 2017 Service Delivery Policy (p. 11-13).

The span-of-service standards, summarized in Table 5-2, vary by mode and by day of the week, reflecting the predominant travel flows in the region. The standards require that the first trip in the morning in the peak direction of travel must arrive in downtown Boston, or the route terminal if the route does not serve downtown Boston, at or before the beginning span-of-service time. At the end of the service day, the last trip in the evening in the peak direction of travel must depart downtown Boston, or the route terminal if the route does not serve downtown Boston, at or after the ending span-of-service time. If Table 5-2 does not specify an expected span of service for a mode or time period, then there is no respective standard and service hours are set based on demand.

Table 5-2
Span of Service

Mode	Day	Expected Span of Service
Bus – Local	Weekday	7:00 AM – 7:00 PM
	Saturday ¹	8:00 AM – 6:30 PM
	Sunday ¹	10:00 AM – 6:30 PM
Bus – Community	Weekday	10:00 AM – 4:00 PM
	Weekday	7:00 AM – 9:00 AM
	Weekday	4:00 PM – 6:30 PM
Bus – Supplemental	Weekday	No minimum span
Bus – Key Bus Routes	Weekday	6:00 AM – midnight
	Saturday	6:00 AM – midnight
	Sunday	7:00 AM – midnight
Heavy Rail	Weekday	6:00 AM – midnight
	Saturday	6:00 AM – midnight
	Sunday	7:00 AM – midnight
Light Rail	Weekday	6:00 AM – midnight
	Saturday	6:00 AM – midnight
	Sunday	7:00 AM – midnight
Commuter Rail	Weekday	7:00 AM – 10:00 PM
	Saturday	8:00 AM – 6:30 PM
Boat	Weekday	7:00 AM – 6:30 PM
	Saturday ²	8:00 AM – 6:30 PM

¹ This is a standard for high-density areas. There is no span-of-service standard for low-density areas on weekends.

² Memorial Day–Columbus Day

Note: The RIDE generally operates from 5:00 AM to 1:00 AM. The MBTA provides extended hours for trips starting and ending within 0.75 miles of a fixed-route service that operates outside of these hours.

Source: MBTA.

The MBTA counts passenger trips taken on services that operate at least during the expected span as “passing” and trips taken on services that operate less than the expected span as “failing.” This measure is weighted by ridership to prioritize the objective of meeting the expected span of service on routes and services with high ridership.

Platform Accessibility

If elevators are not available to people who need to use them, they may not be able to gain access to MBTA services. The following provides a summary of the MBTA’s platform accessibility standard that is detailed in the 2017 Service Delivery Policy (p. 18-19).

The MBTA’s goal is for people to be able to access the platforms in each station at all times service is offered. To this end, the MBTA measures the amount of time that platforms are accessible during service hours, i.e., the percentage of total platform-hours that are accessible. The percentage of total platform-hours that are accessible is measured separately for rapid transit stations, commuter rail stations, and commuter boat docks. Rapid transit stations include gated Silver Line Waterfront stations, but exclude surface-level stops on the Green Line and Silver Line.

Vehicle Accessibility

The following provides a summary of the MBTA’s vehicle accessibility standard that is detailed in the 2017 Service Delivery Policy (p.19):

The MBTA should provide at least one ADA-compliant vehicle on each trip it operates. To this end, the MBTA measures the percentage of trips that are provided with at least one ADA-compliant vehicle.

A trip on the commuter rail is considered compliant if at least one ADA-compliant coach in the trainset can align at each high-level platform at stations served by the trip to load and unload passengers. ADA-compliant commuter rail coaches must include ADA-compliant restrooms. Trips on the Green Line are considered noncompliant if none of the vehicles in a train set is ADA-compliant. Bus trips are not measured since ramps can be deployed manually. Heavy rail and commuter boat trips are covered in the platform accessibility standard.

Service Operated

The following provides a summary of the MBTA's service operated standard that is detailed in the 2017 Service Delivery Policy (p. 24-25):

The MBTA intends to operate all of the service it schedules. A multitude of factors—including equipment failure, lack of personnel, and unforeseen delays, such as medical and police emergencies—can sometimes prevent the MBTA from operating scheduled service. To this end, the MBTA measures the percentage of scheduled service that is actually provided for each bus route, light rail line, heavy rail line, commuter rail line, and commuter boat route. Planned heavy, light, and commuter rail outages where the MBTA offers substitute service do not count against this standard.

SYSTEMWIDE SERVICE POLICIES (FTA C 4702.1B, IV-4.B)

FTA guidance requires that the MBTA adopt systemwide service policies for the distribution of transit amenities and vehicle assignment for each mode to ensure service design and operations practices do not result in discrimination on the basis of race, color, or national origin. Service policies differ from service standards in that they are not necessarily based on a quantitative threshold.

Distribution of Transit Amenities (FTA C 4702.1B, IV-4.b.(1))

The FTA circular defines transit amenities as items of comfort, convenience, and safety that are available to the general riding public. FTA guidance requires the MBTA to set policy to ensure equitable distribution of transit amenities across the system. The following policies address how amenities are distributed within the MBTA's transit system.

Bus Stop Amenities

The following provides a summary of the MBTA's policy on bus stop amenities detailed in Chapter 6 of the MBTA's Bus Stop Design Guidelines (p. 37-45):

The bus stop represents one of the MBTA's best marketing opportunities. A well designed and equipped bus stop improves operations, ridership, and transit's value to the community. Certain customer amenities can also play a significant role in attracting and

retaining customers. Customer amenities are intended to improve customer comfort, as well as provide a sense of safety and security. These attributes can affect an individual's decision on whether or not to use transit.

The following types of amenities can be provided at bus stops, depending on level of usage and/or type of service:

- **Customer shelters** provide comfort and protection from the elements.
- **Benches** provide a level of comfort for customers.
- **Trash and recycling receptacles** help to keep the bus stop area free of litter.
- **Signs, schedules, and maps** provide customer information.
- **Next bus arrival information** provides expected wait time for the next arriving bus.
- **Bicycle parking facilities** help to facilitate multimodal connections.

The decision to install amenities at a particular stop takes into account a number of factors, including the following:

- **Customer Utilization:** The level and type of customer usage plays a primary role in determining where amenities are warranted. Bus stop consolidation often results in customers having to walk further distances to access transit. In these cases, provision of certain amenities is desirable to offset the inconvenience.
- **Customer Transfer Activity:** High transfer activity generally means that customers may have to wait longer periods of time to make transit connections. Depending on the characteristics of the connection, additional amenities should be considered.
- **Transit Corridor Marketing Efforts:** Bus rapid transit (BRT) and Key Bus Route improvements both benefit from enhanced marketing and branding, which is often provided through the provision of amenities.
- **Title VI, Environmental Justice, and Community Equity:** Amenities need to be evenly and fairly distributed among bus stops in both minority and low-income communities to meet the requirements of Title VI of the 1964 Civil Rights Act, as defined in FTA C 4702.1B. Title VI and environmental justice principles mandate that MBTA services—including shelters and amenities—are distributed in such a manner that minority and low-income communities receive benefits in the same proportion as the total service area.

- **Proximity to Existing Sheltered Areas:** New amenities may not be needed if customers are able to take advantage of existing facilities located at the bus stop. For example, an existing storefront canopy or awning could provide shelter for waiting customers and preclude the need for a new freestanding shelter.
- **Customer and Community Requests:** Communities and individuals often make requests for amenities at specific stops. Often these requests reflect specific needs related to the proximity to elderly housing or medical facilities.
- **Installation and Maintenance Costs:** The benefits offered by each type of amenity must be weighed against the cost of installation and maintenance. Although the MBTA may carry the cost of purchasing and installing amenities, often a municipality or a third party will be asked to take on the responsibility for maintenance. Adopt-a-Stop programs can often be established to cover installation and/or maintenance costs.
- **Bus Stop Environment/Adjacent Land Use:** The characteristics of the surrounding neighborhood may influence the type or design of bus stop amenities. For example, neighborhoods may require street furniture that is consistent with the overall design of the streetscape. Design should consider the needs of the local environment and incorporate community input.

Bus Shelter Placement

The following provides a summary of the MBTA's bus shelter policy that is detailed in Chapter 7 of the MBTA's Bus Stop Design Guidelines (p. 46-55):

Given fiscal constraints and right-of-way constraints, the MBTA is not able to provide bus shelters at most of its 8,100 stops. To fairly distribute shelters systemwide, the following MBTA Shelter Policy provides guidance for the placement of bus shelters and establishes a procedure for evaluating shelter requests. This policy in no way establishes a requirement for placement, since all placements will be dependent on available resources. In areas or locations where the MBTA, or its contractors, are the primary suppliers of shelters at bus stops, placements must

1. conform with shelter eligibility standards;
2. pass a site suitability test;
3. meet the requirements of Title VI; and
4. comply fully with accessibility regulations.

Shelter Eligibility Standards

Customer utilization is the primary consideration when determining if a bus stop is eligible for a shelter. All bus stops that meet the required number of boardings are eligible. Table 5-3 lists all criteria to be factored into an assessment of eligibility for each bus stop and the value associated with each criterion. A site must receive a total of 70 points to be considered eligible under this policy. The following criteria are considered:

- **Customer Utilization:** The number of customers boarding at a stop on an average weekday. Any bus stop that has more than 70 boardings is automatically eligible for a shelter. For bus stops with fewer boardings, a combination of the factors listed below are considered in determining eligibility. Stops that have fewer than 25 boardings are not eligible for a shelter.
- **MBTA Initiatives to Strengthen Identity of Route or Bus Stop:** The bus stop is located on a designated Key Bus Route or it serves a potentially highly transit dependent development.
- **Demographics:** The bus stop is in close proximity to medical facilities or senior housing, and/or is used by significant numbers of elderly persons and/or persons with disabilities.
- **Minority and/or Low-Income Areas:** The bus stop is in a Title VI or environmental justice community.
- **Connectivity:** The bus stop serves as a major transfer point to another transit or bus route.
- **Frequency of Service:** Bus stops on routes with less frequent service are more likely to qualify for a shelter, due to the longer time that customers may have to wait for a bus.
- **Site Conditions:** Bus stops that have an unusually high exposure to adverse weather elements.

Table 5-3
Bus Shelter Eligibility

Eligibility Criteria	Points
70 or more average weekday boardings	70
25-69 average weekday boardings	50
MBTA initiative to strengthen route or stop identity	20
Facilities for seniors, disabled, medical or social services nearby	20
Minority and/or low-income area	15
Bus route transfer/connection point	5
Infrequent bus service	10
Poor site conditions at bus stop	10

Source: Table 7.1 in the MBTA Bus Stop Design Guidelines.

For shelters that are procured, installed, and maintained by others, it is not necessary for the shelter to meet these eligibility standards. However, it is strongly recommended for transit equity purposes.

Site Suitability Test

The following physical and practical requirements must be met before a bus stop can be considered for a shelter:

- **Site ownership:** Permission to install a shelter must be granted by the land owner. In most cases, the land owner is the municipality that owns the sidewalk. In some cases, property easements, license agreements, and/or land takings may be required if the sidewalk width is inadequate and the shelter must encroach on adjacent property.
- **Abutter approval:** Depending on the site ownership and proposed setback of the shelter, it may be necessary to notify the abutter and/or obtain their approval.

- **Adequate physical space and clearances:** This typically pertains to sidewalk widths and potential obstacles to an accessible and safe path of travel. There must be sufficient space for the shelter, as well as an accessible path of travel around the shelter and between other street furniture. The busier the sidewalk, the more space is required. In addition, shelters must be sufficiently set back from the curb to avoid being struck by vehicles. Where sidewalks are not sufficiently wide, options may include sidewalk widening or installation of a narrow shelter, curb extension, or bulb out.
- **Proximity to the bus stop:** The shelter should generally be located within the limits of the bus stop zone or no greater than 50 feet from the designated bus boarding area.
- **Community and municipal approval:** For advertising shelters, a license agreement between the municipality and the shelter company is generally required. A permit may also be required from the State Office of Outdoor Advertising (OOA).

Title VI Requirements

Title VI of the 1964 Civil Rights Act is defined in FTA C 4702.1B. Title VI and environmental justice principles mandate that MBTA services—including shelters and amenities—are distributed in such a manner that minority and low-income communities receive benefits in the same proportion as the total service area. The MBTA and CTPS periodically conduct a Title VI analysis to ensure compliance. At times there may be a disparity that needs to be addressed.

Accessibility Requirements

Installation of a bus shelter may trigger specific accessibility requirements, including lengthening of the bus stop, building an accessible bus landing pad, and providing an accessible path of travel between the landing pad, the sidewalk, and the shelter.

Benches at Bus Stops

The following provides a summary of the MBTA's policy on benches at bus stops, as detailed in Chapter 6 of the MBTA's Bus Stop Design Guidelines (p. 40-41).

Benches are the most common bus stop amenity and are generally the simplest and most desirable to provide, given their nominal cost and space requirements. Benches should be provided when any of the following conditions exist:

- The bus stop has at least 50 daily boardings.
- A shelter is warranted but unable to be installed.
- The stop serves a significant number of seniors or persons with disabilities.

Benches may also be warranted in the following situations:

- There is evidence of customers sitting on steps, walls, or other structures located on abutting private property.
- The stop is located on a low frequency bus route.

Provision of Information

Variable Message Signs

The MBTA currently uses four different types of electronic message signs on the bus, rapid transit, and commuter rail systems. These include the following:

- Countdown and public address signs at stations that count down the number of minutes until the next vehicle arrives at or departs from the station. They also display public-service announcements. These signs are present at all subway stations, most commuter rail stations, most bus rapid transit stations, and some above-ground light rail stations.
- Departure boards at stations that list upcoming departures. These boards are present at three major commuter rail stations.
- In-vehicle message and public-address signs that display the next stop. These signs are present on all buses, all Blue and Green Line trains, one-third of Red Line trains, and one-third of commuter rail coaches. The Orange Line, Mattapan Line, and ferries do not currently have in-vehicle message signs. The MBTA is presently procuring two ferries that will have in-vehicle public address signs.
- Digital Advertising screens that also show real-time information and service alerts. These displays are present at 10 subway stations and are being installed at almost all others.

Countdown and Public Address Signs

Subway

The MBTA has installed variable message signs (VMS) at rapid transit stations throughout the system. In accordance with the 2006 agreement between the MBTA and the Boston Center for Independent Living (BCIL), signs are located at each set of fare gates and on inbound and outbound platforms. The exact locations and quantities of signs were determined through field observations of existing conditions and needs at each station.

All Red, Orange, and Blue Line stations are being equipped with electronic message signs that display the number of minutes until the next two trains arrive, as well as a train arrival announcement. The information displayed on these signs is triggered by the train's signal system. This system also shows and audibly plays public service announcements.

Light Rail

As part of the agency's settlement agreement with BCIL, VMS signs were also installed on the Green Line D Branch from Riverside to Kenmore and Green Line Central Subway from Symphony to Lechmere, and the Mattapan Line. These signs display and announce the time until the next two departures at most stations, with the exception of stations where trains originate. Because Green Line trains are more likely to have schedule adjustments to maintain headways than on other lines, it is difficult to predict the actual departure time from their origins. This system also shows and audibly plays public service announcements.

Bus

The same VMS signs that are installed at subway and light rail stations are also present at some bus-rail and bus-bus transfer points: Dudley, Lechmere, Harvard, and Mattapan stations. Underground bus rapid transit (BRT) stations World Trade Center and Courthouse also have these signs. These signs show and announce the next departure for each route serving that stop and play public address messages.

VMS that count down the minutes until the arrival of the next BRT route are placed at 19 of the 23 stops on the Silver Line Washington Street route. The four stops without bus stop VMS boards are Tufts Medical Center (both directions), Chinatown, and Boylston. These signs display delay information for the Silver Line Washington Street route only. They do not audibly announce information or play public address messages.

Commuter Rail

In 1997, in conjunction with the opening of the Old Colony's Middleborough/Lakeville and Kingston/Plymouth Lines, "PENTA" light-emitting diode (LED) message boards were installed at all stations on those lines. Although these signs used the current technology of that period, they have limited display capability—only one message at a time can be shown, with no more than 99 characters per message. PENTA signs were also installed at the new stations on the Framingham/Worcester Line west of Framingham, and on the Newburyport/Rockport Line at the new stations in Ipswich, Rowley, and Newburyport.

A project to install new passenger information signs at all commuter rail stations (with the exception of Silver Hill, Plimptonville, and Foxborough) was initiated in 2000; at least one sign was added on each inbound platform, and an additional sign was added at stations with mini-high platforms. The PENTA signs were not replaced. The new signs can display multiple messages and have a capacity of as many as 1,600 characters. All signs are installed on the inbound platforms in order to serve the greatest number of customers, as they travel inbound during the morning peak period.

The MBTA has implemented a Passenger Train Information System (PTIS), also known as the "Next Train" system, at all commuter rail stations except those that offer staffed information booths (South Station, North Station, and Back Bay Station). The PTIS uses state-of-the-art global-positioning-system (GPS) technology on trains moving along the line to generate automated messages regarding the arrival of the next train on LED signs located on the station platforms. If service is disrupted, the location information is supplemented by a "console operator," who monitors the movement of the trains to send ad hoc messages manually to the signs as required. The system also generates automatic station announcements on board the train.

Departure Screens

Bus

At major bus stations, the MBTA has installed bus departure boards that notify riders when the next bus on each route is expected to depart. These boards are present at Ashmont, Central Square, Dudley, Forest Hills, Harvard, Haymarket, Maverick, Ruggles, Sullivan, and Wonderland stations. The boards utilize real-time bus tracking data and feature both visual and audio messages. They also display service alerts and elevator and escalator outages. A push-button activated sound system allows individuals with visual impairments to access the information on the board.

Commuter Rail

North Station, South Station, and Back Bay Station on the commuter rail have departure screens that display and audibly announce upcoming scheduled departures, the status (on time, number of minutes late, or canceled), and the track on which the train will arrive/depart. These signs display the scheduled departure time until manually changed by a dispatcher.

In-Vehicle Signs

Subway and Light Rail

Public Address (PA) systems on the Blue Line, Green Line, and about half of the Red Line vehicles have VMS displays. They show and announce the current stop, next stop, and indicate on which side of the train the doors will open. They can also display other pre-programmed PA messages. These systems use radio frequency identification (RFID) tags on the tracks to trigger the announcements on the train. There are currently no VMS on Orange Line or Mattapan Line vehicles. New vehicles are being purchased to replace the entire Red and Orange Line vehicle fleets. The new vehicles will be equipped with the same audio-visual announcement system as the vehicles on the Blue, Green, and Red Lines. The Mattapan Line runs historic streetcars and currently there are no plans to replace or retrofit these vehicles.

Bus

All MBTA buses are equipped with a PA system that includes speakers, an overhead LED display in the bus, and front, right side, and rear signs on the outside of the vehicles, which are all part of the TransitMaster Computer-aided Dispatch/Automatic Vehicle Location (CAD/AVL) system. The system announces the next stop and displays it on the interior LED sign. The exterior signs display the route and destination, which are also announced when the bus's doors open. The interior signs and speakers also make general announcements that are programmed centrally by operations staff.

Commuter Rail

All commuter rail coaches are equipped with automated stop announcements that are driven by PTIS, the same system that drives the station LED signs. The system makes audio announcements when the train is approaching each stop. Approximately 30 percent of the coaches have interior LED signs that also display this information to passengers. All new coach purchases are planned to include these interior LED signs. The system can also make general PA announcements.

Ferry

Neither of the MBTA's two ferry boats is equipped with VMS signs, nor are the ferry terminals. The MBTA is purchasing two new ferry boats that will supplement the existing fleet. These vehicles will be equipped with an automated announcement system that includes LED signs on the exterior of the boat and LCD monitors on the interior of the boat that will display the destination of the boat, the next stop, and any other public address messages. These messages will also audibly be announced over the boat's speakers.

Digital Advertising Screens

The MBTA is in the process of installing 700 digital advertising screens at most of its rapid transit stations. These primarily display advertising content, but can also display public service announcements from the MBTA in the normal advertising rotation. In the event of an emergency or severe service disruption, the screens can also be "taken over" by the MBTA to display solely a service alert message. The MBTA is working to add real-time information to these screens in the normal advertising rotation, displaying to customers upcoming train arrivals and any pertinent service alerts, which would complement existing information already provided by the countdown and PA signs. These signs cannot currently make audio announcements, but the MBTA's advertising partner is actively working to be able to announce critical service information in addition to displaying it.

Neighborhood Maps in Rapid Transit Stations

The Neighborhood Map Program involves the placement of two types of maps at rapid transit stations that have bus connections: 1) neighborhood maps, showing major landmarks, bus routes, the street network, the one-half-mile walking radius around the station, green space, pathways, and accessible station entrances; and 2) more detailed maps that show all bus routes that serve a particular station, along with service frequency information.

The objectives that the program hopes to accomplish at each station include 1) providing route and schedule information for bus routes serving that station, 2) placing the transit station in the context of the surrounding neighborhood, and 3) highlighting the areas around the station that are within easy walking distance.

Where space allows, one or both maps are placed at stations with bus connections. The maps are also generally installed at new or renovated stations, regardless of whether or not a station has bus service. Due to space constraints, maps are not located at many surface Green Line stops.

Escalators

Escalators provide vital access to the system, particularly for persons with disabilities. In 2006, the MBTA formalized a partnership with the BCIL through a consent agreement that sets operational protocols and standards as well as a proactive agenda for making the transit system more accessible. The MBTA uses the operability standard defined in Title 49 of the Code of Federal Regulations, § 37.161, *Maintenance of accessible feature: General*:

- a) *“Public and private entities providing transportation services shall maintain in operative condition those features of facilities and vehicles that are required to make the vehicles and facilities readily accessible to and usable by individuals with disabilities. These features include, but are not limited to, lifts and other means of access to vehicles, securement devices, elevators, signage and systems to facilitate communications with persons with impaired vision or hearing.*
- b) *Accessibility features shall be repaired promptly if they are damaged or out of order. When an accessibility feature is out of order, the entity shall take reasonable steps to accommodate individuals with disabilities who would otherwise use the feature.*
- c) *This section does not prohibit isolated or temporary interruptions in service or access due to maintenance or repairs.”*

The MBTA contracts for the complete maintenance, service testing, and inspection of all transit system and facility escalators. The MBTA's contract imposes penalties if the contractor fails to comply with the ADA requirements. The MBTA has implemented a proactive maintenance program to keep equipment safe and operational. Maintenance specifications are defined to cover all equipment components. The MBTA's Maintenance Control Center (MCC) tracks all escalator service requests, which are transmitted to the MCC via MBTA personnel and field inspectors. The MCC transmits the service-request information to the escalator maintenance contractor via a computer terminal, and the contractor then dispatches maintenance personnel to perform repairs. The causes of equipment failures vary, as well as the length of time required to repair them.

Vehicle Assignment (FTA C 4702.1B, IV-4.b.(2))

Vehicle assignment refers to the process by which vehicles are placed in garages and assigned to routes throughout the system. The policies used for vehicle assignment vary by mode and are governed by various operational characteristics and constraints.

Bus Vehicle Assignment

The MBTA's bus fleet consists of 28 electric trackless trolleys; 360 compressed-natural-gas (CNG) vehicles; 502 emission-control-diesel (ECD) vehicles; 37 older diesel buses; 32 dual-mode vehicles; and 25 hybrid vehicles. The MBTA has acquired more than 500 clean-fuel vehicles to provide service on the Silver Line Washington Street BRT route and to replace the oldest diesel vehicles in the fleet. In accordance with the September 1, 2000, Administrative Consent Order, Number ACO-BO-00-7001, issued by the Commonwealth of Massachusetts, the Department of Environmental Protection (DEP), under the Executive Office of Environmental Affairs (now the Executive Office of Energy and Environmental Affairs), the MBTA "insofar as possible, operates the lowest emission buses in the fleet in transit dependent, urban areas with highest usage and ridership as the buses enter the MBTA bus fleet." Table 5-4 provides additional information on the vehicles in the bus fleet.

Table 5-4
Bus Fleet Roster

Propulsion	Active Vehicles	Year Built	Accessible	Over-haul	Length	Width	Seats
Straight Electric	28	2003-04	Ramp	None	40'	102"	31
Diesel Series 60 500 HP (dual-mode)	24	2004-05	Ramp	None	60'	102"	47
	8	2005	Ramp	None	60'	102"	38
CNG Cummins C8.3	175	2004	Ramp	2010-13	40'	102"	39
	124	2003	Ramp	2009-11	40'	102"	39
CNG Series 60 400HP	44	2003	Ramp	None	60'	102"	57
CNG Series 50G	15	2001	Ramp	None	40'	102"	39
	2	1999	Ramp	None	40'	102"	39
Diesel Caterpillar C9	192	2004-05	Ramp	In progress	40'	102"	38
Diesel Series 50	37	1994-95	Lift	2004-05	40'	102"	40
Diesel Cummins ISL	155	2006-07	Ramp	None	40'	102"	39
	155	2008	Ramp	None	40'	102"	39
Hybrid	25	2010	Ramp	None	60'	102"	57

Note: Between late 2016 and fall 2017, 325 new 40-foot buses and 44 new articulated buses will replace the CNG buses acquired between 1999 and 2004.

The MBTA's policy is to maintain an average age of eight years or less for the bus fleet. In general, each bus is assigned to one of nine MBTA bus storage and maintenance facilities and operates only on routes emanating from the garage to which it is assigned. Individual vehicles within each garage are not assigned to specific routes, but circulate among routes based on a number of operating constraints and equipment criteria. The following summarizes the guidelines used by inspectors when assigning vehicles in the current bus fleet to routes:

- **28 Trackless Trolleys:** The trackless trolley fleet currently consists of 28 vehicles. These vehicles are limited to use on three routes—in Belmont, Cambridge, and Watertown—where overhead catenary lines provide electric power.
- **360 Compressed-Natural-Gas (CNG) Buses:** The CNG bus fleet is composed of 316 40-foot nonarticulated vehicles and 44 60-foot articulated vehicles. Service is currently provided on Route 39 and Silver Line Washington Street by the 60-foot vehicles, all of which are housed at the Southamptton facility; 17 of the 60-foot vehicles are dedicated to the Silver Line. All of the 40-foot buses are housed at the Arborway and Cabot garages; they provide service on many routes in the urban core. With the exception of the vehicles at Southamptton, which currently serve only three routes, inspectors assign these buses daily, on a random basis, within each garage. This fleet is being replaced between fall 2016 and fall 2017 with 175 new 40-foot CNG buses, 150 new 40-foot hybrid buses, and 44 new articulated-hybrid buses.
- **539 Diesel Buses:** The diesel buses are assigned to the suburban garages, as well as to the Albany Street and Charlestown garages. Of the 502 ECDs in the fleet, 310 are New Flyer vehicles and 192 are Neoplan vehicles. These ECDs are garaged at the following facilities: Charlestown (134), Lynn (90), Quincy (86), Fellsway (76), and Albany (116). The 37 1994/1995 vintage Nova vehicles remain at the Charlestown garage.
- **32 Diesel-Electric (Dual-Mode) Buses:** All of the 60-foot, articulated dual-mode vehicles are designed for operation on the Waterfront portion of the new Silver Line BRT service between South Station, various locations in South Boston, and Logan Airport.
- **25 Hybrid Buses:** The 2010 vintage 60-foot, articulated hybrid vehicles operate on the following routes: 28, which operates between Mattapan Station and Ruggles Station via Dudley Station; 39, between Forest Hills Station and Back Bay Station; Silver Line 4 (SL4), between Dudley Station and South Station; and Silver Line 5 (SL5), between Dudley Station and Downtown Crossing. There are 150 40-foot and 44 60-foot hybrid vehicles on order to replace a portion of the CNG fleet between fall 2016 and fall 2017.

Light Rail Vehicle Assignment

The MBTA operates light rail vehicles on the Ashmont-Mattapan extension of the Red Line—the Mattapan High-Speed Line—and on all four branches of the Green Line: B–Boston College, C–Cleveland Circle, D–Riverside, and E–Heath Street. Type 7 and Type 8 Green Line vehicles can be operated on any Green Line branch.

There are 24 new Type 9 Green Line vehicles on order for delivery between 2017 and 2019. These will accommodate expanded Green Line service associated with the Commonwealth’s commitment to extend the Green Line to Somerville and Medford.

The Mattapan High-Speed Line has weight, curve, and power limitations that prevent the use of current Green Line light rail vehicles. Instead, President’s Conference Committee (PCC) cars are used for that line. All of the PCC cars have undergone extensive rehabilitation, including the replacement of major structural components. These cars were equipped in 2008, for the first time, with air conditioners. Table 5-5 lists the vehicles in the light rail fleet.

Table 5-5
Light Rail Fleet Roster

Type/Class of Vehicle	Fleet Size	Year Built	Builder	Length	Width	Seats
Green Line - Type 7 (1)	91	1986-88	Kinki-Sharyo (Japan)	74’	104”	46
Green Line - Type 7 (2)	20	1997	Kinki-Sharyo (Japan)	74’	104”	46
Green Line - Type 8	94	1998-2007	Breda (Italy)	74’	104”	44
Mattapan Line - “Wartime” PCC	10	1945-46	Pullman Standard (USA)	46’	100”	40

Heavy Rail Vehicle Assignment

Heavy rail vehicles are operated on the three subway lines: the Red, Orange, and Blue Lines. The specific operating environment of each line prevents one line's cars from operating on another line; therefore, each line has its own dedicated fleet.

Because there are no branches on the Orange Line or the Blue Line, and there is only one type of Orange Line car and one type of Blue Line car, no distribution guidelines are necessary for either of these lines. The Blue Line introduced a new replacement fleet in 2009.

The Red Line has two branches (Ashmont and Braintree) and operates using three types of cars (Types 1, 2, and 3). There are no set distribution policies for the assignment of cars to the two Red Line branches. All three car types are put into service on both branches as available. Presently, the MBTA does not have a policy regarding the assignment of Red Line cars because the only difference between them is the number of doors (3 or 4). In the fall of 2018, the MBTA ran equal numbers of 3- and 4-door cars on the Ashmont Branch, while the Braintree branch was 60 percent 3-door cars and 40 percent 4-door cars.

A new fleet of vehicles for the Red and Orange Lines is under construction, with deliveries anticipated to take place between 2018 and 2023. All of the present fleet will be replaced.

Table 5-6 lists the vehicles that are currently in the heavy rail fleet.

Table 5-6
Heavy Rail Fleet Roster

Type/Class of Vehicle	Fleet Size	Year Built	Builder	Length	Width	Seats
Blue Line - No. 5	94	2007-08	Siemens	48' 10"	111"	42
Orange Line - No. 12	120	1979-81	Hawker-Siddeley (Canada)	65' 4"	111"	58
Red Line - No. 1	74	1969-70	Pullman Standard (USA)	69' 9 ^{3/4} "	120"	63
Red line - No. 2	58	1987-89	UTDC (Canada)	69' 9 ^{3/4} "	120"	62
Red Line - No. 3	86	1993-94	Bombardier (USA)	69' 9 ^{3/4} "	120"	52

Commuter Rail Vehicle Assignment

Vehicle assignments are developed based on specific standards of commuter rail service. These standards include providing a minimum number of seats for each scheduled trip, providing one functioning toilet in each trainset, maintaining the correct train length to accommodate infrastructure constraints, and providing modified vehicles, when necessary, for a specific operating environment. The MBTA strives to assign its vehicles as equitably as possible within the equipment and operational constraints of the system.

The MBTA's Railroad Operations runs a 377-route-mile regional rail system in the Boston metropolitan area composed of 14 lines that serve 125 stations. The existing system consists of two separate rail networks: a five-route northern system, which operates north and east from North Station to terminals at Rockport, Newburyport, Haverhill, Lowell, and Wachusett; and a nine-route southern system, which operates south and west from South Station to terminals at Worcester, Needham, Franklin, Wickford Junction, Stoughton, Readville, Greenbush, Middleborough, Kingston, and Plymouth. Trains operate in a push-pull mode, with the locomotive leading (pull mode) when departing Boston and the control car leading (push mode) when arriving in Boston.

The commuter rail coach fleet is composed of five types of coaches and three types of locomotives, which are assigned to the 14 commuter rail routes. Both coaches and locomotives have a service life of 25 years. Table 5-7 lists the vehicles in the current and near-future fleet.

Table 5-7 lists the vehicles that are currently in the commuter rail fleet.

Table 5-7
Commuter Rail Fleet Roster

Manufacturer	Fleet Size	Date	Classification	Rebuilt	Seats
Pullman	57	1978-79	BTC-1C	1995-96	114
MBB	32	1987-88	BTC-3	-	94
MBB	32	1987-88	CTC-3	-	96
Bombardier A	40	1987	BTC-1A	-	127
Bombardier B	53	1989-90	BTC-1B	-	122
Bombardier C	52	1989-90	CTC-1B	-	122
Kawasaki	50	1990-91	BTC-4	-	185
Kawasaki	24	1990-91	CTC-4	-	175
Kawasaki	17	1997	BTC-4	-	182
Kawasaki	15	2001-02	BTC-4	-	182
Kawasaki	33	2005-07	BTC-4C	-	180
Rotem	28	2013-14	CTC-5	-	173
Rotem	47	2013-14	BTC-4D	-	175

BTC = Blind Trailer Coach; CTC = Controller Trailer Coach

Train consists are assembled as required based on minimum seating capacity to meet the morning and evening peak-period requirements. Presently, the MBTA commuter rail contract operator is contractually required to have 133 coaches in 24 North Side trains and 234 coaches in 39 South Side trains. Most train consists generally are not dedicated to a specific line, but are cycled throughout the system (either North or South). Every train consist must have a control coach. The following vehicle characteristics must also be considered when assigning vehicles:

- **Kawasaki Coaches (bi-level):** There is no specific policy restricting the use of bi-level Kawasaki coaches in the commuter rail system. Currently

they are used primarily in the South Side commuter rail system, since it carries approximately 65 percent of the total boardings of the system. The bi-level coaches offer substantially more seating than the single-level coaches. This allows Railroad Operations to maintain seating capacity while minimizing the impacts of platform and layover facility constraints. The MBTA intends to purchase only bi-level coaches in future procurements in order to accommodate increasing ridership demands and to allow for greater flexibility when scheduling vehicle assignments.

- **Rotem Coaches (bi-level):** The delivery and operation of bi-level Rotem coaches began in 2013 and was completed in 2014. There are 75 cars of which 47 are equipped with toilet facilities.
- **Messerschmitt-Bolkow-Blohm (MBB) Coaches:** The MBB fleet is slated to be reduced as the Rotem fleet enters service. Portions of the MBB fleet are in storage.
- **Old Colony Line Coaches:** The coaches used for service on the Old Colony lines (Middleborough/Lakeville, Kingston/Plymouth, and Greenbush) are equipped with power doors, as all of the stations on these lines have high-level platforms. This enables a crew member to control the operation of the doors in the consist from any coach via the door control panel. Portions of the Kawasaki, Pullman, and MBB coach fleets have had the power doors activated to meet this requirement. All new Rotem coaches are equipped with power doors.
- **Advanced Civil Speed Enforcement System (ACSES):** All control coaches and locomotives operating on the Providence Line must be equipped with a functioning ACSES system. The Federal Railroad Administration (FRA) mandates the use of ACSES on Amtrak high-speed rail service, which shares the Providence Line corridor with the MBTA. All locomotives have ACSES installed and functioning. The Bombardier control coaches do not yet have ACSES installed; therefore, these coaches are limited to North Side service. There are more locomotives and control coaches equipped with ACSES than are required to meet the daily Providence scheduled trips. This provides for greater flexibility in vehicle assignments.

All coaches in the commuter rail fleet are equipped with similar amenities, the exception being the coaches equipped with toilets; therefore, the primary variation among coaches is age. For the purpose of periodic monitoring, an assessment of compliance for vehicle assignment is completed each year based on the average age of a trainset for a specified time period.





Chapter 6: Service Monitoring

The Federal Transit Administration (FTA) requires large transit agencies to monitor the performance of their system relative to their systemwide service standards and policies. It also requires transit agencies to develop a policy for determining whether disparate impacts exist based on race, color, or national origin and to apply that policy to the results of the monitoring activities. Although the FTA requires monitoring not less than every three years, the MBTA monitors its system every year in order to ensure that potential problems are found and rectified in a timely fashion.

The framework for the MBTA's Title VI service monitoring schedule is provided in Table 6-1. The MBTA monitors 19 service standards and policies for three modes (bus, heavy and light rail, and commuter rail) and three schedules (weekday, Saturday, and Sunday) for a total of 128 separate indicators.

As discussed in Chapter 5, the MBTA adopted a new Service Delivery Policy in January 2017. The new Service Delivery Policy takes advantage of the capabilities offered by newer technologies to collect and analyze data and to take the first steps towards creating standards from a passenger perspective.

Table 6-1
MBTA Title VI Service Monitoring Schedule

Service Indicator	Department(s) Responsible for Providing Data	Planned Frequency of Compliance Assessment
Vehicle load	Office of Performance Management and Innovation	Annually
Vehicle headway	Central Transportation Planning Staff	Annually
On-time performance	Office of Performance Management and Innovation	Annually
Service availability	Central Transportation Planning Staff	Annually
Span of service	Central Transportation Planning Staff	Annually
Platform accessibility	Engineering and Maintenance, Office of Performance Management and Innovation	Annually
Vehicle accessibility	Office of Performance Management and Innovation	Annually
Service operated	Service Planning	Annually
Bus shelter and bench placement	Capital Delivery	Biennially - odd years
Bus shelter amenities and conditions	Central Transportation Planning Staff	Biennially - odd years
Rapid transit station amenities and conditions	Central Transportation Planning Staff	Biennially - even years
Commuter rail station amenities and conditions	Central Transportation Planning Staff	Biennially - even years
Faregate and fare-vending machine operability	Automated Fare Collection	Annually

(Table 6-1 Cont.)

Service Indicator	Department(s) Responsible for Providing Data	Planned Frequency of Compliance Assessment
Location of CharlieCard retail sales terminals	Automated Fare Collection	Annually
Neighborhood maps and bus transfer maps	Capital Delivery	Biennially - even years
Variable-message sign operability	Central Transportation Planning Staff	Biennially - even years
Variable-message sign distribution	Real-time Applications	Biennially - even years
Escalator operability	Engineering and Maintenance	Annually
Vehicle assignment	Bus, Subway, and Railroad Operations	Annually

MINORITY CLASSIFICATION

In order to compare the level of service provided to areas with predominantly minority riders with the level of service provided to areas with predominantly nonminority riders, the MBTA utilized two data sources to classify its services:

- **Ridership data:** from the recent MBTA 2015–16 Systemwide Passenger Survey, used to classify MBTA bus routes, rapid transit lines and stations, commuter rail lines and stations, and commuter boat lines and stations.
- **Population data:** from the 2010 US Census, used to classify MBTA bus stops.

Classifications Based on Ridership Data

Minority classifications for all MBTA bus routes, rapid transit lines and stations, commuter rail lines and stations, and commuter boat lines and stations were developed from responses to the 2015–17 MBTA systemwide passenger survey.

The 2015–17 MBTA passenger survey was designed to obtain the highest levels of statistical reliability that were feasible given the constraints on the amount of resources available to the MBTA. After examining the costs for various degrees of survey distribution, the MBTA in consultation with the Central Transportation Planning Staff (CTPS) set goals of obtaining enough valid survey responses to provide a confidence level of 90 percent with a confidence interval of 10 percent (90/10 standards). This typically called for approximately 65 responses per route or station. CTPS determined that the cost to obtain the 90/10 standards for bus stops was prohibitive for most stops.

MBTA passengers were given the option of completing a paper survey or filling out an equivalent online form. The MBTA and CTPS engaged in extensive efforts to publicize the availability of the online form, which preceded distribution of the paper survey from late October through December 2015. The online form continued to be available throughout the entire paper survey distribution period from January 2016 to May 2017. Online surveys accounted for almost half (49 percent) of the usable surveys that were collected.

The survey called for respondents to report each link in their most recent MBTA trip. The information on each route or station used during the trip was included in the summarized results for that mode. For example, a trip on which a passenger started on a bus, transferred from the bus to a rapid transit vehicle, and then transferred from the rapid transit vehicle to a commuter rail train was counted in the results for the bus route, the rapid transit boarding and alighting stations, and the commuter rail boarding and alighting stations.

Minority classification of each MBTA service was based on the percentage of respondents using that service who reported as a minority relative to the systemwide average for all services. To account for differences in survey response rates among routes and stations, it was necessary to apply weight factors to the records.

For the MBTA bus system, control totals were derived from counts taken from on-board automatic passenger counters (APCs) during the fall of 2016, with the exception of the trackless trolley routes, which do not have APC-equipped vehicles. Control totals for trackless trolley routes were based on CTPS manual counts conducted in winter 2016.

For gated rapid transit stations, control totals were based on the average of three weekdays in April 2017 from records produced by the MBTA's automated fare collection (AFC) system. For surface Green Line branches, control totals were also based on AFC records, but noninteraction factors were applied to account for passengers who display monthly or weekly passes but do not register them at the farebox when boarding. Control totals for exit alightings were based on a CTPS model that infers exit locations for each trip from the sequential use of individual farecards in the AFC records. Transfer control totals were calculated from trips having entries and inferred exits on different lines. If more than one reasonable location existed for a specific line-to-line transfer combination, a location was inferred based on past manual counts.

For the MBTA commuter rail system, control totals by line were provided by Keolis Commuter Services, the contract operator of the system. Keolis conducted counts at the Boston terminal stations and Fare Zone 1A stations with rapid transit connections in 2016, and estimated total additional ridership that did not transfer to or from these stations using factors from manual station counts conducted by CTPS in 2012. To determine control totals for individual commuter rail stations, the manual station counts conducted by CTPS in 2012 were factored by the changes in corresponding line ridership from 2012 to 2016. The control totals used for the commuter boat system were based on weekday average boarding counts by line in 2015 provided by Boston Harbor Cruises, the contract operator of the system.

After combining the survey responses with their associated weight factors it was determined that the MBTA systemwide minority percentage was 36.7 percent. Therefore, any MBTA bus route, rapid transit line or station, commuter rail line or station, or commuter boat line or station found to have a minority percentage greater than 36.7 percent was classified as minority; otherwise it was classified as nonminority. The classifications of all MBTA bus routes, rapid transit lines and stations, Commuter Rail lines and stations, and commuter boat lines and stations are provided in Appendix 6-A.

Classifications Based on Population Data

Minority classifications for all MBTA bus stops were determined based on the classification of the census tract in which the stop was located. The classification of each census tract was determined based on a threshold developed using the population of the MBTA core service area, which is comprised of the 65 municipalities that have access to MBTA bus and rapid transit services. Based on data from the 2010 US Census, 31.3 percent of the population in the core service

area was a member of a minority group. A minority census tract was defined as one in which the minority percentage of the population exceeded 31.3 percent. Therefore, a bus stop located in a census tract that had a minority percentage of the population greater than 31.3 percent was classified as minority; otherwise it was classified as nonminority.

DISPARATE IMPACT THRESHOLD FOR SERVICE MONITORING

The MBTA has used a 20-percent threshold for identifying potential disparate impacts for service monitoring since the FTA established the most recent version of its Title VI Circular in 2012. The MBTA chose to adopt a 20-percent threshold based on FTA recommendations provided in the early drafts of the 2012 Title VI Circular and an assessment of the characteristics of its service area and riders. Although the MBTA did not include a statement about its threshold for service monitoring in its revised 2016 Disparate Impact and Disproportionate Burden Policy, the MBTA confirmed internally that a 20-percent threshold would continue to be used. This threshold is consistent with the MBTA's threshold for major service changes.

SERVICE MONITORING RESULTS (FTA C 4702.1B, IV-6)

This section presents a summary of the results of the MBTA's monitoring program for its service standards and policies. The FMCB approved these results on September 25, 2017 as part of its overall approval of the MBTA's Title VI program (see Appendix 1-B). No service monitoring analyses were performed for commuter boat services because all commuter boat services are classified as nonminority.

Every performance metric in the MBTA Service Delivery Policy is monitored and reported at the same route level in the service indicators that follow. Because some of the MBTA's performance metrics include one standard and others include more than one standard based on variables such as time of day and type of service, some indicators assess performance according to a single standard, while others assess an aggregation of performance according to the various standards for the performance metric.

For example, because the MBTA assesses Bus On-Time Performance on Weekdays according to two different standards,¹ one for Frequent Service routes and one for Scheduled-Departure routes, the MBTA combined performance on each of these standards into a systemwide average of the percentage of weekday bus timepoints that were on time (in FY16 that average was 67.5 percent). In order to identify a potential disparate impact, the MBTA compared the percentage of minority bus routes that met or exceeded the systemwide average to the percentage of nonminority bus routes that met or exceeded the systemwide average. Some of the goals set in the Service Delivery Policy are aspirational, and so the MBTA used systemwide averages of current performance as the threshold for those analyses.

Service Standards

Table 6-2 presents a summary of the results of the MBTA's service standards monitoring program. The MBTA analyzed 44 indicators of service standards, of which 40 showed no disparate impact and four showed potential disparate impact. The MBTA has either already addressed or has a plan to address the four indicators that showed potential disparate impact. The text and tables that follow Table 6-2 present results and analysis for the four service standards indicators that showed a potential disparate impact. Appendix 6-B presents detailed results and analysis for all service monitoring indicators.

¹ There are two sets of standards for bus on-time performance: one for Frequent Service routes (those with headways of 15 minutes or less) and one for Scheduled-Departure routes (those with headways greater than 15 minutes). The standards for Frequent Service bus routes are:

- A trip must leave its origin timepoint no later than the scheduled headway plus three minutes
- A trip's actual run time must not exceed 120 percent of its scheduled run time

The standards for Scheduled-Departure routes are:

- A trip cannot leave early and must depart no later than 3 minutes after its scheduled departure time
- A trip must arrive at its midpoints no sooner than 1 minute early and no later than 6 minutes after its scheduled arrival time
- A trip must arrive at its destination no later than 5 minutes after its scheduled arrival time

Table 6-2
Summary of Service Standards Monitoring Results

Indicator/Mode	Result of Disparate Impact Analysis	Page
Vehicle Load		
Bus vehicle load – weekday	No disparate impact	6-B1
Bus vehicle load – Saturday	No disparate impact	6-B2
Bus vehicle load – Sunday	No disparate impact	6-B2
Heavy and light rail vehicle load – weekday	N/A*	6-B2
Heavy and light rail vehicle load – Saturday	N/A*	6-B2
Heavy and light rail vehicle load – Sunday	N/A*	6-B2
Commuter rail vehicle load – weekday	No disparate impact	6-B3
Commuter rail vehicle load – Saturday	No disparate impact	6-B4
Commuter rail vehicle load – Sunday	No disparate impact	6-B4
Vehicle Headway		
Bus vehicle headway – weekday	Potential disparate impact	6-11
Bus vehicle headway – Saturday	No disparate impact	6-B6
Bus vehicle headway – Sunday	No disparate impact	6-B6
Heavy and light rail vehicle headway – weekday	No disparate impact	6-B7
Heavy and light rail vehicle headway – Saturday	No disparate impact	6-B8
Heavy and light rail vehicle headway – Sunday	No disparate impact	6-B8
Commuter rail vehicle headway – weekday	No disparate impact	6-B9
Commuter rail vehicle headway – Saturday	No disparate impact	6-B9

Indicator/Mode	Result of Disparate Impact Analysis	Page
On-Time Performance		
Bus on-time performance – weekday	No disparate impact	6-B10
Bus on-time performance – Saturday	No disparate impact	6-B10
Bus on-time performance – Sunday	No disparate impact	6-B11
Heavy and light rail on-time performance – weekday	No disparate impact	6-B12
Heavy and light rail on-time performance – Saturday	No disparate impact	6-B12
Heavy and light rail on-time performance – Sunday	No disparate impact	6-B13
Commuter rail on-time performance – weekday	No disparate impact	6-B14
Commuter rail on-time performance – Saturday	No disparate impact	6-B14
Commuter rail on-time performance – Sunday	No disparate impact	6-B15
Service Availability		
Service availability – weekday	No disparate impact	6-B15
Service availability – Saturday	No disparate impact	6-B16
Service availability – Sunday	No disparate impact	6-B16
Span of Service		
Bus span of service – weekday	No disparate impact	6-B17
Bus span of service – Saturday	No disparate impact	6-B17
Bus span of service – Sunday	No disparate impact	6-B17
Heavy and light rail span of service – weekday	No disparate impact	6-B18
Heavy and light rail span of service – Saturday	No disparate impact	6-B18
Heavy and light rail span of service – Sunday	No disparate impact	6-B19
Commuter rail span of service – weekday	No disparate impact	6-B19

Indicator/Mode	Result of Disparate Impact Analysis	Page
Commuter rail span of service – Saturday	No disparate impact	6-B20
Platform Accessibility		
Platform accessibility – gated rapid transit stations with elevators	No disparate impact	6-B20
Platform accessibility – all gated rapid transit stations	No disparate impact	6-B21
Platform accessibility – commuter rail stations	No disparate impact	6-B21
Vehicle Accessibility		
Heavy and light rail vehicle accessibility	N/A**	6-B22
Commuter rail vehicle accessibility	N/A*	6-B22
Service Operated		
Bus service operated – weekday	No disparate impact	6-B23
Bus service operated – Saturday	No disparate impact	6-B23
Bus service operated – Sunday	No disparate impact	6-B24
Heavy and light rail service operated – all days	No disparate impact	6-B24
Commuter rail service operated – weekday	Potential disparate impact	6-13
Commuter rail service operated – Saturday	Potential disparate impact	6-14
Commuter rail service operated – Sunday	Potential disparate impact	6-15

N/A* = Not available because the MBTA currently lacks the means to record data for these items.

N/A** = Not applicable because the heavy rail lines and the Mattapan Line use dedicated equipment; all Green Line branches are classified as nonminority.

Bus Vehicle Headway - Weekday

To assess bus vehicle headway adherence between minority-classified routes and nonminority-classified routes, the MBTA compared the performance of each route to the overall performance of the system. On weekdays, the systemwide percentage of passengers on bus services that operated at least the expected frequency stated in the MBTA's bus service frequency standard was 94.2 percent. Table 6-3 shows that 55 of the 93 bus routes (59.1 percent) that are classified minority performed at or above the systemwide average, and 50 of the 67 bus routes (74.6 percent) that are classified nonminority performed at or above the systemwide average. The ratio of the percentage of minority-classified routes performing at or above the systemwide average to the percentage of nonminority-classified routes performing at or above the systemwide average, 0.79, falls slightly below the MBTA's disparate impact threshold of 0.80 and a potential disparate impact is found.

Table 6-3
Bus Vehicle Headway - Weekday

Route Classification	Number of Routes	Number of Routes Performing at or Above Systemwide Average	Percentage of Routes Performing at or Above Systemwide Average
Minority	93	55	59.1%
Nonminority	67	50	74.6%
Ratio of minority to nonminority			0.79
Disparate impact threshold			0.80
Result of disparate impact analysis			Potential Disparate Impact

Note: For the MBTA's weekday transit schedule from March 19, 2016, through June 24, 2016.

Although a potential disparate impact is found for the weekday assessment using FTA's required method of comparing service on a route-by-route basis, a supplemental analysis comparing the overall percentage of passengers on minority routes that pass the service frequency standard (76.0 percent) to the overall percentage of passengers on nonminority routes that pass the frequency standard (89.2 percent) results in a ratio of 0.85, which leads to a finding of no disparate impact. An analysis conducted using this method is more reflective of the overall passenger experience, which is the philosophy under which the service standards in the MBTA's 2017 Service Delivery Policy were developed.

Furthermore, in April 2017 the MBTA started the process for a new bus service plan. Through this process the MBTA will be performing a comprehensive review of all bus routes and their adherence to the service standards. The process will identify gaps in performance for all routes, while giving specific attention towards improving performance on routes that have predominantly minority and low-income passengers.

Commuter Rail Service Operated

To assess the amount of scheduled commuter rail service operated between minority-classified lines and nonminority-classified lines, the MBTA compared the performance of each line to the overall performance of the system using state fiscal year (SFY) 2016 data. On weekdays, the systemwide percentage of scheduled commuter rail trains that were operated was 99.8 percent. Table 6-4 shows that the single commuter rail line that is classified minority did not perform at or above the systemwide average, and eight of the 11 commuter rail lines (72.7 percent) that are classified nonminority performed at or above the systemwide average. The ratio of the percentage of minority-classified lines performing at or above the systemwide average to the percentage of nonminority-classified lines performing at or above the systemwide average, 0.00, falls below the MBTA's disparate impact threshold of 0.80 and a potential disparate impact is found.

Table 6-4
Commuter Rail Service Operated - Weekday

Route Classification	Number of Lines	Number of Lines Performing at or Above Systemwide Average	Percentage of Lines Performing at or Above Systemwide Average
Minority	1	0	0.00%
Nonminority	11	8	72.7%
Ratio of minority to nonminority			0.00
Disparate impact threshold			0.80
Result of disparate impact analysis			Potential Disparate Impact

Note: Data for weekdays from July 1, 2015, through June 30, 2016.

On Saturdays, the systemwide percentage of scheduled commuter rail trains that were operated was 99.9 percent. Table 6-5 shows that the single commuter rail line that is classified minority did not perform at or above the systemwide average, and eight of the 11 commuter rail lines (72.7 percent) that are classified nonminority performed at or above the systemwide average. The ratio of the percentage of minority-classified lines performing at or above the systemwide average to the percentage of nonminority-classified lines performing at or above the systemwide average, 0.00, falls below the MBTA's disparate impact threshold of 0.80 and a potential disparate impact is found.

Table 6-5
Commuter Rail Service Operated - Saturday

Route Classification	Number of Lines	Number of Lines Performing at or Above Systemwide Average	Percentage of Lines Performing at or Above Systemwide Average
Minority	1	0	0.00%
Nonminority	11	8	72.7%
Ratio of minority to nonminority			0.00
Disparate impact threshold			0.80
Result of disparate impact analysis			Potential Disparate Impact

Note: Data for Saturdays from July 1, 2015, through June 30, 2016.

On Sundays, the systemwide percentage of scheduled commuter rail trains that were operated was 99.6 percent. Table 6-6 shows that the single commuter rail line that is classified minority did not perform at or above the systemwide average, and seven of the 10 commuter rail lines (70.0 percent) that are classified nonminority performed at or above the systemwide average. The ratio of the percentage of minority-classified lines performing at or above the systemwide average to the percentage of nonminority-classified lines performing at or above the systemwide average, 0.00, falls below the MBTA's disparate impact threshold of 0.80 and a potential disparate impact is found.

Table 6-6
Commuter Rail Service Operated - Sunday

Route Classification	Number of Lines	Number of Lines Performing at or Above Systemwide Average	Percentage of Lines Performing at or Above Systemwide Average
Minority	1	0	0.00%
Nonminority	10	7	70.0%
Ratio of minority to nonminority			0.00
Disparate impact threshold			0.80
Result of disparate impact analysis			Potential Disparate Impact

Note: Data for Sundays from July 1, 2015, through June 30, 2016.

After identifying this set of potential disparate impacts that resulted from a disproportionate number of trains being cancelled in October 2016 on the MBTA's minority-classified line, the MBTA worked with Keolis to institute a new protocol for advance-notice train cancellations; decisions regarding cancellations will be reviewed by the General Manager or his senior designee to ensure the prevention of any undue burden or impact to riders on any individual line. The revised decision-making protocol takes into account a variety of operational factors coupled with line demographic classifications and recent cancellation history. An assessment of dropped trips from November 2016 through June 2017 shows that the percentage of scheduled service runs on the MBTA's minority-classified line is now well above the systemwide average for all time periods.

Service Policies

Table 6-7 presents a summary of the results of the MBTA's service policies monitoring program. The MBTA analyzed 78 indicators of service policies, of which 69 showed no disparate impact and nine showed potential disparate impact. The MBTA has either already addressed or has a plan to address the nine indicators that showed potential disparate impact. The text and tables that follow Table 6-7 present results and analysis for the nine service policy indicators that showed a potential disparate impact. Appendix 6-B presents detailed results and analysis for all service monitoring indicators.

Table 6-7
Summary of Service Policies Monitoring Results

Indicator/Mode	Result of Disparate Impact Analysis	Page
Bus Shelter and Bench Placement		
Shelter placement – stops with more than 70 ADB	No disparate impact	6-B29
Shelter placement – stops with more than 25 ADB	No disparate impact	6-B29
Bench placement – stops with more than 50 ADB and no shelter	No disparate impact	6-B30
Bench placement – all stops with no shelter	No disparate impact	6-B31
Bus Shelter Amenities and Conditions		
Shelter amenities – seating fixtures	No disparate impact	6-B31
Shelter conditions – structure	No disparate impact	6-B32
Shelter conditions – vandalism	No disparate impact	6-B32
Shelter conditions – cleanliness	No disparate impact	6-B32
Rapid Transit Station Amenities and Conditions		
Subway lobby amenities – trash receptacles	No disparate impact	6-B33
Subway lobby amenities – recycling receptacles	No disparate impact	6-B33

Indicator/Mode	Result of Disparate Impact Analysis	Page
Subway lobby amenities – seating fixtures	No disparate impact	6-B33
Subway lobby amenities – system map	No disparate impact	6-B33
Subway platform amenities – trash receptacles	No disparate impact	6-B33
Subway platform amenities – recycling receptacles	No disparate impact	6-B33
Subway platform amenities – seating fixtures	No disparate impact	6-B33
Subway platform amenities – system map	No disparate impact	6-B33
Subway platform amenities – line map	No disparate impact	6-B33
Subway exterior conditions – structure	No disparate impact	6-B35
Subway exterior conditions – station name signage	No disparate impact	6-B35
Subway exterior conditions – vandalism	No disparate impact	6-B35
Subway exterior conditions – cleanliness	Potential disparate impact	6-22
Subway lobby conditions – structure	No disparate impact	6-B36
Subway lobby conditions – floor surface	No disparate impact	6-B36
Subway lobby conditions – stairwell	Potential disparate impact	6-23
Subway lobby conditions – lighting	No disparate impact	6-B36
Subway lobby conditions – wayfinding signage	No disparate impact	6-B36
Subway lobby conditions – vandalism	No disparate impact	6-B36
Subway lobby conditions – cleanliness	Potential disparate impact	6-23
Subway platform conditions – structure	No disparate impact	6-B37

Indicator/Mode	Result of Disparate Impact Analysis	Page
Subway platform conditions – platform surface	Potential disparate impact	6-25
Subway platform conditions – tactile strips	No disparate impact	6-B37
Subway platform conditions – stairwell	Potential disparate impact	6-25
Subway platform conditions – lighting	No disparate impact	6-B37
Subway platform conditions – station name signage	No disparate impact	6-B37
Subway platform conditions – wayfinding signage	No disparate impact	6-B37
Subway platform conditions – vandalism	No disparate impact	6-B37
Subway platform conditions – cleanliness	Potential disparate impact	6-25
Surface platform amenities – trash receptacles	Potential disparate impact	6-27
Surface platform amenities – recycling receptacles	Potential disparate impact	6-27
Surface platform amenities – seating fixtures	No disparate impact	6-B38
Surface platform amenities – system maps	No disparate impact	6-B38
Surface platform amenities – line map	No disparate impact	6-B38
Surface shelter conditions – structure	No disparate impact	6-B40
Surface shelter conditions – vandalism	No disparate impact	6-B40
Surface shelter conditions – cleanliness	No disparate impact	6-B40
Surface platform conditions – walkway	No disparate impact	6-B41
Surface platform conditions – pedestrian control	No disparate impact	6-B41
Surface platform conditions –platform surface	No disparate impact	6-B41

Indicator/Mode	Result of Disparate Impact Analysis	Page
Surface platform conditions – station name signage	No disparate impact	6-B41
Surface platform conditions – tactile strips	No disparate impact	6-B41
Commuter Rail Station Amenities and Conditions		
Station amenities – trash receptacles	No disparate impact	6-B41
Station amenities – seating fixtures	No disparate impact	6-B41
Station amenities – system map	No disparate impact	6-B41
Station amenities – line schedule	No disparate impact	6-B41
Station amenities – Title VI notice	No disparate impact	6-B41
Shelter conditions – structure	No disparate impact	6-B43
Shelter conditions –station name signage	No disparate impact	6-B43
Shelter conditions – vandalism	No disparate impact	6-B43
Shelter conditions – cleanliness	No disparate impact	6-B43
Platform conditions – platform surface	No disparate impact	6-B44
Platform conditions – tactile strips	No disparate impact	6-B44
Platform conditions – stairwell	No disparate impact	6-B44
Platform conditions – station name signage	No disparate impact	6-B44
Platform conditions – wayfinding signage	No disparate impact	6-B44
Platform conditions – vandalism	No disparate impact	6-B44
Platform conditions – cleanliness	Potential disparate impact	6-29
Automated Fare Collection		
Faregate operability	No disparate impact	6-B44

Indicator/Mode	Result of Disparate Impact Analysis	Page
Availability of Full-Service FVMs	No disparate impact	6-B45
Availability of Cashless and Full-Service FVMs	No disparate impact	6-B46
Populations served by CharlieCard retail sales terminals	No disparate impact	6-B46
Provision of Information		
Neighborhood maps at subway rapid transit stations	No disparate impact	6-B47
Bus transfer maps at subway rapid transit stations	No disparate impact	6-B48
Variable-message sign operability	No disparate impact	6-B49
Distribution of variable-message signs with bus arrival information	No disparate impact	6-B50
Escalator Operability		
Escalator operability	No disparate impact	6-B50
Vehicle Assignment		
Bus vehicle age	No disparate impact	6-B51
Bus air conditioning operability	No disparate impact	6-B52
Heavy and light rail vehicle age	N/A**	6-B52
Commuter rail vehicle age	No disparate impact	6-B53

ADB = Average daily boardings. FVM = Fare vending machines.

N/A** = Not applicable because the heavy rail lines and the Mattapan Line use dedicated equipment; all Green Line branches are classified as nonminority.

Subway Rapid Transit Exterior Station Conditions

For the exterior of subway rapid transit stations, the MBTA monitors the condition of the structure, station name signage, vandalism, and cleanliness. Table 6-8 shows that the ratios of the percentage of minority-classified subway rapid stations to the percentage of nonminority-classified subway rapid stations with acceptable exterior structure, station name signage, and vandalism conditions are above the MBTA's disparate impact threshold of 0.80 and no disparate impacts are found for these items.

However, the ratio of the percentage of minority-classified subway rapid stations to the percentage of nonminority-classified subway rapid stations with acceptable cleanliness conditions is below the MBTA's disparate impact threshold of 0.80 and a potential disparate impact is found for this item.

In September 2016, after CTPS inspected the cleanliness of subway rapid transit stations, the MBTA entered into a new performance-based janitorial contract. Under the contract, frontline staff is trained in accordance with the Station and Bus Stop Inspection Training Manual and actively monitor station cleanliness by conducting daily inspections on a rotating basis and reporting cleanliness performance with the use of a mobile web application. Frontline staff can also communicate in real time with the MBTA Maintenance Control Center and cleaning contractors to report incidents and deficiencies.

The real-time contract-monitoring process ensures that vendors regularly meet cleanliness standards and demonstrates the MBTA's commitment to greater accountability and responsiveness concerning the cleanliness and conditions of its stations. The MBTA will utilize the real-time inspection information to ensure that cleaning services are being conducted in an equitable manner.

Table 6-8
Subway Rapid Transit Exterior Station Conditions

Station Classification	Percentage with Structure Visually Acceptable	Percentage with Station Name Signage Visually Acceptable	Percentage with Vandalism Acceptable	Percentage with Cleanliness Acceptable
Minority	77.3%	95.5%	100%	31.8%
Nonminority	72.5%	90.0%	100%	62.5%
Ratio of minority to nonminority	1.07	1.06	1.00	0.51
Disparate impact threshold	0.80	0.80	0.80	0.80
Result of disparate impact analysis	NDI	NDI	NDI	PDI

NDI = No disparate impact. PDI = Potential disparate impact.

Note: Each subway rapid transit station was inspected once between February 23, 2016, and March 21, 2016. All condition assessments were performed by visual inspection by several experienced CTPS field staff who received training on the criteria used in these assessments.

Subway Rapid Transit Lobby Conditions

For subway rapid transit lobbies, the MBTA monitors the condition of the structure, floor surface, stairwell, lighting, wayfinding signage, vandalism, and cleanliness. Table 6-9 shows that the ratios of the percentage of minority-classified subway rapid stations to the percentage of nonminority-classified subway rapid stations with acceptable lobby structure, floor surface, lighting, wayfinding signage, and vandalism conditions are above the MBTA's disparate impact threshold of 0.80 and no disparate impacts are found for these items.

However, the ratios of the percentage of minority-classified subway rapid stations to the percentage of nonminority-classified subway rapid stations with acceptable lobby stairwell and cleanliness conditions are below the MBTA's disparate impact threshold of 0.80 and potential disparate impacts are found for these items.

As stated previously, the MBTA is utilizing its real-time inspection mobile tool to ensure that cleaning services are being conducted in an equitable manner. The MBTA's Engineering and Maintenance Department will review all reported deficient conditions, and evaluate the reported deficiency and the scope of work to be prioritized for maintenance or programmed for capital investment.

Table 6-9
Subway Rapid Transit Lobby Conditions

Station Classification	Percentage with Structure Visually Acceptable	Percentage with Floor Surface Visually Acceptable	Percentage with Stairwell Visually Acceptable	Percentage with Lighting Visually Acceptable	Percentage with Wayfinding Signage Visually Acceptable	Percentage with Vandalism Acceptable	Percentage with Cleanliness Acceptable
Minority	86.4%	68.2%	36.4%	81.8%	100%	100%	27.3%
Nonminority	70.0%	67.5%	50.0%	82.5%	100%	97.5%	65.0%
Ratio of minority to nonminority	1.23	1.01	0.73	0.99	1.00	1.03	0.42
Disparate impact threshold	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Result of disparate impact analysis	NDI	NDI	PDI	NDI	NDI	NDI	PDI

NDI = No disparate impact. PDI = Potential disparate impact.

Note: Each subway rapid transit station was inspected once between February 23, 2016, and March 21, 2016. All condition assessments were performed by visual inspection by several experienced CTPS field staff who received training on the criteria used in these assessments.

Subway Rapid Transit Platform Conditions

For subway rapid transit platforms, the MBTA monitors the condition of the structure, platform surface, tactile strips, stairwell, lighting, station name signage, wayfinding signage, vandalism, and cleanliness, as compared to the built condition. Table 6-10 shows that the ratios of the percentage of minority-classified subway rapid stations to the percentage of nonminority-classified subway rapid stations with acceptable platform structure, tactile strips, lighting, station name signage, wayfinding signage, and vandalism conditions are above the MBTA's disparate impact threshold of 0.80 and no disparate impacts are found for these items.

However, the ratios of the percentage of minority-classified subway rapid stations to the percentage of nonminority-classified subway rapid stations with acceptable platform surface, stairwell and cleanliness conditions are below the MBTA's disparate impact threshold of 0.80 and potential disparate impacts are found for these items.

The MBTA's Engineering and Maintenance Department will review all reported deficient conditions and evaluate the deficiencies. As necessary, the department will prepare the scopes of work to address the deficiencies either through maintenance or capital investment.

Table 6-10
Subway Rapid Transit Platform Conditions

Station Classification	Percentage with Structure Visually Acceptable	Percentage with Platform Surface Visually Acceptable	Percentage with Tactile Strips Visually Acceptable	Percentage with Stairwell Visually Acceptable	Percentage with Lighting Visually Acceptable	Percentage with Station Name Visually Acceptable	Percentage with Wayfinding Signage Visually Acceptable	Percentage with Vandalism Acceptable	Percentage with Cleanliness Acceptable
Minority	52.2%	43.5%	78.3%	26.1%	65.2%	100%	95.7%	100%	21.7%
Nonminority	50.0%	55.0%	90.0%	57.5%	77.5%	97.5%	100%	100%	57.5%
Ratio of minority to nonminority	1.04	0.79	0.87	0.45	0.84	1.03	0.96	1.00	0.38
Disparate impact threshold	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Result of disparate impact analysis	NDI	PDI	NDI	PDI	NDI	NDI	NDI	NDI	PDI

NDI = No disparate impact. PDI = Potential disparate impact.

Note: Each subway rapid transit station was inspected once between February 23, 2016, and March 21, 2016. All condition assessments were performed by visual inspection by several experienced CTPS field staff who received training on the criteria used in these assessments.

Surface Rapid Transit Station Amenities

To monitor the distribution of surface rapid transit station amenities, the MBTA relies on CTPS to record the presence of each amenity. CTPS field staff visited each surface rapid transit station from February 2016 through June 2016 and recorded the presence of each amenity.

For surface rapid transit stations, the MBTA monitors the presence of trash receptacles, recycling receptacles, seating fixtures, and up-to-date system maps and line maps. Table 6-11 shows that the ratios of the percentage of minority-classified surface rapid transit stations to the percentage of nonminority-classified surface rapid transit stations with seating fixtures and up-to-date system maps and line maps are all above the MBTA's disparate impact threshold of 0.80 and no disparate impacts are found for these items.

However, the ratios of the percentage of minority-classified surface rapid transit stations to the percentage of nonminority-classified surface rapid transit stations with trash receptacles and recycling receptacles are below the MBTA's disparate impact threshold of 0.80 and potential disparate impacts are found for these items.

The MBTA's Engineering and Maintenance Department will review and evaluate the reported distribution of trash and recycling receptacles. As necessary, the department will prepare the scopes of work to address the deficiencies either through maintenance or capital investment.

Table 6-11
Surface Rapid Transit Station Amenities

Station Classification	Percentage with Trash Receptacles	Percentage with Recycling Receptacles	Percentage with Seating Fixtures	Percentage with System Map	Percentage with Line Map
Minority	47.6%	19.0%	66.7%	61.9%	57.1%
Nonminority	73.5%	26.5%	73.5%	44.9%	24.5%
Ratio of minority to nonminority	0.65	0.72	0.91	1.38	2.33
Disparate impact threshold	0.80	0.80	0.80	0.80	0.80
Result of disparate impact analysis	PDI	PDI	NDI	NDI	NDI

NDI = No disparate impact. PDI = Potential disparate impact.

Note: Each surface rapid transit station was inspected once between February 25, 2016, and June 18, 2016. All amenity assessments were performed by visual inspection by several experienced CTPS field staff who received training on the criteria used in these assessments.

Commuter Rail Platform Conditions

For commuter rail stations, the MBTA monitors the condition of the platform surface, tactile strips, stairwell, station name signage, wayfinding signage, vandalism, and cleanliness. Table 6-12 shows that the ratios of the percentage of minority-classified commuter rail stations to the percentage of nonminority-classified commuter rail stations with acceptable platform surface, tactile strips, stairwell, station name signage, wayfinding signage, and vandalism conditions are above the MBTA's disparate impact threshold of 0.80 and no disparate impacts are found for these items.

However, the ratio of the percentage of minority-classified commuter rail stations to the percentage of nonminority-classified commuter rail stations with acceptable platform cleanliness conditions is below the MBTA's disparate impact threshold of 0.80 and potential disparate impact is found for this item.

The MBTA continues to work closely with Keolis on implementing its Title VI plan, including concerns related to station cleanliness. Currently, the three minority-classified stations that did not pass CTPS's cleanliness inspection (Four Corners/ Geneva Avenue, Talbot Avenue, and Uphams Corner) are already cleaned more frequently than other stations in that region of the commuter rail network. The MBTA and Keolis are working together to determine if adjustments to the cleaning schedule should be made.

Table 6-12
Commuter Rail Platform Conditions

Station Classification	Percentage with Platform Surface Visually Acceptable	Percentage with Tactile Strips Visually Acceptable	Percentage with Stairwell Visually Acceptable	Percentage with Station Name Signage Visually Acceptable	Percentage with Wayfinding Signage Visually Acceptable	Percentage with Vandalism Acceptable	Percentage with Cleanliness Acceptable
Minority	100%	87.5%	75.0%	87.5%	87.5%	87.5%	62.5%
Nonminority	38.9%	45.2%	87.3%	88.1%	78.6%	87.3%	81.0%
Ratio of minority to nonminority	2.57	1.93	0.86	0.99	1.11	1.00	0.77
Disparate impact threshold	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Result of disparate impact analysis	NDI	NDI	NDI	NDI	NDI	NDI	PDI

NDI = No disparate impact.

Note: Each commuter rail station was inspected once between February 11, 2016, and March 5, 2016. All condition assessments were performed by visual inspection by several experienced CTPS field staff, who received training on the criteria used in these assessments.





Chapter 7: Requirement to Evaluate Service and Fare Changes

INTRODUCTION

As a transit provider that operates 50 or more fixed-route vehicles during peak service in an urbanized area (UZA) of more than 200,000 in population, the Massachusetts Bay Transportation Authority (MBTA) is required to evaluate major service change and fare change proposals to identify possible disparate impacts on minority populations and/or disproportionate burdens on low-income populations in the service area. The analyses listed below reflect those performed by the MBTA during this triennial reporting period:

- A fare equity analysis for the MBTA Youth Pass Pilot Program, which provides all eligible youth in participating municipalities with equal access to a reduced-fare product that had previously only been available to students through the existing Student Pass Program. This analysis was accepted by the MBTA Fiscal and Management Control Board (FMCB) on December 21, 2015.
- A fare equity analysis for the State Fiscal Year (SFY) 2017 MBTA Fare Change. This analysis was accepted by the FMCB on March 16, 2016.

- A service equity analysis for the termination of the Late Night Service Pilot Program; the program was terminated due to the deleterious impact it had on maintenance by reducing the hours that vehicles and infrastructure were available for necessary maintenance regimens. This analysis was accepted by the FMCB on March 16, 2016.
- A service equity analysis for the Fitchburg Line Improvement Project, which reduced travel times and improved service reliability throughout the corridor. This analysis was accepted by the FMCB on July 11, 2016.
- A service equity analysis for the Wachusett Extension Project, which constructed a new station at the end of the Fitchburg commuter rail line and provided upgrades to the existing rail line to accommodate the four-mile extension. This analysis was accepted by the FMCB on July 11, 2016.

The Federal Transit Administration (FTA) requires transit service providers to set several distinct policies that shape the evaluation process for these service and fare change equity analyses – including definitional policies and numeric threshold policies. As such, the MBTA conducts its analyses in accordance with policies it has established that define necessary terms, identify analysis thresholds, and detail data sources. The MBTA has incorporated each policy requirement into a comprehensive Disparate Impact/Disproportionate Burden (DI/DB) Policy, which is presented in Appendix 7-A. The FMCB voted to accept the DI/DB and Major Service Change policy on January 30, 2017 (see Appendix 7-B). The DI/DB Policy is composed of the following:

- **Major Service Change Policy**, which defines those service change proposals that are considered “major” and would, therefore, require a disparate impact or disproportionate burden analysis to understand possible impacts on protected populations from the proposed service change.
- **Disparate Impact Policy**, which sets a threshold for identifying the potential of adverse effects of service changes to be experienced disparately by minority populations within the service area.
- **Disproportionate Burden Policy**, which sets a threshold for identifying the potential of adverse effects of service changes to be experienced disproportionately by low-income populations within the service area.

- **Minority Disparate Impact Policy**, which sets a threshold for identifying the potential of adverse effects of fare changes to be experienced disparately by minority populations within the service area.
- **Low-Income Disproportionate Burden Policy**, which sets a threshold for identifying the potential of adverse effects of fare changes to be experienced disproportionately by low-income populations within the service area.

The MBTA's current DI/DB Policy is the result of a 2016 undertaking to revise the 2014 version of the policy. Two key objectives for the 2016 revision process included (1) redefining a "major service change" to distinguish between minor quarterly service adjustments and more significant changes advanced through the rollout of new biennial service plans, and (2) setting disparate/disproportionate impact thresholds that would not be susceptible to false positives attributable to margins of error in the data source, regardless of whether the data source is the US Census or most recent MBTA passenger survey.

The MBTA conducted an extensive public engagement process for setting these policies, including:

- Two stakeholder workshops representing diverse interests and communities served by the MBTA (37 organizations invited, 16 participated)
- Four public meetings held in Roxbury, Lynn, Downtown Boston, and Mattapan (101 attendees, 55 individual comments)
- MBTA webpage providing draft policy text, background information, and online comment opportunity
- Public meeting flyers emailed to over 3,600 contacts via GovDelivery
- Flyers distributed by hand to organizations and posted on community boards in Dudley Square, Codman Square, Fields Corner, and Mattapan

For more details on the public engagement and policy development process, please see "Plan to Engage Minority and Limited-English-Proficient Populations" in Chapter 2 of this report, pages 2-40 to 2-41.

MBTA SERVICE AND FARE EQUITY ANALYSES, 2014–17 (FTA C 4702.1B, IV-7)

The equity analyses performed by the MBTA during this triennial reporting period are detailed below.

Fare Equity Analysis: MBTA Youth Pass Pilot Program

The MBTA completed a fare equity analysis for the MBTA Youth Pass Pilot Program, a program designed to provide all eligible youth in participating municipalities with equal access to a reduced-fare product, closing gaps in the existing Student Pass Program. The fare equity analysis for the Youth Pass Program was accepted by the MBTA's FMCB on December 21, 2015.

The Youth Pass Pilot has increased transit access for primarily low-income and minority youth, providing them access to recreational opportunities, work, school, and medical appointments they would not have had access to otherwise. MBTA usage by Youth Pass participants increased approximately 30 percent on average. Participants reported that without the Youth Pass they still would have taken 60 percent of their trips on the MBTA, but they would have been unable to make 13 percent of their trips. Three quarters of the applicants for the Youth Pass were eligible for the MBTA's existing reduced-fare Student Pass, but they were unable to access it because their school did not offer it or because it was unavailable during summer months. The monthly Youth Pass, which is the same price as the MBTA Student CharlieCard pass (\$26), represents a 65 percent discount compared to a full-price monthly LinkPass (\$75).

The MBTA performed a fare equity analysis of the MBTA Youth Pass Pilot Program with assistance from the Central Transportation Planning Staff (CTPS), which is the staff of the Boston Region Metropolitan Planning Organization (MPO). The Youth Pass Pilot Program was assessed at the end of its six-month period to allow for the collection of data on pass usage. Using data available from application surveys collected through October 15, 2015, CTPS determined the share of Youth Pass riders who identified themselves as minority or low-income youth. CTPS then compared these values to the combined minority and low-income youth (12 to 21 years old) population of the participating municipalities (Boston, Chelsea, Malden, and Somerville), using the US Census Public Use Micro Area (PUMA) and decennial US Census data. These results are included in Table 7-1, which shows that a very large share of Youth Pass participants identify themselves as minority (93.3 percent) or low-income (72.9 percent). These percentages are significantly higher than the percentages of minority

youth (56.3 percent) and low-income youth (50.2 percent) in the population of the four municipalities. Therefore, no disparate impacts on minority populations or disproportionate burdens on low-income populations were found as a result of the Youth Pass Pilot Program.

Table 7-1
Minority and Low-Income Participation in Youth Pass Pilot Program

Population	Total	Minority	Percentage Minority	Low-Income	Percentage Low-Income
Youth Pass participants	431	402	93.3%	314	72.9%
Population of eligible youth	131,671	74,716	56.3%	60,834	50.2%

Note: The figures on Youth Pass participants pertains to the period of July 2015 through October 15, 2015.

Sources: MBTA, 2007-11 Public Use Microdata, and 2010 US Census.

The MBTA Youth Pass Pilot Evaluation is provided in Appendix 7-C, and the detailed fare equity analysis conducted by CTPS is provided in Appendix 7-D. Reference to the FMCB's approval of the fare equity analysis is provided in Appendix 7-E.

Fare Equity Analysis: SFY 2017 MBTA Fare Change

The MBTA completed a fare equity analysis for the SFY 2017 MBTA fare change. The fare equity analysis for this change was accepted by the FMCB on March 16, 2016.

Before considering any systemwide changes in fares, the MBTA undertakes a comprehensive process to model the impacts of the changes. This modeling is done with the assistance of CTPS, which examines the impacts of the systemwide fare change on ridership, revenue, and fare equity. To model the impacts of the SFY 2017 MBTA fare change, CTPS used an elasticity-based spreadsheet model known as the Fare Elasticity, Ridership, and Revenue Estimation Tool (FERRET) to estimate the projected ridership loss associated with the proposed fare increase, and the net revenue change that would result from lower ridership and higher fares. Using FERRET, CTPS estimated that

the SFY 2017 MBTA fare change would result in a 9.3 percent average fare increase, leading to a 7.1 percent increase in revenue and 1.5 percent decrease in ridership.

Table 7-2 presents the existing and proposed average fares, and absolute and relative price changes for minority riders, low-income riders, and all riders. Minority and low-income riders pay lower average fares compared to the overall average fare for all riders. This is largely because nonminority and non-low-income riders use the commuter rail system and other more expensive modes more than minority and low-income riders. At the proposed fare levels, minority and low-income riders would continue to pay lower average fares.

Table 7-2
Existing and Proposed Average Fares and Price Changes
(Weighted by Fare Usage Frequency)

Rider Classification	Existing Average Fare	Proposed Average Fare	Absolute Price Change	Percentage Price Change
Minority	\$1.24	\$1.36	\$0.12	9.49%
Low-income	\$1.06	\$1.15	\$0.09	8.46%
All riders	\$1.55	\$1.69	\$0.14	9.35%

Note: The values in this table are rounded to the nearest cent or the nearest hundredth of a percent. All calculations were performed using unrounded values.
Source: CTPS, FERRET analysis.

Using the information provided in Table 7-2, the absolute increase in the average fare for minority riders was calculated as 82 percent of the absolute increase in the average fare for all riders, and the percentage increase in the average fare relative to the initial fare for minority riders was 101 percent of the percentage increase in the average fare relative to the initial fare for all riders. Furthermore, the absolute increase in the average fare for low-income riders was 62 percent of the absolute increase in the average fare for all riders, and the percentage increase in the average fare relative to the initial fare for low-income riders was 90 percent of the percentage increase in the average fare relative to the initial fare for all riders. Because the ratio of the percent change in fare for minority and low-income riders to all riders is less than the 10 percent threshold in the MBTA's DI/DB Policy, no disparate impacts on minority populations or disproportionate burdens on low-income populations were found as a result of the SFY 2017 MBTA fare change.

The detailed fare equity analysis conducted by CTPS for the SFY 2017 MBTA fare change is provided in Appendix 7-F, and reference to the FMCB's approval is provided in Appendix 7-G.

Service Equity Analysis: Termination of Late Night Service Pilot

The MBTA completed a service equity analysis for the termination of the Late Night Service Pilot Program; the program was terminated to allow greater opportunities for the evening maintenance of the MBTA's vehicles and physical assets. The service equity analysis for the Late Night Service Pilot Program was accepted by the FMCB on March 16, 2016.

The MBTA began a pilot program of extended weekend late-night hours of service on March 28, 2014. This program was initially intended to operate for one year, through March 27, 2015. However, because the MBTA wanted the pilot program to last long enough to provide sufficient data to evaluate the program and because vehicle operator schedules are set well in advance of each new schedule-rating period, the program was continued without changes through June 26, 2015.

On April 15, 2015, the Massachusetts Department of Transportation (MassDOT) Board of Directors, which then governed the MBTA, voted to implement the SFY 2016 budget that accounted for certain changes in the late-night program to become effective in June of 2015. These changes consisted of discontinuing all late-night trips that had been added to five of the pilot bus routes in March of 2014 and reducing the span-of-service hours of the remaining late-night service on the bus and rapid transit routes in the pilot program. In July of 2015, governance of the MBTA was transferred to the new FMCB, and on December 14, 2015, the FMCB directed MBTA staff to pursue discontinuation of the remaining late-night service as part of a series of cost-reduction measures and to allow greater opportunities for the evening maintenance of the MBTA's vehicles and physical assets.

The MBTA performed a service equity analysis for the termination of the Late Night Service Pilot with the assistance of CTPS. Two data sources were used to conduct the analysis:

- Ridership data from surveys collected during the final month of the original one-year pilot period (March 6, 7, 13, and 14, 2015), weighted by results from the MBTA 2008-09 Systemwide Passenger Survey. These data were

used to compare the proportion of minority and low-income late-night service riders with the proportion of minority and low-income riders using the MBTA system as a whole, for each mode of late-night transit service.

- Population data weighted by the share of systemwide service hours. This data was used to compare the proportion of minority and low-income population with access to late-night service and to the MBTA system as a whole.

Results Using Ridership Data

Table 7-3 shows that the proportion of minority riders who used the 10 late-night bus routes that the MBTA proposed to discontinue (54.4 percent) was higher than the proportion of minority riders who used MBTA bus service systemwide (47.5 percent). The resulting ratio of the proportion of minority riders who used the 10 late-night bus routes that the MBTA proposed to discontinue to the proportion of minority riders who used MBTA bus service systemwide, 1.15, was less than the 1.20 disparate burden threshold.

Table 7-3
Assessment of Disparate Burdens on Minority Riders for the Termination of Late-Night Service on Bus Routes using Ridership Data

Metric	Valuation
Late-night service on 10 bus routes – percentage minority	54.4%
MBTA bus system – 2008-09 weighted percentage minority	47.5%
Ratio of late-night to systemwide minority ridership	1.15

Sources: 2015 MBTA late-night service survey and MBTA 2008-09 Systemwide Passenger Survey.

Table 7-4 shows that the proportion of low-income riders who used the 10 late-night bus routes (64.4 percent) was higher than the proportion of low-income riders who used MBTA bus service systemwide (41.5 percent). The resulting ratio of the proportion of low-income riders who used the 10 late-night bus routes to the proportion of low-income riders who used MBTA bus service systemwide, 1.55, was greater than the 1.20 disproportionate burden threshold.

Table 7-4
Assessment of Disproportionate Burdens on Low-Income Riders for the Termination of
Late-Night Service on Bus Routes using Ridership Data

Metric	Valuation
Late-night service on 10 bus routes – percentage low-income	64.4%
MBTA bus system – 2008-09 weighted percentage low-income	41.5%
Ratio of late-night to systemwide low-income ridership	1.55

Sources: 2015 MBTA late-night service survey and MBTA 2008-09 Systemwide Passenger Survey.

Table 7-5 shows that the proportion of minority riders who used the late-night rapid transit service that the MBTA proposed to discontinue (47.1 percent) was higher than the proportion of minority riders who used MBTA rapid transit service systemwide (28.5 percent). The resulting ratio of the proportion of minority riders who used the late-night rapid transit service that the MBTA proposed to discontinue to the proportion of minority riders who used MBTA rapid transit service systemwide, 1.65, was greater than the 1.20 disparate burden threshold.

Table 7-5
Assessment of Disparate Burdens on Minority Riders for the Termination of
Late-Night Service on Rapid Transit Lines using Ridership Data

Metric	Valuation
Late-night rapid transit service – percentage minority	47.1%
Rapid transit system – 2008-09 weighted percentage minority	28.5%
Ratio of late-night to systemwide minority ridership	1.65

Sources: 2015 MBTA late-night service survey and MBTA 2008-09 Systemwide Passenger Survey.

Table 7-6 shows that the proportion of low-income riders who used late-night rapid transit service (59.2 percent) was higher than the proportion of low-income riders who used MBTA rapid transit service systemwide (24.1 percent). The resulting ratio of the proportion of low-income riders who used the late-night rapid transit service to the proportion of low-income riders who used MBTA rapid transit service systemwide, 2.46, was greater than the 1.20 disproportionate burden threshold.

Table 7-6
Assessment of Disproportionate Burdens on Low-Income Riders for the Termination of
Late-Night Service on Rapid Transit Lines using Ridership Data

Metric	Valuation
Late night rapid transit service – percentage low-income	24.1%
Rapid transit system – 2008-09 weighted percentage low-income	59.2%
Ratio of late-night to systemwide low-income ridership	2.46

Sources: 2015 MBTA late-night service survey and MBTA 2008-09 Systemwide Passenger Survey.

Results Using Weighted Population Data

Table 7-7 shows that the proportion of minority population with access to late-night service (46.6 percent) was higher than the proportion of minority population with access to the MBTA system as a whole (42.0 percent). The resulting ratio of the proportion of minority population with access to the late-night service that the MBTA proposed to discontinue to the proportion of minority population with access to the MBTA system as a whole, 1.11, was less than the 1.20 disparate burden threshold.

Table 7-7
Assessment of Disparate Burdens on Minority Riders for the Termination of
Late-Night Service using Population Data Weighted Based on System Access

Metric	Valuation
Late-night minority percentage	46.6%
MBTA systemwide minority percentage	42.0%
Ratio of late-night to systemwide minority population	1.11

Sources: 2010 US Census and MBTA.

Table 7-8 shows that the proportion of low-income population with access to late-night service (39.1 percent) was higher than the proportion of low-income population with access to the MBTA system as a whole (37.1 percent). The resulting ratio of the proportion of low-income population with access to the late-night service that the MBTA proposed to discontinue to the proportion of low-income population with access to the MBTA system as a whole, 1.05, was less than the 1.20 disproportionate burden threshold.

Table 7-8
Assessment of Disproportionate Burdens on Low-Income Riders for the Termination of Late-Night Service using Population Data Weighted Based on System Access

Metric	Valuation
Late-night low-income percentage	39.1%
MBTA systemwide low-income percentage	37.1%
Ratio of late-night to systemwide minority population	1.05

Sources: 2010-14 American Community Survey and MBTA.

Conclusion

The results of the service equity analysis using ridership data indicated that discontinuing the late-night service that had been operated on 10 MBTA bus routes would not result in a disparate burden on minority riders, but would result in a disproportionate burden on low-income riders. Discontinuing the late-night service that had been operated on all MBTA rapid transit lines would result in a disparate burden on minority riders and a disproportionate burden on low-income riders.

However, because late-night service draws a broad base of potential riders, most of which are infrequent users, the MBTA believes the best results are drawn from the weighted population data, which takes into consideration access to the service. The results of the service equity analysis using the weighted population data indicated that the overall discontinuance of late-night service would not result in a disparate burden on minority populations and would not result in a disproportionate burden on low-income populations.

The detailed service equity analysis conducted by CTPS for the termination of the Late Night Service Pilot is provided in Appendix 7-H, and reference to the FMCB's approval is provided in Appendix 7-I.

Service Equity Analysis: Fitchburg Line Improvement Project

The MBTA completed a service equity analysis for the Fitchburg Line Improvement Project, a project that reduced travel times and improved service reliability throughout the Fitchburg commuter rail corridor. This service equity analysis was accepted by the FMCB on July 11, 2016.

The Fitchburg Line Improvement Project was funded by three sources: Small Starts, American Recovery and Reinvestment Act (ARRA), and ARRA Transportation Investment Generating Economic Recovery (TIGER) funds. The portion of the project funded by Small Starts contained the following elements:

- Replacement and realignment of the track structure
- Replacement or repair of eight bridge structures
- Upgrades to signal and communication systems
- Resolution of freight rail and passenger rail conflicts
- Upgrades to South Acton Station

Upon completion of the project, service reliability along the corridor was expected to increase on-time performance from 83 percent to over 95 percent, and maximum train speeds could be expected to increase from 60 miles per hour (mph) to 80 mph. Construction was substantially completed at the end of 2015, and new train schedules reflecting the faster and more reliable service were implemented on May 23, 2016. Although the improvements did not qualify as a major service change under the MBTA's Service Delivery Policy, FTA regulations pertaining to Title VI of the Civil Rights Act of 1964, found in FTA Circular 4702.1B, required the MBTA to conduct a service equity analysis for Small Start capital projects, whether or not the changes to existing service rise to the level of a major service change.

The MBTA performed a service equity analysis for the Fitchburg Line Improvement Project with the assistance of CTPS. CTPS used the 2008-09 MBTA systemwide passenger survey to obtain the percentage of minority and low-income inbound boardings on the Fitchburg Line and compared that figure to the percentage of minority and low-income riders who used MBTA commuter rail systemwide.

Table 7-9 shows that the proportion of minority riders who used the Fitchburg Line (13.0 percent) was slightly lower than the proportion of minority riders who used MBTA commuter rail systemwide (14.4 percent). The resulting ratio of the

proportion of minority riders who used the Fitchburg Line to the proportion of minority riders who used MBTA commuter rail systemwide, 0.90, was greater than the threshold of 0.80 and, thus no disparate benefit was found.

Table 7-9
Assessment of Disparate Benefits for the Fitchburg Line Improvement Project

Metric	Valuation
Fitchburg commuter rail line – percentage minority	13.0%
MBTA commuter rail system – percentage minority	14.4%
Ratio of Fitchburg Line to MBTA commuter rail systemwide minority ridership	0.90

Source: MBTA 2008-09 Systemwide Passenger Survey.

Table 7-10 shows that the proportion of low-income riders who used the Fitchburg Line (5.8 percent) was slightly lower than the proportion of low-income riders who used MBTA commuter rail systemwide (7.2 percent). The resulting ratio of the proportion of low-income riders who used the Fitchburg Line to the proportion of low-income riders who used MBTA commuter rail systemwide, 0.81, was greater than the threshold of 0.80 and, thus no disproportionate benefit was found.

Table 7-10
Assessment of Disproportionate Benefits for the Fitchburg Line Improvement Project

Metric	Valuation
Fitchburg commuter rail line – percentage low-income	5.8%
MBTA commuter rail system –percentage low-income	7.2%
Ratio of Fitchburg Line to MBTA commuter rail systemwide low-income ridership	0.81

Source: MBTA 2008-09 Systemwide Passenger Survey.

The detailed service equity analysis for the Fitchburg Line Improvement Project is provided in Appendix 7-J, and reference to the FMCB’s approval is provided in Appendix 7-K.

Service Equity Analysis: Wachusett Extension Project

The MBTA completed a service equity analysis for the Wachusett Extension Project; the project extended the Fitchburg commuter rail line four miles, constructed a new station at the end of the line, and provided upgrades to the existing rail line to accommodate the four-mile extension. The service equity analysis was accepted by the FMCB on July 11, 2016.

The goals of the Wachusett Extension Project were as follows:

- Improve mass transit options to the communities west of Fitchburg
- Improve the region's economy by reducing the commute time from the Montachusett Region to the Boston area job market
- Increase the supply of commuter rail parking for riders in the western part of the Boston region
- Improve the operation and capacity of the Fitchburg Line train layover facility

The MBTA's Service Delivery Policy in effect at the time this project was underway defined a *major service change* at the individual route level as ones that would have a significant effect on riders, resource requirements, route structure, or service delivery, and specifically noted that route extensions of greater than one mile constituted a major service change. Since the new Wachusett Station extended commuter rail service on the Fitchburg Line four miles west of its pre-existing terminus, the Wachusett Extension Project was considered to effect a major service change under the MBTA's Service Delivery Policy.

The MBTA performed a service equity analysis for the Wachusett Extension Project with the assistance of CTPS. To conduct the analysis, CTPS created a demographic profile of the market access area surrounding Wachusett Station (including minority status, low-income status, and population density of each census tract) by selecting roadways within five miles of the station using geographic information system (GIS) software. Roadways within five miles of the station represent the market access area of a terminal station outside of the 65 municipalities in the MBTA's core service area. Since the five-mile market access area for Wachusett Station overlaps with the five-mile market access area for Fitchburg Station, the overlapping area was divided halfway, and each station was assigned the half nearest to it. The area of each tract within the Wachusett

Station market access area was calculated, and then multiplied by the population density to obtain the population in the market access area. Finally, minority and low-income populations in the market access area were summed to obtain a total for each category. The demographic profile of the market access area surrounding Wachusett Station was compared to the demographic profile of the MBTA systemwide service area.

Table 7-11 shows that the minority percentage of the population in the market access area surrounding Wachusett Station (15.3 percent) was lower than the minority percentage of the population in the MBTA systemwide service area (26.2 percent). The resulting ratio of the minority percentage of the population in the market access area surrounding Wachusett Station to the minority percentage of the population in the MBTA systemwide service area, 0.58, was less than the 0.80 threshold, thus a disparate benefit was found. However, the FMCB has determined that there was substantial legitimate justification for the Wachusett Extension Project and that there were no alternatives that would have a less disparate impact on minority riders.

Table 7-11
Assessment of Disparate Benefits for the Wachusett Extension Project

Metric	Valuation
Wachusett Station market access area – percentage minority	15.3%
MBTA systemwide service area –percentage minority	26.2%
Ratio of Wachusett Station market access area to MBTA systemwide service area minority population	0.58

Source: 2010 US Census.

Table 7-12 shows that the low-income percentage of the population in the market access area surrounding Wachusett Station (30.2 percent) was slightly lower than the low-income percentage of the population in the MBTA systemwide service area (31.9 percent). The resulting ratio of the low-income percentage of the population in the market access area surrounding Wachusett Station to the low-income percentage of the population in the MBTA systemwide service area, 0.95, was greater than the 0.80 threshold, thus no disproportionate benefit was found.

Table 7-12
Assessment of Disproportionate Benefits for the Wachusett Extension Project

Metric	Valuation
Wachusett Station market access area – percentage low-income	30.2%
MBTA systemwide service area –percentage low-income	31.9%
Ratio of Wachusett Station market access area to MBTA systemwide service area low-income population	0.95

Source: 2010-14 American Community Survey

The detailed service equity analysis for the Wachusett Extension project is provided in Appendix 7-J, and reference to the FMCB's approval is provided in Appendix 7-K.

Appendix 1-A

Definitions from FTA Title VI Circular 4702.1B

Definitions

The following terms and definitions are drawn from the FTA Title VI Circular 4702.1B and are helpful for understanding the facts, analyses, and other components within this report. Many of these terms are incorporated in the MBTA's nondiscrimination policies and are used throughout this document.

- **Direct Recipient:** An entity that receives funding directly from FTA. For purposes of Title VI, a direct recipient is distinguished from a primary recipient in that a direct recipient does not extend financial assistance to subrecipients, whereas a primary recipient does.
- **Discrimination:** Any action or inaction, whether intentional or unintentional, in any program or activity of a federal-aid recipient, subrecipient, or contractor that results in disparate impact, disparate treatment, or perpetuating the effects of prior discrimination based on race, color, or national origin.
- **Disparate Impact:** A facially neutral policy or practice that disproportionately affects members of a group identified by race, color, or national origin, where the recipient's policy or practice lacks a substantial legitimate justification and where there exist one or more alternatives that would serve the same legitimate objectives but with less disproportionate effect on the basis of race, color, or national origin.
- **Disproportionate Burden:** A neutral policy or practice that disproportionately affects low-income populations more than non-low-income populations. A finding of disproportionate burden requires the recipient to evaluate alternatives and mitigate burdens where practicable.
- **Disparate Treatment:** Actions that result in circumstances where similarly situated persons are intentionally treated differently (i.e. less favorably) than others because of their race, color, or national origin.
- **Equity Analysis:** An analytical study that requires transit providers to evaluate, before implementation, any proposed service change that exceeds the provider's major service change threshold, as well as any proposed fare change. The objective of the analysis is to determine whether those changes will have a discriminatory impact on minority populations within the transit provider's service area. Low-income populations, while not a protected class under Title VI, are protected by FTA within its implementation of the Environmental Justice Executive

Order. As such, FTA requires transit providers to evaluate whether any proposed major service or any fare change would have a disproportionate burden on low-income populations.

- **Fixed Route:** Refers to public transportation service provided in vehicles operated along a pre-determined route according to a fixed schedule.
- **Limited English Proficient:** Refers to persons for whom English is not their primary language and who have a limited ability to read, write, speak, or understand English. It includes individuals who reported to the US Census that they speak English less than very well, not well, or not at all.
- **Low-Income Person:** An individual whose household income is at or below twice the federal poverty level of 2014—as defined in Section 673(2) of the Community Services Block Grant Act (42 U.S.C 9902(2)) including any revision required by that section for a family of the size involved.
- **Low-income Population:** Any readily identifiable group of low-income persons who live in geographic proximity and, if circumstances warrant, geographically dispersed or transient persons (such as migrant workers or Native Americans) who will be similarly affected by a proposed FTA program, policy, or activity.
- **Minority Persons include the following:**
 1. American Indian and Alaska Native, which refers to people having origins in any of the original peoples of North and South America (including Central America), and who maintain tribal affiliations or community attachment.
 2. Asian, which refers to people having origins in any of the original peoples of the Far East, Southeast Asia, or the Indian subcontinent, including, for example, Cambodia, China, India, Japan, Korea, Malaysia, Pakistan, the Philippine Islands, Thailand, and Vietnam.
 3. Black or African American, which refers to people having origins in any of the Black racial groups of Africa.
 4. Hispanic or Latino, which includes persons of Cuban, Mexican, Puerto Rican, South or Central American, or other Spanish culture or origin, regardless of race.

5. Native Hawaiian or Other Pacific Islander, which refers to people having origins in any of the original peoples of Hawaii, Guam, Samoa, or other Pacific Islands.

- **Minority Populations:** Any readily identifiable group of minority persons who live in geographic proximity and, if circumstances warrant, geographically dispersed or transient populations (such as migrant workers or Native Americans) who will be similarly affected by a proposed Department of Transportation (DOT) program, policy, or activity.
- **Minority Transit Route:** A route that has more than 40 percent of its boardings in minority census tracts. To strengthen the statistical reliability of analyses on passengers who ride or have access to the system, in certain cases, the MBTA may use route specific ridership data that does not reflect the characteristics of the census block, block group, or tract.
- **National Origin:** The particular nation in which a person was born or where the person's parents or ancestors were born.
- **Recipient:** Any public or private entity that receives federal financial assistance from FTA, whether directly from FTA or indirectly through a primary recipient. This term includes subrecipients, direct recipients, designated recipients, and primary recipients. The term does not include any ultimate beneficiary under any such assistance program.
- **Service Standard/Policy:** An established service performance measure or policy used by a transit provider or other recipient as a means to plan or distribute services and benefits within its service area.
- **Subrecipient:** An entity that receives federal financial assistance from FTA through a primary recipient.
- **Title VI Program:** A document developed by an FTA recipient (e.g. MBTA) to demonstrate how the recipient is complying with Title VI requirements. Direct and primary recipients must submit their Title VI Programs to FTA every three years. The Title VI Program must be approved by the recipient's board of directors or appropriate governing entity or official(s) responsible for policy decisions prior to submission to FTA.

Appendix 1-B

FMCB Approval of MBTA Title VI Program



Charles D. Baker, Governor
Karyn E. Polito, Lieutenant Governor
Stephanie Pollack, MassDOT Secretary & CEO
Luis Manuel Ramirez, General Manager & CEO

massDOT
Massachusetts Department of Transportation

VOTED:

That Fiscal and Management Control Board ("FMCB") hereby approves the Authority's Title VI Program, as presented at the FMCB meetings of September 18 and 25, 2017.

FURTHER VOTED:

That the General Manager is hereby authorized and directed to take any steps deemed necessary and appropriate, pursuant to, and in compliance with, Title 49, Section 21.9(b) of the United States Code and applicable Title VI regulations and guidance, to submit, on behalf of the Authority, the attached Title VI Program Report to the Federal Transit Administration.

A true copy,

Attest: September 25, 2017

Joseph Aiello, Chair
Fiscal and Management Control Board

Appendix 2-A

List of Posting Locations of Title VI Nondiscrimination Notice

	Notification	Quantity
Red Line		
Alewife	Y	2
Davis	Y	2
Porter	Y	1
Harvard	Y	3
Central	Y	2
Kendall/MIT	Y	2
Charles/MGH	Y	1
Park Street	Y	1
Downtown Crossing	Y	3
South Station	Y	2
Broadway	Y	1
Andrew	Y	1
JFK/UMass	Y	1
Savin Hill	Y	1
Fields Corner	Y	1
Shawmut	Y	1
Ashmont	Y	1
North Quincy	Y	2
Wollaston	Closed for Renovation - Pending	
Quincy Center	Y	1
Quincy Adams	Y	1
Braintree	Y	1

Orange Line		
Oak Grove	Y	1
Malden Center	Y	1
Wellington	Y	1
Assembly	Y	2
Sullivan Square	Y	1
Community College	Y	1
North Station	Y	3
Haymarket	Y	2
State Street	Y	3
Downtown Crossing	Y	4
Chinatown	Y	2
Tufts Medical Center	Y	2
Back Bay	Y	1
Massachusetts Avenue	Y	2
Ruggles	Y	4
Roxbury Crossing	Y	1
Jackson Square	Y	2
Stony Brook	Y	2
Green Street	Y	2

Forest Hills	Y	2
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Blue Line		
Wonderland	Y	1
Revere Beach	Y	1
Beachmont	Y	1
Suffolk Downs	Y	2
Orient Heights	Y	2
Wood Island	Y	2
Airport	Y	2
Maverick	N - a case is being installed	0
Aquarium	N - a case is being installed	0
State Street	Y	3
Government Center	N - a case is being installed	0
Bowdoin	Y	1

Green Line		
Lechmere	N - a poster is being hung	0
Science Park	Y	1
North Station	Y	1
Haymarket	Y	2
Government Center	N - a poster is being hung	0
Park Street	N - a poster is being hung	0
Boylston	Y	2
Arlington	N - a poster is being hung	0
Copley	Y	2
Hynes Convention Center	N - a poster is being hung	0
Kenmore	N - a poster is being hung	0
Prudential	Y	1
Symphony	Y	1
Northeastern University	N	0
Museum of Fine Arts	N	0
Longwood Medical Area	N	0
Brigham Circle	N	0
Fenwood Road	N	0
Mission Park	N	0
Riverway	N	0
Back of the Hill	N	0
Heath	N	0
Fenway	N - a poster is being hung	0
Longwood	Y	1
Brookline Village	Y	1
Brookline Hills	N - a poster is being hung	0
Beaconsfield	N	0
Reservoir	Y	1

Chestnut Hill	N	0
Newton Centre	N	0
Newton Highlands	N	0
Eliot	N	0
Waban	N	0
Woodland	N	0
Riverside	Y	1
Saint Marys Street	N	0
Hawes Street	N	0
Kent Street	N	0
Saint Paul Street	N	0
Coolidge Corner	N	0
Summit Avenue	N	0
Brandon Hall	N	0
Fairbanks Street	N	0
Washington Square	N	0
Tappan Street	N	0
Dean Road	N	0
Englewood Avenue	N	0
Cleveland Circle	N	0
Blandford Street	N	0
Boston University East	N	0
Boston University Central	N	0
Boston University West	N	0
Saint Paul Street	N	0
Pleasant Street	N	0
Babcock Street	N	0
Packards Corner	N	0
Harvard Avenue	N	0
Griggs Street	N	0
Allston Street	N	0
Warren Street	N	0
Washington Street	N	0
Sutherland Road	N	0
Chiswick Road	N	0
Chestnut Hill Avenue	N	0
South Street	N	0
Boston College	Y	1

Silver Line		
South Station	Y	1
Courthouse	Y	2
World Trade Center	Y	2
Silver Line Way	N	0
Airport Terminals	N	0

Appendix 2-B

Title VI Nondiscrimination Notice

Notice of Nondiscrimination Rights and Protections to Beneficiaries

Federal “Title VI/Nondiscrimination” Protections

The Massachusetts Bay Transportation Authority (MBTA) operates its programs, services, and activities in compliance with federal nondiscrimination laws including Title VI of the Civil Rights Act of 1964 (Title VI), the Civil Rights Restoration Act of 1987, and related statutes and regulations. Title VI prohibits discrimination in federally assisted programs and requires that no person in the United States of America shall, on the grounds of **race, color, or national origin** (including **limited English proficiency**), be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination under any program or activity receiving federal assistance. Related federal nondiscrimination laws administered by the Federal Transit Administration prohibit discrimination on the basis of **age, sex, and disability**. These protected categories are contemplated within the MBTA Title VI Program consistent with federal interpretation and administration. Additionally, the MBTA provides meaningful access to its programs, services, and activities to individuals with limited English proficiency, in compliance with US Department of Transportation policy and guidance on federal Executive Order 13166.

State Nondiscrimination Protections

The MBTA also complies with the Massachusetts Public Accommodation Law, M.G.L. c 272 §§ 92a, 98, 98a, prohibiting making any distinction, discrimination, or restriction in admission to or treatment in a place of public accommodation based on **race, color, religious creed, national origin, sex, sexual orientation, disability, or ancestry**. Likewise, the MBTA complies with the Governor’s Executive Order 526, section 4 requiring all programs, activities, and services provided, performed, licensed, chartered, funded, regulated, or contracted for by the state shall be conducted without unlawful discrimination based on **race, color, age, gender, ethnicity, sexual orientation, gender identity or expression, religion, creed, ancestry, national origin, disability, veteran's status** (including Vietnam-era veterans), or **background**.

Additional Information

To request additional information regarding Title VI and related federal and state nondiscrimination obligations, please contact:

MBTA Customer Communications
10 Park Plaza Room 5610
Boston, MA 02116

617-222-3200
TTY: 617-222-5416
www.mbta.com

Complaint Filing

To file a complaint alleging a violation of Title VI or related federal nondiscrimination law, contact the MBTA Title Specialist (via MBTA Customer Communications) within 180 days of the alleged discriminatory conduct.

To file a complaint alleging a violation of the state's Public Accommodation Law, contact the Massachusetts Commission Against Discrimination within 300 days of the alleged discriminatory conduct at:

Massachusetts Commission Against Discrimination (MCAD)
One Ashburton Place, 6th Floor
Boston, MA 02109
617-994-6000
TTY: 617-994-6196

Translation

English: If this information is needed in another language, please contact the MBTA Title VI Specialist at 617-222-3200.

Portuguese: Caso esta informação seja necessária em outro idioma, favor contar o Especialista em Título VI do MBTA pelo telefone 617-222-3200.

Spanish: Si necesita esta información en otro idioma, por favor contacte al especialista de MBTA del Título VI al 617-222-3200.

Chinese Simplified: (mainland & Singapore): 如果需要使用其它语言了解信息，请联系麻纱湾区交通局（MBTA）《民权法案》第六章专员，电话617-222-3200。

Chinese Traditional: (Hong Kong & Taiwan): 如果需要使用其它語言了解信息，請聯繫麻省灣區交通局（MBTA）《民權法案》第六章專員，電話617-222-3200。

Russian: Если Вам необходима данная информация на любом другом языке, пожалуйста, свяжитесь со специалистом по Титулу VI MBTA по тел: 617-222-3200.

Haitian Creole: Si yon moun vle genyen enfòmasyon sa yo nan yon lòt lang, tanpri kontakte Espesyalis MBTA Title VI la nan nimewo 617-222-3200.

Vietnamese: Nếu quý vị cần thông tin này bằng tiếng khác, vui lòng liên hệ Chuyên viên Luật VI của MBTA theo số điện thoại 617-222-3200.

French: Si vous avez besoin d'obtenir une copie de la présente dans une autre langue, veuillez contacter le spécialiste du Titre VI de MBTA en composant le 617-222-3200.

Italian: Se ha bisogno di ricevere queste informazioni in un'altra lingua si prega di contattare lo Specialista MBTA del Titolo VI al numero 617-222-3200.

Khmer: ប្រសិនបើលោក-អ្នកត្រូវការបកប្រែព័ត៌មាននេះ

សូមទាក់ទងអ្នកឯកទេសលើជំពូកទី**6** របស់**MBTA** តាមរយៈលេខទូរស័ព្ទ **617-222-3200**

Arabic: 617-222-3200

The MBTA's summary Title VI Notice in English and Spanish is provided below:

Summary Title VI Notice - English

Under Title VI of the Civil Rights Act of 1964, the MBTA does not discriminate against any person in its programs, services, and activities based on race, color, or national origin. To learn more about your civil rights or to file a complaint, please contact:

MBTA Title VI Specialist
Office of Diversity and Civil Rights
10 Park Plaza
Boston, MA 02116
(617)-222-3200
Email: MBTACivilRights@mbta.com
Website: www.mbta.com/TitleVI

Noticia de Título VI - Spanish

Conforme al Título VI de la Ley de Derechos Civiles de 1964, MBTA no discrimina a ningún individuo en sus programas, servicios y actividades por razones de raza, color u origen nacional. Si desea conocer más sobre sus derechos civiles o presentar una reclamación, favor contactar a:

Especialista del Título VI de MBTA (*MBTA Title VI Specialist*)
Oficina de Diversidad y Derechos Civiles (*Office of Diversity and Civil Rights*)
10 Park Plaza
Boston, MA 02116
(857) 368-8580
7-1-1 para servicio de relevo de voz
E-mail: MBTACivilRights@mbta.com
Sitio web: www.mbta.com/TitleVI

Appendix 2-C

Title VI Complaint Form



Discrimination Complaint Form

Please provide the following information in order for us to process your complaint. This form is available in alternate formats and multiple languages. Should you require these services or any other assistance in completing this form, please let us know.

Name: _____

Address: _____

Telephone Numbers: (Home) _____ (Work) _____ (Cell) _____

Email Address: _____

Please indicate the nature of the alleged discrimination:

Categories protected under *Title VI of the Civil Rights Act of 1964*:

☐ Race ☐ Color ☐ National Origin (including limited English Proficiency)

Additional categories protected under related Federal and/or State laws/orders:

☐ Disability ☐ Age ☐ Sex ☐ Sexual Orientation ☐ Religion ☐ Ancestry

☐ Gender ☐ Ethnicity ☐ Gender Identity ☐ Gender Expression ☐ Creed

☐ Veteran's Status ☐ Background

Who do you allege was the victim of discrimination?

☐ You ☐ A Third Party Individual ☐ A Class of Persons

Name of individual and/or organization you allege is discriminating:

Do you consent to the investigator sharing your name and other personal information with other parties to this matter when doing so will assist in investigating and resolving your complaint?

☐ Yes ☐ No

Please describe your complaint. You should include specific details such as names, dates, times, witnesses, and any other information that would assist us in our investigation of your allegations. Please include any other documentation that is relevant to this complaint. You may attach additional pages to explain your complaint.

Have you filed this complaint with any other agency (Federal, State, or Local)?

☐ Yes ☐ No

If yes, please identify: _____

Have you filed a lawsuit regarding this complaint?

☐ Yes ☐ No

If yes, please provide a copy of the complaint.

Signature: _____ Date: _____

Mail to: Title VI Coordinator, MBTA Office of Diversity and Civil Rights, Suite 3800,
10 Park Plaza, Boston, MA 02116

or,

Email to: MBTACivilRights@mbta.com

Appendix 2-D

Public Participation Plan

Massachusetts Bay Transportation Authority

PUBLIC PARTICIPATION PLAN



Massachusetts Bay Transportation Authority

Driven by Customer Service

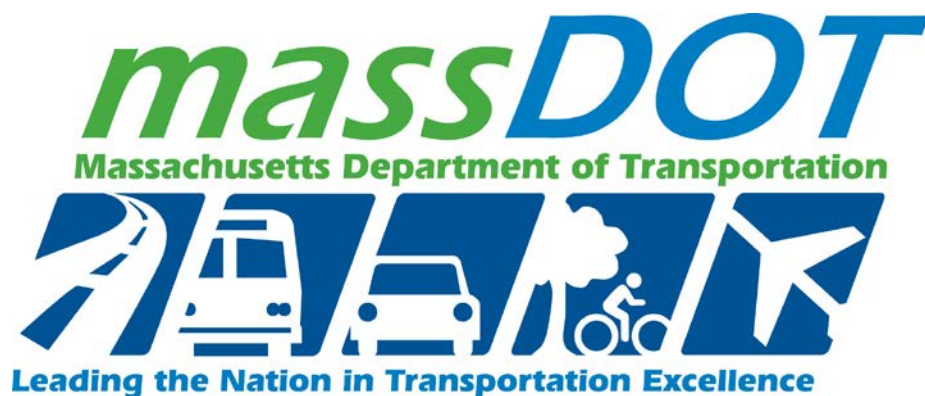


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1 INTRODUCTION

In accordance with state and federal law requirements¹, and to ensure inclusive and accessible public engagement processes for transportation decision making, the Massachusetts Bay Transportation Authority (MBTA) as a component of the Massachusetts Department of Transportation (MassDOT/MBTA) has developed this Public Participation Plan (PPP). This Plan serves to guide agency public participation efforts, including populations that have been underserved by the transportation system and/or have lacked access to the decision-making process. This Plan guides MassDOT/MBTA in its efforts to offer early, continuous, and meaningful opportunities for the public to help identify social, economic, and environmental impacts of proposed transportation policies, projects and initiatives across MassDOT/MBTA.

The Plan is based on federal and state requirements for encouraging and ensuring community participation. It describes MassDOT/MBTA's overall goals, guiding principles, and strategic approach to achieving stated objectives. The Plan also defines how MassDOT/MBTA incorporates public participation into its transportation decision-making processes, and how the agency ensures access for people with disabilities and the inclusion of low income and minority stakeholders. Specifically, the Plan states the methods that MassDOT/MBTA will use to reach out to persons who are low-income, minority, Limited English Proficient (LEP), or have a disability, and other traditionally underrepresented populations. Because different transportation decisions to be made require different techniques for reaching the public, this Plan provides a toolbox of techniques to be applied, as appropriate, to achieve effective participation.

This Plan is a living document which will change and grow to help MassDOT/MBTA deepen and sustain its work to engage diverse community members throughout the state. Therefore, MassDOT/MBTA will modify its public participation methods and activities over time, based on ideas and feedback from community members and MassDOT/MBTA's evaluation of our public participation effectiveness.

The Plan was developed through a collaborative effort between the MassDOT/MBTA Highway Division, the Rail and Transit Division (including the Massachusetts Bay Transportation Authority's Systemwide Accessibility Department), the Office of Transportation Planning and the Office of Diversity and Civil Rights. It is intended as a document that will govern MassDOT/MBTA's public

¹ The federal and state statutory and regulatory requirements are included at Attachment 1.

participation activities, but also serve as a useful guide for the metropolitan planning organizations and cities and towns MassDOT/MBTA works with, as well as for the consultants we contract with for public engagement support. The Plan also empower the public through its clear definition of how MassDOT/MBTA conducts its public participation activities, and sets a standard for our public facing departments, including managers and staff, to achieve. This Plan is not intended to be applied in a wooden manner, meaning that there may be occasions where the facts or circumstances may not allow for absolute compliance with the protocols and policies stated, but that we will make every effort to meet the standards we have set. Also, it is important to note that some areas within MassDOT/MBTA have pre-existing and approved policies for public engagement that are unique to the functions they carry out or the targeted audiences served, and in such instances (for example, Disadvantaged Business Enterprise goal setting), there may be departures from this Plan that are legitimate and reasonable.

In order for this Plan to take full effect, MassDOT/MBTA requires and will seek public comment, and make such changes and improvements on this Plan and related protocols and policies as will improve our ability to provide an equal opportunity for public input in our transportation decision making processes.

1.1 MassDOT/MBTA's Structure, Mission and Values

The MBTA is a separate legal entity but exists within the organizational structure of MassDOT. The MBTA operates within the Rail and Transit subdivision of the MassDOT structure.

- The Rail and Transit Division is responsible for overseeing, coordinating, and planning all transit and rail matters throughout the commonwealth. The division administers and manages the freight and rail programs of the department and the intercity bus capital assistance program, and oversees the Massachusetts Bay Transportation Authority (MBTA) and all regional transit authorities in the Commonwealth. The MassDOT/MBTA Board of Directors serves as the governing body of the MBTA.

MassDOT/MBTA's mission is to deliver excellent customer service to people who travel in the Commonwealth and to provide our nation's safest and most reliable transportation system in a way

that strengthens the Commonwealth's economy and quality of life. MassDOT/MBTA embraces the following values:

1. **Dedication:** We will provide service around the clock and under all circumstances.
2. **Respect:** We will treat the public as our valued customer, and treat one another as we would like to be treated.
3. **Innovation:** We will improve and integrate transportation services using creative thinking and the best available practices and technology, while minimizing disruption to the public.
4. **Diversity:** We will promote an inclusive workforce and a culture that serves employees and customers fairly.
5. **Honesty:** We will provide the public with accurate information that is understandable and accessible.

1.2 MassDOT/MBTA's Public Participation Goals

MassDOT/MBTA has the following public participation goals which agency representatives and those working in concert with MassDOT/MBTA on transportation projects and initiatives should strive to achieve:

1. *Obtain Quality Input and Participation*

Comments received by MassDOT/MBTA are to be encouraged and reviewed to the extent they can be useful, relevant, and constructive, and contribute to better plans, projects, programs, and decisions.

2. *Establish Consistent Commitment*

MassDOT/MBTA strives to communicate regularly and develop trust with communities, while helping build community capacity to provide public input, as needed.

3. *Increase Diversity*

Participants who are encouraged to participate in public engagement processes should represent, as appropriate to a project or those impacted, a range of socioeconomic, ethnic, and cultural perspectives and include people from low-income and minority neighborhoods, people with limited English proficiency, and other traditionally underserved people.

4. *Ensure Accessibility*

Every effort should be made to ensure that participation opportunities are physically, geographically, temporally, linguistically and culturally accessible.

5. *Provide Relevance*

Issues are framed clearly and simply such that the significance and potential effect may be understood by the greatest number of participants.

6. *Foster Participant Satisfaction*

MassDOT/MBTA should encourage the public to participate in project and initiative related discussions, recognizing that people who take the time to participate feel it is worth the effort to join the discussion and provide feedback.

7. *Clearly Define Potential for Influence*

The process clearly identifies and communicates where and how participants can have influence and direct impact on decision making.

8. *Establish and Maintain Partnerships*

MassDOT/MBTA develops and maintains partnerships with communities and community-based organizations through the activities described in the PPP.

9. *Provide Opportunities to Build Consensus*

MassDOT/MBTA should ensure that discussions, particularly where there are conflicting views, are structured to allow for levels of compromise and consensus that will satisfy the greatest number of community concerns and objectives. MassDOT/MBTA recognizes that processes which allow for consensus to be achieved is critical to enable public support for recommended actions.

1.3 Guiding Principles for Public Participation at MassDOT/MBTA

To help MassDOT/MBTA achieve its goals for public participation, the following principles have been adopted:

1. *Promote Respect*

All transportation constituents and the views they promote should be respected. All feedback received should be given careful and respectful consideration. Members of the public should have opportunities to debate issues, frame alternative solutions, and affect final decisions.

2. *Provide Proactive and Timely Opportunities for Involvement*

Avenues for involvement should be open, meaningful, and organized to let people participate comfortably, taking into consideration accessibility, language, scheduling, location and the format of informational materials. Meetings should be structured to allow informed, constructive dialogue, be promoted broadly and affirmatively; and be clearly defined in the early stages of plan or project development. Participation activities should allow for early involvement and be ongoing and proactive, so participants can have a fair opportunity to influence MassDOT/MBTA decisions.

3. *Offer Authentic and Meaningful Participation*

MassDOT/MBTA should support public participation as a dynamic and meaningful activity that requires teamwork and commitment at all levels. Public processes should provide participants with purposeful involvement, allowing useful feedback and guidance. Participants should be encouraged to understand and speak with awareness of the many competing interests, issues, and needs that lead to transportation ideas and projects.

4. *Provide a Clear, Focused, and Predictable Process*

The participation process should be understandable and known well in advance. This clarity should be structured to allow members of the public and officials to plan their time and use their resources to provide input effectively. Activities should have a clear purpose, the intended use of input received made clear, and all explanations described in language that is easy to understand.

5. *Foster Diversity and Inclusiveness*

MassDOT/MBTA should proactively reach out to and engage people with disabilities, as well as low-income, minority, limited English proficient disabled and other traditionally underserved populations.

6. *Be Responsive to Participants*

MassDOT/MBTA meetings should facilitate discussion addresses participants interests and concerns. Scheduling should be designed to meet the greatest number of participants possible and be considerate of their schedules and availability. Informational materials provided should be clear, concise and responsive to known community concerns, while avoiding misleading or biased suggestions or solutions.

7. Record, Share and Respond to Public Comments ***

Public comments, written and verbal, should be given consideration in MassDOT/MBTA decision making processes and reported in relevant documents. Specifically, public comments provide an opportunity for shared knowledge among MassDOT/MBTA departments and transportation partners, but also require clear responses that are documented to demonstrate that community input was in fact addressed. MassDOT/MBTA should communicate the impact of the public input on decisions at a broad summary level, describing the major themes, the decisions reached, and the rationales for the decisions.

8. *Self-evaluation and Plan Modification*

The effectiveness of this Plan will be reviewed periodically to ensure it meets the needs of the public, and will be revised to include new strategies and approaches.

2. MassDOT/MBTA'S APPROACH TO PUBLIC PARTICIPATION

Transportation decision making and project development processes are regulated and follow set procedures, including the need to give the public opportunities to participate. These public involvement objectives are further shaped by MassDOT/MBTA's commitment to civil rights related obligations, such as removal of barriers to participation, diversity, and inclusive outreach. This Public Participation Plan describes participation opportunities generally and includes specific protocols and resources that are designed to facilitate diverse and inclusive public outreach and involvement. The plan is a flexible and evolving document. As necessary, MassDOT/MBTA will revise the PPP based on recurring assessments of successes and/or challenges associated with outreach, as well as suggestions made and the results of public engagement processes.

In this chapter, a general description of MassDOT/MBTA's public participation activities is presented. Chapter 3 contains the specific civil rights protocols utilized by MassDOT/MBTA for all public outreach activities, categorized by types of communication formats, including large group discussions targeted group engagement and one-on-one interactions. Chapter 3 also contains the MassDOT/MBTA Accessible Meeting Policy. Our view is that if these objectives and standards are consistently applied to the different types of public meetings MassDOT/MBTA convenes or participates in, the resulting discussions and resolution of issues will be inclusive and accessible to all.

In the subsequent chapters, specific opportunities to participate are described in the context of the development of:

- Fare Changes
- Service Planning and Operations
- Capital Project Development and Design

These outreach described for these specific activities should be read in concert with the civil rights protocols set forth in Chapter 3, as they are both congruent with and structured to facilitate inclusion in all MassDOT/MBTA public participation efforts.

In addition, relevant federal policy guidance, principles and techniques are referenced that enhance the potential for successful public participation processes. These ideas are derived from the U.S. DOT– sponsored guidance for systematically setting up and implementing a public

participation program for a specific plan, program, or project. See Appendix 2, U.S. DOT Guidance, *Public Involvement Techniques for Transportation Decision-Making*.

2.2 Public Participation Techniques

MassDOT/MBTA takes pride in its work to maintain a collaborative relationship with community and municipal stakeholders and has strategically developed this Public Participation Plan to foster collaboration in an all-inclusive manner. The MassDOT/MBTA public outreach effort rests on utilizing multiple communication channels to distribute information to and solicit input from affected constituencies. MassDOT/MBTA typically communicates with the general public through one or more of the following methods:

- MassDOT/MBTA website
- Public Media (including local minority and non-English newspapers, radio stations, and television stations)
- Press releases
- Posters, display boards, and flyers
- Project fact sheets
- Brochures
- Newsletters
- Public service announcements
- Mailing and email lists
- Information stands at local events
- Social media tools, including Twitter, the blog, Flickr, YouTube, email distribution lists, and other new media venues
- Legislative briefings
- Presentations, public meetings, public hearings, open houses, and workshops
- Civic advisory committees and working groups

MassDOT/MBTA Website Specifics:

Many people use the Internet as their main source of data and information. The MassDOT/MBTA website is a comprehensive resource for people wanting information about MassDOT/MBTA programs, projects, and activities. Public notices of all MassDOT/MBTA meetings, public hearings, and public comment periods are posted on this site, along with information about MassDOT/MBTA programs, projects, and activities. Some programs and projects have dedicated web pages on the MassDOT/MBTA website that include:

- Information about upcoming meetings
- Project presentations and fact sheets
- Summary notes for meetings/workshops on the project
- A way to be added to the project's electronic distribution list

Project websites are important tools for people who cannot attend meetings. Members of the public can review presentations and meeting summaries and provide comments through emails and letters to the project team. People with disabilities that limit their ability to attend meetings can also review project information and provide comments on the website, and thereby have an alternative to physically attending a meeting.

Meeting Notice Content and Distribution:

MassDOT/MBTA announces all meetings, public hearings, open houses, workshops, and public comment periods through press releases, mailings, and/or the distribution of informational meeting flyers as well as placing meeting information on the MassDOT/MBTA website. Notices are published in local English newspapers, and if the project has an impact on low income or minority populations, an effort is made to place notices in media that serves local, minority and non-English communities in regions across the Commonwealth. In the greater Boston area, such publications include *El Mundo*, *El Planeta*, *Vocero Hispano*, *Mattapan Reporter*, *Haitian Reporter*, *Sampan*, and *The Bay State Banner*. Meeting notices will include information about getting to a meeting location using public transportation, when transit is available. MassDOT/MBTA notices also let people know they can request foreign language assistance, and that sign-language interpreters and other accommodations are available on request for people with disabilities (with timely notification). There is also information that lets people know who they can contact with questions or concerns. The information for these meetings and the informational materials provided at the meetings are translated into languages other than English, as needed.

2.2.1 Public Meetings, Open Houses, and Workshops

1) Public Meetings

Public meetings are held to present information to the public and obtain input from community residents. Meetings provide a time and place for face-to-face contact and two-way communication. They are generally tailored to specific issues or community groups and can be either informal or formal. Public meetings are used to disseminate information, provide a setting for public discussion, and receive feedback from the community.

2) Open Houses

Open houses are informal settings where people can obtain information about a plan, program, or project. They do not have formal agendas, and no formal discussions or presentations take place. At open houses, people receive information informally from exhibits and staff, and they are encouraged to give opinions, make comments, and state preferences to staff, orally or in writing. Informal presentations, slide shows, and one-on-one discussions take place continuously throughout the event, which usually includes a series of stations: a reception area; a presentation area for slide shows or short talks; areas for one-on-one discussions between community people and agency staff members; and displays of background information, activities to date, work flow, and anticipated next steps, accompanied by an array of primary subject panels. Since there is no fixed agenda, open houses are usually scheduled for substantial portions of a day or evening, so that people can drop in at their convenience and fully participate.

Note that Open Houses often involve one-on-one discussion of issues or concerns between meeting participants and project engineers or other MassDOT/MBTA representatives. The content and nature of these informal exchanges is not easily captured in documents such as meeting summaries or notes. Thus, those MassDOT/MBTA representatives that have such an exchange are instructed to relay the content to the Project Manager so that these issues are catalogued and tracked, as needed.

3) Workshops

Workshops are organized around a particular topic or activity and typically involve a relatively small group of people who want to participate intensively. These events are usually one to three hours in duration, and small groups work on a specific agenda. MassDOT/MBTA staff members provide

information, answer questions, and participate as individuals in workshops. Workshops are inherently participatory and encourage a “working together” atmosphere.

2.2.2 Public Hearings

A public hearing is more formal than a public meeting. The public hearing is an opportunity for members of the public to make recorded statements of their views immediately before project decision making and, in the case of an environmental impact statement (EIS), preparation of the final environmental impact statement (FEIS). MassDOT/MBTA views the hearing as a specific, observable administrative benchmark for public involvement.

A public hearing is held near the end of a process or subprocess, prior to a decision point, to gather community comments and hear the positions of all interested parties for the public record and input into decisions. Public hearings are required by the federal government for many transportation projects and have specific legal requirements.

2.2.3 Meeting Facilities and Accessibility

MassDOT/MBTA is required to hold public hearings, meetings, open houses, and workshops in accessible facilities that are, wherever possible, at locations close to or served by fixed-route transit service, to let people know that the meeting location is accessible. Meeting planners must conduct an analysis of the demographics of the area where the meeting is to be held to determine whether notices should be translated into languages other than English. The availability of handout materials in alternative formats—Braille, large print, and/or audio cassette, and languages other than English—as well as other accommodations (language interpreters, sign language interpreters, CART translators, etc.) must be indicated in the meeting notices along with specific information on how to request these accommodations.

MassDOT/MBTA meeting planners should research and make every effort to select the location, size, and setup of meeting facilities based on the specific characteristics of the audience and the type of information to be presented. Whenever possible, hearings, meetings, and workshops should be held in places that are centrally located to the project and likely to attract a cross section of the people and businesses representative of the community stakeholders. Public libraries, public schools, and community centers are often used.

MassDOT/MBTA meeting planners should strive to create a welcoming environment. The staff members charged with the coordination of any meeting are responsible for providing resources, including free accessibility assistance and language assistance, to ensure that the event is

accessible to all people and to provide the greatest opportunity for participation by interested parties.

2.3 Tailoring Outreach to Underserved People

Meeting planners should not only schedule a room, post notices and ensure that accommodations are in place for a meeting to be well attended. There is also an obligation to conduct outreach to encourage attendance, particularly among groups protected by the anti-discrimination laws MassDOT/MBTA has promised to comply with.

Many people in minority and low-income communities, as well as those with low literacy and/or limited English proficiency, have traditionally been underserved by conventional outreach methods. Outreach to traditionally underserved groups helps ensure that all constituents have opportunities to affect the decision-making process. It sets the tone for subsequent project activities and promotes a spirit of inclusion. The greater the consensus among all community members, the more likely the position agreed upon will aid in decision making for the plan, program, or project. Inclusive outreach efforts are particularly useful because they:

- Provide fresh perspectives to project planners and developers
- Give MassDOT/MBTA firsthand information about community-specific issues and concerns
- Allow MassDOT/MBTA to understand potential controversies
- Provide feedback to MassDOT/MBTA on how to get these communities involved
- Ensure that the solutions ultimately selected will be those that best meet all of the communities' needs

MassDOT/MBTA staff should strive to understand the full range of a community's needs in order to create more responsive and more innovative plans. By interacting with community members, MassDOT/MBTA staff will gain insight into the reasons why community members agree or disagree with proposed plans or projects. The perspective of traditionally underserved people can inform the goals and outcomes of planning and project development, and ignoring this input can seriously threaten a project from being approved. Such individuals can suggest fresh approaches to transportation issues that otherwise might not be raised. MassDOT/MBTA's public outreach efforts are designed to accommodate the needs of low-income, minority, Limited English Proficiency, and other traditionally underserved people throughout all phases of any public participation process. MassDOT/MBTA staff should recognize that traditional techniques are not

always the most effective with these populations. Staff and managers employ a variety of public involvement techniques when working with underserved populations and communicates with community leaders to find out the best techniques for working with a particular group (e.g., which approaches to use, where and when to hold events, how to recruit people, and what to avoid doing).

2.4 The MBTA Rider Oversight Committee (ROC)

The MBTA established the Rider Oversight Committee in 2004 to meet monthly and discuss customer-service improvements and service-quality issues. Through the ROC, the MBTA has institutionalized ongoing public participation in all aspects of the Authority's operations.

The MBTA Rider Oversight Committee's mission statement is:

The MBTA ROC, a diverse group of riders, advocates, and MBTA employees, provides recommendations to the MBTA that communicate the needs and concerns of all riders in order to assist the MBTA in providing affordable, safe and quality service.

The MBTA and members of the ROC come together to address the concerns of public-transit customers. The 24-member committee addresses various transit-related issues, including but not limited to the MBTA's Fare Policy, fare structure, fare equity issues, service improvements, service-quality standards, ridership data collection, and alternative funding sources for both the capital program and the operating budget. In addition to monthly meetings, the committee meets quarterly with the MBTA's General Manager and Deputy General Manager/Chief Financial Officer, and the Secretary of Transportation, who also serves as Chairman of the MBTA board of Directors.

3 Title VI and ADA PROTOCOLS, POLICIES, AND RESOURCES

The civil rights protocols set forth in this document are a baseline for holding inclusive, accessible and responsive public meetings, hearings and the like. There are two primary sections in this chapter. Section 3.1 contains protocols and resources for ensuring diversity and inclusivity in public engagement. Section 3.2 contains protocols and resources for ensuring the accessibility of MassDOT/MBTA's public activities. These efforts are related and appropriate references are made between these sections, as needed.

3.1 Civil Rights Protocols for Public Engagement

Many MassDOT/MBTA departments and units conduct and participate in unique types of meetings and hearings within the course of their day to day operations. These Protocols have been designed with the intention of supporting and not supplanting the basic form and structure of existing operations. Further, these Protocols will provide links, resources and contacts for the purpose of achieving public engagement that is compliant with civil rights law. It is anticipated that these Protocols should be considered part of existing Standard Operating Procedures, Guidelines and Manuals, and that as these document are revised, these Protocols will be incorporated into the relevant portions of these documents.

The obligation to comply with these Protocols begins with the person(s) responsible for organizing and/or conducting the meeting or hearing, and because of the shared nature of many public processes between units, should be viewed as a shared responsibility. For example, in the 25% Design Public Hearing, there are multiple units involved in presenting information to the public, and each unit has specific civil rights obligations to ensure that Title VI/Nondiscrimination populations, including people with limited English proficiency and/or disabilities are able to participate equally in these meetings.

These Protocols include steps and strategies to implement prior to holding a public meeting or other such activity and during the course of the public process. Due to the varied nature of MassDOT/MBTA's engagement with the public, it is not the intention within these Protocols to include all required actions specific to varying stages of the planning process, or varying departmental standard operation procedures. However, where a Project Manager or other staff member encounters a difficult public involvement situation, he/she is advised to contact the Title VI Specialist and/or the Manager of Federal Programs to identify strategies and alternatives to address such situations.

Similarly, these Protocols should not be woodenly applied to every meeting/hearing. Meetings should be tailored to the special needs of the community, and/or the target audience and subject matter to be addressed. Effective public participation from a civil rights perspective includes awareness of the local population (demographics) or individuals to be engaged, including languages spoken, represented cultural groups, community organizations and leaders and key players. Equally critical to an effective meeting are well communicated (effectively circulated across types of media, and translated when needed) and timely notice, early response and coordination on requests for language assistance for limited English proficient individuals or reasonable accommodation for people with disabilities.

Federal nondiscrimination obligations, through Title VI of the Civil Rights Act of 1964, Section 504 and 508 of the Rehabilitation Act of 1973, and the Americans with Disabilities Act (ADA) reach the categories of race, color, national origin (including LEP), age, sex, and disability. These protocols are designed to ensure that sufficient consideration of outreach to and inclusion of these groups is incorporated into MassDOT/MBTA's public engagement procedures. Adherence to these protocols will also sufficiently address State-level nondiscrimination obligations².

While the following protocols endeavor to highlight specific resources where available, past experience with the public can and should be considered a resource to identify individual and community needs, including civil rights related considerations such as language assistance needs, accessibility accommodations and inclusive public participation. Please use these Protocols as a guide and use good professional judgment in the decisions you make as you implement them.

3.1.1 Civil Rights Protocols by Type of Public Engagement

The following represent the four types of public engagement most commonly encountered by MassDOT/MBTA employees:

- Meetings for the general public
- Targeted outreach gatherings
- Open houses
- One-on-one interactions

² State level protections include the federal protections plus ethnicity, sexual orientation, gender identity or expression, religion, creed, ancestry, veteran's status (including Vietnam-era veterans), and background.

An introduction to each of these four types of public engagement is provided below. Familiarity with the following descriptions will help inform the user on how they should navigate the protocols set forth in this document.

Meetings for the General Public (Sec 2.1)

Public meetings and hearings, both at the project level and more broadly, are an opportunity for members of the public to engage in the transportation decision making process. The civil rights considerations described in this section are designed to inform and guide all MassDOT/MBTA staff involved in planning and conducting such events. Incorporation of these processes and utilization of these resources when planning or participating in public meetings/hearings will help ensure that these events are Title VI compliant.

Open Houses (Sec 2.2)

In the case that you are planning an open house session as a standalone event (such as a public information session) that will not precede a public meeting or hearing, see Sections 2.1.1 to 2.1.4.

MassDOT/MBTA staff and consultants regularly interact with members of the public through “open house” sessions prior to meetings/hearings. These sessions afford members of the public an opportunity to view design plans for projects that will be discussed at the formal public outreach event. MassDOT/MBTA staff and consultants (Designers, Planners, Right of Way Agents, Environmental Agents, etc.) are on hand to discuss particular details of interest with members of the public. While the interactions during these sessions are informal, critical issues are often raised. MassDOT/MBTA staff and consultants strive to address these issues accurately and effectively during these sessions. *[Practice Tip: Some attendees choose to forego the meeting/hearing satisfied with the information gained or with the opportunity to express concerns at the open house session.]* Due to the direct nature of interaction with members of the public at these open houses, there exist civil rights risk factors. These risks can be mitigated by adhering to the principles outlined in this section.

Targeted Outreach Gatherings (Sec 2.3)

At times, the complexity of a project, controversial issues, or the reality of having multiple large Title VI groups to address may require engaging targeted audiences of stakeholders. Similarly, MassDOT/MBTA may at times convene selected people within advisory committees, research efforts, focus groups and the like. The general work of understanding the demographics of people in a locality or project area still apply to determine what Title VI groups are impacted by an

initiative, as described above. However, there may be a need to include strong and possibly visible community leaders within Title VI populations; this can require more subtle and challenging efforts to secure their participation and needed contribution to discussions or deliberations.

One-on-One Interactions (Sec 2.4)

MassDOT/MBTA staff members interact directly with the public by virtue of the public facing programs, services, and activities the organization provides. These interactions can include planned meetings, such as those with property and business owners directly impacted by transportation projects, and spontaneous interactions with members of the public. These interactions, whether in person, over the phone, or electronic, present particular civil rights related risk factors that can be mitigated through the strategies articulated in Section 2.4.

3.1.2 Meetings for the General Public

3.1.2.1 Preliminary/Ongoing Considerations

- 1) Identify the population and composition of the individuals/communities impacted by the MassDOT/MBTA program, service, or activity by considering the following:
 - a. Project parameters, such as location, areas that will be impacted by construction phases, areas that may benefit from the completed project, and the areas that may be burdened by the completed project
 - b. The nature of the program, service, or activity (is it connected to the project development process? is it statewide, regional or local?)
- 2) Determine the Title VI features of the community to be engaged by reference to MassDOT/MBTA's Title VI maps, which include the limited English proficient (LEP) and minority populations across the Commonwealth. Consult the following maps and additional resources. *[Practice Tip: The first map (Figure 3) shows concentrations of LEP populations. You can identify the particular languages present in those areas by referencing the language specific maps. Foreign language services may be required for public outreach in these areas (see below).]*
 - a. MassDOT/MBTA LEP Maps
 - i. Percentage of LEP Speakers
<https://www.MassDOT/MBTA.state.ma.us/Portals/0/docs/CivilRights/TitleVI/Item5/Fig3.pdf>
 - ii. Spanish Language Overlay
<https://www.MassDOT/MBTA.state.ma.us/Portals/0/docs/CivilRights/TitleVI/Item5/Fig4.pdf>

- iii. Portuguese Language Overlay
<https://www.MassDOT/MBTA.state.ma.us/Portals/0/docs/CivilRights/TitleVI/Item5/Fig5.pdf>
 - iv. Chinese Language Overlay
<https://www.MassDOT/MBTA.state.ma.us/Portals/0/docs/CivilRights/TitleVI/Item5/Fig6.pdf>
 - v. French Creole Overlay
<https://www.MassDOT/MBTA.state.ma.us/Portals/0/docs/CivilRights/TitleVI/Item5/Fig7.pdf>
 - vi. Vietnamese Language Overlay
<https://www.MassDOT/MBTA.state.ma.us/Portals/0/docs/CivilRights/TitleVI/Item5/Fig8.pdf>
 - vii. Additional Languages Overlay
<https://www.MassDOT/MBTA.state.ma.us/Portals/0/docs/CivilRights/TitleVI/Item5/Fig9.pdf>
 - b. MassDOT/MBTA Minority Populations Map [*Practice Tip: This map shows the concentration of minority populations. This information can help you develop a strategy to publicizing public engagement opportunities and disseminating materials that effectively reaches representative and diverse stakeholders.*]
<https://www.MassDOT/MBTA.state.ma.us/Portals/0/docs/CivilRights/TitleVI/Item5/Fig3-2.pdf>
 - c. US Census Bureau Language Mapper
http://www.census.gov/hhes/socdemo/language/data/language_map.html?e=ml=gd
- 3) Identify key Title VI-related and other community based organizations and community leaders. [*Practice Tip: You may already have well established connections with individuals and groups throughout the Commonwealth. You are encouraged to continue reaching out to those. These instructions provide you with steps to identify previously unknown points of contact to diversify outreach.*] There are several approaches meeting planners can take to accomplish this step:
- a. Use the Civil Rights Constant Contact database that has been developed through IT, and codes organizations by e-mail, county. (pending completion)
 - b. Contact the MPO for the local area for a list of organizations by county and key leaders.
 - c. Consult tOffice of Transportation Planning MPO Liaisons who work with the individual MPOs and can support the effort to identify groups and individuals.

- d. Consult the Office of Public Affairs which has conducted a variety of meeting outreach efforts across the state and can identify key groups and individuals in every city in the state.
- e. For outreach in the Boston region, contact the Mayor's Office of Neighborhood Services. http://www.cityofboston.gov/ons/coor_list.asp
[Practice Tip: This office maintains liaisons in all of the Boston neighborhoods as well as liaisons to these demographic groups.]

3.1.2.2 Meeting Location and Time

1) Title VI Considerations

- a. Consult with community leaders and community based organizations to identify any aspects of the community which may be central in determining the time and location of the public engagement activity. *[Practice Tip: These individuals can help you understand the cultural, ethnic, religious, gender, and political histories/experiences of the demographic groups in the locale to better inform meeting planning.]*
- b. Consider factors such as cultural sensitivities and/or professional and academic commitments in setting the number of meetings. Multiple meetings can be held at various locations and times if doing so promotes meaningful access to the public engagement opportunity.
- c. Where possible, select a meeting location near public transportation options. *[Practice Tip: A general rule of thumb is within ½ mile walking distance.]*

2) ADA Considerations

- a. Identify a venue for the public meeting that is ADA compliant and accessible to people with disabilities.
 - i. MassDOT/MBTA maintains an Accessible Facilities Database that contains updated information regarding venues that have been previously assessed for ADA compliance.
- b. If an appropriate venue cannot be identified in the database, the following resources can identify public meeting venues that may be accessible:
 - i. The Massachusetts Office on Disability
<http://www.mass.gov/anf/employment-equal-access-disability/oversight-agencies/mod/>
 - ii. The Disability Commissions (S:\Civil Rights\ADA\Disability Commissions)

- iii. The Independent Living Centers
<http://www.masilc.org/membership/cils>
- c. Take the opportunity afforded by early communication with venue staff to identify pre-existing accessibility accommodations, such as assistive listening devices and Communication Access Real-Time Translation (CART) equipment. *[Practice Tip: Even though you don't know if such devices will be needed yet, this is a good opportunity to take stock of what is available should the need arise.]* The need for these accommodations will be addressed in Section 2.1.4, below.
- d. For a full treatment regarding ADA obligations in the public outreach context, consult the MassDOT/MBTA Accessible Meeting Policy in Section 3.2 below or online at:
http://www.MassDOT/MBTA.state.ma.us/Portals/0/docs/CivilRights/ADA/Attachment_13.pdf . The policy enumerates ADA obligations in the public meeting context and provides a checklist for holding an ADA accessible public meeting. *[Practice Tip: If you are planning on using a venue for the first time, this checklist can help you verify its accessibility. The completed checklist should be shared with ODCR's Manager of Federal Programs for incorporation into the database.]*

3.1.2.3 Coordinating Public Notice

- 1) Draft the public meeting notice document, either utilizing existing approved templates or creating a new one, ensuring that the following civil rights related components are included:
 - a. Notice of Nondiscrimination
 - i. (Insert Updated Notice Language Here)
 - b. Availability of language services and reasonable accommodations
 - i. (Insert Updated Notice Language Here)
 - c. Contact information and procedures for requesting the above services, additional information, or to express a concern
 - i. (Insert Updated Notice Language Here)
 - d. International Symbol of Accessibility
http://en.wikipedia.org/wiki/International_Symbol_of_Access
- 2) Public meeting notices must be accessible. For guidance, please refer to Section 2.1.4 §§ 3. *[Practice Tip: Since public meeting notices are disseminated in a variety of ways, including physical postings, website postings, and email blasts, it is*

important that the appropriate font and font size be used and that the electronic document be compatible for use with screen readers.]

- 3) Address language needs and utilize non-English language outreach resources in the dissemination area if individuals who have limited proficiency in English are present.
 - a. Identify non-English language media (print, TV, radio, online, etc.) and sites with a strong presence of individuals who have limited proficiency in English (transportation facilities, community centers, libraries, commercial/employment/educational establishments, places of worship, cultural centers, etc.) that may be effective in communicating notice to individuals who have limited proficiency in English. *[Practice Tip: The reason you are identifying these resources first is to know what services actually exist to provide translated materials to.]* Consider consulting the following resources:
 - i. MassDOT/MBTA Office of Diversity and Civil Rights
<http://www.MassDOT/MBTA.state.ma.us/OfficeofCivilRights.aspx>
 - ii. MassDOT/MBTA Public Affairs
 - iii. Community Leaders
 - iv. Metropolitan Planning Organizations (MPOs)
<http://www.MassDOT/MBTA.state.ma.us/Portals/17/Images/DataMaps/boundry/MPOs-RPAs-Statewide.pdf>
 - v. Regional Transit Agencies (RTAs)
<http://www.MassDOT/MBTA.state.ma.us/Portals/17/docs/MapCatalog/Maps/RTAs-Statewide.pdf>
 - vi. Public Libraries <http://www.publiclibraries.com/massachusetts.htm>
 - vii. Schools/Universities
http://en.wikipedia.org/wiki/List_of_colleges_and_universities_in_Massachusetts
 - viii. Chambers of Commerce <http://masshome.com/cofc.html>
 - ix. Local Legislators
 - b. Develop translated version(s) of the notice document or other related announcements, as needed, based on the extent of LEP need and available media sources. *[Practice Tip: If you've identified a large population of individuals who are LEP in the meeting or project locale, consider translating the meeting notice in full. If you are less likely to encounter individuals who*

are LEP, you can consider including the single line of text into the languages other than English you may encounter.] This could include:

- i. Full translation of the notice into the languages indicated
 - ii. The inclusion of the following statement translated into the appropriate languages into the English language version of the notice.
 1. “*This notice describes the date, time, and location of a public meeting or hearing on a transportation project in this area. If you need this notice translated, contact MassDOT/MBTA’s Title VI Specialist at 857-368-8580.*”
 - iii. Translated versions of print, TV, radio, and online announcements related to the meeting, as applicable.
- c. Consult the following resources for translation needs:
- i. UMass Translation Center
 1. Request Procedure:
<http://www.umasstranslation.com/services/request-an-estimate/>
 2. Rates: <http://www.umasstranslation.com/services/rates/>
 - ii. Statewide Language Services Contract
 1. Contract Info:
<https://www.ebidsourcing.com/displayPublicContSummView.do?doValidateToken=false&docViewType=ACTIVE&docId=124184&docStatus=ACTIVE&docUserId=3155&userType=PUBLIC>
 2. Vendor Info:
https://www.ebidsourcing.com/displayPublicContActiveSwcVendorList.do?doValidateToken=false&menu_id=2.4.4.1&docUserId=3155&docViewType=ACTIVE&docId=124184&userType=PUBLIC&docNumberText=PRF48
- 4) The final dissemination of public notice should incorporate the following:
- a. The dissemination of public notice has occurred sufficiently in advance of meeting to ensure adequate processing time for language and accessibility accommodation requests. *[Practice Tip: Distributing notice three weeks in advance of a public engagement opportunity is generally regarded as appropriate, with two weeks or 10 business days considered the minimum limit for reasonable notice.]*

- b. The public notice/announcement materials have been delivered to non-English language outreach resources and sites identified in Section 2.1.3 §§ 3; a.
- c. The public notice has been delivered directly to individuals, organizations, and other stakeholders that represent Title VI populations in the region. You should consider sending notice to the entities below with the instruction that they forward the notice among their own distribution lists and/or post it.
 - i. MassDOT/MBTA Office of Diversity and Civil Rights
<http://www.MassDOT/MBTA.state.ma.us/OfficeofCivilRights.aspx>
 - ii. MassDOT/MBTA Public Affairs
 - iii. Community Leaders
 - iv. Metropolitan Planning Organizations (MPOs)
<http://www.MassDOT/MBTA.state.ma.us/Portals/17/Images/DataMaps/boundry/MPOs-RPAs-Statewide.pdf>
 - v. Regional Transit Agencies (RTAs)
<http://www.MassDOT/MBTA.state.ma.us/Portals/17/docs/MapCatalog/Maps/RTAs-Statewide.pdf>
 - vi. Public Libraries <http://www.publiclibraries.com/massachusetts.htm>
 - vii. Schools/Universities
http://en.wikipedia.org/wiki/List_of_colleges_and_universities_in_Massachusetts
 - viii. Chambers of Commerce <http://masshome.com/cofc.html>
 - ix. Local Legislators
 - x. Boston Mayor's Office of Neighborhood Services
http://www.cityofboston.gov/ons/coor_list.asp

3.1.2.4 Preparation for the Meeting

- 1) While preparing for the meeting, consider the following questions: (1) are there civil rights implications in the background/history of the project, (2) what public involvement has already been accomplished and did it illuminate civil rights concerns, and (3) what are the known benefits and burdens of the MassDOT/MBTA program, service, or activity on Title VI populations? Consult the following resources:
 - a. Public meeting/hearing transcripts

- b. Written public comments
 - c. MassDOT/MBTA staff involved in planning and/or conducting prior related meetings
 - d. ProjectINFO comments
 - e. Public meeting demographics surveys
- 2) Meeting planners should maintain an ongoing dialogue with the individuals and organizations identified in Sections 2.1.3 §§ 3; a; i and 2.1.3 §§ 3; c; i in order to remain well informed on the level of community interest and likely involvement in the public outreach event.
- 3) Ensure that electronic documents related to the subject of the public meeting and intended for public dissemination and review are accessible, in compliance with the Americans with Disabilities Act and Section 508 of The Rehabilitation Act of 1973. *[Practice Tip: Adobe Acrobat Professional and Microsoft Word have built-in “accessibility checkers.”]* This applies to documents produced by MassDOT/MBTA staff as well as consultants. Consult the following for instructions on developing accessible documents:
- a. Best practices for text and color contrast considerations when preparing hardcopy and electronic visual aids (such as maps, posters, plans, PowerPoint templates/graphics, charts, graphs, etc.)
<http://www.lighthouse.org/accessibility/design/accessible-print-design/>
 - b. Creating accessible Word documents: <http://office.microsoft.com/en-us/word-help/creating-accessible-word-documents-HA101999993.aspx>
 - c. Creating accessible Excel workbooks: <http://office.microsoft.com/en-us/excel-help/creating-accessible-excel-workbooks-HA102013545.aspx?CTT=3>
 - d. Creating accessible PowerPoint presentations:
<http://office.microsoft.com/en-us/powerpoint-help/creating-accessible-powerpoint-presentations-HA102013555.aspx?CTT=3>
 - e. Creating accessible PDFs with Microsoft Office products through “Tagging”:
<http://office.microsoft.com/en-us/excel-help/create-accessible-pdfs-HA102478227.aspx?CTT=3>
 - f. General information on accessibility from Adobe:
<http://www.adobe.com/accessibility/>

- g. Adobe Acrobat X Accessibility Guide:
<http://www.adobe.com/content/dam/Adobe/en/accessibility/products/acrobat/pdfs/acrobat-x-accessible-pdf-from-word.pdf>
 - h. Adobe Acrobat 9 Pro Accessibility Guide:
<http://www.adobe.com/content/dam/Adobe/en/accessibility/products/acrobat/pdfs/A9-accessible-pdf-from-word.pdf>
 - i. Video on preparing accessible InDesign files:
<http://tv.adobe.com/watch/accessibility-adobe/preparing-indesign-files-for-accessibility/>
- 4) The period between notice dissemination and the meeting date should be used to identify and arrange accommodations and produce meeting materials in alternate languages and formats (such as Braille and large-print), if requested.
- a. Alternate formats can be obtained by contacting:
 - i. MassDOT/MBTA Copy and Print Center
 - ii. MBTA System Wide Accessibility
http://www.mbta.com/riding_the_t/accessible_services/default.asp?id=16901
 - iii. The Central Transportation Planning Staff
 - 1. Janie Guion, 617-973-7507 or jguion@ctps.org
 - b. The nature and extent of accommodations that may be needed can be identified through the following.
 - i. Direct requests
 - ii. Past experiences, both within the community and at specific meeting locations which can include previously encountered reasonable accommodation and language service requests
 - 1. Meeting coordinators are required to submit demographic and accommodation summaries to ODCR. You can request this information from ODCR to better understand the past experiences of other meeting planners in the locale of your meeting.
 - iii. An understanding of community demographics

- iv. Feedback from community leaders, CBOs, stakeholders, advocacy groups, etc.
- v. MassDOT/MBTA Accessible Meeting Checklist
- c. Foreign language document translation can be provided by:
 - i. UMass Translation Center
 - 1. Request Procedure:
<http://www.umasstranslation.com/services/request-an-estimate/>
 - 2. Rates: <http://www.umasstranslation.com/services/rates/>
 - ii. Statewide Language Services Contract
 - 1. Comm-PASS Info:
<https://www.ebidsourcing.com/displayPublicContSummView.do?doValidateToken=false&docViewType=ACTIVE&docId=124184&docStatus=ACTIVE&docUserId=3155&userType=PUBLIC>
 - 2. Vendor Info:
https://www.ebidsourcing.com/displayPublicContActiveSwcVendorList.do?doValidateToken=false&menu_id=2.4.4.1&docUserId=3155&docViewType=ACTIVE&docId=124184&userType=PUBLIC&docNumberText=PRF48
- d. To obtain accessibility accommodations not provided by the venue (Section 2.1.2 §§ 2; c), contact:
 - i. MassDOT/MBTA Facilities
 - 1. Phone: (857) 368-9560
 - 2. Email: dotgeneralservices@dot.state.ma.us
 - ii. MBTA System Wide Accessibility
http://www.mbta.com/riding_the_t/accessible_services/default.asp?id=16901
 - iii. Metropolitan Planning Organizations
<http://www.MassDOT/MBTA.state.ma.us/Portals/17/Images/DataMaps/boundry/MPOs-RPAs-Statewide.pdf>

- iv. Massachusetts Office on Disability
<http://www.mass.gov/anf/employment-equal-access-disability/oversight-agencies/mod/>
- e. If unsure how to provide a particular accommodation or for guidance on recommended accommodations, consult:
 - i. MassDOT/MBTA Office of Diversity and Civil Rights
<http://www.MassDOT/MBTA.state.ma.us/OfficeofCivilRights.aspx>
 - ii. MassDOT/MBTA Public Affairs
 - iii. MBTA System Wide Accessibility
http://www.mbtta.com/riding_the_t/accessible_services/default.asp?id=16901
 - iv. The Massachusetts Office on Disability
<http://www.mass.gov/anf/employment-equal-access-disability/oversight-agencies/mod/>
 - v. The Disability Commissions (S:\Civil Rights\ADA\Disability Commissions)
 - vi. The Independent Living Centers
<http://www.masilc.org/membership/cils>
- f. Funding Considerations
 - i. All accommodations must be provided to the public free of charge.
 - ii. For public outreach events which are necessitated by the project development process, each project contains an administration budget that should be utilized, if available.
 - iii. For all other requests, contact the MassDOT/MBTA Budget Office at (857) 368-9150.

3.1.2.5 Meeting Set-Up

- 1) ADA considerations in public outreach are fully articulated in the MassDOT/MBTA Accessible Meeting Policy in Section 3.2 below and online at:
http://www.MassDOT/MBTA.state.ma.us/Portals/0/docs/CivilRights/ADA/Attachment_1_3.pdf. Meeting setup is addressed in the “Accessibility Checklist for Meeting Planners” which should be used in order to verify the following:

- a. If the main entrance to the building is not accessible, is the accessible entrance unlocked?
 - b. Are there integrated seating areas for individuals who use a wheeled mobility device in the meeting room? *[Practice Tip: Seating areas for individuals with disabilities should not be segregated from the rest of the audience or limited to just one area.]*
 - c. Is there seating available for attendees who are deaf or hard of hearing, and have requested an accommodation, near the front of the meeting room so that attendees may see the interpreter/captioner, or lip read?
 - d. Is the space allotted to sign language interpreters and/or the CART screen or monitor clearly visible?
 - e. Are the aisles at least three feet wide and clear of obstacles or tripping hazards?
 - f. If microphones are used during the public meeting, are adjustable microphone stands available for attendees? Can staff be used as floaters with microphones as an alternative?
 - g. If the main entrance to the building is not accessible, is there directional signage towards the accessible entrance?
 - h. Is the accessible entrance unlocked and able to be used independently? If the meeting is taking place at night, is the path leading to the alternate entrance well lit?
 - i. If a stage or platform will be used during the public meeting, is it accessible?
 - j. If a podium will be used during the public meeting, is the podium height adjustable? If not, is there a small table (between 28 and 34 inches in height) provided to the side of the podium?
 - k. Have assistive devices been tested for full functionality immediately prior to the start of the event?
 - l. Is there directional signage for accessible restrooms and/or emergency exits, if applicable?
- 2) Title VI considerations can be addressed through the following:
- a. Based on identified or likely-to-be-encountered language needs, has signage in other languages been posted?
 - b. Is the space allotted to foreign language interpreters clearly visible to the entire audience?

- c. Has space been given to foreign language interpreters to sit with individuals who need language assistance?
- d. Have Title VI related materials been made available at the welcome desk and/or in the meeting packet? *[Practice Tip: Assistance is provided at the welcome desk, paying special attention to indications that meeting attendees may have literacy or non-English speaking issues.]* This should include:
 - i. “I speak” language cards <http://www.lep.gov/ISpeakCards2004.pdf>
 - ii. Translated versions of the written comment form, as applicable
 - iii. Demographics survey (insert link)

3.1.2.6 During the Meeting

- 1) In the event that this public meeting/hearing is preceded by an open house, please refer to Section 2.2 regarding civil rights considerations in that setting.
- 2) At the official start of the meeting, make the following statements. If a foreign language translator(s) is present, instruct them to repeat.
 - a. (Insert language here, address: general statement regarding nondiscrimination and availability of language and accessibility accommodations, including assistance in providing written comments and/or filing in forms such as the demographics survey)
 - b. Include instructions on site-specific accessibility considerations, such as accessible emergency exits.
 - c. Encourage attendees to complete the Demographics Survey, which can be either turned in during the event or mailed to MassDOT/MBTA after the fact.
- 3) MassDOT/MBTA is required to “demonstrate explicit consideration and response to public input” ([23 CFR 450.210](#)). During a public outreach event, this requires affording attendees with opportunities to voice comments, questions, and concerns and provide an adequate response at the event or by following up in writing (see Section 2.1.7) or at subsequent public outreach opportunities. *[Practice Tip: All MassDOT/MBTA staff in attendance should give their attention to oral comments made by the public during the meeting and during one-on-one interactions in order to relay general sentiments and/or particular issues to the Project Manager as part of post-meeting follow up.]*

3.1.2.7 Post Meeting

- 1) All public comments (written and oral), testimonials, and sentiments expressed during the public outreach event have been gathered/documented by

MassDOT/MBTA staff that attended the meeting and passed on to the Project Manager (or designee). *[Practice Tip: This can be accomplished through in-person debriefing sessions following the meeting or reviewing the meeting transcript, if available.]*

- 2) Once received, the Project Manager (or designee) catalogues all public comments.
- 3) The Project Manager is responsible for coordinating responses to public comments. *[Practice Tip: Remember: direct impacts require direct communication. [23 CFR 450.210](#)]*
 - a. Methods of responses can include:
 - i. Individualized written responses
 - ii. General distribution written statements (web, email, newsletter, newspaper, etc.)
 - iii. Postings to project specific website, if available
 - iv. In-person or telephonic follow-ups with individuals/organizations regarding the topics of discussion at the public outreach event
[Practice Tip: The protocols and tips found in Section 2.4 regarding one-on-one interactions can help you eliminate communication barriers you may encounter.]
 - b. The Project Manager (or designee) reviews the public comments to determine which MassDOT/MBTA program areas (such as Civil Rights, Right of Way, Design, Environmental, Planning, etc.) should be consulted with or assigned the responsibility of drafting a response that “demonstrate[s] explicit consideration... to public input” ([23 CFR 450.210](#)).
- 4) In instances where MassDOT/MBTA will draft a written response to a public comment, the content of the response itself can “demonstrate explicit consideration” by:
 - a. Describing changes to the recommended design prompted/requested by the comment and how they will be considered
 - b. Describing alternate designs prompted/requested by the comment and how they will be considered
 - c. Describing mitigation measures prompted/requested by the comment and how they will be considered
 - d. Describing the MassDOT/MBTA program areas that were consulted in formulating the response

- e. Noting whether the comment is novel or previously encountered
 - f. Noting whether the comment has been received from a multitude of sources
- 5) Responses should also contain:
- a. Contact information for additional information and follow-up
 - b. Notice of upcoming related public engagement opportunities
- 6) The Project Manager should note, through ProjectINFO “comments,” civil rights considerations encountered through the planning and conducting of the outreach event, such as translation requests or foreign languages encountered. *[Practice Tip: For projects that have received a ProjectINFO number, the “comments” section can be used to highlight civil rights related comments or concerns from the public. The document database for these projects can also be used to store scans of comment forms.]*
- 7) The community leaders identified in Section 2.1.1 §§ 3 should be thanked for their assistance/efforts with a call or written correspondence.

3.1.3 Open Houses

3.1.3.1 Title VI Considerations

- 1) “I Speak” language cards have been provided at the welcome desk.
<http://www.lep.gov/ISpeakCards2004.pdf>
- 2) If MassDOT/MBTA is providing interpretive services at the public meeting/hearing session, then they should also be available during the open house session and their availability should be made clear through signage and/or announcements. *[Practice Tip: Those running the meeting should ask interpreters to announce their presence and the availability of their services several times during the open house.]*
- 3) After the session, MassDOT/MBTA staff and consultants in attendance should relay the nature of questions and concerns identified through interaction with the public to the Project Manager (or designee). *[Practice Tip: It is important for MassDOT/MBTA staff working on all stages of project development to know community concerns. Sometimes these are made evident during informal open house interactions. Just because they don't make it onto a public hearing transcript doesn't mean we don't have an obligation to be aware of them and respond accordingly.]*
- 4) Written descriptions of items on display may need to be translated depending on requests received and/or the anticipated level of LEP participation.

3.1.3.2 ADA Considerations

- 1) The open house should be set up in an ADA compliant manner. Please see the MassDOT/MBTA Accessible Meeting Policy in Section 3.2 below or online at: http://www.MassDOT/MBTA.state.ma.us/Portals/0/docs/CivilRights/ADA/Attachment_13.pdf
- 2) Consider the following when setting up the open house venue:
 - a. Consult the following guide on best practices for text and color contrast considerations when preparing hardcopy and electronic visual aids (such as maps, posters, plans, PowerPoint templates/graphics, charts, graphs, etc.) <http://www.lighthouse.org/accessibility/design/accessible-print-design/>
[Practice Tip: Choose color schemes that are least likely to be problematic for individuals with common types of color blindness and visual impairments.]
 - b. Pathways that guide attendees to display materials or MassDOT/MBTA staff and consultants should be clear of obstructions. *[Practice Tip: Rule of Thumb: remove tripping hazards (such as electrical cords) and keep the pathway at least 3' wide.]*
 - c. Proper heights and viewing angles of display materials to make them accessible. *[Practice Tip: Rules of Thumb: For display materials mounted on the wall, they should be no higher than 48" from the floor and provide clear floor space 30" wide and 48" wide. For tabletop displays, the table should be between 28 and 34" inches in height and there should be at least 27" of knee space from the floor to the underside of the table.]*
 - d. Horizontal surfaces used for display should be at a height accessible to individuals that are short of stature and/or rely on assistive mobility devices.
 - e. Similarly, materials displayed vertically should not be at an excessive height nor at an angle that makes them difficult to view.
- 3) MassDOT/MBTA staff and consultants should be prepared to describe displays to blind or visually impaired attendees.
- 4) Alternate versions (Braille, large print, etc.) of public documents (such as informational packets) should be available if requested.

3.1.4 Targeted Outreach Gatherings (Small Group Meetings/Committees/Task Forces/Studies)

3.1.4.1 Strategic Planning for Title VI Group and Individual Inclusion

Strategic planning for the involvement of Title VI community members on special purpose meeting groups or committees is essential to an inclusive and successful effort. Engaging the public in a targeted context is complex, political and always challenging, and ensuring diverse participation adds even more difficulty to meeting this objective.

Preliminary Steps:

- 1) Identify and analyze the location affected by the project or initiative at issue to determine the Title VI populations in the area.
- 2) Establish a clear objective and role for the envisioned targeted group, including the nature of community involvement and particular skills which may be needed for fruitful discussion or deliberations.
- 3) Create an outline or public participation matrix to identify the different types of community representation and interests that reflect the community affected by a project or initiative with careful attention to Title VI populations. Types of organizations or interests that may include representatives of Title VI populations:
 - a. transit-dependent community
 - b. affected businesses
 - c. civic organizations (women, seniors, youth, people with disabilities)
 - d. freight interests
 - e. the disability community
 - f. neighborhood association
 - g. schools
 - h. churches

Beyond demographic data and identification of the types of Title VI related groups or individuals in the community, there are certain key questions to help define the individuals or groups to invite. Consider meeting with a small group of internal staff and/or managers from among key MassDOT/MBTA departments who know the community and who can help answer these key questions:

- 1) Who can represent these diverse groups and constituencies in a credible and responsible way?
- 2) Who needs to be at the table for the work to be accomplished?
- 3) What is the history of relationships between stakeholder representatives and groups? Is there any past tension that may be a deterrent to participation? If so,

are there other community leaders who could help mediate to encourage participation despite differences?

- 4) If known from past experience, are there stakeholders critical to the process who may be reluctant to participate? How can this reluctance be alleviated? What would be the impact of their refusal to participate in the process? Is there an alternative to their participation?
- 5) What commitments do you want from participants?
- 6) Other than known stakeholders, what other individuals or groups could have an interest in the project that are not in the immediate project area, and/or are not otherwise represented in the outreach strategy?
- 7) Do any necessary parties have possible concerns about participating? How can those concerns be alleviated?
- 8) Do you have natural allies on an issue? Natural adversaries?

3.1.4.2 Consult MassDOT/MBTA and MBTA and State Resources

Based on MassDOT/MBTA and the MBTA's vast prior experience in communities across the Commonwealth, we have significant corporate knowledge of local groups, key individuals and community issues or concerns that can help answer these questions.

- 1) the Office of Diversity and Civil Rights (which does a range of outreach across the Commonwealth, responds to complaints and works with key Title VI leadership on transportation matters in contracting and employment)
- 2) Office of Transportation Planning (which conducts significant long-range studies that engage the public and builds knowledge of communities and has access to the Metropolitan Planning Organizations in all regions of Massachusetts)
- 3) Government and Public Affairs (which can reach out to state legislators and their aides for suggestions)
- 4) Design (which works directly with project proponents, especially in instances of municipally proposed projects, although there can be a risk of bias in favor of suggestions that support the project.)
- 5) Use the MassDOT/MBTA Title VI interactive mapping tool (currently under development) to identify community organizations that are associated with Title VI community members and interests

There may be other sources of contact in additional MassDOT/MBTA and MBTA departments or Divisions (Design, Environmental, Right of Way, Registry or Aeronautics)

that may have had experience with a location and or community representatives, which could also be helpful to explore.

3.1.4.3 Consult Statewide Resources

- 1) Reach out at the state level for help in identifying and possibly supporting our outreach to potential Title VI related groups and individuals to contact. These resources may also have particular information that is important to know about the locality, its history and community challenges or controversy which may be critical to support your outreach:

- a. Administration and Finance – Office of Access and Opportunity

Office of Access & Opportunities
State House, Room 373, Boston, MA 02133
Phone: (617) 727-2040
E-mail: Ronald.Marlow@state.ma.us

- b. Massachusetts Office on Disability

One Ashburton Place #1305
Boston, MA 02108
(617) 727-7440 or (800) 322-2020 toll free (both V/TTY)
E-mail: Myra.Berloff@state.ma.us

3.1.4.4 Conduct Targeted Research on the Leads you Gather

Conduct a Google-type search on the communities involved and the groups and individuals who have been identified. This effort is potentially time consuming, but will both educate the meeting convener and potentially identify “landmines” that could complicate the effort to organize a group.

Tip: In carrying out this task, it is useful to limit searches which can be done through linking key words to a query such as a year, a past issue or individual words like “bio,” “biography,” “background,” “transportation,” “complaint” and the like.

If a meeting planner is not aware of the racial, ethnic or national origin background of the individual or group being engaged, it is similarly possible to research Title VI groups individually, using query strings to the group or individuals and Massachusetts, the regional area or the locality where the group or individual is based. This information is useful in gaining a basic understanding of traditions and holidays which may impact participation, through to a more thorough understanding of complex considerations like values, beliefs and relationship to government and/or transportation.

3.1.4.5 Reaching out to Potential Title VI Group Members – Anticipating Potential Obstacles to Participation

1) Outreach approaches:

- i. Look for formal and informal opportunities to engage, collaborate, and build relationships, including calls of introduction made by volunteers you identify who are trusted in the community.
- ii. Use multiple outreach methods and do not rely on e-mail or websites alone
- iii. Tailor materials to the audience, including translations
- iv. Identify existing channels of communication through communities
- v. Experiment and reflect on the effectiveness of new approaches

In Title VI communities, there are a range of factors leading to reluctance to participate for individuals and groups that could be helpful in a transportation planning or development process. For example, many times natural leaders are either the heads or well-placed leaders of agencies or community groups; this causes limits their ability to participate because there are many demands on their time, resources and commitment.

2) Think through and identify the factors which would encourage participation and involvement before reaching out, to be in the best position to explain how it is important for this individual or group to participate. If there is a possibility of grant funding to support participating groups, this can certainly provide an incentive for participation, but such ideas should only be shared if the possibility is real.

3) The following are some common barriers to participation, and reasonable responses that a meeting planner should anticipate, understand and be able to articulate to encourage potential participants to get involved:

- a. **Limited English language skills and/or limited literacy** – it is first important to know that MassDOT/MBTA has the ability and obligation to fund translation and interpretation support and to convey this message. It would be ideal to have a colleague or staff person who speaks the language or is of the culture in question to support the outreach effort, or to use a translator as an intermediary.
- b. **Lack of trust due to past experiences** - it is important to be in a position to respond with as much information as will demonstrate that both participation and the project are being honestly and openly addressed.
- c. **Lack of experience with transportation decision making processes** – if this process is not well understood or the meeting convener has a difficult

time explaining the process, it is important to have a representative from Planning involved to explain the process.

- d. **Economic barriers** – transportation costs, work schedules – meetings should be sited in the community to avoid cost factors, and they should be timed to meet the schedule of the majority of participants, after due consideration of all schedules, suggested alternatives and needs.
- e. **Cultural barriers** – there may be intergroup dynamics that make bringing groups together problematic due to class, racial ethnic or political differences. Early research will help build understanding of this possibility, and suggest whether a mediated way of bringing the groups together is an option, or there is a need to have separate meetings.
- f. **Common barriers** – time, other demands. The key to this element is making sure that the importance of an effort is clear and well stated to the candidate, including the benefit to an individual or group representative being recruited.

3.1.4.6 Responding to a Refusal to Participate from a Potential Title VI Participant

- 1) If a person or group declines to participate in a particular effort, it is important not to get frustrated and to handle the refusal diplomatically because that same group might be the subject of an outreach effort in the future, and may wish to participate on another occasion.
- 2) In responding to a decision not to participate, thank the person or group for considering the invitation and suggest that they might accept an invitation for a different opportunity in the future. In this way, no feelings are hurt, doors are left open and the person or group remains feeling that they are valued into the future.
- 3) Consider sending the individual or organizations updates on the effort that are sent to others. This effort could be informative and demonstrate a good faith effort to be inclusive.

3.1.4.7 Documenting the Effort to Achieve Diversity and Next Steps

It may be impossible to achieve a perfectly diverse committee for purposes of transportation planning, given the difficulty of recruitment and obstacles to participation. Simply put, the concept of diversity in transportation planning is elastic - it will change based on the geographic location, the issue under study or discussion or the nature of the need for input. Nonetheless, our federal partners, and even community members will

expect to know about our efforts and may wish to question whether MassDOT/MBTA truly conducted outreach for Title VI inclusion purposes. For Title VI purposes, this documentation is good evidence of the opportunity that was given to the public, such that complaints after the fact about the lack of inclusion can be responded to. Our Title VI obligation requires us to provide an equal opportunity to participate in transportation planning exercises; ultimately, it is the exercise of trying and proving that MassDOT/MBTA has been thoughtful and reached out effectively to increase diversity in our community engagement.

For purposes of proving that an outreach effort was genuine and reached out to diverse communities, there are steps that the meeting convener or planner should take:

- 1) The meeting planner should keep a file on available resources and methods used to identify individuals and groups, the nature of the outreach effort, the people invited and the results of a recruitment effort. Possible resources:
 - a. Lists of potential invitees who were considered and/or accepted
 - b. Samples of research conducted and/or consultations made for recruitment
 - c. Copies of invitation e-mails or other correspondence
 - d. Group membership lists, with indications of the Title VI communities represented
 - e. Meeting sign in sheets
 - f. Correspondence from invited individuals
- 2) The meeting planner should make the list of actual participants easily available and strive to secure a means for the public to reach out to these individuals should they have question, comments or concerns that they may not be willing to air publicly.
- 3) Meeting planners should plan to discuss with the members of the group that is ultimately recruited the efforts made to reach out and recruit individuals, including the potential need that may remain after the fact for additional participation by certain Title VI group members or related organizations.
- 4) Effective management of the group that is ultimately formed is key to the productivity and longevity of relationships with Title VI community members. Following-through with stakeholders to demonstrate that input was considered and/or had an impact on project parameters, study outcomes, and planned activities can demonstrate to participants the value added to their interests and communities through continued involvement in these activities.

3.1.5 One-on-One Interactions

3.1.5.1 Communicating with Individuals with Limited English Proficiency (LEP)

If a member of the public is attempting to interact with you but there is a language barrier, the following procedures are recommended based on the types of interactions.

- 1) In-person (such as MassDOT/MBTA reception areas, district offices, construction sites, RMVs, E-ZPass service centers, etc.)
 - a. The first step is to identify the preferred language of the individual. The following resources are available:
 - i. "I Speak" cards, <http://www.lep.gov/ISpeakCards2004.pdf>
 - ii. Google Translate (<http://translate.google.com/>) or a similar real-time free online language translator can be used to identify the language. *[Practice Tip: If the member of the public is directed to type (or speak into the computer's microphone, if available) on the webpage in a language other than English, the software can "Auto-Detect" which language is being used and provide real-time translations. Please note that the accuracy and effectiveness of these translation systems is not complete and should not be relied on as an exclusive means of providing language access to LEP individuals.]*
 - i. Assistance from co-workers in your unit that may be able to identify the language.
 - ii. Language Line (<https://www.language.com/>)
 - b. Once the language has been identified, the methods you use to address the needs of the individual will change depending on the circumstances.
 - i. You may be able to address simple inquiries informally on-the-spot with the aid of multi-lingual staff or Google Translate (<http://translate.google.com/>) or a similar product. *[Example: providing directions around the building/office to an LEP individual.]*
 1. If you work in one of the MassDOT/MBTA Highway units that has been surveyed for multi-lingual staff (ROW, OTP, Environmental, Design, and OREAD), refer to the corresponding database to identify a co-worker in your unit that can assist. *[Practice Tip: Assisting in this way is purely voluntary and the nature of the communication should be incidental.]*

- a. S:\Civil Rights\Title VI\Staff Language Directory
 2. An employee and an LEP individual can type or speak into Google Translate software and carry out a rudimentary conversation. This should remain limited to incidental interactions.
 - ii. If the conversation turns to more complex issues or you have reached the limitations of the technology or your knowledge of the subject at issue, the MassDOT/MBTA staffer providing informal translations or Google Translate should inform them that professional language services are available that may be better suited to meeting their need. More complex issues may require professional translators/interpreters. *[Example: An LEP individual who needs assistance to engage in the complaint resolution process or to participate in a MassDOT/MBTA program, service, or activity that requires an application process. (such as a driver's licenses, E-ZPass, etc.)]* Complex issues are those that affect the legal rights of the individual and therefore depend on the accuracy of translations/interpretations. The following services are available in those instances:
 1. Language Line (<https://www.language.com/>)
 2. Statewide Language Services Contract
 - a. Comm-PASS Info:
<https://www.ebidsourcing.com/displayPublicContSummView.do?doValidateToken=false&docViewType=ACTIVE&docId=124184&docStatus=ACTIVE&docUserId=3155&userType=PUBLIC>
 - b. Vendor Info:
https://www.ebidsourcing.com/displayPublicContActiveSwcVendorList.do?doValidateToken=false&menu_id=2.4.4.1&docUserId=3155&docViewType=ACTIVE&docId=124184&userType=PUBLIC&docNumberText=PRF48
 - iii. Should you require time to secure professional language services (such as scheduling a meeting with an interpreter or sending out documents to be translated) then you should try to make this clear to the individual on-the-spot with the aid of multi-lingual staff or Google Translate. *[Practice Tip: Using Google Translate to convey this information allows you to include details such as expected turnaround times, meeting dates and locations, and contact information.]*
- 2) Over the Phone

- a. If you are able to identify the language of the caller and you work in one of the MassDOT/MBTA Highway units that has been surveyed for multi-lingual staff (ROW, OTP, Environmental, Design, and OREAD), refer to the corresponding database to identify a co-worker in your unit that can assist.
 - i. S:\Civil Rights\Title VI\Staff Language Directory
 - b. If you are unable to identify the language of the caller and/or you do not work in ROW, OTP, Environmental, Design, and OREAD, contact Language Line for real-time over the phone interpretation services (<https://www.language.com/>)
- 3) Electronically (includes email, website comment form, etc.)
- a. If you receive such correspondence in a language other than English, use Google Translate (<http://translate.google.com/>) or similar product to determine the language and nature of the interaction
 - b. Once the language and the nature of the interaction has been identified, the methods you use to address the needs of the individual will change depending on the circumstances.
 - i. You may be able to address simple inquires informally with the aid of multi-lingual staff or Google Translate (<http://translate.google.com/>) or a similar product. *[Example: emailing a link to requested web content.]*
 1. If you work in one of the MassDOT/MBTA Highway units that has been surveyed for multi-lingual staff (ROW, OTP, Environmental, Design, and OREAD), refer to the corresponding database to identify a co-worker in your unit that can assist.
 - a. S:\Civil Rights\Title VI\Staff Language Directory
 - ii. If the conversation turns to more complex issues or you have reached the limitations of the technology or your knowledge of the subject at issue, the MassDOT/MBTA staffer providing informal translations or Google Translate should inform them that professional language services are available that may be better suited to meeting their need. More complex issues may require professional translators/interpreters. *[Practice Tip: Complex issues are those that affect the legal rights of the individual and therefore depend on the accuracy of translations/interpretations.] [Example: An LEP individual who needs assistance to engage in the complaint resolution process or to participate in a MassDOT/MBTA program, service, or activity that requires an application process. (such as a driver's licenses, E-ZPass, etc.)]* The following services are available in those instances:
 1. Language Line (<https://www.language.com/>)

2. Statewide Language Services Contract

a. Comm-PASS Info:

<https://www.ebidsourcing.com/displayPublicContSummView.do?doValidateToken=false&docViewType=ACTIVE&docId=124184&docStatus=ACTIVE&docUserId=3155&userType=PUBLIC>

b. Vendor Info:

https://www.ebidsourcing.com/displayPublicContActiveSwcVendorList.do?doValidateToken=false&menu_id=2.4.4.1&docUserId=3155&docViewType=ACTIVE&docId=124184&userType=PUBLIC&docNumberText=PRF48

3.1.5.2 Communicating with People with Disabilities

1) Outlined below are tips to help you in communicating with persons with disabilities.

[Practice Tip: For more information visit:

<http://www.labor.state.ny.us/workforcenypartners/forms/communication.pdf>.]

a. General Tips:

- i. When introduced to a person with a disability, it is appropriate to offer to shake hands. People with limited hand use or who wear an artificial limb can usually shake hands. (Shaking hands with the left hand is an acceptable greeting.)
- ii. If you offer assistance, wait until the offer is accepted. Then listen to or ask for instructions.
- iii. Relax. Don't be embarrassed if you happen to use common expressions such as "See you later," or "Did you hear about that?" that seem to relate to a person's disability.
- iv. Don't be afraid to ask questions when you're unsure of what to do.

b. Tips for Communicating with Individuals who are Blind or Visually Impaired:

- i. Speak to the individual when you approach him or her.
- ii. State clearly who you are; speak in a normal tone of voice.
- iii. When conversing in a group, remember to identify yourself and the person to whom you are speaking.
- iv. Never touch or distract a service dog without first asking the owner.
- v. Tell the individual when you are leaving.

- vi. Do not attempt to lead the individual without first asking; allow the person to hold your arm and control her or his own movements.
 - vii. Be descriptive when giving directions; verbally give the person information that is visually obvious to individuals who can see. For example, if you are approaching steps, mention how many steps.
 - viii. If you are offering a seat, gently place the individual's hand on the back or arm of the chair so that the person can locate the seat.
- c. Tips for Communicating with Individuals who are Deaf or Hard of Hearing:
- i. Gain the person's attention before starting a conversation (i.e., tap the person gently on the shoulder or arm).
 - ii. Look directly at the individual, face the light, speak clearly, in a normal tone of voice, and keep your hands away from your face. Use short, simple sentences.
 - iii. If the individual uses a sign language interpreter, speak directly to the person, not the interpreter.
 - iv. If you telephone an individual who is hard of hearing, let the phone ring longer than usual. Speak clearly and be prepared to repeat the reason for the call and who you are.
- d. Tips for Communicating with Individuals with Mobility Impairments:
- i. If possible, put yourself at the wheelchair user's eye level.
 - ii. Do not lean on a wheelchair or any other assistive device.
 - iii. Never patronize people who use wheelchairs by patting them on the head or shoulder.
 - iv. Do not assume the individual wants to be pushed —ask first.
 - v. Offer assistance if the individual appears to be having difficulty opening a door.
 - vi. If you telephone the individual, allow the phone to ring longer than usual to allow extra time for the person to reach the telephone.
- e. Tips for Communicating with Individuals with Speech Impairments:
- i. If you do not understand something the individual says, do not pretend that you do. Ask the individual to repeat what he or she said and then repeat it back.
 - ii. Be patient. Take as much time as necessary.

- iii. Concentrate on what the individual is saying.
 - iv. Do not speak for the individual or attempt to finish her or his sentences.
 - v. If you are having difficulty understanding the individual, consider writing as an alternative means of communicating, but first ask the individual if this is acceptable.
- f. Tips for Communicating with Individuals with Cognitive Disabilities:
- i. If you are in a public area with many distractions, consider moving to a quiet or private location.
 - ii. Offer assistance completing forms or understanding written instructions and provide extra time for decision-making. Wait for the individual to accept the offer of assistance; do not "over-assist" or be patronizing.
 - iii. Be patient, flexible and supportive. Take time to understand the individual and make sure the individual understands you.
- 2) Additional information can be provided by:
- a. MassDOT/MBTA Office of Diversity and Civil Rights
<http://www.MassDOT/MBTA.state.ma.us/OfficeofCivilRights.aspx>
 - b. MBTA System Wide Accessibility
http://www.mbta.com/riding_the_t/accessible_services/default.asp?id=16901
 - c. Massachusetts Office on Disability <http://www.mass.gov/anf/employment-equal-access-disability/oversight-agencies/mod/>
 - d. Commonwealth of Massachusetts - Office of Access and Opportunity
<http://www.mass.gov/anf/employment-equal-access-disability/diversity-access-and-opportunity/access-and-opportunities/>

3.2 MassDOT/MBTA Accessible Meeting Policy

1.0 Purpose

This policy outlines criteria that must be fulfilled in order to ensure that all MassDOT/MBTA public meetings are fully accessible to persons with disabilities. This document will also address issues related to attendees with limited English proficiency.

The ability to access and participate in state government, including participating in public meetings, is a fundamental right protected by both State and Federal law. The Massachusetts Public Accommodation Law and the Americans with Disabilities Act mandate that persons with disabilities must not be denied participation in public meetings, and that reasonable accommodation requests made by attendees shall be honored. For these reasons, when planning and executing public meetings, MassDOT/MBTA personnel must ensure that all aspects of the meeting are accessible to persons with disabilities.

Under Title VI of the Civil Rights Act of 1964 and Commonwealth Executive Order 526, MassDOT/MBTA must also ensure that programs and activities do not discriminate based on race, color or national origin, age, disability and sex, among other protected categories. A public participation plan is being developed for Title VI purposes, which should be consulted by meeting planners in coordination with this Accessible Meeting Policy to ensure that MassDOT/MBTA includes Title VI constituencies in transportation programs and activities. The method for determining whether and/or what non-English languages need to be translated or interpreted is called a “four factor analysis.” Essentially, to determine whether translation is needed, meeting planners must analyze the number of limited English proficiency persons (LEP) by language group where a meeting will be held, the frequency of contacts with the program, the importance of the program and cost factors.

This document will provide guidelines for ensuring the accessibility of public meetings hosted by MassDOT/MBTA. Components such as the meeting location, room setup, alternate formats and translations of handouts, and the requirement to provide CART and/or sign language and/or foreign language interpreters upon request will be discussed.

2.0 Definitions

2.1 *Public Meeting*

Any meeting open to the general public, hosted by or on behalf of the MassDOT/MBTA, during which information is shared.

2.2 *Attendee*

An individual attending a public meeting.

2.3 *Reasonable Accommodation*

Any reasonable service, aid, modification or adjustment to the public meeting that gives a person with a disability the opportunity to be an active participant in the meeting process.

2.4 *Path of Travel*

A continuous, unobstructed way of pedestrian passage by means of which an area may be approached, entered, and exited.

2.5 *TTY (Text Telephone)*

An electronic device for text communication via a [telephone](#) line, used when one or more of the parties has a hearing or speech-related disability. Public payphones equipped with TTY have a small keyboard that pulls out underneath the phone. Note: TTYs are gradually phasing out for many people due to the increased use of voice and video relay, but they will remain in use for some period into the future.

2.6 *Clear floor space*

The minimum unobstructed floor or ground space required to accommodate a single, stationary wheelchair and occupant.

2.7 *Wheeled mobility device*

Means by which some individuals with physical disabilities travel throughout their environment. Commonly refers to such devices as wheelchairs (manual and motorized) and scooters. Non-traditional wheeled mobility devices may include Segways and bicycles.

2.8 *American Sign Language (ASL) Interpreter*

An individual trained to facilitate communication between a deaf American Sign Language user and hearing individuals via American Sign Language.

2.9 *Assistive Listening Device*

An electronic device used by individuals who are hard of hearing to amplify sound. The assistive listening device is usually used as a system where the audio source is broadcast [wirelessly](#) over an FM frequency. The person who is listening may use a small FM [Receiver](#) to tune into the signal and listen at their preferred volume. There are other forms of Assistive Listening Devices that exist and could be used as alternatives.

2.10 *CART (Computer Assisted Real-time Transcription)*

A trained operator uses keyboard or stenography methods to transcribe spoken speech into written text. This may be done either on site or remotely by using a voice connection such as a telephone, cell phone, or computer microphone to send the voice to the operator and the real-time text is transmitted back over an Internet connection. For meeting rooms without an internet connection, it is possible to establish connectivity via a WIFI router connection or by using a wireless “hot spot.”

2.11 *Video Remote Interpreting*

A contracted video service that allows individuals who are Deaf to communicate over webcams/video phones with hearing people in real-time, via a sign language interpreter.

2.12 *Video and Telecommunication (Voice) Relay Services*

Video Relay Service (VRS) is a form of Telecommunications Relay Service (TRS) that enables persons with hearing disabilities who use American Sign Language (ASL) to communicate with voice telephone users through video equipment, rather than through typed text. Video equipment links the VRS user with a TRS operator – called a “communications assistant” (CA) – so that the VRS user and the CA can see and communicate with each other in signed conversation. The VRS caller, using a television or a computer with a video camera device and a broadband (high speed) Internet connection, contacts a VRS CA, who is a qualified sign language interpreter. They communicate with each other in sign language through a video link. The VRS CA then places a telephone call to the party the VRS user wishes to call. The VRS CA relays the conversation back and forth between the parties – in sign language with the VRS user, and by voice with the called party. No typing or text is involved.

Telecommunications Relay Service (TRS) is a telephone service that allows persons with hearing or speech disabilities to place and receive telephone calls. TRS uses operators, called communications assistants (CAs), to facilitate telephone calls between people with hearing and speech disabilities and other individuals. A TRS call may be initiated by either a person with a hearing or speech disability, or a person without such disability. When a person with a hearing or speech disability initiates a TRS call, the person uses a teletypewriter (TTY) or other text input device to call the TRS relay center, and gives a CA the number of the party that he or she wants to call. The CA in turn places an outbound traditional voice call to that person. The CA then serves as a link for the call, relaying the text of the calling party in voice to the called party, and converting to text what the called party voices back to the calling party. VRS and TRS are overseen by the Federal Communications Commission and private contractors who perform the intermediary communication service are reimbursed for this service.

2.13 *Closed Captioning*

A term describing several systems developed to display text on a television, computer or video screen to provide additional or interpretive information to viewers/listeners who wish to access it. Closed captions typically display a transcription of the audio portion of a program (either verbatim or in edited form), sometimes including non-speech elements.

2.14 *Descriptive Video/Described Narration*

A feature that makes television programs, videos, films, and other visual media accessible to people who are blind or visually impaired by providing descriptive narration of key visual elements in programs. Key visual elements in a program that a viewer who is visually impaired would ordinarily miss are described by voice. Actions, costumes, gestures and scene changes are just a few of the elements that, when described, engage the blind or visually impaired viewer with the story.

2.15 *Limited English Proficient (LEP)*

Individuals who do not speak English as their primary language and who have a limited ability to read, speak, write, or understand English can be limited English proficient, or “LEP.” These individuals may be entitled to language assistance with respect to a particular type of service, benefit, or encounter.

2.16 *Four Factor Analysis*

Federal DOT guidance outlines **four factors** recipients should consider to assess language needs and decide what steps they should take to ensure meaningful access for LEP persons:

- 1) The number or proportion of LEP persons eligible to be served or likely to be encountered by a program, activity, or service of the recipient or grantee.
- 2) The frequency with which LEP individuals come in contact with the program.
- 3) The nature and importance of the program, activity, or service provided by the recipient to the LEP community.
- 4) The resources available to the MassDOT/MBTA and overall cost.

In each instance, this analysis will enable MassDOT/MBTA staff to determine the extent of language assistance that must be provided to enable LEP individuals to participate in a program or activity. For further information, including answers to specific situations that meeting planners may encounter, planners should consult the ADA Coordinator, the Title VI Specialist and/or the Language Access Plan.

2.17 *Vital Document*

A vital document is determined by the context of a program, service or activity, and can include but not be limited to an application, notice, complaint form, legal contract, and outreach material published by a covered entity in a tangible format that informs individuals about their rights or eligibility requirements for benefits and participation.

2.18 *Language Access Plan*

Under Federal Executive Order Executive Order 13166, each Federal agency is required to prepare a plan to improve access to its federally conducted programs and activities by eligible LEP persons. Each plan is required to be consistent with the standards set forth in related guidance, and shall include the steps the agency will take to ensure that eligible LEP persons can meaningfully access the agency's programs and activities. Just as federal agencies must have LEP Plans, as a condition of receiving federal financial assistance, they must establish guidelines for recipients such as MassDOT/MBTA to comply with Title VI and LEP requirements, including the provision of language assistance, as needed.

3.0 Scope

All public meetings hosted by, or on behalf of, MassDOT/MBTA.

4.0 Responsibilities

It is the responsibility of the MassDOT/MBTA staff or Department(s) charged with the coordination of the public meeting to ensure that the public meeting is accessible to all. The local contacts for the meeting facility, in conjunction with the responsible MassDOT/MBTA staff, are responsible for filling out the “Accessibility Checklist for Meeting Planners” in Attachment 6.1 to ensure the space is accessible prior to the meeting.

5.0 Policy

5.1 General Considerations

5.1.1 Public meeting planners shall identify at least one person who is responsible for making sure that the public meeting is accessible for all attendees. This individual shall serve as the contact for attendees requesting reasonable accommodations. See, Attachment 6.1 for a Checklist for Meeting Planners.

5.1.2 Public meetings should be planned and publicized as early as possible—ideally, at least 21 calendar days, but no less than 14 days in advance.

5.1.2.1 Meeting notices should include a date by which attendees should request reasonable accommodations—typically ten days before the meeting.

Note: After the cutoff date, staff must still try to provide an accommodation but should not guarantee the provision of the requested accommodation. Since it is so difficult to schedule CART and/or sign language interpreters with less than 2-3 weeks’ notice, most meetings should be publicized with 21 days’ notice. This allows attendees ample opportunity to request and receive appropriate reasonable accommodations.

5.1.3 Attendees shall not be charged for any reasonable accommodation provided.

5.2 Choosing a Location

5.2.1 Access to Nearby Transportation. All public meetings shall be within ¼ mile of an accessible bus stop or rail station, where feasible.

5.2.1.1 The path of travel from the transit stop to the meeting location shall be accessible. Specifically, it should be:

5.2.1.1.1 At least three feet wide

5.2.1.1.2 Unobstructed (not blocked by trash cans, light poles, etc.)

5.2.1.1.3 Free of steps, drop-offs or curbs

5.2.2 Parking. If parking is available to meeting attendees, meeting planners shall ensure that the number of accessible parking spaces available complies with state and Federal regulations. See, Attachment 6.2 for state and Federal regulations regarding accessible parking.

5.2.2.1 The path of travel from the accessible parking to the meeting location shall be accessible. Specifically, it shall be:

5.2.2.1.1 At least three feet wide

5.2.2.1.2 Unobstructed (no trash cans, light poles, etc.)

5.2.2.1.3 Free of steps, drop-offs or curbs

5.2.3 Identifying the Accessible Entrance. If the main entrance to the building (in which the public meeting is being held) is not the accessible entrance, a sign containing the universal symbol of accessibility with an arrow appropriately pointing to the accessible entrance shall be posted at the main entrance.

5.2.4 Ensure the alternate accessible entrance is unlocked and available to be used independently and that the path of travel to the alternate entrance is well lit (if the meeting is taking place at night). If the door is locked and intercom service or another format is used to gain access, an attendant must be at the door to accommodate deaf or hard of hearing individuals, as well as others with disabilities.

5.2.5 Accessible Restrooms. If restrooms are available for use by the public then all public meetings shall have at least one accessible restroom for men and one accessible restroom for women, or one accessible gender neutral restroom. See, Attachment 6.3 for state and Federal regulations regarding accessible restrooms.

5.2.5.1 The accessible restrooms shall be within reasonable proximity to the meeting room.

5.2.6 Accessible Telephones. If two or more public payphones are available at the meeting facility, at least one should be:

5.2.6.1 Equipped with TTY

5.2.6.2 Mounted no higher than 48" from the floor and provide clear floor space 30" wide and 48" wide (so that attendees using wheeled mobility can properly access the phone).

- 5.2.6.3 MassDOT/MBTA should notify the facility owner if the facility does not comply with the accessible telephone requirement.

5.2.7 The Meeting Room: The meeting room in which the public meeting will take place shall be made accessible for persons with disabilities. The following shall be provided:

- 5.2.7.1 An integrated seating area for wheeled mobility device users shall be made available.

- 5.2.7.1.1 If possible, meeting planners should remove several chairs to accommodate potential attendees who use wheeled mobility devices.

Note: Remove a chair to the side and to the rear of the designated space to ensure enough room for the wheeled mobility device.

- 5.2.7.1.2 Such spaces for wheeled mobility device users shall be dispersed throughout the room, and not clustered all in one section (e.g. all in the front or all in the back). This allows attendees using wheeled mobility a variety of seating/viewing options.

- 5.2.7.2 Space for Sign Language, CART and Foreign Language Interpreters

- 5.2.7.2.1 A well-lit area and chairs facing the audience shall be made available for sign language interpreters at the front of the room (likely just off to one side of the main presentation area). If a CART provider is to be used, a small table for the laptop and space for a screen and projector should be provided near an electrical outlet.

- 5.2.7.2.2 Priority seating at the front of the audience and in direct line of sight of the interpreters/CART provider shall be provided for attendees who are deaf/hard of hearing.

- 5.2.7.2.3 For foreign language interpreters, there is a need for space where they can sit with the individuals who require language assistance.

- 5.2.7.3 Aisles within the meeting room shall be

- 5.2.7.3.1 Clear of tripping hazards (e.g. electric cords).

- 5.2.7.3.2 At least 3 feet wide.

- 5.2.7.4 Microphones. The microphones used at public meetings shall be available on a stand that is adjustable in height.

Note: While wireless microphones have become popular, some attendees with disabilities will not be able to hold a microphone independently. In this situation, allowing an attendee use of a microphone stand adjusted to their height is almost always preferable to holding the microphone for them. Alternatively, and particularly for larger meetings, staff with a floating microphone would be preferable to facilitate communication.

- 5.2.7.5 Podiums. If any attendee may have an opportunity to speak at a podium, meeting planners shall ensure that either:

- 5.2.7.5.1 The podium is height adjustable, or

- 5.2.7.5.2 A small table is provided to the side of the podium.

- 5.2.7.5.2.1 The table shall be between 28 and 34" inches in height.

- 5.2.7.5.2.2 There shall be at least 27" of knee space from the floor to the underside of the table.

- 5.2.7.5.2.3 If a microphone is provided at the podium, one shall also be provided at the small table.

- 5.2.7.6 Raised Platforms. If any attendee may have an opportunity to move onto a raised platform or stage during the meeting, the raised platform or stage shall be accessible by:

- 5.2.7.6.1 A ramp that

- 5.2.7.6.1.1 Is at least 3 feet wide.

- 5.2.7.6.1.2 Does not have a slope that exceeds 1/12.

- 5.2.7.6.2 Platform lift

- 5.2.7.7 High Speed internet Connection. Public meeting rooms shall provide for a high speed internet connection to allow attendees who rely on video remote interpreting or CART. There should also be a conference capable telephone with a speakerphone function available.

5.3 American Sign Language and Foreign Language Interpreters, Assistive Listening Devices, CART and Video Remote Interpreting.

- 5.3.1 American Sign Language and/or foreign language interpreters shall be provided at all public meetings upon request. See, Attachment 6.4 for information on how to request an interpreter.

- 5.3.1.1 To ensure their availability, interpreters should be requested at least two weeks in advance of the public meeting.
- 5.3.1.2 The cost associated with providing sign language or foreign language interpreters shall be paid for by the Department hosting the event.
- 5.3.2** Assistive Listening Devices. Assistive Listening Devices for attendees who are hard of hearing shall be provided at all public meetings upon request. See, Attachment 6.5 for information on how to provide assistive listening devices.
- 5.3.3** CART services shall be provided at all public meetings upon request (See Attachment 6.6 for information on how to provide CART services.). Staff should schedule or make requests for CART services at least two weeks in advance of the meeting, and preferably as soon as an attendee makes this need known. When remote CART services are to be used (the CART reporter is not in the room), staff should try to provide the reporter any technical terms or acronyms to be used, as well as the names of key meeting attendees before the meeting date.
- 5.3.4** Video Remote Interpreting shall be provided at all public meetings upon request via a computer/laptop with a webcam and high speed internet connection.

Note: Video Remote Interpreting is a relatively new form of technology and may be an adequate alternative to providing ASL interpreters in certain situations. However, if an attendee requests Video Remote Interpreting, ASL interpreters will be an adequate substitute, if the meeting planner cannot secure the requested technology.

5.4 Alternative Formats and Translation of Handouts/Presentation Material

Large print versions of all printed material shall be available at all public meetings. If requests for additional alternative formats are made in advance of the meeting (within the timeframes below), these formats must be available for the start of the meeting. If requests for alternative formats are made at or following the meeting, the alternative format must be provided within seven days of the request.

These requirements are the same with respect to translation into foreign languages, where the language requested is identified through application of the four factor analysis process, set forth in the MassDOT/MBTA Title VI Language Assistance Plan. When a language group is small, defined as 5% or 1,000, whichever is less, of the population of persons eligible to be served or likely to be affected or encountered, foreign language translations of “vital documents” should be provided,

and non-vital documents may be orally translated. This requirement does not affect the requirement to provide meaningful translation to one or more in a small group of LEP individuals through competent oral interpreters or translation where language services are needed and are reasonable.

5.4.1 Creating Alternative Formats

See attachment 6.7 for step by step instructions on creating alternative formats.

5.4.2 Large Print Version

5.4.2.1 At least five copies of any text-based printed material to be handed out during the meeting shall be in large print.

5.4.2.2 Large print meeting materials shall:

5.4.2.2.1 Be created using "Arial" font with a font size of 16 pt.

5.4.2.2.2 Have the same information as the original handout.

5.4.2.2.3 Have the highest contrast possible (e.g. black on white).

5.4.2.2.4 If graphics (such as images, tables, or graphs) are used in the original document, the same graphics shall be included in the large print version of the document.

5.4.2.2.4.1 If graphics are used in the large print document, a brief description of the image shall be provided. Image descriptions shall be brief and provide the viewer of the document with a general idea of what is in the image.

5.4.2.2.4.2 If tables or graphs are used in the large print document, a summary of the table or graph shall be provided.

5.4.3 Electronic Version

5.4.3.1 If an electronic version of materials is requested within 24 hours in advance of the meeting, this version shall be available for the meeting, if no advance request is made but rather is requested at or after the meeting, then meeting materials shall be made available electronically, within 7 calendar days of the request.

Note: Whenever possible, meeting planners should bring several copies of an electronic accessible version of the meeting material to the public meeting. Some individuals with visual

impairments or other disabilities may attend with portable screen reading software that would allow them to access electronic material during the meeting.

5.4.4 Braille Version

- 5.4.4.1 If a Braille version of materials is requested within one week in advance of the meeting, this version shall be available for the meeting, if no advance request is made but rather is requested at or after the meeting, then Meeting materials shall be made available in Braille within 7 calendar days of the request.

5.4.5 Audible Version

- 5.4.5.1 If an audible version of materials is requested within one week in advance of the meeting, this version shall be available for the meeting, if no advance request is made but rather is requested at or after the meeting, then meeting materials shall be made audible, within 7 calendar days of the request.

5.4.6 Foreign Language Version

- 5.4.6.1 If a common foreign language version of materials is requested within one week in advance of the meeting, this version shall be available for the meeting, if no advance request is made but rather is requested at or after the meeting, then Meeting materials shall be made available in the language requested within 7 calendar days of the request.

5.4.7 Other requests for alternate formats

- 5.4.7.1 Individual attendees may have unique specifications for alternate formats. All reasonable requests for alternate formats shall be honored upon request, within 7 calendar days of the request.

5.4.8 Meeting attendees will not be charged for any cost affiliated with the creation of alternate formats of meeting material.

5.5 Publicizing the Meeting

- 5.5.1** Public meetings shall be publicized as early as possible—ideally, at least 21 calendar days in advance, but never less than 14 days in advance. This allows attendees time to submit requests for reasonable accommodations and for meeting planners to set deadlines for accommodation requests to be made

in a timely manner. The meeting publicity also needs to be translated into the languages that are identified through application of the four factor analysis set forth in the MassDOT/MBTA Title VI Language Assistance Plan.

5.5.2 In addition to any other means, all public meetings shall be posted on www.mbta.com or <http://www.MassDOT/MBTA.state.ma.us>

5.5.3 All meeting notices shall include:

- 5.5.3.1 The statement “This location is accessible to persons with disabilities”
- 5.5.3.2 A brief listing of accessibility features that either are available or may be made available upon request during the public meeting (e.g. sign language, CART, assistive listening devices and/or foreign language interpreters).
- 5.5.3.3 Information on how to request reasonable accommodations by phone, e-mail or fax and the deadline for requests.
- 5.5.3.4 Information on how to request foreign language interpreter assistance.
- 5.5.3.5 See Attachment at section 6.7 for a sample meeting posting.

5.6 Additional Considerations

5.6.1 Within 48 hours, meeting planners shall follow-up with attendees who have requested reasonable accommodations to let them know their request has been received and will be honored to the extent possible.

Note: Especially in the case of ASL interpreters, the meeting planner may not know of their availability until 24 hours prior to the meeting. It is reasonable to let people know their request has been received and that it is in the process of being put in place, however if no interpreter is available people need to be notified and alternate plans must be made – such as CART or Video Relay.

5.6.2 Emergency Preparedness

- 5.6.2.1 In the event of an emergency, some attendees with disabilities may not be able to evacuate independently. Meeting planners shall familiarize themselves with the evacuation plan for the meeting space.
- 5.6.2.2 At the beginning of each meeting, meeting presenters shall announce the safety briefing--including information regarding where those attendees who would require assistance should wait during an emergency.

5.6.3 When opening a public meeting, presenters shall announce:

- 5.6.3.1 The presence and function of sign language interpreters (if interpreters are in the room), and/or CART providers
- 5.6.3.2 That assistive listening equipment is available
- 5.6.3.3 The location of accessible restrooms
- 5.6.3.4 The safety briefing (see 5.6.2.2).

5.6.4 When presenting, presenters at public meetings shall:

- 5.6.4.1 Speak slowly and clearly so that the sign language interpreters have time to interpret.
- 5.6.4.2 Verbally describe information presented visually (e.g. PowerPoint) so that attendees with visual impairments can access the information.
- 5.6.4.3 Ensure that any videos/DVDs shown during the meeting are encoded with closed captioning and are shown on a closed caption compatible device. Subtitles are an acceptable alternative.
 - 5.6.4.3.1.1 Provide an alternate version of the video/DVD with descriptive video/described narration. (See Attachment 6.9 for captioning resources.)

Note: It may not always be a good choice to use a described video in an open meeting as this can be a problem for other viewers.

6.0 Attachments

6.1 Accessibility Checklist for Meeting Planners

Meeting Date:

Meeting Time:

Subject of Meeting:

Location:

MassDOT/MBTA

Attendees:

☐ Is there at least one person or Department who is responsible for ensuring that the public meeting is accessible for all attendees?

Print Name/Department: _____

Publicizing Meeting:

☐ Has the public meeting been publicized at least 3 weeks in advance?

☐ Has the meeting been publicized on the MassDOT/MBTA or MBTA website?

☐ Has the meeting been publicized in the required foreign languages and ethnic newspapers for the relevant populations in the community where the meeting is to be held?

☐ Does the public meeting notice include accessibility information, how to request a reasonable accommodation, relevant dates for making requests and information on whom to contact to request a reasonable accommodation?

☐ Does the public meeting notice include information on how to request foreign language interpreters?

Facility:

Date of Facility Assessment: _____

☐ Where applicable (in areas where public transportation is available), is the meeting location 1/4 mile or less from the nearest accessible bus stop or rail station?

- ☐ Where applicable, is there an accessible path of travel provided from the public transportation stop to the meeting location and meeting room?
- ☐ If parking will be available at the meeting location, are there accessible parking spaces available (review # of car and van accessible spaces)?
- ☐ Is there an accessible path of travel provided from the accessible parking area to the meeting area?
- ☐ If the main entrance to the building is not accessible, is there directional signage towards the accessible entrance?
- ☐ Is the accessible entrance unlocked and able to be used independently? If the meeting is taking place at night, is the path leading to the alternate entrance well lit?
- ☐ If there are restrooms that are open to the public, is there a pair of accessible restrooms available within close proximity of the meeting area? If not, is there at least one accessible gender neutral restroom?
- ☐ If there are public phones, is there at least one accessible (TTY and within appropriate height range) telephone available?
- ☐ If a stage or platform will be used during the public meeting, is it accessible?
- ☐ If a podium will be used during the public meeting, is the podium height- adjustable? If not, is there a small table (between 28 and 34 inches in height) provided to the side of the podium?
- ☐ Is there a high speed internet connection within the meeting space?

Ensuring Appropriate Accommodations:

- ☐ Have sign language and foreign language interpreters, if requested, been reserved for the public meeting?
- ☐ Have CART services, if requested, been reserved for the public meeting?
- ☐ Are Assistive Listening Devices available for the public meeting? Does someone know how to use the device? Have you checked the devices at least 24 to 48 hours before the meeting and

rechecked immediately before the meeting starts? (Note: For large meetings, to avoid the loss of equipment, it is reasonable to ask for a driver's license or other ID as collateral.)

- ☐ Are at least five large print copies of meeting handouts available?
- ☐ Are printed materials available upon request, in alternative formats and/or relevant foreign languages?
- ☐ Are film or video presentations closed captioned and audio described?

Facility/Room Setup (prior to meeting):

- ☐ If the main entrance to the building is not accessible, is the accessible entrance unlocked?
- ☐ Is there an integrated seating area for individuals who use a wheeled mobility device in the meeting room?
- ☐ Is there seating available for attendees who are deaf or hard of hearing, and have requested an accommodation, near the front of the meeting room so that attendees may see the interpreter/captioner, or lip read?
- ☐ Is there an appropriately lit area in the front of the room for sign/foreign language interpreters and/or CART providers?
- ☐ Are the aisles at least three feet wide and clear of obstacles or tripping hazards?
- ☐ If microphones are used during the public meeting, are adjustable microphone stands available for attendees? Can staff be used as floaters with microphones as an alternative?

For recordkeeping and reporting purposes, please submit a copy of this completed checklist to:

Massachusetts Department of Transportation
Office of Diversity and Civil Rights
10 Park Plaza, Suite 3170
Boston, MA 02116
(For MassDOT/MBTA hosted or sponsored meetings)

Or

Department of System-Wide Accessibility
MBTA
10 Park Plaza, Suite 4470
Boston, MA 02116
(For MBTA hosted or sponsored meetings)

6.2 Ensuring adequate accessible parking

6.2.1 See http://www.mass.gov/Eeops/docs/dps/aab_regs/521023.pdf for Massachusetts Architectural Access Board (MAAB) regulations

6.2.2 See <http://www.access-board.gov/ada-aba/final.cfm#a502> for Americans with Disabilities Act Architectural Guidelines (ADAAG)

6.3 Accessible Restrooms

6.3.1 See http://www.mass.gov/Eeops/docs/dps/aab_regs/521030.pdf for Massachusetts Architectural Access Board (MAAB) regulations

6.3.2 See <http://www.access-board.gov/ada-aba/final.cfm#a603> for Americans with Disabilities Act Architectural Guidelines (ADAAG)

6.4 How to request sign language, CART Providers or foreign language interpreters

6.4.1 Sign Language Interpreters

- Complete and submit an on-line request for interpreting services through the Massachusetts Commission for the Deaf and Hard of Hearing's (MCDHH) website
 - Go to <http://mass.gov/mcdhh>
 - Click on "Interpreter/CART referral services"
 - Select "Request an Interpreter on-line"
 - Note: A copy of the Request Form is attached at 6.7, for reference.
- Requests should be submitted within 21 days, but no later than 14 calendar days in advance of the meeting to ensure interpreter availability.
- If the meeting is cancelled or rescheduled, interpreter requests must be canceled at least 48 hours advance in order to avoid being billed for the service. CART providers must be cancelled no later than 72 hours in advance of the event.
- Interpreters invoices are billed as a minimum of two hours.

- For meetings that are anticipated to last more than 75 minutes, two interpreters shall be provided. In most situations, one CART provider is sufficient if the meeting is no longer than three hours.

6.4.2 How to reserve CART Providers

Complete and submit an on-line request for interpreting services through the Massachusetts Commission for the Deaf and Hard of Hearing's (MCDHH) website

Go to <http://mass.gov/mcdhh>

Click on "Interpreter/CART referral services"

Click on "[CART \(Communication Access Realtime Translation\) Providers](#)"

Click on "Request a CART Provider" and follow listed directions

Note: A copy of the Request Form is attached at 6.7, for reference.

6.4.3 Foreign Language Interpreters/Translators

- MassDOT/MBTA's policy combines the use of bilingual staff, interpreter services and translated materials to communicate effectively with persons who are not fluent in English. When a request for oral interpretation is made, or a significant language speaking population is expected to attend a public meeting, the following steps should be reviewed and carried out to ensure compliance with Title VI requirements.
- Conduct a four-factor analysis as to the kind of meeting in question and the populations that are in the affected communities, using the language group maps that are contained in the Language Assistance Plan. Identify the languages that are likely to be needed and consult with the Office of Diversity and Civil Rights Title VI Coordinator and/or Specialist for assistance with any problems concerning the language groups that may require interpreter services.
- Identify the source for interpreter services, recognizing that most providers require one-two weeks advance notice of a meeting, based on the language(s) to be interpreted.

6.4.2.1 Interpreter Resources

Projects should have a line item in the budget allocating funds for translation/interpretive services for public meetings. When additional resources are needed for unexpected or unanticipated documents or meetings, there may be funds available. Please contact your department manager to make a request through Budget to secure state or federal funds, as needed. For shared services or internal operations where there may not be a project number, please contact the Chief Administrative Officer of MassDOT/MBTA to secure the funds.

6.4.2.2 Request and cancellation timeframes

- Requests should be submitted at least 14 calendar days in advance of the meeting to ensure interpreter availability
- If the meeting is cancelled or rescheduled, interpreter requests must be canceled at least 48 hours advance in order to avoid being billed for the service
- Interpreter invoices vary by provider but may have a minimum of two to three hours.
- For meetings that are anticipated to last more than 75 minutes, two interpreters shall be provided.

6.5 How to reserve assistive listening devices

6.5.1 Contact MassDOT/MBTA Facilities at 857-368-9560.

6.5.2 Departments that frequently host public meetings are encouraged to purchase Assistive Listening Devices so that they are readily available.

6.5.3 Currently OTA/THE RIDE owns Assistive Listening Devices that other departments can reserve and sign out for a public meeting.

Contact:

Carol Joyce-Harrington, OTA/THE RIDE

617-222-2256 or CJoyce-Harrington@MassDOT/MBTA.com

6.6 How to Create Alternate Formats

6.6.1 Electronic Version

- 6.6.1.1 Accessible electronic formats include email, and Microsoft Word Document (DOC or DOCX), a text file (TXT), or Rich Text Format (RTF).

Note: Some attendees requesting material electronically may have a visual impairment and use screen reading software. The formats referenced above are most compatible with such software.

- 6.6.1.2 Public meeting materials that are created electronically shall:

- 6.6.1.2.1 Be created using "Arial" font and a font size of 16 pt.
- 6.6.1.2.2 Shall have the same information as the original document and shall have the highest contrast possible.
- 6.6.1.2.3 If graphics (such as images, tables, or graphs) are used in the original document, the same graphics shall be included in the electronic version of the document.
- 6.6.1.2.4 If images are used in the electronic document, a brief description (providing the viewer of the document with a general idea of what's in the image) shall be provided.
- 6.6.1.2.5 If tables or graphs are used in the electronic document, a summary of the table or graph shall be provided.

6.6.2 Braille Version

- 6.6.2.1 Meeting materials that are in Braille shall:

- 6.6.2.1.1 Be created using contracted Braille (Grade 2) and single-spaced.
- 6.6.2.1.2 Braille documents shall have the same information as the non-accessible handout.
- 6.6.2.1.3 If tables or graphs are used in the regular document, a summary of the table or graph shall be provided in the Braille document.

- 6.6.2.2 In order to create a Braille document:

MassDOT/MBTA's Central Planning Transportation Services (CTPS) currently owns and operates a Braille printer.

Contact:

Janie Guion, CTPS

617-973-7507 or jguion@ctps.org

6.6.3 Audible Version

6.6.3.1 Public meeting material that is recorded audibly shall:

6.6.3.1.1 Have the same information that's printed on the original handout.

6.6.3.1.2 Be spoken clearly.

6.6.3.1.3 Shall describe images used in the original handout.

6.6.3.1.4 Shall provide an explanation of any table or graph is used in a meeting document. The meeting planner shall ensure that the audible explanation of the table/graph is clearly explained and represents the table or graph on the printed document.

6.7 Sample meeting posting (in an MBTA context)

Meeting Date	September 21, 20__
Meeting Time	1:00 P.M.-3:00 P.M.
Subject of Meeting	Judge Patrick King's Update on MBTA/BCIL Settlement Agreement
Location	State Transportation Building, 2nd Floor, Conference Rooms 2-3
MBTA Attendees	Department of System-Wide Accessibility

Sample Text

Meeting Purpose - Judge Patrick King will be hosting a public meeting to discuss his assessment of the MBTA's progress towards compliance with the MBTA/BCIL settlement agreement. Please come to share your questions and comments regarding accessibility at the T.

Notice: This location is accessible to people with disabilities. MassDOT/MBTA provides reasonable accommodations and/or language assistance free of charge upon request (including but not limited to interpreters in American Sign Language and languages other than English, open or closed captioning for videos, assistive listening devices and alternate material formats, such as audio tapes, Braille and large print), as available. For accommodation or language assistance, please contact MassDOT/MBTA's Chief Diversity & Civil Rights Officer by phone at (857) 368-8580, TTD/TTY at (857) 266-0603, fax (857) 368-0602 or by email to MASSDOT/MBTA.CivilRights@dot.state.ma.us. Requests should be made as soon as possible prior to the meeting, and for more difficult to arrange services including sign-language, CART or language translation or interpretation, requests should be made at least ten business days before the meeting.

(Note: This notice should be translated into the languages other than English that are identified to be necessary for the Limited English Proficient populations represented in the area of the project or initiative to be invited to participate.)

6.8 Resources for adding closed captioning and/or described narration to your video

- WGBH - <http://main.wgbh.org/wgbh/pages/mag/services/captioning/>
- 3 Play Media - <http://www.3playmedia.com/>
- Line 21 - <http://www.line21.tv/>
- TelePrint Digital Media - <http://www.tele-print.com/>
- Broadcast Captioning & Consulting Services - <http://www.closedcaptioning.com/>

6.9 Document History (Reserved)

4. Public Participation during the Fare Change process

4.1 Public Process for Fare Increase

The MBTA followed its most recent Policy on Public Process for Fare Increases, updated in 2009.

“Proposed changes to a fare restructuring, and/or a fare increase will be developed with significant public input and will be adopted after consultation with the Rider Oversight Committee, public workshops, public comment and at least one designated public hearing, and MBTA Board of Directors approval³. In addition, this public process shall be followed, to the extent applicable, for proposed major service reductions, defined as a systemwide reduction of 10% or more, as measured by typical daily usage. Proposed changes in fares and service reductions may be consolidated for purposes of this public process⁴

The public process shall include (but is not limited to) the following steps:

1. The MBTA will provide public notification of proposals of any of the following types:

- Changes to the fare structure
- A fare increase
- Major service reductions.

At the time of notification, the MBTA will issue a schedule for a public outreach process, provide background information on the reasons for the proposed changes, and provide preliminary summary documents (including preliminary and summary impact analyses that address revenue and ridership).

2. The MBTA will hold public workshops to discuss the proposed changes and solicit direct input from the public. For major changes to the fare structure, or a system wide fare increase of 10% or more (or a system-wide fare increase of less than ten percent that results in a cumulative increase

³ The MBTA may, without action by the MBTA Board of Directors, determine and, from time to time, adjust or suspend fares for occasional, short-term service related to special events, to promote the use of a particular service, or where, in the judgment of the General Manager, such action is required by considerations of the public safety or convenience. The MBTA may also provide pilot programs to test the effectiveness of different types of fare discounts before seeking Board approval for permanent implementation.

⁴ The Public Process described herein is intended to apply primarily to service reductions that may be proposed and/or considered in conjunction with changes in fare levels or fare structure. Nothing herein is intended to alter the process applicable to general service planning as described in the MBTA’s Service Delivery Policy, adopted January 14, 2009.

of ten percent or more within a three year period)⁵, at least ten workshops will be held in the following areas:

- Downtown Boston – 2 meetings
- Metropolitan Urban Neighborhoods – 3 meetings
- Metropolitan Suburban Communities – 4 meetings
- I-495 corridor – 1 to 3 meetings

For minor changes to the fare structure, or for a fare increase of less than 10%, the MBTA will hold up to five public workshops, to be located where feasible in areas most affected by the changes. The public workshops will be followed by a public comment period, during which the public can submit feedback in writing via mail, email or the MBTA website. The MBTA may designate one or more of the public workshops as a public hearing or hearings for purposes of 3.

3. As part of the public process, the MBTA will make available via the MBTA website its most recent § 11 reports to the Governor, Legislature, and Advisory Board, as well as any draft report or analysis addressing revenue, ridership, air quality, and environmental justice impacts. Following the availability or posting of such materials, the MBTA will hold at least one public hearing, which shall be held in a central location or locations within the MBTA service district. At any such hearing, the MBTA will make a formal presentation regarding the proposed changes, and the public will have the opportunity to provide testimony on the proposals for the public record.

4. Following the public workshops and hearing(s), the MBTA may make revisions to the draft documents, based on the comments received through the public workshops, comment period and hearing(s). The revised drafts and a summary of the public comments will be submitted to the MBTA Advisory Board and Board of Directors for review. The summary of comments, with MBTA responses, will be made available to the public on the MBTA website.

5. In connection with a proposed system-wide fare increase of ten percent or more, the MBTA Board of Directors will make environmental findings. Such findings will include: the purpose and need of a fare increase; actions taken to avoid a fare increase; the impacts of the fare increase, including economic, transportation, air quality, and environmental justice; alternatives to a fare increase, including impacts of no fare increase; and measures to reduce impacts. Environmental consideration of major service reductions shall be conducted in accordance with applicable law.

⁵ The percent of fare increase represents the percent of additional fare revenue realized by the MBTA as a result of increased fares. Thus, with a system-wide fare increase of ten percent, riders on some services may experience an increase of more than ten percent and others less.

6. The Board of Directors will make a final vote on the proposed changes after considering the overall financial condition of the MBTA, the ridership and revenue implications of the changes, the staff's summary of public comments, the air quality and environmental justice analyses, and comments from the MBTA Advisory Board. Except where the Board of Directors determines that the condition of the MBTA requires prompt action, the Board of Directors vote will not take place until at least 15 days after the summary of public comments has been made available.

Public notifications will be placed in citywide and community newspapers, on the MBTA website, on transit vehicles, and via station signage. Documents will be made available electronically on the MBTA website (formatted for easy download) and in hard copy at local libraries throughout the service area. Reasonable measures will be taken to assure that notifications are made to appropriate groups of persons with limited English proficiency (LEP).

Public workshops and hearing(s) will be scheduled Monday – Thursday, will be held at times that are convenient for commuters and transit dependent riders, and will take place at locations that are within walking distance of MBTA services.

5. Public Participation during the Capital Project Development and Design Process

5.1 Project Development

The project development process covers a range of activities extending from the identification of a project need to a finished set of contract plans, through construction and project completion. The sequence of decisions made through the project development process progressively narrows the project focus and, ultimately, leads to a project that addresses the identified needs. The MBTA coordinates all project planning with the Office of Transportation Planning (OTP).

The MBTA is committed to providing ample opportunities for public participation throughout the entire project development process. This work and coordination follow the planning phase to take advantage of research already conducted on the communities impacted by a project and the level of public support, measured through the public participation process.

The procedures MassDOT/MBTA has adopted for project development are intended to be implemented in conformity with the MassDOT/MBTA Title VI and Americans with Disabilities Act protocols, policies and procedures for inclusive and accessible public participation provided in this document.

5.1.1 Need Identification

The project development process is initiated in response to an identified need in the transportation system. This need can result from suggestions or concerns about a regularly maintained asset or by the operation of a performance-management system, such as MassDOT/MBTA's bridge management system, or a recent corridor or area planning process. Problem, need, or opportunity identification can also occur through the regional planning initiatives of a planning organization or arise from community, legislative, or citizen input.

The development of solutions to address identified needs often involves input from transportation planners, community leaders, citizens, environmental specialists, landscape architects, natural resource agencies, local public works officials, permitting agencies, design engineers, financial managers, and agency executives. Solutions might target a single mode of transportation, or address the range of road users including pedestrians, bicyclists, transit operators, automobile drivers, and truckers moving freight and goods. It is important to engage from the beginning of project development.

Transportation decision making is complex and can be influenced by legislative mandates, environmental regulations, financial limitations, agency programmatic commitments, and partnering opportunities. Decision makers and reviewing agencies, when consulted early and often during the project development process, can ensure that all participants understand the potential impact these factors can have on project implementation.

5.1.2 Project Planning

Upon identification of a transportation improvement need, the planning process commences. As part of the planning process, the project proponent must conduct a public participation outreach and involvement program, provide information regarding the project, and decide, based on the totality of information gathered during the planning process as well as public input, whether to continue the project development process.

In the planning phase, the proponent identifies issues, impacts, and potential required approvals in order to determine which design and permitting processes are called for. This phase also helps to define project responsibilities and benefits.

Public participation in a project should begin early in project planning and before there is a recommended course of action. Consultation with public involvement specialists on early and long-term efforts is recommended wherever a broad-based public involvement effort is planned and

implemented. The initial public outreach process starts with an early informational meeting and continues at strategic milestones during the planning process. Substantial effort should be made to reach a broad spectrum of interested parties at this early project stage and throughout the project.

Public meetings are conducted during the planning phase in order to relay information to the general public and to solicit input to the project. The public meetings serve as forums at which MassDOT/MBTA can learn about and respond to community concerns. A public meeting typically begins in an open house format to allow individuals to speak one-on-one with MassDOT/MBTA staff regarding their concerns and questions with respect to the project, and then formal presentations are made to share information and elicit public comments and suggestions.

During the scoping of projects, MassDOT/MBTA coordinates with the affected metropolitan planning organizations (MPOs), regional planning agencies (RPAs), regional transit authorities (RTAs), and municipalities to determine the amount and type of public outreach that will be required for the project. These entities maintain Public Participation Plans of their own and should be contacted directly for a copy of said plans.

Following review by all constituents and by environmental agencies of the alternatives and proposed project, the Project Planning Report can be completed and made ready for review. The report documents the need for the project, existing and future conditions, alternatives considered, public participation outcome, and solution recommended.

5.1.4 Construction

After a construction contract is awarded, the proponent and the contractor will need to develop a construction management plan. The permitting agencies, local authorities, businesses, and affected members of the general public need to be informed of the plan. These entities should also be notified as changes in detours, traffic operations, and construction areas and activities occur throughout the project.

Before construction activities begin, the proponent and construction manager must determine the appropriate type of public notification and participation needed. Different projects result in different types of disruption to transportation and other nearby activities. For simple projects, including resurfacing, a minimal degree of public participation may be needed. For these projects, the proponent should, at a minimum, notify abutters (in languages other than English, if appropriate) of the impending construction activity.

For complex projects, the proponent may need to schedule a construction management plan meeting with abutters and other project participants (local boards, interest groups, business associations, etc.). At this meeting, the proponent can describe the types of construction activity needed, construction phasing, and durations. Issues and concerns associated with the construction period can be identified and adjustments made to the construction management program to minimize community impacts.

It is critical to remain in contact with stakeholders, neighbors, abutters, legislators, and municipal officials throughout the duration of a project, including the construction phase. Monthly or quarterly stakeholder and abutter meetings should be held when the size or location of a project calls for them. In addition, MassDOT/MBTA will utilize the following communication tools to share project information and receive feedback.

- **MassDOT/MBTA website:** By the time construction is underway, many projects already have their own project page on the MassDOT/MBTA website. The project page should be a clearinghouse for accurate, up-to-date information. It is important that the Project Manager or a Public Affairs staff person assigned to the project page update the content regularly throughout the duration of the project. In addition, any public meetings scheduled for a project should always be posted in the MassDOT/MBTA website calendar.
- **Media:** MassDOT/MBTA utilizes press releases, advisories, alerts, and other traditional forms of media outreach.
- **Social media tools:** MassDOT/MBTA currently uses Twitter, MassDOT blog, Flickr, email distribution lists, and other new media venues for project updates, traffic advisories, and notices of upcoming project meetings.
- **Public Affairs email account:** MassDOT/MBTA has an email account that is used to send meeting notices and traffic advisories to the project contact lists and to receive public input.

6. Public Participation Process for Service Planning & Operations

6.1 Service Planning/ Operations

The MBTA Board of Directors adopted the *Service Delivery Policy* in September 1996. This policy defined service standards and outlined a process to evaluate and modify service. Standards relate to:

- Span of Service
- Frequency of Service
- Vehicle Loading
- Schedule Adherence
- Net Cost per Passenger

6.2 Service Planning Outreach Process

After the MBTA releases its draft proposal for service changes, the MBTA holds a series of meetings to solicit feedback and comments on the proposed changes. In addition, the MBTA has established an e-mail (serviceplanning@mbta.com) to receive public comment on proposed service plans. The first Service Plan was implemented in 1998, and since then major service changes have been implemented in 2002, 2004, 2006 and 2009, using the same Service Plan process. The Service Delivery Policy itself has also been refined since 1996, as a part of the process.

Public participation in the service planning process varies somewhat by mode and occurs as both an on-going process and as a Service Plan specific process. The purpose of public involvement in the service planning process is to promote a regular dialogue with existing and potential riders, elected officials, and communities regarding their ever-changing service needs

On-Going Public Outreach

The MBTA provides avenues for on-going communication through the MBTA's website, as well as the customer complaints phone line and comments sent to individual MBTA officials. Service related comments/requests are directed to the appropriate department for consideration and response. Upon request, MBTA staff also attend public meetings held by municipalities and meetings with public officials to address specific service issues. In addition, from time to time, the MBTA may conduct specific market or route-based surveys to gather direct input on a major service change or potential new service.

Biennial Service Plan Public Outreach

Service Plan outreach efforts are intended to provide members of the public with the opportunity to submit service requests to the MBTA for consideration in development of the Biennial Service Plan. To this end, the MBTA solicits ideas for service changes through written comments (submitted on-line or via the mail), as well as through public meetings throughout the service area, before a draft plan is written.

Upon completion of the draft biennial Service Plan, the MBTA schedules a second round of public meetings in appropriate locations. At these open meetings the MBTA presents the analysis and issues behind the proposed service changes and solicits public comments on them. In addition, at least one Public Hearing is held to receive formal public comments on the draft Biennial Service Plan. MBTA staff then assess and analyze the suggestions made through the public comments and, as appropriate, incorporate them into the final recommendations that go to the MBTA Board of Directors for approval before implementation.

All Service Plan public notifications, meetings, and hearings will conform to the requirements of the Americans with Disabilities Act, Title VI of the Civil Rights Act of 1964, and MBTA policies associated with these laws.

APPENDIX 1

Federal Public Participation Mandates

23 CFR 450

The federal regulations concerning public participation in statewide transportation decision making are specified in Title 23, Section 450.210, of the Code of Federal Regulations (CFR). These regulations require that public involvement processes be proactive and provide complete information, timely public notice, full public access to key decisions, and opportunities for early and continuing involvement; they leave the choice of methods for facilitating participation to the discretion of each state. The regulations specify that participation processes must provide:

- Early and continuing opportunities for public involvement
- Timely information on transportation issues and decision-making processes
- Reasonable access to technical and policy information
- Electronically accessible public information on the Web
- Adequate notice of involvement opportunities and time for review and comment at key decision points
- Procedures for demonstrating explicit consideration of and responses to public input
- A process for soliciting and considering the needs of traditionally underserved populations
- Periodic review and evaluation of the participation process
- Public meetings at convenient and accessible locations and convenient times
- Visualization techniques to describe the proposed plans and studies
- 45 calendar days for public review of and written comment on public participation procedures in the development of the Long-Range Statewide Transportation Plan (LRSTP) and the Statewide Transportation Improvement Program (STIP) before new procedures and any major revisions to existing procedures are adopted

Title 23, Section 450.212, specifies the public participation requirements for systems-level, corridor, and subarea planning studies.

Title 23, Section 450.214, specifies the public participation requirements for development of the Long-Range Statewide Transportation Plan.

Title 23, Section 450.216, specifies the public participation requirements for development of the Statewide Transportation Improvement Program.

Title 23, Section 450.218, specifies that the transportation-planning process is to be carried out in accordance with all of the applicable requirements of:

- 23 USC 134 and 49 USC 5303 regarding metropolitan transportation planning, 23 USC 135 and 49 USC 5304 regarding statewide transportation planning, and 23 CFR 450 regarding planning assistance and standards.
- Title VI of the Civil Rights Act of 1964, as amended (42 USC 2000d–1), and 49 CFR part 21 regarding nondiscrimination in federally-assisted programs of the Department of Transportation.
- 49 USC 5332, prohibiting discrimination on the basis of race, color, creed, national origin, sex, or age in employment or business opportunity
- Section 1101(b) of SAFETEA-LU (Pub. L. 109–59) and 49 CFR part 26, regarding the involvement of disadvantaged business enterprises in U.S. DOT–funded projects
- 23 CFR part 230, regarding implementation of an equal employment opportunity program on federal and federal-aid highway construction contracts
- Americans with Disabilities Act of 1990 (42 USC 12101 *et seq.*) and 49 CFR parts 27, 37, and 38
- In states containing air pollutant nonattainment and maintenance areas, Sections 174 and 176 (c) and (d) of the Clean Air Act, as amended (42 USC 7504, 7506 [c] and [d]) and 40 CFR part 93
- Older Americans Act, as amended (42 USC 6101), prohibiting discrimination on the basis of age in programs or activities receiving federal financial assistance
- Section 324 of Title 23 USC, regarding the prohibition of discrimination based on gender
- Section 504 of the Rehabilitation Act of 1973 (29 USC 794) and 49 CFR part 27, regarding discrimination against individuals with disabilities

Americans with Disabilities Act of 1990 (ADA)

The Americans with Disabilities Act of 1990 (ADA) states that “no qualified individual with a disability shall, by reason of such disability, be excluded from participation in or be denied the benefits of services, programs, or activities of a public entity, or be subjected to discrimination by any such entity.” Therefore, ADA requires that locations for public participation activities, as well as the information presented, must be accessible to persons with disabilities.

ADA requires specific public participation efforts for the development of paratransit plans:

- Hold a public hearing
- Provide an opportunity for public comment
- Consult with disabled individuals

Title VI of the Civil Rights Act of 1964

Title VI of the Civil Rights Act of 1964, together with related statutes and regulations, provides that “no person in the United States shall, on the ground of race, color, or national origin be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance.” The entire institution, whether educational, private or governmental, must comply with Title VI and related Federal civil rights laws, not just the program or activity receiving federal funds.

FTA C 4702.1A, Title VI and Title VI-Dependent Guidelines for Federal Transit Administration Recipients, provides guidance on promoting inclusive public participation. This circular recommends the seeking out and consideration of the viewpoints of minority, low-income, and LEP populations when conducting public outreach and involvement activities. It identifies the following effective practices for fulfilling the inclusive public participation requirement:

- Coordinate with individuals, institutions, or organizations and implement community-based public involvement strategies to reach out to members of the affected minority and/or low-income communities.
- Provide opportunities for public participation through means other than written communication, such as personal interviews or use of audio or video recording devices to capture verbal comments.

- Use locations, facilities, and meeting times that are convenient and accessible to low-income and minority communities.
- Utilize different meeting sizes or formats or vary the type and number of news media used to announce public participation opportunities, tailoring communications to the particular community or population.
- Implement DOT's policy guidance concerning recipient's responsibilities to LEP persons to overcome barriers to participation.

Executive orders regarding environmental justice and outreach to persons with limited English proficiency are also regulated under Title VI of the Civil Rights Act:

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, 1994

This executive order states that "each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations." Traditionally underserved groups such as low-income and minority populations must be identified and given increased opportunity for involvement in order to ensure effective participation.

Executive Order 13166, Improving Access to Services for Persons with Limited English Proficiency, 2000

This executive order requires that recipients of federal financial aid ensure that their programs and activities that are normally provided in English are accessible to persons with limited English proficiency.

23 USC 109(h)

The U.S. Secretary of Transportation is required by 23 USC 109(h) to promulgate guidelines to ensure that possible adverse economic, social, and environmental effects relating to any proposed project on any federal-aid system have been fully considered in developing such project, and that the final decisions on the project are made in the best overall public interest, taking into consideration the need for fast, safe, and efficient transportation, public services, and the costs of eliminating or minimizing such adverse effects as the following:

- Air, noise, and water pollution

- Destruction or disruption of manmade and natural resources, aesthetic values, community cohesion, and the availability of public facilities and services
- Adverse employment effects, and tax and property value losses
- Injurious displacement of people, businesses, and farms
- Disruption of desirable community and regional growth

23 CFR 771

The joint FHWA/FTA regulations of 23 CFR 771 prescribe the policies and procedures for implementing the National Environmental Policy Act of 1969 as amended (NEPA) and the Council on Environmental Quality (CEQ), 40 CFR 1500-1508. It sets forth all FHWA, FTA, and U.S. DOT requirements under NEPA for the processing of highway and urban mass transportation projects and sets forth procedures to comply with 23 USC 109(h), 128 and 138, and 49 USC 303, 1602(d), 1604(h), 1604(i), 1607a, 1607a-1, and 1610.

Section 771.111 discusses early coordination, public involvement, and project development.

Section 771.111 (h) specifies (for the federal-aid highway program) that each state must have procedures approved by the FHWA to carry out a public involvement/public hearing program pursuant to 23 USC 128 and 40 CFR parts 1500 through 1508.

State public involvement/public hearing procedures must provide for:

- Coordination of public involvement activities and public hearings with the entire NEPA process.
- Early and continuing opportunities during project development for the public to be involved in the identification of social, economic, and environmental impacts, as well as impacts associated with relocation of individuals, groups, or institutions.
- One or more public hearings or the opportunity for hearing(s)⁶ to be held by the state highway agency at a convenient time and place for any federal-aid project that requires significant amounts of right-of-way, substantially changes the layout or functions of connecting roadways or of the facility being improved, has a substantial adverse impact on

⁶ An “opportunity for hearing(s)” is when the public is given the opportunity to request that one or more hearings be held so that members of the public can give formal comments on the public record.

abutting property, otherwise has a significant social, economic, environmental, or other effect, or for which the FHWA determines that a public hearing is in the public interest.

- Reasonable notice to the public of either a public hearing or the opportunity for a public hearing. Such notice will indicate the availability of explanatory information. The notice shall also provide information required to comply with public involvement requirements of other laws, executive orders, and regulations.

49 CFR 24.8(b)

This section requires that the implementation of uniform relocation assistance and real property acquisition for federal and federally-assisted programs is in compliance with Title VI of the Civil Rights Act of 1964.

APPENDIX 2

The development of an effective public participation program for a transportation plan, program, or project is a strategic effort that requires techniques designed to meet the particular needs involved. MassDOT/MBTA has considered and based its public participation approaches on the following guidance from the United States Department of Transportation, to systematically set up and implement a public participation program for a specific plan, program, or project:

1. **Set goals and objectives for your public participation program.** *The goals and objectives derive from the specific circumstances of a given transportation plan, program, or project. What decisions, formal or informal, are to be made? When? By whom? What public input is needed? Public input can be in the form of a consensus on a plan or a buildable project. Consensus does not mean that everyone has to agree enthusiastically but that all influential groups and individuals can live with a proposal. Public input can be in the form of information used by staff or decision makers. Agencies use the objectives to form the public involvement program. The more specific the objectives, the better they will guide the involvement program.*
2. **Identify the people to be reached.** *The general public and those directly affected, such as abutting property owners, are some of those who should be reached. If the public is not included or there is no proof of our attempt to reach out, there may be grounds for concerned individuals to challenge the fairness of a project development process. Review who is affected directly and indirectly, as well as those who have shown past interest. Look for people who do not traditionally participate, such as minorities and low-income groups. What information do they need to participate? What issues or decisions affect which specific groups or individuals? How can their ideas be incorporated into decisions? New individuals and groups appear throughout a public involvement program; there should be a way to identify and involve them. Conceptualize the public as a collection of discrete groups, individuals, and the general public; each has different interests and different levels of energy for participation. Most importantly, we must be clear that every member of the public we serve has a right to be part of any transportation planning process, and we are obligated to create real opportunities in support of that right.*

Usually, setting the goals and objectives for a public participation program and identifying the people to be reached should interact and are conducted simultaneously. In addition to brainstorming and analysis by agency staff, MassDOT/MBTA staff should ask members of the public for their input on goals, objectives, and names of people who might be interested. This can be done through key person interviews or focus groups or public opinion surveys.

3. **Develop a general approach or set of general strategies that are connected to the goals and objectives of the participation program and the characteristics of the target audiences.** For example, if an objective is to find out what people think about a proposal, use several techniques for eliciting viewpoints. Strategies fit the target audience in terms of what input is desired and the level of interest or education. General approaches respect agency resources of time, money, and staff. A general approach can be visualized in terms of a principal technique; for example, a civic advisory committee. It could be visualized as a stream of different activities connected to specific planning or project decisions. Alternatively, a general approach could be viewed as a focus on one or more public groups or interests. Be sure to check with members of the public for ideas on your general approach and whether the public to be reached finds the approach acceptable.
4. **Flesh out the approach with specific techniques.** Consult past experience for what works and does not work. Look at manuals of techniques, such as Public Involvement Techniques for Transportation Decision-Making (<http://www.fhwa.dot.gov/reports/pittd/cover.htm>) and the International Association for Public Participation's Public Participation Toolbox (provided in Appendix A). Choose techniques that fit your specific purpose and your public. Target individual groups with appropriate techniques. Approaches that fit the general public often do not fit specific groups well and result in lack of attendance at meetings. Do not isolate groups; provide a way for them to come together and for the general public to review what groups have contributed. This linkage can be essential for building consensus, when needed.
5. **Assure that proposed strategies and techniques aid decision-making to close the loop.** Ask agency staff the following questions: Are many people

participating with good ideas? Are key groups participating? Is the public getting enough information as a basis for meaningful input? Are decision-makers getting adequate public information when it is needed? If a consensus is needed for decision-making, consensus-building techniques like negotiation and mediation or collaborative task forces may be useful. Ask participants who is missing from the participation process. How can missing participants be attracted? Do participants think discussion is full and complete? Do they think the agency is responsive? Is participation rewarding? If not, why not? Continually evaluate and make mid-course corrections.

Appendix 2-E

Summary of Department-Level Public Engagement Activities

Summary of Department-Level Public Engagement Activities

OVERVIEW

Since submitting the 2014 Title VI Report to FTA, the MBTA's affirmative response to infrastructure and fiscal challenges has heightened understanding that there is a strong need to engage effectively with the public across MBTA departments. Some of these efforts focused on major projects, such as the Green Line Extension or the response to the snow challenge in 2015, while others were related to policy matters involving the 2016 fare increase, equity analyses, and the Disparate Impact/Disproportionate Burden and Service Delivery Policy development efforts.

In 2016, following leadership changes within the state and MBTA administrations, ODCR renewed training on the PPP with Legislative Affairs and Community Relations. The centrality of these groups in coordinating public engagement on MBTA projects, policies, and other initiatives made these units essential to work with to reinforce the importance of the PPP and promote compliance. Within this training, emphasis was given to FTA's requirement of a PPP and the MBTA's PPP policy document, as well as the need to adhere to the principles of this plan in connection with civil rights mandates under Title VI.

In 2015, the MBTA hired a full-time Title VI Specialist, whose job includes supporting inclusive community engagement and expanding the reach of ODCR's ability to identify risk factors in public participation by department, providing training in the PPP, and identifying resources to improve the MBTA's public engagement profile.

In 2015, ODCR conducted a briefing regarding Title VI and our PPP with MassDOT and the MBTA's consultant community, through the MBTA leadership group to the American Council of Engineering Consultants – Massachusetts (ACEC-MA). These external consultants were made aware of the existence of the PPP and the need to adhere to PPP principles in MBTA projects. In 2017, ODCR met with this group a second time to provide an orientation to the Engage software and requested that ACEC-MA members work with the tool and provide feedback.

The sections that follow outline the responsibilities and key efforts among the MBTA departments with significant public engagement activities during the 2014–17 triennial cycle. We have summarized the projects that reflect public involvement for each department within the triennial period.

COMMUNITY RELATIONS AND LEGISLATIVE AFFAIRS DEPARTMENTS

Within the triennial reporting period, the Legislative Affairs and Community Relations Departments engaged with the public and with state and local public officials concerning projects that involved both the MBTA and MassDOT. These units collaborated to coordinate public outreach efforts related to capital projects, policy development, capital investment planning, and other initiatives. The two units maintained an active working relationship with community-based organizations, stakeholders, and state and local elected officials, and for Title VI purposes, with the Black and Latino Legislative Caucus. At the project level, the Community Relations unit coordinated with project managers from various departments on public engagement matters.

With regard to civil rights-related outreach, as noted above, in 2016 the Community Relations unit, as part of a multidisciplinary team, helped ODCR organize public meetings to educate the public and obtain feedback while developing a revised MBTA Disparate Impact and Disproportionate Burden Policy. Also during 2016, both Legislative Affairs and Community Relations worked with MBTA Planning and Schedules, Civil Rights, the Office of Performance Management and Innovation, and the General Manager's office on public engagement for the fiscal year 2016 fare increase. These units have helped ODCR to orient legislative leaders who represent communities with significant Title VI and environmental justice constituencies to Title VI at the MBTA, the proposed DI/DB policy, and about how to seek support for community outreach.

The collaborative efforts between ODCR, Legislative Affairs, and Legislative have led to broader and more effective outreach, both generally and toward minority and low-income communities, with shared strategies that are creatively designed to involve communities that traditionally are hard to reach.

During summer 2017, Legislative Affairs and Community Relations merged into a new External Affairs Department, which represents all agencies under the Department of Transportation, including the MBTA, and manages public engagement and targeted outreach for public meetings, as needed. The External Affairs Department plays a lead role in both proactively and reactively engaging with and responding to all transportation stakeholders in Massachusetts. Stakeholders include but are not limited to elected and appointed federal, state and municipal officials of the Commonwealth, business organizations such as Chambers of Commerce, and community and neighborhood groups, along with Title VI and Environmental Justice constituencies, elderly people, and individuals with disabilities. External Affairs works closely with the Communications Unit to

ensure accurate and timely dissemination of information to the public, and coordinates the documentation of and response to public input for mandated public meetings about fare changes and major policy initiatives. ODCR will continue its collaboration with the External Affairs Department and continue to build on the strategies developed to solicit participation from and engage minority and low-income communities.

MBTA Service Diversions Communications Plan

Beginning in 2017, the MBTA is will undertake several infrastructure improvements that will impact Commuter Rail customers by rerouting users' bus service, to facilitate the construction process. During summer 2017, the Newburyport/Rockport Commuter Rail line experienced two service diversions related to the installation of Positive Train Control (PTC) measures and the reconstruction of the Beverly drawbridge. Bus shuttles replaced rail service during these two major projects.

According to the MBTA's Communications Plan for Service Diversion, "the Newburyport/Rockport Diversion is the largest supplemental service plan the MBTA has provided for a construction project to date." For this effort, the MBTA initiated a communications pilot strategy, building a toolbox designed for staff to use on upcoming planned diversions around the MBTA system. This resource created the ability to measure the effectiveness of messaging before, during, and after the diversions to support continuous improvements prior to a subsequent diversion activity. The following elements reflect the outreach strategy that was contained in the toolbox for the Newburyport/Rockport Diversion, including:

1. Posters at all stations with available ad space
2. Website – promotion, landing page, contractor project page
3. Pamphlets made available to customers with information and schedules
4. North Station digital screen messages (eight screens) to inform passengers of alternative service
5. Fare Vending Machine Stickers at North Station
6. Free parking signage at stations
7. Shuttle bus identifiers
8. Directional signage to shuttle buses for use at all stations inbound and Salem station outbound
9. Curbside banners at bus shuttles at Salem Station and North Station (Newburyport and Rockport lines only)
10. Posters at North Station ticket office and curbside banners
11. Weekend tickets

The communications strategy utilized during the Newburyport/Rockport line diversions was effective and positively received by the public. This strategy will be adapted for related service diversions that are being planned for the future,

with modifications to address differences in customer demographics for those communities impacted by future PTC projects.

MBTA/MassDOT Capital Investment Plan

Project Description

In fall 2015, under lead coordination through Community Relations, Legislative Affairs, and the Office of Transportation Planning, the MBTA and MassDOT began the process of developing their first combined five-year capital plan for state fiscal year 2017–21. The Capital Investment Plan (CIP) is a multi-billion dollar program that determines how the MBTA/MassDOT prioritizes its largest investments, covering all transportation projects from highway and municipal projects to regional airports and regional transit authorities (RTAs). The draft CIP is published electronically, and public comments on the document are solicited through an online comment tool, U.S. mail, and/or email. The Authority designates a public-comment period that begins approximately two weeks before public workshops and hearings on the draft. Also in fall 2015, MassDOT/MBTA held “Capital Conversations” throughout the Commonwealth to inform the public of the new approach to capital planning and seek public input before the first joint plan was drafted.

There were a total of 16 public meetings held throughout the state with 1,351 comments received from participants during the Capital Conversations event. MBTA/MassDOT staff synthesized the comments received and compiled a breakdown of the most frequent topics that came up during the meeting. The results showed that 39% of participants believed that improved service reliability and transit service expansion are critical to access better opportunities. Once the state fiscal year 2017–21 CIP was drafted, additional public meetings were held to discuss the proposed plan and receive public comment from constituents and customers. MassDOT staff conducted a social equity analysis of this public engagement process. Based on meeting attendance and submitted public comments, it was determined that people of color, low-income people, and limited-English proficient communities had been underrepresented in Capital Conversations. To address this, MassDOT changed the outreach strategy during the second round of Capital Conversations (conducted after the release of the draft CIP). The outreach list was broadened, and efforts were made to directly contact a variety of community-based organizations across the Commonwealth to more accurately reflect the diversity of MassDOT and MBTA customers. This effort led to public meeting attendance and comments that better reflected the Commonwealth’s constituents.

Public Outreach Activities

To notify the public of the draft document, including any upcoming events, the MBTA/MassDOT posted meeting information on both agency websites and coordinated with the Boston Region Metropolitan Planning Organization to disseminate information, including published announcements in local newspapers. Members of the public were given options to submit comments via U.S. mail and/or email, and during in-person meetings. Feedback collected through the public participation process was synthesized and presented to the MassDOT board of directors and the MBTA's Fiscal Management and Control Board.

The public meetings provided an opportunity for individuals to give their input on and ask questions about the proposed capital plan in person. Various MBTA departments designated key personnel to be present at each of the meetings to conduct presentations and respond to questions. All meeting locations were accessible to people with disabilities, including individuals with limited-English proficiency.

Public Meeting Formats

CIP public meetings were conducted in one of the following two formats:

- **Public Hearing Format:** During the public hearings, the MBTA presented an overview of the draft CIP, with highlights of key existing and new projects. Members of the public were then invited to provide formal comments; however, no questions were answered during the hearing. An MBTA/MassDOT staff person recorded the entire meeting, including the comments submitted by each of the participants, which became part of the public record. After the meeting, members of the public were invited to meet informally with MBTA personnel to have their questions answered.
- **Workshop Format:** Each public workshop began with an overview of the draft CIP, including highlights of key existing and new projects. Since members of the public often came to the meetings expecting to have their questions answered, the workshop format included a question-and-answer segment. No stenographer was present to record the program in this format. However, MBTA staff members took notes during the session and incorporated the information into a report summarizing the public-participation process.

Locations/Meetings

The Capital Conversations were held throughout Massachusetts in fall 2015 during the pre-CIP draft, and public meetings were organized across the Commonwealth during the CIP public comment period in spring 2016. There

were a total of 15 meetings conducted during the 2016 CIP public process, both within and beyond the MBTA service area, with 10 of the meetings located in areas served by the MBTA. This process will be repeated annually, as each subsequent year's capital funding plan is developed.

COMMUNICATIONS

The Massachusetts Department of Transportation and MBTA Communications Unit is engaged proactively, seven days each week, in delivering news and information to transportation customers about initiatives and events in all MassDOT and MBTA divisions and units. The Communications team utilizes both traditional outreach to news media and an aggressive social media presence in order to deliver information in a timely manner. The team works to respond promptly to news media and constituent inquiries while also proactively delivering positive updates about MassDOT and MBTA services. A comprehensive statewide list of news and constituent contacts is utilized to distribute news releases and other information. Social media tools, many used daily, include Twitter, Facebook, Instagram, Flickr, You Tube, and the active MassDOT Blog, all of which provide important multimedia updates about agency happenings. The Communications team is guided by a commitment to highly responsive customer service in daily interactions with the public, news media, advocates, and all parties interested in MassDOT and MBTA services, as part of our commitment to transparency and civic engagement in government.

MBTA CUSTOMER EXPERIENCE DEPARTMENT

The MBTA Customer Experience Department was established in July 2016, with the focus of enhancing the customer experience by developing timely, relevant, and clear communications that inform and engage customers and stakeholders. The department also leverages technology to enhance the customer experience cost effectively.

The Customer Experience Team is responsible for leadership of MBTA communications functions across all customer touchpoints, management of the Authority's call center, and in-station customer care services.

Recent Customer Experience initiatives include managing the new MBTA Call Center contracted-service initiative, which resulted in extended service hours and expanded language support. The Customer Experience Team is also supporting the introduction of contracted "Transit Ambassadors" in MBTA stations to augment the customer care provided by the Authority's Customer Service Agents. While still in pilot mode, this initiative offers the opportunity to expand the number of hours and stations where customer care resources are available to help riders purchase fares, plan trips, and answer questions. The Office of

Diversity and Civil Rights coordinated with the Customer Experience team to ensure that these Transit Ambassadors have the resources to meet language access needs, such as "I Speak" cards for LEP customers to identify the language in which they wish to communicate, and tablets that support translation software applications to provide an opportunity to meet such a language access need in real-time.

Finally, the Customer Experience team makes sure that all customer care agents have the appropriate training and subsequent knowledge to be more perceptive in assisting seniors and persons with disabilities. The Customer Experience team leads customer care training for MBTA in-station customer service agents, and is developing new technology-based tools to put information at their fingertips in order to best support our customers.

A top priority of the Customer Experience team is increasing and targeting MBTA messages to limited-English-proficient customers, particularly during planned and unplanned service interruptions where non-English speaking customers often have the hardest time navigating the system. The Customer Experience team is also charged with developing more consistent, easy-to-understand, and timely messaging that keeps all of our customers "in the know."

Recently, this team organized more than 150 staff volunteers from several departments across the Authority to assist with the expected high volume of customer traffic throughout the system during special events, including the New England Patriots Super Bowl Victory Parade, Boston Marathon, and Sail Boston. These efforts were roundly praised for demonstrating our customer service commitment to the riding public and supporting operations staff during times of great concern about safety and system burden.

The Customer Experience team routinely works on other project initiatives with several departments across the MBTA, including System-Wide Accessibility, the Office of Diversity and Civil Rights, MassDOT Community Relations Department, and the General Managers Office, among others.

CUSTOMER CALL CENTER

During this triennial cycle, the MBTA Customer Call Center provided service information to more than 1,200 MBTA customers per day. Customers contacted the Call Center via telephone, email, letter, and walk-in visits regarding a broad range of questions about the MBTA and its services. During the past three years, MBTA Call Center inquiries have decreased by 32 percent as a result of the MBTA's enhanced customer communications through T-Alerts, web-based resources, and in-station information. The latter includes platform displays with

real-time schedule information and improved signage, particularly regarding planned service interruptions.

Also during this triennial cycle, the Customer Support Services team was composed of a diverse work staff, which provided translation services to MBTA customers in Spanish, French, Haitian Creole, and Cantonese. The Customer Call Center tracking system, called HEAT/ISIS, allowed staff to track customer calls from start to finish. Each complaint was assigned an incident number, then prioritized and routed to various departments within the MBTA for investigation and resolution. HEAT also provided reports regarding complaints, recommendations, and trends in service levels, which enabled staff and managers to use this data to make changes in services to benefit our customers.

In late spring 2017, the Customer Call Center's responsibilities were contracted out to a private company, Global Contact Services (GCS). The principal focus of GCS is to provide advanced customer phone support, including enhanced language support services. This change has allowed for the creation of a new Issue Resolution Team that focuses on resolving customer complaints, investigating issues, and identifying trends in an effort to reduce complaints and improve service. ODCR and Systemwide Accessibility trained the GCS Call Center staff and managers about civil rights-related matters that they might encounter, and the role of ODCR in responding to civil rights-related inquiries and complaints. During the training, MBTA staff emphasized the need to accurately enter information into the HEAT system to support proper investigations.

While most complaints alleging civil rights concerns are received within the Call Center, ODCR also maintains separate means for customers to file complaints directly with that office. The Call Center continues to utilize the HEAT system for tracking matters, and that system has been updated to improve data accuracy and utility. When matters are received by the Call Center, each complaint is assigned a task number, then prioritized and assigned electronically to various departments within the MBTA for investigation, response, and reporting.

Complaints are divided into by four categories of complaint types: Safety, Accessibility, Title VI/Discrimination, and General Complaints. The complaints are prioritized based on type, category, and reason. All Safety, Accessibility, and Title VI/Discrimination complaints are given a "priority one" for immediate action. If the complaint is a "happening now" complaint (emergency, safety, or accessibility issue), the Operations Control Center is alerted immediately for action. ODCR is immediately alerted in the instance of Title VI/Discrimination complaints.

The HEAT system was recently updated to improve data collection, provide departments with a collaborative tool to investigate a complaint jointly, and facilitate identification and resolution of patterns of concern. Further, the Office of Diversity and Civil Rights partnered with Information Technology and the Customer Experience Department to change the Title VI complaint module to concur with the MBTA's Title VI complaint form and FTA requirements. Lastly, ODCR provided definitions for each federal- and state-protected category to further assist frontline staff—who could encounter a complaint related to discrimination—in identifying the protected group so they might refer the matter appropriately.

OFFICE OF TRANSPORTATION PLANNING

The Office of Transportation Planning (OTP)—the primary source of transportation planning for MassDOT—is also a part of the Enterprises Services office. OTP develops transportation plans, programs, and projects to advance the policies and objectives of the Governor and the Secretary of Transportation. OTP also ensures compliance with federal and state transportation and environmental laws and regulations, administers the statewide research program, and coordinates the state's metropolitan planning organizations. MassDOT planning staff performs, participate in, and manage several types of transportation planning studies, conducted either internally or by other entities such as consultant firms, the regional planning agencies, and other divisions of MassDOT. OTP plans include content that ranges from overall vision concepts to specific recommendations for improving individual travel modes and enhancements to particular street configurations. Each plan differs in scale and complexity, but all incorporate a strategic and multi-modal approach focused on safety and customer service.

MassDOT's Office of Transportation Planning supports the MBTA in a number of ways. Through its role coordinating the development of the annual Capital Investment Plan, OTP develops a civic engagement effort intended to solicit the input of a broad range of stakeholders. This work has included the use of an online platform — Engage, discussed earlier in this chapter — to facilitate public outreach by identifying LEP populations, diverse community contacts, and accessible meeting venues. For the long-range capital needs of the MBTA, OTP is leading the Focus40 investment plan. This multi-year planning effort establishes a vision for the MBTA in 2040, and features an extensive outreach program that has connected with thousands of stakeholders through strategies designed to ensure that the input received is proportional to the demographic and geographic diversity of the MBTA's customer base. OTP has also led extensive on-the-ground engagement efforts in low-income, transit-dependent communities in support of short- to medium-term MBTA investment strategies through its work

on the Roxbury/Dorchester/Mattapan Transit Needs Study, the Silver Line Gateway project, and the Everett Transit Action Plan.

MBTA Focus40

Project Description:

Focus40 is a 25-year investment plan to position the MBTA to meet the needs of the Greater Boston region in 2040. This project is meant to illustrate and describe the longer vision that recognizes today's infrastructure challenges, shifting demographics, climate change, and the growth of technology that may affect the role the MBTA will play in the future of Greater Boston. Focus40 aims to:

- Conduct an extensive public engagement process
- Prioritize long-term performance/reliability and capacity investments
- Solicit new ideas for system improvement and expansion
- Strengthen public partnerships for improved transit in our region

Public Outreach Activities:

Focus40 aimed to gather feedback from a broad range of stakeholders across the MBTA service area to help develop a vision for how the MBTA can meet the needs of the Boston region in 2040. To ensure that the process incorporated diverse viewpoints and values, particularly those of bus riders and low-income populations, who often are underrepresented in public processes, Focus40 created a multifaceted engagement strategy. The Focus40 Street Team spent 100 hours talking directly to customers at stops and stations throughout the system to collect ideas for the MBTA's long-range plan, ultimately reaching more than 1,500 individuals.

The Street Team outreach effort was designed to correspond with overall MBTA ridership by mode. As a result, the Street Team spent 60 hours at rapid transit stations, 30 hours at bus stops and 10 hours at commuter rail stations. More than a third of the Street Team outreach (40 hours) was spent talking to customers in low-income neighborhoods like Mattapan, Roxbury, and Dorchester. Since May 2016, the Focus40 project team has held three large-scale public events and three stakeholder workshops, and has participated in a range of activities conducted by a variety of interested parties, including business groups, educators, elected officials, non-profits, and students, to gather investment ideas they believe the MBTA should pursue in the future. The Focus40 project team also spent more than 50 hours in one-on-one meetings, discussing the future of the MBTA transit system with more than 80 different organizations, including municipalities, businesses, and community development groups.

As a result of this multifaceted engagement plan, Focus40 received more than 3,000 ideas from the public about the types of investment ideas they would like to see the MBTA pursue in the future. While MBTA civic engagement efforts will always be met with ideas for major system expansions, the majority of input was about improvements in the core system. What we heard also appeared to change based on the type of outreach. Through our Street Team outreach, we heard that creating a more reliable system with frequent service was the number one thing the MBTA should focus on in the long term. Conversely, expansion ideas appeared to be the top priority from various stakeholders. Overall, Focus40 outreach underscored that the public would like to see a more reliable and well-functioning MBTA system in the future.

Everett Transit Action Plan

The Everett Transit Action Plan aimed to identify near- and long-term solutions to the transit challenges facing Everett residents and workers. The Project Team conducted several types of outreach including stakeholder briefings, “tabling” at community events, hosting open houses, and talking to riders at bus stops in Everett and at Sullivan Square, where many riders transfer. The Team also conducted two online surveys during the process, which were advertised by the City. All materials were available in Spanish, Portuguese, and Haitian Creole. Spanish interpreters were available at all meetings and for most additional outreach efforts, and Haitian Creole interpretation was also available at several of these events. One of the major outcomes of the Everett Transit Action Plan was a “pop-up” bus lane that the Mayor made permanent at the end of the week-long pilot.

CAPITAL DELIVERY DEPARTMENT

The Capital Delivery Department consists of approximately 160 MBTA managers and staff and is responsible for the delivery of capital construction projects in support of the MBTA's \$7.4 billion five-year Capital Investment Program (exclusive of the Green Line Extension Project). The Capital Investment Program's priorities include reliability and modernization (state of good repair) and expansion. Capital projects encompass track, signal, power, bridges, stations, and other facilities throughout the system. The department is responsible for successfully delivering capital construction projects consistent with the capital investment program and ensuring that projects are on time and within available funding.

The MBTA's Capital Delivery Department is also responsible for engaging with the public during the project design, development, and construction process, and for providing guidance based on this department's “2014 Standard Operating Procedure for Project Managers.” In addition, project managers in capital delivery

coordinate public engagement with MassDOT's Communications Department (MassDOT CD) from the beginning of the initial design stage through the end of construction. ODCR is currently engaging with the Capital Delivery Department to train project managers in the MBTA's PPP protocol to ensure that the efforts of this department are fully coordinated with our public engagement commitments under Title VI.

Blue Hill Avenue Design Public Process

During the triennial cycle, the public process leading to the construction of the Fairmount Line's Blue Hill Avenue Commuter Rail Station has been noteworthy. This location will be part of the commuter rail service from South Station through the Boston neighborhoods of Roxbury, Dorchester, and Mattapan, which are home to many minority and low-income residents and customers.

Starting in 2008, when the project was first conceptualized, the MBTA began a process of engagement that has included 13 public/working group meetings that have extended through the design phase. To improve meeting notices and messaging, during the past three years the Capital Delivery Department held six working group meetings and one public meeting, with the latter publicized at least four to six weeks in advance to give community members enough time to plan, review meeting materials, and participate in productive dialogues.

The working group for this effort is comprised of community members selected by public officials, and is responsible for representing the neighborhoods and their residents. Moreover, the outreach process implemented for the public meetings has included leafletting flyers with project information to riders at train stations, local businesses, churches, ethnic radio stations, libraries, and community health centers.

Project information and meeting materials have been made available in English, Spanish, and Haitian Creole, with appropriate notice advising the public of their right to request language assistance and/or accessibility accommodations. The Capital Delivery Department also hired a member of the community to provide grassroots support, outreach to local newspaper outlets, and recruit volunteer support to present relevant project information at public meetings. The meetings were scheduled on the first Tuesday and second Thursday of each month, from 5:30 to 7:30 PM at the newly renovated Mattapan Public Library, which has ample meeting space and is a heavily visited resource in the community.

Ruggles Station Commuter Rail Platform Project

Project Description

The Ruggles Station Commuter Rail Platform Project involves constructing an 800-foot long commuter rail platform to service Track 2, which will increase direct access to the station for passengers, as well as accessibility and state of good repair improvements. Ruggles Station is the fourth-busiest commuter rail station in the MBTA system and accommodates 29 inbound trains, 49 outbound trains, and 14 bus routes. Ruggles Station is considered a minority rapid transit station, according to the most-recent MBTA passenger survey (conducted between 2015 and 2017), with the majority of bus routes and outbound rapid transit trains traveling within minority and low-income communities. As noted on the project homepage,¹ “Ruggles Station, is the primary intermodal transfer point for suburban commuters working at the hospitals, colleges, and museums in the Longwood Medical Area and Back Bay. It is limited in its commuter rail operations because only two of the three tracks serve the existing platforms.

The physical limitations of the station, in conjunction with daily congestion along the corridor from both MBTA and Amtrak trains, make it difficult to offer a complete schedule of trains at Ruggles Station. Today, more than 30 percent of the inbound trains bypass Ruggles Station, requiring inbound passengers to transfer from the commuter rail to the Orange Line at Back Bay to travel back to Ruggles Station.” Planned improvements to the commuter rail platform include:

- Improved station accessibility
- Enhanced pedestrian safety and security
- Interior and exterior repairs to upgrade the station to current codes
- Replacement of existing station elevators
- An additional elevator
- Improved lower busway paths of travel

Public Outreach Activities

In 2012, the MBTA held a series of 10 open house meetings at Northeastern University’s African American Institute to solicit input on the proposed design of the new commuter rail platform, which included one legislative briefing. Further, the MBTA’s Capital Delivery Department, in coordination with Community Relations, Legislative Affairs, and the Communications Unit held an open house and public meeting at the Boston Center for Youth and Families (in Boston) to discuss the construction that would take place during the summer and how it would affect traffic and transit users in the stations. The MBTA utilized several different public outreach methods to reach a wide-range of diverse community

members and residents who travel to or live in proximity to the construction taking place at Ruggles Station. The MBTA reached out to individuals and community-based organization within the surrounding Roxbury neighborhoods to disseminate flyers and project information, while answering any questions or concerns from the public. All public meetings flyers were translated into Spanish and included information about the ability to request free language assistance and/or reasonable accommodations. In addition to flyers, the following tools were employed to support outreach:

- MBTA project web page
- Internet communications
- Media outreach
- Ongoing coordination with stakeholders, including:
 - Northeastern University
 - City of Boston
 - Masco
 - Amtrak
 - Longwood Medical Area
 - Roxbury neighborhoods
 - Mission Hill
 - Wentworth Institute
 - Museum of Fine Arts
 - Mass College of Art

Green Line Extension (GLX) Project

Project Description

The Green Line Extension Project is a design-build project that will extend the existing MBTA Green Line light rail service from the relocated Lechmere Station in East Cambridge north to College Avenue in Medford (along the Lowell Commuter Rail Line) and northwest to Union Square in Somerville (along the Fitchburg Commuter Rail Line). The goal of this project is to increase mobility, encourage public transit usage, improve regional air quality, ensure a more equitable distribution of transportation services, and support opportunities for sustainable development. The Project includes the following elements:

- Relocate Lowell Commuter Rail tracks and new Medford Branch light rail tracks (3.4 miles)
- Relocate Fitchburg Commuter Rail tracks and new Union Square branch light rail tracks (0.9 miles)
- Add or relocate seven stations – Lechmere, Union Square, Washington Street, Gilman Square, Lowell Street, Ball Square and College Avenue

- Construct a vehicle maintenance and storage facility, including a transportation building and parking deck
- Replace/rehabilitate eight bridges
- Construct new drainage conduits, viaducts, retaining walls, and communications systems
- Improve roadways and intersections
- Purchase new Green Line vehicles (24)

Throughout the long history of planning this project, multiple public outreach events have taken place to keep members of the community informed and involved during all phases of the project development process. The public meetings and workshops were held in neighborhoods for which the new Green Line Stations will be built. For example, on June 21, 2017, the MBTA/MassDOT staff held a community meeting in Medford to give residents an update on the status of the GLX Design-Build implementation process. In addition to the project update discussion, it was noted during the presentation that the MBTA will develop a GLX Communication Working Group to:

- Facilitate timely issuance of near-term construction schedules
- Identify upcoming community impacts and other project updates
- Include community members, other stakeholders, and MBTA GLX team staff in the initial working group
- Include representation from the Design-Build team after the Design-Build Notice-to-proceed is issued

The MBTA/MassDOT has developed and implemented a comprehensive public engagement strategy for outreach during the design, engineering, and construction stages of the Green Line Extension project. Because of the design-build nature of this project, the MBTA has required that the selected contractor engage a full-time Title VI Coordinator to support public participation, respond to concerns, and support compliance reporting and related activities. The MBTA included a Public Involvement Plan in the project's Final Environmental Impact Report.

MASSDOT SECURITY AND EMERGENCY MANAGEMENT DEPARTMENT

As stated in the MBTA's 2016 Safety Plan, the MassDOT Security and Emergency Management Department is responsible for administering and maintaining the MBTA Emergency Management Plan (EMP) and other procedures, in addition to conducting and assessing emergency drills, exercises, training, and after-action reviews.

Each emergency drill acts out the scenario of a plausible major mass casualty emergency involving the MBTA transit system. The department is also

responsible for coordinating with external responders participating in the drill, including local fire, police, emergency medical services, hospital emergency room personnel, and regulatory agencies, as applicable. The MassDOT Emergency Management Department works in collaboration with other agencies such as the Registry of Motor Vehicles, MassDOT Aeronautics Division, and Logan Airport to assist with planning and coordinating emergency drills, training videos, and community outreach, including finding community volunteers to participate in exercises.

After a drill has concluded, volunteers and participants are asked to submit written feedback about their experience during the exercise, including citing any improvements that could be made to the evacuation process in the future. The purpose of these drills is to establish a learning environment for first responders and MBTA staff in situations where the public's health, safety, and security are in imminent danger. The MBTA has an obligation to develop policies and procedures for when critical incidents occur throughout the system and is responsible for conducting exercises to test their practices, in accordance with the Massachusetts Department of Public Utilities regulations.

On October 29, 2016, the MBTA and MassDOT conducted a subway evacuation drill in the City of Cambridge at Alewife Station, where responders and participants were given a scenario involving smoke on the train. In planning this exercise, multiple departments and local officials met for months to ensure the drill was carefully planned and executed. To support the exercise, the MassDOT Security and Management Department solicited volunteers to act as passengers, including some who were injured, during the simulated incident. Outreach for volunteers focused on area schools and local community-based organizations, and on local hospitals for emergency medical technicians and nursing staff. The Office of Systemwide Accessibility assisted the Emergency Management Team in finding participants with disabilities to ensure that first responders were given real-life scenarios in which they could practice their procedures of getting vulnerable passengers to safety. The MassDOT Security and Emergency Management Department, the MBTA/MassDOT Office of Diversity and Civil Rights and the MBTA Office of Systemwide Accessibility will continue to include communities and individuals who reflect the diverse profile and characteristics of the MBTA service area in these critical safety activities.

MBTA TRANSIT POLICE

The MBTA Transit Police Department's mission is to maintain a safe environment for all riders throughout the system and all members of the community. As with many police organizations across the country, a valuable resource to help curb and proactively address public safety issues, such as crime, terrorism, or social

disorder is the commitment to building trust and relationships with the community.

In providing excellent service to the community, while also respecting the differences that exist between neighborhoods, the MBTA Transit Police Department is structured into three geographical areas (designated as districts). The three districts divide into sectors that closely match the geographic boundaries of neighborhoods within the city of Boston, but still allow transit police to serve other cities and towns within their jurisdiction. A sergeant supervises each district and is overseen by one of two lieutenants at all times, during which they are all responsible for the quality of police service in their assigned areas, including engaging with the community to develop policing strategies tailored to local needs. Furthermore, the department places great emphasis on community policing as the cornerstone of the policing strategy. Community policing is designed to include the regular use of partnerships and problem-solving techniques that proactively address the immediate conditions that give rise to public safety issues. Each district engages in community outreach and involvement activities.

The MBTA Transit Police, moreover, participate in a variety of public engagement activities such as attending local community meetings, volunteering in youth programs, and launching the “See Something, Say Something” campaign. Some riders in minority and low-income communities believe that the “See Something, Say Something” initiative is helping to deter and discourage gang violence and drug use throughout the system. In addition, the Office of Diversity and Civil Rights in coordination with other departments, translated the “See Something, Say Something” public advisory announcement into Spanish, which is currently available in transit stations located in predominantly Spanish-speaking communities, and on select bus routes and rapid transit vehicles. Also, another useful tool for riders to remain vigilant and engaged is the utilization of a transit police mobile app, “See Say,” which gives customers the flexibility and discretion to report a problem, call the police, and/or receive real-time alerts on their cell phones regarding events related to public safety.

Finally, a major focus for the MBTA Transit Police Department is participating in youth development programs. A few of the programs that are attended regularly by transit police include:

- Children’s Services of Roxbury (CSR) Mentoring Program: This program strives to connect Youth and Police in Partnership (YPP) in a program to provide youth with a mentor relationship that will help to ensure a successful transition to a healthy adulthood and create life-long connections.

- CSR Round Table Discussion: Monthly discussions held at youth lock-down facilities and alternative schools to address a particular issue that affects youth—such as, how to forge healthy interpersonal relationships, the potential negative effects of social media, and so forth.
- Youth/Police Dialogues hosted by the YWCA – Boston: A six-week program between youth and police that facilitates open communication to discuss issues that may help to break down biases and stereotypes between the two groups.
- Volley Against Violence (Sportsmen’s Tennis & Enrichment Center): A group of programs designed and offered by Sportsmen’s in an effort to decrease violence among Boston area youth by providing them with positive experiences, skill building to promote positive decision-making, and connections to adult role models, including police officers.

OFFICE OF PERFORMANCE MANAGEMENT AND INNOVATION

The Massachusetts Department of Transportation’s Office of Performance Management and Innovation (OPMI) is responsible for:

- Evaluating the goals and measures established by the department and its divisions, and monitoring reported results
- Recommending changes to proposed goals and measures as are appropriate to align them with the strategic priorities of the secretary of transportation
- Reporting regularly to the public on the progress that the department and its divisions are making to achieve stated goals²

In meeting its statutory requirements, the Office of Performance Management and Innovation OPMI undertakes efforts to make performance information readily and publicly accessible. For instance, OPMI has developed an online dashboard that monitors the overall performance of the MBTA system, where riders are frequently updated on reliability, financial data, ridership, and customer satisfaction measures. Since its inception in 2009, MassDOT has utilized performance management throughout the agency, including the MBTA. After eight years of activity, MassDOT has fully integrated the concepts and tools of performance monitoring and management into enterprise processes and practices. Among other benefits, this approach helps the executive leadership team make strategic decisions, allows management-level staff to allocate personnel resources on a daily basis, and provides front-line employees with a

picture of the impact their work has on improving the transportation system and the customer experience.³

To restate the MBTA's Service Delivery Policy, OMPI helped establish the metrics needed to measure transit quality, provision of amenities, and distribution of service throughout the system. These standards are used in the Title VI performance monitoring analysis, which ensures that no person is unjustly denied or discriminated against with regard to the "routing, scheduling, or quality of transportation service on the basis of race, color, or national origin."⁴ Moreover, the Service Delivery Policy provides the MBTA's Planning and Schedules Department with the standards needed to create a comprehensive Biennial Service Plan to improve the reliability of bus service throughout the system. The development of the Service Delivery Policy required an extensive public engagement process to solicit customer feedback on the proposed measures. The information below highlights the Service Delivery Policy public process that further demonstrates OMPI's commitment to community engagement.

MBTA Service Delivery Policy (SDP) - Public Engagement Effort

Project Description:

The purpose of the Service Delivery Policy is to set the standards needed for the MBTA to measure transit quality and allocation of service to ensure that riders have access to a high-quality transportation system throughout the MBTA service area. The SDP, developed by the OMPI, provides staff with tools and guidance to begin a bus service planning process that encompasses a variety of measures to improve the service. These measures include service availability (span and frequency of service), reliability (schedule adherence, passenger wait times), and comfort (vehicle load and crowding). This policy also sets the standards and criteria for the MBTA's Title VI Service Performance Monitoring analysis to ensure that transit service is distributed equitably across the system.

The Office of Performance Management and Innovation (OMPI) conducted a comprehensive public participation process that involved surveying riders and facilitating both stakeholder and public meetings to learn more about the specific needs facing the community as it relates to transit. OMPI also participated in the Disparate Impact and Disproportionate Burden Policy public process to continue engaging with riders from diverse communities to discuss how the SDP and the DI/DB work together to ensure that service design and operations do not result in discrimination on the basis of race, color, or national origin. OMPI then

synthesized all the comments received during the public engagement process and developed a priority-setting strategy that focused on prioritizing certain standards and maintaining acceptable levels for all other measures. The Service Delivery Policy was approved by the Fiscal Management and Control Board in January 2017.

Public Outreach Activities

The Service Delivery Public Engagement Process is summarized below.

- Collaborative process between the MBTA, MassDOT, the Central Transportation Planning Staff (CTPS), and stakeholders since early 2015
- Policy Advisory Committee of internal and external stakeholders met four times to draft objectives and review measures
- Technical Advisory Committee met seven times to determine measures based on best available data
- Online survey with more than 6,000 responses
- Ten workshops with community organizations
- Participated in the four DI/DB public meetings

MBTA PLANNING AND SCHEDULES DEPARTMENT

The Planning and Schedules Department is responsible for monitoring and reviewing transit services, recommending schedule or route changes, and developing transportation plans to improve service quality and performance. This department also prepares vehicle and crew assignments for the Operations Department and interfaces scheduled information with internal and external downstream systems, such as payroll, pick, daily operations, and public-facing timetables.

Following the January 2017 approval of a revised Service Delivery Policy by the MBTA's Fiscal Management and Control Board, the Planning and Schedules Department began work with the new policy standards to construct a Service Plan, focusing primarily on improving bus service performance. This strategy is being designed to address each bus district prospectively on a regular, rolling basis and will recommend a number of tiered approaches that focus on updating scheduled running times, right-sizing frequency of service, and addressing overcrowding.

Public engagement for this effort is anticipated to be conducted by in-house staff with the support of consultant teams who have broad public engagement experience with MassDOT and the MBTA. It is anticipated that this work will involve assisting MBTA staff in administering multiple open houses and/or public meetings in each bus district. The effort will include non-traditional outreach methods, such as deploying trained street teams to conduct in-person interviews/information sessions at key bus stop locations

throughout the system. The in-person interviews will be supplemented by an online feedback form for riders to complete. Other outreach methods will include emails through GovDelivery, a project website with an online comment tool, social media, and meeting flyers/postcards available in multiple languages.

DEPARTMENT OF SYSTEM-WIDE ACCESSIBILITY

In 2006, the MBTA created a Department of System-wide Accessibility (SWA) to guide the Authority's ongoing efforts to provide accessible transit services, in compliance with the Americans with Disabilities Act (ADA) and related legal protections against discrimination on the basis of disability. Articulated through a court settlement, the mission statement of SWA establishes a clear, public-facing objective regarding the interface between the public transit services provided by the Authority and the public served by the agency, namely that "all people with disabilities must have every opportunity to be fully participating members of our community and that fundamental to this opportunity is the right and ability to use public transportation in an equal, effective, and dignified manner."⁵

On a daily basis, SWA serves as a clearinghouse for accessibility information, guidance, case studies, and best practices, and staff consists of subject matter experts on wide ranging access-related issues, projects, and initiatives. To facilitate the crucial objective of providing accessible transit service across the MBTA's fixed-route network, SWA has systematized a number of public engagement opportunities to understand the needs of the transit-riding public from an accessibility perspective and to include the advocacy community in the development of new initiatives to improve the accessibility compliance profile of the MBTA's operation.

Below is a sample of recurring interfaces between the public and SWA staff, leadership, and project development partners:

- Ad Hoc Vehicle Advisory Committee –
This group of customers and advocates is convened as needed to evaluate new vehicle design concepts at the early conceptual stages of any vehicle modification or procurement activities.
- Settlement Agreement Semi-Annual Meetings –
Following a settlement agreement between the MBTA and the Boston Center for Independent Living (BCIL) in 2006 where both parties agreed to strategic accessibility improvements across the MBTA network, including both capital investments and operating modifications, the MBTA has hosted semi-annual public meetings on progress and related initiatives.

These meetings provide a public forum to discuss progress updates on settlement-agreement initiatives and each session includes a public input component to ensure that public sentiment is considered on an ongoing basis as part of the evaluation of achieving the objectives of the settlement agreement and as an opportunity to consider new and evolving access challenges as they are encountered.

- Senior Leadership Field Work –
SWA's management team regularly attends local advocacy meetings, transit conferences, and other such public forums to publically share information on accessibility compliance efforts and innovations at the MBTA. It is common for these interface moments to include detailed information on travel training opportunities for the constituents of these advocacy groups and other organizations but also ensures that the MBTA places these departmental leaders in a position to effectively coordinate with those individuals and organizations across the service area that either represent the community of individuals with disabilities or are positioned to spread vital information about improved access opportunities or to identify challenges in this regard.
- Accessibility Advisory Committee to the MBTA (AACT) –
AACT is an advocacy group that was created to provide the MBTA with independent third-party advice about transit accessibility for persons with disabilities and seniors. AACT holds monthly meetings to discuss issues related to accessible transportation. SWA is an integral partner with AACT, providing monthly reports on accessibility issues and innovations at the MBTA to AACT membership and leaders, serving as a liaison between AACT and the MBTA's fixed-route services, and seeking input on key initiatives (like accessibility considerations in the procurement of new vehicles). A recent initiative included a customer survey designed in collaboration between SWA and AACT to identify areas for possible accessibility improvements across the MBTA's service area.
- Project-Level Support –
On an as-needed basis, SWA is available to provide recommendations around project-level public engagement strategies and highlight possible accessibility considerations that may be encountered by the project management team during the development process.
- Complaint Handling –

SWA regularly works with the Office of Diversity and Civil Rights on disability related complaint investigations. This can include communicating with the complainant, respondent, or staff supervisors/managers to address issues presented in individual cases and to extrapolate from those considerations to develop Authority-wide initiatives, such as staff trainings, that can help avoid the risk of disability related discrimination complaints going forward.

By continuing the compliance oversight and monitoring that is integral to the operation of SWA, as well as soliciting feedback from advocates, riders, and the general public, this office will continue to strive towards the goal of making the MBTA the global benchmark for accessible and inclusive public transportation.

ACCESS ADVISORY COMMITTEE TO THE MBTA

The Access Advisory Committee (ACCT) to the MBTA is an independent body that ensures the viewpoints of people with disabilities are shared with the MBTA. The Boston Region Metropolitan Planning Organization supports ACCT with a full-time staff person to assist with coordinating meetings and public outreach but does not have an official representation on the committee. ACCT works on a variety of issues to improve safety, efficiency, and accessibility of the MBTA system, including monitoring compliance with the Americans with Disability Act (ADA) in coordination with the Office for Transportation Access, System-Wide Accessibility, and other key MBTA departments.

The Access Advisory Committee meets once a month with MBTA officials and paratransit operators to identify accessibility problems in the service area and develop innovative solutions. ACCT meetings are open to the public and convene's on the fourth Wednesday of each month, between 1:00 PM and 3:00 PM, at the Massachusetts State Transportation Building in Boston. Meeting information is distributed in several formats, in accordance with ADA requirements. Additionally, upon request, AACT makes an effort to ensure a Sign Language interpreter is available at committee meetings.

ACCT's membership is open to the public, particularly persons with disabilities, senior citizens, or a representative of a human services agency. As a volunteer organization, ACCT requires members to attend regularly in order to maintain their eligibility to vote on a variety of policy issues and positions related to MBTA services or facilities. Members also elect a board of directors who are tasked with representing the interest of ACCT's constituency on many MBTA committees, including the Advisory Council to the Boston Region Metropolitan Planning Organization.

MBTA RIDER OVERSIGHT COMMITTEE (ROC)

In 2004, the MBTA established the Rider Oversight Committee (ROC) to discuss customer-service improvements and service-quality issues. Through the ROC, which meets monthly, the MBTA has developed a structure for ongoing public participation in all aspects of the Authority's operations.

The MBTA ROC's mission statement is:

"The MBTA ROC, a diverse group of riders, advocates, and MBTA employees, provides recommendations to the MBTA that communicate the needs and concerns of all passengers to assist the MBTA in providing affordable, safe, and quality service."

The 21-member committee is comprised of members of the public and diverse advocacy groups throughout the MBTA service area. The MBTA provides staff support as a resource for ROC members, which includes assisting with scheduling conference rooms at the Transportation Headquarters Building at 10 Park Plaza, Boston, MA. MBTA staff updates the committee on information regarding transit service, and engages in dialogue about customer service-improvements and service quality issues. The ROC live streams its meetings and invites a range of guests to discuss topical issues. ODCR has provided this group with a general orientation to Title VI and review of the equity policy development work that took place in 2016.

The ROC also addresses various transit-related issues, including but not limited to the MBTA's fare policy and structure, fare equity issues, service improvements, service quality standards, ridership data collection, and alternative funding sources for both the capital program and the operating budget.

MBTA/MASSDOT OFFICE OF DIVERSITY AND CIVIL RIGHTS

The Office of Diversity and Civil Rights (ODCR) assists all MassDOT divisions and the MBTA in the development, implementation, and oversight of all policies and programs regarding civil rights in the Commonwealth's transportation system. ODCR ensures that MassDOT and the MBTA comply with the U.S. Department of Transportation's and federal modal agency civil rights regulations, in both internal and external programs.

ODCR is comprised of both internal and external operations of which there are several subunits tasked with specific program area compliance responsibilities. The list below highlights the various units and subunits within ODCR:

- Internal Unit (Equal Employment Opportunity and Affirmative Action)
- External Unit (Disadvantaged Business Enterprises and Contractor Compliance)
- Access Unit (Title VI and ADA)
- Investigations (processing employee and public discrimination allegations)

The profile for engaging the public on MBTA matters has been enhanced during this past reporting cycle, with the employment of a full-time dedicated MBTA Title VI Specialist, whose role is to provide front-line support in creating, documenting, implementing, and reporting on Title VI. The MBTA Title VI Specialist provides technical assistance on civil rights matters raised by departments across the Authority on a range of issues, including public engagement efforts, to help ensure diverse outreach and participation among minority, LEP and low-income communities. This role is supervised by the ODCR Manager of Federal Programs, with support and guidance provided by MassDOT's Senior Title VI Specialist.

During the triennial cycle, the MBTA Title VI Specialist, MassDOT's Senior Title VI Specialist, and the Manager of Federal Programs focused on issue-specific and general orientation meetings with key transportation-interested community nonprofits and activists who represent diverse constituencies. Among the meetings conducted were the following:

- Introduction to Title VI with Transportation 4 Massachusetts Collaborative
- Introduction to Title VI with leader of local NAACP chapter
- Meetings with ad hoc transit advocacy stakeholder group on proposed Disparate Impact/Disproportionate Burden and Service Delivery policies
- Community meetings on DI/DB policy development in Lynn, Roxbury, Boston MBTA headquarters and Mattapan
- Presentations to MBTA Rider Oversight Committee on Title VI
- Meeting with MBTA Rider Oversight Committee members on autonomous vehicles
- Presentation on Language Access and effort to include Spanish on Blue Line and bus service at Veronica Robles Cultural Center
- Presentation to the Access Advisory Committee to the MBTA
- Panel presenter on Creating Language Access Plans for Asian Pacific Islanders Community Action Network, Language Access Conference
- Presentation on Public Participation Plan to ACEC-MA

As noted above, in 2016, ODCR, in coordination with other departments, revised the MBTA's Disparate Impact and Disproportionate Burden Policy, which included a public engagement strategy that featured both online comments solicitation and in-person public meetings. The public meeting component began with two key stakeholder meetings with organizations focused on civil rights and transit. The purpose of these meetings was to educate community leaders on the complex DI/DB policy structure, the need for the MBTA to revise this policy, and preliminary recommended standards, and to offer advocates an opportunity to

weigh in on proposed standards and definitions. The result of these conversations was that the MBTA incorporated community-based recommendations into its DI/DB policy before board review and approval.

Part of this work included developing a computer-based graphical interface to depict the impact of types of service changes for disparity and disproportionality at different threshold levels that helped key leaders recommend standards and approaches for broader community engagement. The MBTA's PPP helped ensure that the meetings we conducted were informative, and engaged a diverse group of community leaders; and that it further expanded the visibility of and intention to engage with key Title VI leadership. Below is a list of the key stakeholder groups that participated the policy-development process:

- Transportation for Massachusetts (T4MA)
- Lawyers Committee for Civil Rights and Economic Justice
- Charles Hamilton Houston Institute
- Conservation Law Foundation
- Codman Square Neighborhood Development Corporation (CSNDC)
- Massachusetts Institute of Technology (MIT)
- Black Economic Justice Coalition
- Greater Four Corners Action Coalition
- United Neighbors of Fitchburg
- Ridership Oversight Committee
- The Alliance for Business Leadership
- Action for Boston Community Development (ABCD)
- Massachusetts Senior Action Council
- Alternatives for Community and Environment (ACE)

The proposed policies were then brought to the larger community through a series of public meetings at which members of the strategic team contributed time, resources, and participation to ensure that the public was well informed and could provide input on these critical policies.

MBTA/MassDOT staff held four public meetings in Lynn, Roxbury, Boston, and Mattapan to solicit comments from the general public. The public meetings gave members of the community an opportunity to engage in the policy-development process and share their experiences in riding the system. During these meetings, MBTA/MassDOT staff explained the role of the DI/DB policy while providing a visual representation of theoretical service changes and comparing the proposed policy changes with the proposed standards and definitions. The public meetings were designed to educate the public on the proposed policy while gathering

various points of view from diverse riders to develop informed recommendations for the final policy draft.

To encourage participation, MBTA/MassDOT staff employed various methods and techniques to connect with riders and share information in several languages about the proposed DI/DB policy. The outreach activities conducted during this process included door to door outreach in the Mattapan, Dorchester, and Roxbury communities, attending community meetings, and email blasts to reach local organizations throughout the MBTA service area.

CENTRAL TRANSPORTATION PLANNING STAFF (CTPS)

CTPS, staff to the Boston Region Metropolitan Planning Organization, has a long-standing relationship with the MBTA to provide support to the Title VI program and various forms of technical assistance. This support falls into the following areas:

- Service and fare equity analysis
- Survey development, implementation, and analysis
- Data collection and analysis
- Policy development and analysis
- Planning studies
- Operations analysis

A component of this support is assistance to the MBTA in communicating with and engaging the public. CTPS prepares handouts and other materials for distribution to the public, presents policies and technical materials at stakeholder and public meetings, develops interactive web-based educational tools to enhance stakeholder understanding and obtain feedback, explains analyses of policy proposals and implementation during stakeholder and public meetings, and responds to questions about the analyses.

During the three years ending fiscal year 2017, CTPS assisted the MBTA in:

- Developing the new MBTA Disparate Impact and Disproportionate Burden Policy
- Developing the new MBTA Service Delivery Policy
- Obtaining customer input on the MBTA SDP
- Evaluating the ridership, revenue, and equity impacts of the FY 2017 fare changes
- Evaluating the ridership, revenue, and equity impacts of the Youth Pass Program
- Developing criteria for determining which accessibility improvements would have the greatest positive impacts on seniors, people with

disabilities, and others who rely on accessible infrastructure, and developing an algorithm for prioritizing accessibility improvements for the MBTA's Plan for Accessible Transit Infrastructure (PATI)

- Conducting the MBTA's annual Title VI performance monitoring
- Developing standards and ensuring consistency in all surveys conducted about the MBTA
- Developing cost-allocation models for the MBTA
- Collecting data for and reporting to the National Transit Database

Also, in its role serving the Boston Region Metropolitan Planning Organization (MPO), CTPS has promoted the MBTA's public outreach process to people who subscribe to or follow the Boston Region MPO. CTPS has used MBTA materials in its own social media accounts, retweeting calls for public input and involvement in meetings and viewing materials online. In addition, CTPS has used its e-mail distribution list to promote the MBTA's public outreach efforts.

Appendix 2-F

List of Public Meetings

MBTA Public Meetings during the Title VI 2014-17 Triennial Cycle

The MBTA conducts a variety of meetings about projects, funding, and management of the agency, as well as meetings about accessibility, ridership, oversight, and planning for the future. The tools used for outreach include the MBTA Public Participation Plan (PPP), which provides general information and specific steps that meeting planners must take to ensure that their meetings are inclusive and accessible to all members of the public.

Project managers organize the majority of MBTA meetings on projects with support from private consultants or the office of Government and Public Affairs. These meetings are required to follow the PPP, including the protocols for outreach, identifying potential language access needs, ensuring meeting accessibility, and the principles for diplomacy and follow up to community input. These project-level meetings are typically held in the project area, and the PPP directs meeting planners to tailor outreach strategies (including contact with local community leaders, multilingual information sharing based on LEP languages found in the area or reached by the project, and the selection of local accessible meeting locations) to the specific communities where outreach will occur. ODCR assists meeting planners and is consulted as needed by both internal and consultant meeting planners, particularly on complex projects.

The schedule for standing MBTA leadership meetings is fixed annually, with the Fiscal and Management Control Board (FMCB) meeting every Monday. Specific topics, agenda items, and advance materials are provided as soon as possible for each meeting. Meeting notices are disseminated primarily via the MBTA website's monthly calendar. Local news media further disseminate these meeting announcements, reaching diverse constituencies across the service area. FMCB meetings are also live streamed via the web to support members of the public who are not able to attend in person.

PUBLIC MEETINGS LIST

- Access Advisory Committee to the MBTA (AACT) Executive Board Meetings - 38
- AACT General Membership Meetings - 39
- AACT Transit Accessibility Summits - 2
- Alewife Russell Field Path Flooding Community Meeting
- Andover Board of Selectmen Meeting on Idling Trains
- Back Bay Station Concourse Project
- Back Bay Station Ventilation Project
- Back Bay Station Development Public Meeting with the Boston Redevelopment Authority
- Beverly Commuter Rail Bridge and Positive Train Control Project Meetings - 3
- Blue Hill Avenue Station Construction Contract Meetings - 2

- Blue Hill Avenue Station Integral Art Project
- Braintree Station 100% Design Public Meeting
- Buzzards Bay Commuter Rail Extension Public Meeting
- Capital Conversation Meetings to introduce Capital Investment Planning and to seek public input on potential MBTA and MassDOT projects – 17 (12 meetings held in MBTA service area)
- Capital Programs Committee Meeting on MBTA Construction/Infrastructure projects - 5
- Capital Investment Plan meetings to seek input on ideas and identify and explain MBTA and MassDOT projects for funding – 15 (11 meetings held in MBTA service area)
- Commonwealth Avenue Green Line Improvements Public Meeting
- Commuter Rail Schedule Change Public Meetings – 8
- Fairmount Sponsored Service Kickoff Event with Congressman Mike Capuano
- Fare Policy Meetings -2
- Fare Proposal Public Meetings and Hearing to introduce proposed fare increase and seek public comment - 6
- Fiscal and Management Control Board (FMCB) Meetings - 83
- FMCB and MassDOT Board Joint Meetings - 28
- FMCB Draft Strategic Planning Meetings - 3
- FMCB Emergency or Special Meetings - 2
- Focus40 Event: The Ideas of March
- Focus40 Kickoff Event
- Future of Late-Night Service Informational Meetings - 5
- Future RIDE Program Service Design Change Discussion
- Gloucester Community Meeting on Drawbridge Final Design
- Government Center Station Ribbon Cutting
- Green Line Extension Project Meetings - 14
- Green Line Extension WIN Access and Opportunity meeting for contractors on the Green Line Extension project
- Green Line Extension Working Group - Somerville
- Guild Street Bridge Reconstruction Community Meeting
- Haverhill Line Positive Train Control Public Meetings - 2
- Heart to Hub: Worcester to Boston Express Train Event
- MBTA Service Delivery Policy and Title VI Disparate Impact/Disproportionate Burden Policy Joint Public Meetings - 4
- Judge King's Update on Compliance with MBTA/BCIL Accessibility Settlement - 7
- Late Night Service Modifications Public Meeting – 3
- Lowell Line Positive Train Control Weekend Work Public Meeting
- Mattapan Station Parking Lot Development
- Mattapan-Ashmont Trolley Service Meetings - 3
- MBTA and KEOLIS Commuter Services - Business Diversity Outreach
- MBTA Bus Service Meetings - 2
- MBTA Rider Oversight Committee Public Meetings - 28
- MBTA Job Fair and Informational Session regarding Blue Hill Avenue Station Construction
- Morton Street Bridge Project Informational Meeting
- Needham Line Positive Train Control Weekend Work Public Meeting

- Newburyport/Rockport Line Improvements Public Meeting on Positive Train Control - 3
- Newton Highlands Accessibility Improvements Community Meeting
- Parking Payment Modifications Public Meetings in Newton Highlands and Gloucester - 2
- Public Hearing on Proposed Regulations on Authority Employees Compensated by Someone Other Than the Commonwealth or the Authority
- Quincy Adams Garage Renovation Public Meeting
- Quincy Center Garage Demolition Public Meetings
- Red Line "Track 61" Test Track Public Meeting
- Replacement of the East Street Bridge, Westwood
- Ruggles Station Commuter Rail Platform Project Public Meeting
- Silver Line Gateway Phase 2 Integral Art Project
- Silver Line Gateway Public Meeting
- South Boston Bus Stops and Service Improvements Project Public Meeting
- South Coast Rail Public Meetings - 6
- South Station Expansion Public Meeting
- Standing Committee on Audit and Finance - 17
- Standing Committee on Capital Programs - 4
- Standing Committee on Compensation and Labor - 10
- Strategic Planning Forum on Service Delivery and MBTA Plan
- Symphony Station Accessibility Project – 2
- Water Transportation Working Group
- Waverley Commuter Rail Station Public Meeting with the Belmont Board of Selectmen
- Wollaston Station Improvements Public Meetings - 6
- Worcester Line Schedule Proposal Meeting in Natick

Appendix 2-G

Language Assistance Plan



LANGUAGE ASSISTANCE PLAN:

PROVIDING ACCESS TO PROGRAMS AND SERVICES FOR PEOPLE WITH LIMITED ENGLISH PROFICIENCY

Revised December 2018

The purpose of the MBTA's Title VI Program is to ensure that no person shall, on the grounds of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving federal financial assistance. This includes taking steps to provide meaningful access to programs and services for people with limited English proficiency.

Meaningful access goes beyond offering translation and interpretative services to limited-English-proficient (LEP) riders. It also includes informing customers and potential customers how to request multilingual assistance in the language groups the MBTA knows it serves. This assistance is available beyond simply riding the network as the MBTA encourages public input and engagement on projects, reaches out to understand community impacts, and tries to work with the feedback received to operate effectively.

This Language Assistance Plan is monitored on an ongoing basis and is updated every three years to improve its effectiveness in accordance with federal regulations and according to the changing needs of the region's diverse communities.

The Federal Transit Administration (FTA) defines LEP individuals as:

Limited English Proficient (LEP) persons refers to persons for whom English is not their primary language and who have a limited ability to read, write, speak, or understand English. It includes people who reported to the US Census that they speak English less than very well, not well, or not at all.

The MBTA uses this definition, the US Census American Community Survey (ACS), along with additional local information such as information from community-based organizations (CBOs), to update the Language Assistance Plan.

The US Department of Transportation guidance outlines four factors that agencies should apply to the various kinds of contacts they have with the public to assess language needs and decide what reasonable steps they should take to ensure meaningful access for LEP persons:

1. **LEP Population Size:** The number or proportion of LEP persons likely to be served in our programs. This includes:
 - a. How LEP persons interact with our programs, activities, and services;
 - b. Identification of LEP communities and assessment of LEP persons from each language group to determine appropriate language services for each group;

- c. The literacy skills of LEP populations in their native languages to determine whether translation of documents will be an effective practice; and
 - d. Whether LEP persons are underserved due to language barriers.
- 2. **Frequency of Contact:** The frequency with which LEP persons come into contact with our programs, activities, and services. This includes assessments of:
 - a. MBTA service use
 - b. Pass and ticket purchases through vending machines, outlets, websites, and over the phone
 - c. Public meeting participation
 - d. Customer service interactions
 - e. Ridership surveys
 - f. Operator surveys
- 3. **Importance:** The nature and importance of the program, activity, or service provided to people's lives. This is informed through:
 - a. Feedback from LEP groups about effective means of providing meaningful information about services, programs, and public outreach
 - b. Information obtained from public, facilitated meetings with LEP persons and stakeholders
 - c. Analysis of surveys to determine the needs of LEP persons respective to different regions and communities
 - d. Analysis of programs, activities, and services to ensure they are providing meaningful access to LEP persons
- 4. **Resources:** The resources available for LEP outreach and the costs associated with that outreach. This means addressing cost and resource issues by investigating:
 - a. Technological advances
 - b. Reasonable business practices

- c. The sharing of language assistance materials and services among and between recipients, advocacy groups, LEP populations, and federal agencies

The first two of the four factors are used to identify individuals who need language assistance. The third factor determines what needs to be translated, and the fourth factor identifies translation resources and costs. The MBTA has followed FTA guidance in completing a four-factor analysis to identify and document the number and geographic distribution of potential LEP customers within the MBTA's 175-municipality service area and to evaluate the need for language assistance.

I. Identification of LEP individuals for whom language assistance may be needed

Factor 1: The Number and Proportion of Persons in the Service Population Who Are LEP

Quantitative Analysis

Data from the 2010–14 ACS five-year estimates were used to analyze the number of LEP persons living in the MBTA service area. The US Census table, “Language Spoken at Home by Ability to Speak English for the Population 5 Years and Over” was used to estimate the number of LEP people for all census tracts within the MBTA's 175-town service area. To calculate the number of people with limited English proficiency, the counts of people who self-reported to speak English less than “very well” were summed.

The total LEP population in the MBTA's 175-town service area is 446,974 people, or approximately 9.81 percent of the total population above the age of five. The largest single group of LEP persons is composed of Spanish speakers, which represent 37.8 percent of the LEP population of the service area; approximately 168,863 people in the service area are limited-English Spanish speakers. The top five language groups of LEP persons within the service area make up nearly 73 percent of the total LEP population:

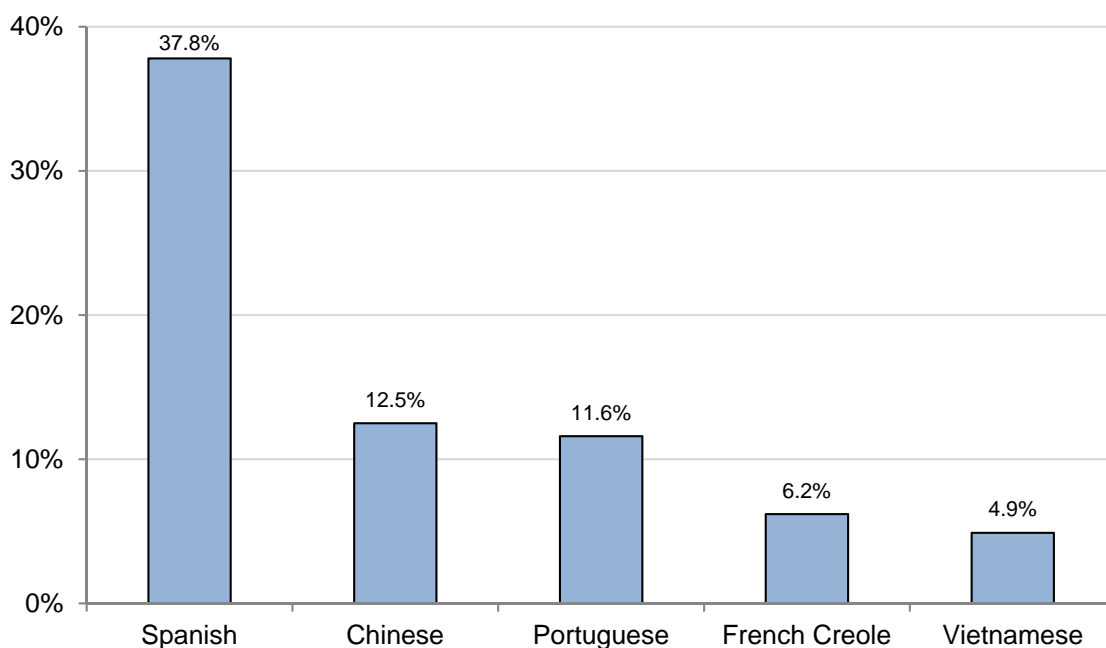
- Spanish/Creole (168,863)
- Chinese (55,757)
- Portuguese/Portuguese Creole (51,817)
- French Creole (27,818)
- Vietnamese (21,960)

Given that the majority of LEP individuals in the MBTA service area belong to one of these top five language groups, this element of the Four Factor Analysis includes further

details about each. This includes identifying country of origin and dialect details that may help inform translation and interpretation decisions, geolocating these populations within the MBTA service area, and tracking recent shifts among these populations. Additional language groups that fall outside the top five are also identified in this Four Factor Analysis, and the strategies for reaching them are described in detail – see below.

Figure 1 presents the percentage of total LEP persons that each of the top five languages represent in the MBTA's 175-town service area.

Figure 1
Percentage of Total LEP Persons in the MBTA Service Area by Language
for the Top Five Languages Spoken



Source: 2010–14 ACS five-year estimates

The MBTA mapped the ACS data to provide a geographic representation of where concentrations of LEP persons live and to show what languages are spoken at home in those areas. Figures 2a and 2b show the percentage of LEP persons by census tract, regardless of the language spoken at home. Figure 2a shows the percentage of LEP persons in the 175 municipalities of the MBTA commuter rail service area, and Figure 2b shows the percentage of LEP persons in the 65 municipalities of the MBTA's core service area, where the majority of MBTA transit services are located. Most of the areas with the highest LEP percentages are urban areas.

To identify locations containing large concentrations of LEP individuals that belong to the top five language groups, municipalities were selected that had an overall LEP

population larger than five percent of the total population, and where any of the top five language groups comprised more than 25 percent of the municipality's LEP population, or more than 1,000 persons. As the following information shows, it is apparent that some languages are spoken primarily in and around Boston, while others are more broadly distributed.

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Spanish-Speaking LEP Populations

The Spanish-speaking population is the largest LEP population in the MBTA's 175-town service area. Spanish is also the language spoken by the largest group of LEP people in many of the largest municipalities of the MBTA service area.

Dialects and Countries of Origin

Spanish-speaking individuals in the MBTA service area come from a variety of regions, predominantly from Puerto Rico and the Dominican Republic, in addition to a range of countries in Central and South America. This population speaks a variety of regional dialects, each of which has its own idiomatic expressions, slang, and colloquialisms, although these different dialects of written and spoken Spanish are generally understood between most speakers.

Service Coverage

Spanish-speaking LEP individuals are served by nearly every line of the MBTA system. The largest four of these populations in the MBTA service area are in Boston, Lawrence, Worcester, and Lynn. Boston is well served by numerous bus routes, and it is a terminus point for all MBTA rapid transit lines as well as the commuter rail lines. Lynn is served by numerous MBTA bus routes and by the Newburyport/Rockport commuter rail line. Worcester and Lawrence are both served by the Haverhill commuter rail line.

Recent Population Changes

Lowell, Lynn, Brockton, and Haverhill have all seen significant increases in their Spanish-speaking LEP populations between 2011 and 2014, which is depicted both in the maps and tables below. Worcester, Boston, and Lawrence have all seen declines in their populations of Spanish-speaking LEP people.

Population Data by Municipality

Tables 1a and 1b provide a list of municipalities containing relatively large concentrations of Spanish-speaking LEP individuals, as identified using the previously described methodology. Table 1a provides information on the total number of Spanish-speaking individuals in each municipality along with their percentage of the municipality's total population and LEP population. Table 1b provides information on the changes in Spanish-speaking LEP population for each municipality. Figure 3a displays the concentration of Spanish-speaking LEP individuals in the 175 municipalities of the MBTA commuter rail service area, and Figure 3b displays the concentration of Spanish-speaking LEP individuals in the 65 municipalities of the MBTA's core service area. Municipalities outlined in Figures 3a and 3b are those identified as containing relatively

large concentrations of Spanish-speaking individuals. Figures 4a and 4b show the change in Spanish-speaking LEP population in both MBTA service areas.

Table 1a
Representation of the Spanish-Speaking LEP Population by Municipality

Municipality	Spanish-Speaking LEP Population	Spanish-Speaking LEP Population - Percentage of Total Population	Spanish-Speaking LEP Population - Percentage of LEP Population
Boston	42,887	7.3%	43.4%
Lawrence	24,715	35.3%	92.8%
Worcester	13,999	8.3%	47.4%
Lynn	12,348	14.8%	65.1%
Chelsea	11,622	36.2%	85.3%
Lowell	6,414	6.5%	30.6%
Revere	6,086	12.5%	54.1%
Everett	3,981	10.3%	34.6%
Framingham	3,680	5.8%	34.5%
Waltham	3,128	5.4%	43.4%
Brockton	2,962	3.4%	18.3%
Methuen	2,848	6.4%	63.7%
Haverhill	2,614	4.6%	70.3%
Somerville	2,225	3.1%	25.3%
Fitchburg	2,205	5.9%	70.8%
Leominster	2,134	5.6%	61.7%
Malden	1,880	3.4%	12.4%
Salem	1,775	4.5%	59.4%
Marlborough	1,607	4.5%	38.1%
Cambridge	1,236	1.2%	15.5%
Peabody	1,017	2.1%	29.4%
Attleboro	896	2.2%	39.5%
Dedham	445	1.9%	37.4%
Shirley	381	5.5%	71.6%
Westborough	312	1.8%	29.9%
Holbrook	256	2.5%	47.5%

Table 1b
Changes in Spanish-Speaking LEP Population by Municipality

Municipality	2011 Spanish-Speaking LEP Population	2014 Spanish-Speaking LEP Population	Absolute Change in Spanish-Speaking LEP Population	Percentage Change in Spanish-Speaking LEP Population
Boston	43,313	42,887	-426	-1.0%
Lawrence	25,126	24,715	-411	-1.6%
Worcester	16,318	13,999	-2,319	-14.2%
Lynn	11,529	12,348	819	7.1%
Chelsea	11,269	11,622	353	3.1%
Lowell	5,100	6,414	1,314	25.8%
Revere	6,223	6,086	-137	-2.2%
Everett	3,539	3,981	442	12.5%
Framingham	3,542	3,680	138	3.9%
Waltham	3,235	3,128	-107	-3.3%
Brockton	2,305	2,962	657	28.5%
Methuen	2,841	2,848	7	0.2%
Haverhill	2,123	2,614	491	23.1%
Somerville	2,244	2,225	-19	-0.8%
Fitchburg	2,581	2,205	-376	-14.6%
Leominster	2,260	2,134	-126	-5.6%
Malden	1,804	1,880	76	4.2%
Salem	2,176	1,775	-401	-18.4%
Marlborough	1,443	1,607	164	11.4%
Cambridge	1,065	1,236	171	16.1%
Peabody	919	1,017	98	10.7%
Attleboro	749	896	147	19.6%
Dedham	249	445	196	78.7%
Shirley	341	381	40	11.7%
Westborough	227	312	85	37.4%
Holbrook	98	256	158	161.2%

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Replace Page with Figure 4b

Chinese-Speaking LEP Populations

The Chinese-speaking population is the second largest LEP population in the MBTA's 175-town service area. Chinese is the top language of LEP people in several municipalities that are adjacent to Boston, and it is a significant proportion of the LEP languages in Boston and some of its suburbs.

Dialects and Countries of Origin

The Chinese-speaking population in Massachusetts is comprised of speakers of the dialects Cantonese, Mandarin, Taiwanese, Fukien, and Shanghai. Two different writing systems, Traditional Chinese and Simplified Chinese, are used within the Chinese-speaking population, and do not correspond directly to spoken dialects.

Service Coverage

The largest four Chinese-speaking LEP populations in the MBTA service area are in Boston, Quincy, Malden, and Newton. Boston is well served by numerous bus routes, and it is a terminus point for all the rapid transit lines as well as the commuter rail lines. Quincy is served by numerous bus routes, three Red Line stops (North Quincy, Wollaston, and Quincy Center), and the Quincy Center commuter rail station, which serves as a stop for the Middleborough/Lakeville, Plymouth/Kingston, and Greenbush commuter rail lines. Malden is served by several bus routes, the Orange Line at Malden Center and Oak Grove, and the Haverhill commuter rail line at Malden Center. Newton is well served by buses, numerous stops on the B and D branches of the Green Line, and the Newtonville, West Newton, and Auburndale stops of the Worcester commuter rail line.

Recent Population Changes

Boston, Quincy, Malden, and Newton have all seen significant increases in their Chinese-speaking LEP populations between 2011 and 2014, depicted both in the maps and tables below. Populations of Chinese-speaking LEP people have declined slightly in Brookline and Cambridge.

Population Data by Municipality

Tables 2a and 2b provide a list of municipalities containing relatively large concentrations of Chinese-speaking LEP individuals, as identified using the previously described methodology. Table 2a provides information on the total number of Chinese-speaking individuals in each municipality along with their percentage of the municipality's total population and LEP population. Table 2b provides information on the changes in Chinese-speaking LEP population for each municipality. Figure 5a displays the concentration of Chinese-speaking LEP individuals in the 175 municipalities of the

MBTA commuter rail service area, and Figure 5b displays the concentration of Chinese-speaking LEP individuals in the 65 municipalities of the MBTA's core service area. Municipalities outlined in Figures 5a and 5b are those identified as containing relatively large concentrations of Chinese-speaking individuals. Figures 6a and 6b show the change in Chinese-speaking LEP population in both MBTA service areas.

Table 2a
Representation of the Chinese-Speaking LEP Population by Municipality

Municipality	Chinese-Speaking LEP Population	Chinese-Speaking LEP Population - Percentage of Total Population	Chinese-Speaking LEP Population - Percentage of LEP Population
Boston	14,119	2.4%	14.3%
Quincy	10,586	12.1%	65.5%
Malden	5,856	10.5%	38.5%
Newton	2,171	2.7%	34.3%
Brookline	1,556	2.8%	30.0%
Cambridge	1,485	1.5%	18.6%
Worcester	1,353	0.8%	4.6%
Waltham	1,002	1.7%	13.9%
Lexington	875	2.9%	41.0%
Belmont	676	2.9%	32.9%
Braintree	641	1.9%	33.1%
Acton	609	2.9%	41.0%
Winchester	595	3.0%	55.5%
Andover	521	1.7%	29.3%
Westford	506	2.4%	45.3%
Sharon	451	2.7%	40.1%
Westborough	277	1.6%	26.5%
Boxborough	131	2.7%	46.3%

Table 2b
Changes in the Chinese-Speaking LEP Population by Municipality

Municipality	2011 Chinese-Speaking LEP Population	2014 Chinese-Speaking LEP Population	Absolute Change in Chinese-Speaking LEP Population	Percentage Change in Chinese-Speaking LEP Population
Boston	13,353	14,119	766	5.7%
Quincy	8,016	10,586	2,570	32.1%
Malden	4,776	5,856	1,080	22.6%
Newton	1,670	2,171	501	30.0%
Brookline	1,687	1,556	-131	-7.8%
Cambridge	1,685	1,485	-200	-11.9%
Worcester	1,144	1,353	209	18.3%
Waltham	929	1,002	73	7.9%
Lexington	926	875	-51	-5.5%
Belmont	460	676	216	47.0%
Braintree	584	641	57	9.8%
Acton	452	609	157	34.7%

Winchester	469	595	126	26.9%
Andover	498	521	23	4.6%
Westford	344	506	162	47.1%
Sharon	244	451	207	84.8%
Westborough	241	277	36	14.9%
Boxborough	111	131	20	18.0%

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Portuguese-Speaking LEP Populations

The Portuguese-speaking population, including Portuguese Creole, is the third largest LEP population in the MBTA's 175-town service area. Portuguese is the top language of the LEP populations of Brockton, Framingham, and Somerville, and is spoken by significant proportions of the LEP populations of other cities in the Boston metropolitan area, North Shore, and in the Merrimack River Valley.

Dialects and Countries of Origin

Portuguese speakers in Massachusetts generally can be grouped as speaking one of three dialect categories: Brazilian Portuguese, European Portuguese, and Cape Verdean (Portuguese Creole). Although these three spoken dialects differ significantly, written Brazilian and European Portuguese are mostly understood by speakers within each of these groups. Brazilian and European Portuguese, however, have some differences in spelling and vocabulary.

Service Coverage

The largest four Portuguese-speaking LEP populations in the MBTA service area are in Brockton, Boston, Framingham, and Everett. The Middleborough/Lakeville Line of the MBTA commuter rail passes through Brockton with stops at Campello, Montello, and Brockton stations. Boston is well served by numerous bus routes, and it is a terminus point for all MBTA rapid transit lines as well as the commuter rail lines. Framingham is served by the Framingham/Worcester commuter rail line at Framingham Station. Everett is served by several bus routes that run through the bus-hub Everett Square.

Recent Population Changes

Brockton, Somerville, and Lowell have all seen significant increases in their Portuguese-speaking LEP populations between 2011 and 2014, depicted both in the maps and tables below. Boston, Framingham, Malden, and Worcester have all seen declines in their populations of Portuguese-speaking LEP people.

Population Data by Municipality

Tables 3a and 3b provide a list of municipalities containing relatively large concentrations of Portuguese-speaking LEP individuals, as identified using the previously described methodology. Table 3a provides information on the total number of Portuguese-speaking individuals in each municipality along with their percentage of the municipality's total population and LEP population. Table 3b provides information on the changes in Portuguese-speaking LEP population for each municipality. Figure 7a displays the concentration of Portuguese-speaking LEP individuals in the 175 municipalities of the MBTA commuter rail service area, and Figure 7b displays the

concentration of Portuguese-speaking LEP individuals in the 65 municipalities of the MBTA's core service area. Municipalities outlined in Figures 7a and 7b are those identified as containing relatively large concentrations of Portuguese-speaking individuals. Figures 8a and 8b show the change in Portuguese-speaking LEP population in both MBTA service areas.

Table 3a
Representation of the Portuguese-Speaking LEP Population by Municipality

Municipality	Portuguese-Speaking LEP Population	Portuguese-Speaking LEP Population - Percentage of Total Population	Portuguese-Speaking LEP Population - Percentage of LEP Population
Brockton	7,387	8.5%	45.6%
Boston	4,952	0.8%	5.0%
Framingham	4,105	6.4%	38.5%
Everett	3,567	9.2%	31.0%
Taunton	2,771	5.3%	64.1%
Somerville	2,755	3.8%	31.4%
Lowell	2,580	2.6%	12.3%
Malden	1,828	3.3%	12.0%
Marlborough	1,744	4.9%	41.4%
Worcester	1,597	0.9%	5.4%
Peabody	1,454	3.0%	42.0%
Stoughton	910	3.6%	43.8%
Woburn	658	1.8%	28.5%
Seekonk	247	1.9%	43.3%

Table 3b
Changes in Portuguese-Speaking LEP Population by Municipality

Municipality	2011 Portuguese-Speaking LEP Population	2014 Portuguese-Speaking LEP Population	Absolute Change in Portuguese-Speaking LEP Population	Percentage Change in Portuguese-Speaking LEP Population
Brockton	5,388	7,387	1,999	37.1%
Boston	6,875	4,952	-1,923	-28.0%
Framingham	4,515	4,105	-410	-9.1%
Everett	3,511	3,567	56	1.6%
Taunton	3,009	2,771	-238	-7.9%
Somerville	2,481	2,755	274	11.0%
Lowell	2,444	2,580	136	5.6%
Malden	2,555	1,828	-727	-28.5%
Marlborough	1,732	1,744	12	0.7%
Worcester	2,251	1,597	-654	-29.1%
Peabody	1,618	1,454	-164	-10.1%
Stoughton	1,156	910	-246	-21.3%
Woburn	719	658	-61	-8.5%
Seekonk	339	247	-92	-27.1%

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French Creole–Speaking LEP Populations

The French Creole-speaking population is the fourth largest LEP population in the MBTA's 175-town service area. French Creole is the predominate language spoken by LEP people in Randolph, and it is spoken by significant proportions of LEP people in some of the municipalities within the MBTA service area.

Dialects and Countries of Origin

The primary dialect of French Creole spoken across Massachusetts is Haitian Creole. Although Haiti recognizes both French and Haitian Creole as its official languages, significant changes have been made to the way these languages are used and taught. Haitian Creole was not introduced formally to Haitian school systems until 1978; the language is still considered a primarily informal language, while French has a more formal connotation. Haitian Creole-speaking individuals who were formally educated in French may not be able to read Haitian Creole. Conversely, written French may be a less easily understood language for those who communicate primarily in Haitian Creole.

Service Coverage

French Creole-speaking LEP individuals are served by nearly every line of the MBTA system. The largest of these populations in the MBTA service area are in Boston, Brockton, Everett, Randolph, and Malden. Boston is well served by numerous bus routes, and it is a terminus point for all MBTA rapid transit lines as well as the commuter rail lines. The Middleborough/Lakeville Line of the MBTA commuter rail passes through Brockton with stops at Campello, Montello, and Brockton stations. Everett is served by several bus routes that run through the bus-hub Everett Square. Randolph is served by two bus routes and the Holbrook/Randolph stop on the Middleborough/Lakeville commuter rail line. Malden is served by several buses, the Haverhill commuter rail line, and the Orange Line at Malden Center and Oak Grove.

Recent Population Changes

Boston and Everett have both seen significant increases in their French Creole-speaking LEP populations between 2011 and 2014, depicted both in the maps and tables below.

Population Data by Municipality

Tables 4a and 4b provide a list of municipalities containing relatively large concentrations of French Creole-speaking LEP individuals, as identified using the previously described methodology. Table 4a provides information on the total number of French Creole-speaking individuals in each municipality along with their percentage of the municipality's total population and LEP population. Table 4b provides information on

the changes in French Creole-speaking LEP population for each municipality. Figure 9a displays the concentration of French Creole-speaking LEP individuals in the 175 municipalities of the MBTA commuter rail service area, and Figure 9b displays the concentration of French Creole-speaking LEP individuals in the 65 municipalities of the MBTA's core service area. Municipalities outlined in Figures 9a and 9b are those identified as containing relatively large concentrations of French Creole-speaking individuals. Figures 10a and 10b show the change in French Creole-speaking LEP population in both MBTA service areas.

Table 4a
Representation of the French Creole–Speaking LEP Population by Municipality

Municipality	French Creole-Speaking LEP Population	French Creole-Speaking LEP Population - Percentage of Total Population	French Creole-Speaking LEP Population - Percentage of LEP Population
Boston	11,634	2.0%	11.8%
Brockton	4,461	5.1%	27.5%
Everett	2,006	5.2%	17.4%
Randolph	1,619	5.3%	35.5%
Malden	1,051	1.9%	6.9%

Table 4b
Changes in the French Creole–Speaking Population by Municipality

Municipality	2011 French Creole-Speaking LEP Population	2014 French Creole-Speaking LEP Population	Absolute Change in French Creole-Speaking LEP Population	Percentage Change in French Creole-Speaking LEP Population
Boston	8,889	11,634	2,745	30.9%
Brockton	4,113	4,461	348	8.5%
Everett	1,387	2,006	619	44.6%
Randolph	1,321	1,619	298	22.6%
Malden	1,234	1,051	-183	-14.8%

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Replace Page with Figure 10b

Vietnamese-Speaking LEP Populations

The Vietnamese-speaking population is the fifth largest LEP population in the MBTA's 175-town service area. Vietnamese is not one of the top LEP languages in any municipality in the MBTA service area; however, there are significant proportions of LEP people who speak Vietnamese throughout the MBTA service area.

Dialects and Countries of Origin

Vietnamese can generally be grouped into North, Central, and South Vietnamese dialect regions, which differ slightly in vocabulary and grammar, and more significantly in sound.

Service Coverage

The largest four of these populations in the MBTA service area are in Boston, Lowell, Quincy, and Worcester. Boston is well served by numerous bus routes, and it is a terminus point for all MBTA rapid transit lines as well as the commuter rail lines. Lowell is served by the Lowell commuter rail line. Quincy is served by numerous bus routes, three Red Line stops (North Quincy, Wollaston, and Quincy Center), and the Quincy Center commuter rail station, which serves as a stop for the Middleborough/Lakeville, Plymouth/Kingston, and Greenbush commuter rail lines. Worcester is served by the Framingham/Worcester commuter rail line at Union Station.

Recent Population Changes

Boston and Lowell have both seen minor increases in their Vietnamese-speaking LEP populations between 2011 and 2014, which is depicted both in the maps and tables below. Worcester and Quincy have experienced minor declines in their populations of Vietnamese-speaking LEP people.

Population Data by Municipality

Tables 5a and 5b provide a list of municipalities containing relatively large concentrations of Vietnamese-speaking LEP individuals, as identified using the previously described methodology. Table 5a provides information on the total number of Vietnamese-speaking individuals in each municipality along with their percentage of the municipality's total population and LEP population. Table 5b provides information on the changes in Vietnamese-speaking LEP population for each municipality. Figure 11a displays the concentration of Vietnamese-speaking LEP individuals in the 175 municipalities of the MBTA commuter rail service area, and Figure 11b displays the concentration of Vietnamese-speaking LEP individuals in the 65 municipalities of the MBTA's core service area. Municipalities outlined in Figures 11a and 11b are those identified as containing relatively large concentrations of Vietnamese-speaking

individuals. Figures 12a and 12b show the change in Vietnamese-speaking LEP population in both MBTA service areas.

Table 5a
Representation of the Vietnamese-Speaking LEP Population by Municipality

Municipality	Vietnamese-Speaking LEP Population	Vietnamese-Speaking LEP Population - Percentage of Total Population	Vietnamese-Speaking LEP Population - Percentage of LEP Population
Boston	7,527	1.3%	7.6%
Worcester	3,151	1.9%	10.7%
Quincy	1,316	1.5%	8.1%
Lowell	1,143	1.2%	5.5%

Table 5b
Changes in the Vietnamese-Speaking LEP Population by Municipality

Municipality	2011 Vietnamese-Speaking LEP Population	2014 Vietnamese-Speaking LEP Population	Absolute Change in Vietnamese-Speaking LEP Population	Percentage Change in Vietnamese-Speaking LEP Population
Boston	7,178	7,527	349	4.9%
Worcester	3,373	3,151	-222	-6.6%
Quincy	1,424	1,316	-108	-7.6%
Lowell	1,124	1,143	19	1.7%

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Smaller Safe Harbor Language Groups in MBTA Service Area

As discussed above, the top five non-English language groups in the MBTA's 175-town service area are Spanish, Chinese, Portuguese and Portuguese Creole, French Creole, and Vietnamese. Collectively these languages are spoken by 327,906 people, which amount to 73 percent of the total LEP population of the service area. These top five language groups have been identified as the largest LEP communities to which the MBTA provides translation and interpretation services.

In addition to these five language groups, there are 23 smaller language groups in the MBTA service area that include at least 1,000 speakers, thereby falling within the U.S. DOT's definition of a safe harbor language group. Table 6 lists those smaller language groups, the number of people who speak them, and the percentage of LEP persons each group represents within the MBTA service area.

Table 6: Smaller LEP Language Groups

	LEP Population	Percent of LEP Total
Russian	12,678	2.83%
Arabic	12,399	2.77%
Mon-Khmer, Cambodian	10,715	2.39%
African languages	9,474	2.11%
French (incl. Patois, Cajun)	8,673	1.94%
Italian	8,650	1.93%
Other Indic languages	6,529	1.46%
Korean	6,550	1.46%
Other Indo-European languages	6,065	1.35%
Greek	5,473	1.22%
Other Asian languages	5,185	1.16%
Polish	3,349	0.75%
Hindi	3,202	0.71%
Gujarati	2,963	0.66%
Japanese	2,977	0.66%
Persian	1,895	0.42%
Tagalog	1,853	0.41%
Armenian	1,724	0.38%
Laotian	1,426	0.32%
German	1,275	0.28%
Thai	1,259	0.28%
Serbo-Croatian	984	0.22%
Other Slavic languages	1,002	0.22%

Total

116,300

Sources: 2014 American Community Survey 5-Year Summary File, 2010 Census Summary File 1

The 23 language groups shown in Table 6 represent 116,300 LEP individuals, which amounts to 25 percent of the LEP population of the MBTA service area and 2.6 percent of the total population of the service area. Aside from a few identifiable concentrations in particular locations, there is no accurate way to determine the number of LEP individuals who live in proximity to or actually use MBTA services.

The smaller populations of LEP individuals across the 175 towns in the service area range in size from 12,678 (2.83% of the LEP population) in the Russian community to 1,000 (0.22% of the LEP population) among the “other Slavic languages” grouping. The diffusion of these populations across the 3,232 square miles of the MBTA service area makes it difficult to identify core community hubs where translation would be practical and effectively utilized by members of the public. The exceptions noted include those smaller language groups that are concentrated in certain areas, such as the Russian communities in Brighton and Brookline and in parts of the North Shore. Where significant concentrations are identified, the Government and Public Affairs department, Customer Experience Department, project managers, and ODCR consult to determine whether translation of materials on a particular project or initiative would be beneficial in the smaller language group context. Translation is also considered when there are indications that an identified LEP population will be impacted by a particular project or initiative.

Through the Engage tool for public participation, MBTA project managers and staff confirm the languages spoken in connection with projects by geocode or within a drawn circumference in the MBTA service area. As noted above, however, often the Engage tool will also show the numbers for smaller safe harbor languages groups to be quite low relative to the language groups in a project area, which then triggers the discussion on reasonableness of translating materials in that context. Despite this reality, the MBTA is taking additional steps to ensure that strategies are in place to build better connections between LEP individuals and the Authority, when assistance is needed, as discussed in the section on Language Assistance Measures, below.

Qualitative Analysis Techniques

In addition to performing the quantitative analyses discussed above, the MBTA continues to refine its understanding of the locations of LEP populations through qualitative analyses. The MBTA works with CBOs, state legislators, and other government entities or interested parties to identify LEP populations that may need translation services for specific programs or activities. The MBTA conducts outreach to

CBOs that work with LEP populations, such as neighborhood community service centers, community development corporations, and ethnic and cultural organizations. These organizations provide information that is not included in the census or state and local resources, such as the existence of pockets of the LEP populations relative to specific projects or public participation efforts, population trends, and what services are most frequently sought by the LEP population. Many of these organizations have resources that include language assistance, neighborhood knowledge, and expertise useful in communications with residents and customers. The MBTA's experience in this area shows that the greatest need for language assistance is in Spanish, but that there is also a need for assistance in a diverse range of primary languages, with an emphasis on the top LEP languages in the MBTA service area, including Chinese, Haitian Creole, Portuguese, and Vietnamese.

Conclusions for Factor 1

The MBTA has used quantitative, qualitative, and spatial analyses to estimate the total number and proportion of LEP people in its service area and to identify areas that have high concentrations of LEP people. The top five language groups—Spanish, Portuguese and Portuguese Creole, Chinese, French Creole, and Vietnamese—represent nearly 73 percent of the total LEP population. Due to the size of these top LEP language groups, the MBTA is able to identify geographic areas and transit services where there is a prevalence of these LEP populations, allowing the MBTA to be proactive in disseminating multilingual information in those areas. The MBTA has studied the smaller LEP safe harbor populations that comprise the remaining 25% of language groups and has determined that in many instances it is difficult to pinpoint core communities among these groups across the massive MBTA service area. Instead, the MBTA relies on a coordinated strategies and information-sharing to reach these language groups wherever they exist across the system. This approach emphasizes informing members of LEP communities that language services are available and how to make specific requests for them. When it is possible to identify concentrations among these smaller communities in connection with MBTA projects and initiatives, the MBTA makes reasonable efforts to provide translated materials.

Factor 2: The Frequency of Contact

The FTA requires that the MBTA analyze the frequency of contact that the agency has with people with limited English proficiency. The MBTA uses the following data and analysis methods to evaluate the frequency with which LEP individuals come into contact with the MBTA:

- Evaluation of Call Center metrics
- Evaluation of customer website browser primary language preferences and visits to the MBTA website

- Analysis of paratransit records

Call Center

The Call Center houses several staff who are fluent in Spanish. The Call Center provides telephone translation service in all languages via a language assistance line.

Below is a table of the number of Spanish calls by year handled by the Call Center between 2012 and December 2017. The number of Spanish-speaking callers had remained stable, however, in 2016 we noticed a significant drop. The volume remained steady in 2017, with a spike in website usage especially in many languages other than English.

Table 7
Call Center Calls
in Spanish (2012–17)

Year of Operation	Number of Calls in Spanish
2012	8,452
2013	7,829
2014	8,055
2015	8,209
2016	6,531
2017	6,136

In June 2018, the MBTA entered into a contract with a private vendor to assume operations of the MBTA Call Center. Since the transition Exela has offered weekday, weekend, and evening hours of service. Exela has made a commitment to hire bilingual staff, specifically Spanish. For the month of October 2018, the vendor reported receiving 45 calls in Spanish, 1 call in Portuguese, 1 call in Mandarin, and 2 calls in Arabic.

The MBTA also compiled Call Center data on the use of Language Line during the summer months of 2018, when a greater volume of tourist visits and local resident summer vacation and use of MBTA services is likely. We found that the volume of calls supported by Language Line remained low during this period. This data is shown in Table 8. The exception was in the use of Spanish, where there was an increase in the referrals to Language Line in recent months. This could be a result of a reduction of call center staff who are fluent in this language, causing a greater need for use of Language Line for Spanish speaking LEP individuals. It is evident that there are few calls across the smaller safe harbor populations that reside within the MBTA service areas that are being referred for Language Line interpretation assistance.

Table 8: Call Center Referrals to Language Line

	Jun-18	Jul-18	Aug-18	Sep-18	Oct-18
Language	Number of Calls	Number of Calls	Number of Calls	Number of Calls	Number of Calls
Arabic	0	0	0	1	2
Bengali	0	0	1	0	0
Cantonese	0	0	0	1	0
French	1	0	1	0	0
Haitian Creole	1	0	0	0	0
Portuguese	0	0	1	0	1
Russian	0	0	0	1	0
Spanish	0	5	15	39	45
Vietnamese	0	0	1	0	1
Total	2	5	19	42	49

The low volume of calls supported by Language Line clearly indicates a gap in usage, which could be explained by several factors such as the use of the MBTA website through the translation software, lack of knowledge among LEP individuals of the availability of real-time language support services, or the level of MBTA services utilized by smaller safe harbor groups. Separately, there is significant data indicating a tendency among many safe harbor language groups to use the MBTA website, via preferred languages, to secure needed information. This fact in no way dismisses the need for other means of communication with LEP individuals but points to a practical reality in the way the MBTA's customers tend to seek information. Further, the reality of low volumes of calls supported by Language Line invites the MBTA to take more proactive steps to ensure notice in these communities of the ability to obtain free language assistance, if needed.

Website Analytics Based on Preferred Language and Locale Settings

The MBTA is able to distinguish between categories of visitors to its website by the language that an individual's Web browser identifies as its primary language. Data from the MBTA website analytics for calendar year 2016 indicate that the overwhelming majority of visits (97.29 percent) to the MBTA's website are on browsers that are set to English as the primary language. The next two most commonly set alternative languages are Spanish (0.74 percent of all visits) and Chinese (0.48 percent of all visits), followed by French, German, Japanese, Portuguese, and Korean.

While there was a decrease in non-English-language requests to the MBTA website in 2016, this was also true for English-language speakers, and for the total number of visitors overall to the website.

The number of visitors reveals a greater statistical representation of LEP persons using technology than is shown in the population data from the ACS for the MBTA service area. One reason for this difference is that website data reveal the preferences of people living outside of the MBTA's service area, including visitors to the region who are interested in using public transit.

Within Table 9, below, the MBTA has outlined data on the number of visits on the MBTA website based on preference language on an annualized basis. From this data, there are clear indications over a number of years, from 2014 to 2016 of numerous "hits" that reflect recurring visits to the website by a consistent yet small number of LEP individuals among many visits across the broader LEP community. Across nearly half of the 28 Safe Harbor language groups in the MBTA service area, it is evident that we have annualized website visits far in excess of the population numbers for these groups in the MBTA service area.

There are also a significant number of other visits, of up to 135,472 among the "Other Languages" grouping, reflecting a significant number of potentially other smaller language groups. Recurring visits are clearly evident among 13 of the safe harbor language groups. It is noteworthy that the MBTA has not received complaints about the information obtained from the web from among foreign language users.

This data compels the conclusion that among many safe harbor communities, there is both consistent and recurring use of the MBTA website among LEP individuals, whether in Massachusetts or abroad. This reality does not speak to the quality of the translations of the MBTA website, although our research indicates that the efforts by Google to improve its translation accuracy have improved significantly in recent years. While this is not a preferred method for communication, the lack of complaints and evidence of use of this resource indicate that customers are in fact using the MBTA website and finding good results, even if the translations are not completely accurate. In conducting this element in the four-factor analysis, ODCR staff reached out to the Director of Customer Communications in the Customer Experience Department and confirmed that the MBTA has not received complaints or inquiry about the quality of the Google translation software.

ODCR staff has also conducted a literature review on the quality of Google translation software and has learned that the software's accuracy has improved significantly over the past few years as the result of a shift from Phrase-Based Machine Translation (PBMT) to Neural Machine Translation (NMT). This 2016 shift now covers over one

hundred languages, and the central feature is that translations are now being made of complete sentences under NMT, as opposed to phrase based translation that was done under PBMT. See, web article, “How Accurate is Google Translate in 2018,” ARGO Translation, <https://www.argotrans.com/blog/accurate-google-translate-2018/>. While this transition appears to have led to translation accuracy improvement, the MBTA remains convinced that these machine translations are not completely accurate, and that in given situations, the vital nature of information to be shared continues to warrant MBTA investment in translation and interpretation services.

Table 9
Number and Percentage of Visits by the Browser Setting for Preferred Language
during Visits to the MBTA Website

Language	Number of Visits (2014)	Percentage of Visits (2014)	Number of Visits (2015)	Percentage of Visits (2015)	Number of Visits (2016)	Percentage of Visits (2016)
English	307,198,14	97.10%	33,675,076	97.09%	28,207,942	97.29%
Spanish	213,083	0.67%	246,682	0.71%	214,771	0.74%
Chinese	164,674	0.52%	175,214	0.51%	139,499	0.48%
French	102,403	0.32%	100,756	0.29%	87,288	0.30%
German	69,434	0.22%	72,183	0.21%	72,163	0.25%
Japanese	58,729	0.19%	64,030	0.18%	53,595	0.18%
Portuguese	43,838	0.14%	47,742	0.14%	41,908	0.14%
Korean	40,233	0.13%	37,847	0.11%	28,683	0.10%
Italian	29,168	0.09%	29,522	0.09%	27,463	0.09%
Russian	21,181	0.07%	27,041	0.08%	17,763	0.06%
Arabic	19,451	0.06%	9,971	0.03%	10,810	0.04%
Turkish	10,431	0.03%	10,883	0.03%	9,293	0.03%
Swedish	7,626	0.02%	8,125	0.02%	7,200	0.02%
Vietnamese	3,556	0.01%	6,163	0.02%	8,103	0.03%
Polish	5,835	0.02%	5,971	0.02%	5,529	0.02%
Hebrew	4,983	0.02%	5,543	0.02%	5,252	0.02%
Danish	4,912	0.02%	5,118	0.01%	5,155	0.02%
Greek	2,920	0.01%	3,261	0.01%	3,013	0.01%
Czech	3,057	0.01%	2,880	0.01%	2,520	0.01%
Finnish	2,873	0.01%	3,023	0.01%	2,612	0.01%
Thai	2,745	0.01%	2,313	0.01%	2,264	0.01%
Hungarian	2,192	0.01%	2,404	0.01%	2,096	0.01%
Norwegian	114	0.00%	2,615	0.01%	2,919	0.01%
Catalan	1,648	0.01%	1,718	0.00%	1,489	0.01%
Indonesian	1,525	0.00%	1,444	0.00%	2,096	0.01%
Farsi	1,198	0.00%	742	0.00%	719	0.00%
Romanian	1,193	0.00%	1,169	0.00%	1,246	0.00%
Other Languages	99,991	0.32%	135,472	0.39%	29,656	0.10%
Non-English Visits	918,993	2.90%	1,009,832	2.91%	785,105	2.71%
Total	31,638,807	100.00%	34,684,908	100.00%	28,993,047	100.00%

During 2017, the MBTA changed the website, which resulted in divided data between the two sites that is difficult to reconcile accurately. As a result, we have looked at the data for website visits in 2018 in comparison to 2016 data, to reflect further on the consistency of visits from safe harbor groups. In Table 10, below, we show the number of Massachusetts-based safe harbor language speaking users who chose to use the

MBTA website in their spoken language. This information provides a monitoring resource that the MBTA can study to identify possible trends and gaps that suggest opportunities for community engagement, including with respect to the reasons for any significant change in usage. Most importantly, this data suggests an opportunity for outreach by the MBTA to smaller language groups in the service area to ask questions about the need for information and the best means for communicating with more diffuse language groups.

Table 10 – Comparison of MBTA Website Visits 2016 and 2018

Language	Number of Visits (2016)	Percentage of Visits (2016)	Number of Sessions in Massachusetts (2018 Jan. to Oct.)	Percentage of Sessions in Massachusetts (2018 Jan. to Oct.)	LEP Population in the MBTA's 175-Town Service Area	Percentage of Population in 175-Town Service Area
English	28,207,942	97.29%	23,328,742	98.09%	n/a	n/a
Spanish	214,771	0.74%	171,986	0.72%	170,612	3.73%
Chinese	139,499	0.48%	91,562	0.38%	55,195	1.21%
French	87,288	0.30%	34,477	0.14%	37,049	0.81%
German	72,163	0.25%	32,488	0.14%	1,275	0.03%
Japanese	53,595	0.18%	17,702	0.07%	2,977	0.07%
Portuguese	41,908	0.14%	39,715	0.17%	51,413	1.13%
Korean	28,683	0.10%	10,012	0.04%	6,550	0.14%
Italian	27,463	0.09%	10,543	0.04%	8,650	0.19%
Russian	17,763	0.06%	10,078	0.04%	12,678	0.28%

Dutch	--	--	7,757	0.03%	--	--
Polish	5,529	0.02%	7,360	0.03%	3,349	0.07%
Vietnamese	--	--	1,923	0.01%	22,310	0.49%

Sources: MBTA.com website analytics, 2014 American Community Survey 5-Year Summary File, 2010 Census Summary File 1

Beyond the website as an information access point for LEP persons, a number of mobile transit applications (apps) for accessing and navigating the MBTA transit system have been developed by third-party developers. Among the many apps that the MBTA lists as resources on its Online Trip Planning Tools page, the MBTA has officially endorsed the “Transit” software application, which is available in English, French, German, Italian, Portuguese, and Spanish. The Transit App, which has been popular and well received by users, offers passengers real-time updates for buses and trains, step-by-step navigation, trip planning, transit schedules, and city maps. This app has also integrated methods of accessing bike-sharing, carsharing, and ride hailing when public transit is unavailable.

Paratransit (THE RIDE) Data for LEP Individuals

In the October 2017 Title VI Report, there was a reference, from the MBTA’s paratransit contractors, indicating that less than 1 percent of all paratransit riders calling for transportation services need interpretation translation assistance. Given the prevalence of English speaking RIDE users, which would logically diminish the impact of RIDE calls from LEP individuals, that data point does not fully reflect the reality of potential LEP RIDE customers who make contact for eligibility determinations. Nevertheless, there is a certain need for assistance that the MBTA makes efforts to address, as discussed below.

To ensure language access for LEP populations eligible for paratransit service through The Ride, the MBTA informs potential customers of the availability of this service in multiple languages. Key publications meant to inform the public about this service, such as the “Ride Guide,” include instructions in multiple languages on how to secure language assistance in seeking The Ride service. The MBTA is also preparing a basic information document for LEP populations in the service area that identifies and describes all of the MBTA services, including paratransit, along with instructions on how

to request additional information about accessing these services. This one page document will be translated in its entirety into all LEP language groups that meet or exceed 1,000 people or 5%, whichever is less, and will be disseminated directly by the MBTA and in partnership with advocacy groups and service organizations that serve LEP populations in the service area.

LEP individuals interested in The Ride service are directed to make contact with The Ride via phone with real-time interpretation and verbal document translation provided by Language Line. The MBTA tracks the use of this service. When sampling records over an 11 month period from 2017-2018, The Ride received average of 65 eligibility related calls from potential LEP RIDE customers, per month. Although some of these calls may be repeat calls to finalize eligibility from the same LEP individuals/customers, the consistent averages provide a sense that LEP individuals are reaching the RIDE to seek out this important service and are receiving the assistance they need. The languages on these calls aligns with the top LEP language groups in the MBTA service area. A handful of additional languages have also featured and the Language Line service was able to provide interpretation in those instances (20 different languages were requested during the same 11 month period sampled above). In addition, further sampling from March 2018 indicates that 5.8% of all interviews were conducted in a requested language other than English.

The MBTA will continue to monitor LEP participation in The Ride service from applications for eligibility through service related data to demonstrate LEP utilization. Ultimately, current language access efforts and data tracking sources suggest that LEP individuals are effectively reaching out to and communicating with The Ride.

Conclusions for Factor 2

Though LEP people represent a small percentage of all riders on the MBTA system, significant numbers of Spanish-speaking LEP customers request translation services through MBTA customer information channels, including the website and customer communications call center. The frequency of contact among the other top language groups is significantly lower than for Spanish speaking LEP individuals. For the smaller LEP safe-harbor language groups, there are also indications that a number of individuals, including international visitors and/or residents within the MBTA service area, make recurring contact with the MBTA based on their browser language selection preferences in coming to the MBTA website.

There are also strong indications of recurring reliance on the MBTA website among Massachusetts-based LEP individuals, though this does not directly indicate a high frequency of contact but rather an effective website translation as a mechanism to address these low-volume and infrequent multilingual needs. While the MBTA's web-based information is not translated exactly, the repeated visits and the lack of customer complaints indicate that this resource plays an important role in communicating with MBTA customers, while interpretation and translation services continue to be needed, based on the vital nature of the information to be conveyed. Further, the MBTA has established a strategy for outreach, based on our understanding that can lead to improving communication with all MBTA customers.

Factor 3: The Importance to LEP Persons of the Program, Activity, or Service Provided by the MBTA

The MBTA performed a quantitative analysis using the results of interviews performed by Boston Region Metropolitan Planning Organization (MPO) staff, surveys of bus operators and CSAs, and responses from the MBTA's Rider Oversight Committee to identify issues that LEP customers encountered while riding on the MBTA. This analysis showed the services that were deemed the most critical to LEP persons: fares and tickets, routes and schedules, and safety and security. These areas were chosen because language barriers could limit a person's ability to fully benefit from MBTA services or, in some cases, they could place a person in physical danger.

The quantitative analysis indicated that:

- MBTA programs and services are very important to LEP people, many of whom are transit dependent. A cross-tabulation of the data for zero-vehicle households and the ability to speak English using the 2010–14 five-year public-use microdata sample shows that 14.8 percent of the people who speak English “less than very well” live in zero-vehicle households. Further, this percentage increases to 26.1 percent when the data are limited to people who speak English “less than well.”
- LEP customers experience frustrations similar to those of other MBTA riders, but are at risk of experiencing specific difficulties if they are unable to find assistance from MBTA staff (the survey results from Factor 2 show that MBTA staff does not often have difficulty assisting LEP customers). LEP customers in particular are susceptible to having problems when something unusual happens or when a service is changed to respond to an incident, and only an operator's audio announcement is made. Examples of this are when a bus or train switches to express service or drop-off only, or when a bus replacement service is deployed. LEP customers could potentially become endangered or lost if they are unable to understand emergency announcements.

- Finally, LEP customers often rely on traveling companions, such as family members or friends, to use the MBTA.

Conclusions for Factor 3

From the results of the quantitative analysis, it is apparent that the MBTA has an important role to play in the lives of people with limited proficiency in English, many of whom are transit dependent. Further, staff members familiar with riders with limited English proficiency have noted that riders who have difficulty communicating in English struggled with respect to receiving correct information on fares and tickets, routes and schedules, and safety and security.

Factor 4: The Resources Available to the MBTA and Costs of Providing a Program, Activity, or Service

The fourth and final factor looks at associated costs and resources available to the MBTA to provide language assistance services considering the language needs identified in Factor 3 in the context of the MBTA's available and projected resources. The MBTA makes both strategic and well-funded commitments to language assistance that are commensurate with the size and complexity of the organization and the customers we serve. The approach we have taken in identifying and prioritizing top languages in the service area by population, coupled with existing strategies and other methods to be implemented under this Language Assistance Plan, provide certainty that the MBTA has reasonably addressed coverage for the largest LEP population concentrations.

This approach to resource allocation has allowed the MBTA to commit to and follow through on a multi-year language access implementation plan that emphasizes professional translation of vital information into the top five LEP language groups in the service area. Under this approach, the MBTA has also been able to expand professional translation to the top ten LEP language groups for key Title VI documents (such as the Complaint Form, the Complaint Procedures, and the Notice to the Public).

Beyond the top ten LEP language groups, it becomes unreasonably costly and difficult, if not impossible to professionally translate vital documents in all the current 28 safe harbor languages represented in the MBTA service area and any future language groups that cross this threshold. The reasons for this limitation are reflected in the practical barriers to translate, print, create and display notices in a bus or station environment, which would provide little benefit to riders on the whole, while expending funds that might better serve the improvement of service for all customers.

As one example, it is worth considering the extra steps the MBTA has taken to ensure understanding among LEP customers at the outset of shutting down of the Red Line's

Wollaston Station for remediation that includes major accessibility improvements. During the 2017 effort to notify the community, the MBTA provided the general public and the identified majority Vietnamese and Chinese LEP community members with notices, posters and community meetings, including translations, to ensure public awareness and the opportunity for input. When it became clear that there was a need for more notice to be provided the local LEP populations, the MBTA contracted with the Quincy Asian Resources Incorporated community organization to provide additional field support to share public notices with LEP individuals. The organization identified bilingual speakers who served as ambassadors during a two week period to engage with the riders and other members of the community. This effort, which also included outreach to local merchants and a door-to-door information campaign, reflects the desire within the MBTA to provide services that meet the needs of its ridership, but also the tactical use of limited resources to meet Title VI requirements.

By contrast, we believe that the range of contact points and ease of access to Language Line real time assistance in 200 languages via the Call Center, which can be accessed by Inspectors, Transit Ambassadors, office staff and the MBTA Police, effectively serve to provide explanations of critical information to customers and provide a reasonable and effective stand-in for professional written translation of all vital information into any and all safe-harbor language groups. Moreover, in the context of a document, it would be possible to provide interpretation of the document through Language Line to a member of the public who does not speak English.

Further, when a more lengthy or complex document or information is requested by a customer contacting the Call Center, including via the use of Language Line, these matters will be referred to the appropriate MBTA department. That department then will coordinate with ODCR to determine the most reasonable way to respond to the request. The nature of the response can range from reading the information to a customer in their spoken language, identifying a portion of a document that is needed for translation and/or translating an entire document where the facts and need warrant this solution. Moreover, internally created “Engage” software supports public engagement via features that include the capacity to identify concentrations of people needing language support. This tool has been effectively used by the MBTA to support translations or interpretation in languages beyond those in the largest language groups.

Concerning in station resources and the use of technology to provide real time translation, the MBTA is currently undertaking a whole screen design and use process development effort to maximize opportunities for communication on platforms and other locations where digital signage is being deployed. As part of the reevaluation process on this resource the MBTA will consider how these may be used to provide important information to customers in other languages. The T has recognized certain difficulties in providing messages in multiple languages, including timing considerations in

coordinating this messaging with train and bus related information and schedule content that is of primary importance to all users.

Finally, the reality of fiscal limitations cannot be ignored, as the MBTA makes efforts to control budget while making costly investments to improve the quality of service that is provided to all of the millions of people who utilize our services. The idea of translating many documents for communities based on a speculative use of MBTA services risks waste, beyond actual cost, and would not be practical in terms of having the ability to disseminate this information effectively. Nonetheless, the MBTA does make every effort to translate documents that will help customers and the transit system to better understand customer need and potential responses. One example is in the use of surveys, where a “bank” has been established to support ongoing and new efforts to garner information. Currently, the MBTA has translated certain surveys into Spanish, Simplified Chinese, Traditional Chinese, French, Portuguese, Haitian Creole, Vietnamese, and Cape Verdean Creole, which can be deployed in multiple contexts in a cost efficient and effective manner.

Conclusions for Factor 4

The MBTA maintains in-house resources, through staff, consultants and technology, to assist LEP customers, and has contracted for call center assistance across many languages that have built the MBTA's capacity for providing language services to the entire LEP community the MBTA serves. The MBTA also has identified consistent customer use of the MBTA website to obtain many of the key pieces of information that we have determined to be important to our customers. For meetings, special initiatives and other public engagement, the MBTA makes known consistently that there is availability of free language assistance services, in addition to reasonable accommodation for people with disabilities.

The MBTA and MassDOT have also invested in improving inclusive public participation through the Engage software tool that helps meeting planners and others identify potential language needs across locations in the MBTA service area. This information is being used to support meeting planning, including outreach to ensure that potential language assistance needs are anticipated and addressed when needed.

Concluding Remarks

The MBTA is committed to providing meaningful access to LEP persons. Given the results of the four-factor analysis, the MBTA will continue to place a premium on providing language access via oral and electronic (website) channels. The MBTA will focus on enhanced language access for speakers of Spanish, who are the plurality of LEP persons with whom the MBTA engages. The MBTA will continue its efforts in enhancing its language services to the speakers of Portuguese, Chinese (Mandarin and

Cantonese), Haitian Creole, and Vietnamese, who account for significant concentrations of LEP persons in the MBTA service area. The MBTA will provide outreach, language translation and real-time interpretation upon request at a minimum for all languages meeting the safe harbor threshold and attempt to address those outside of that threshold whenever possible.

The remainder of this document describes:

- Methods and measures the MBTA uses to communicate with customers with limited proficiency in English
- Training programs for educating staff about the Authority's Title VI obligations, including providing accessible service to customers who are not proficient in English
- Methods the Authority uses to provide notice to the public of the Authority's Title VI obligations, including providing language assistance to customers who are not proficient in English
- MBTA's plans for monitoring and updating the Language Assistance Plan

II. Language Assistance Measures

Based on prior discussions with FTA, and as a result of the 2018 FTA triennial audit, the MBTA has significantly expanded the number of documents that are now being translated into at least the top languages in the MBTA services area. These efforts include a range of approaches that include multiple tiers of information. Across the system, there are now more multilingual postings, clear improvement of call center interpretation resources and development of a field network supported by training to help LEP individuals communicate with the MBTA.

The MBTA has an expansive approach to language assistance that is focused on providing real time interpretation assistance and on identifying key transactions or relations to the MBTA that result in vital documents that warrant translation. The areas identified for document translation include matters related to:

- Communications affecting health and safety
- Security announcements and signage
- Emergency related public announcements
- Materials regarding Title VI rights and complaint procedures

- Basic critical customer information on how to use and access the MBTA system such as ticket/pass purchase instruction
- Information and notices affecting a rider's ability to access and use the system safely and effectively (for example, major station changes, renovations, and permanent major changes in fares, service, or service routes)

Language Nuance Considerations

Within the top five languages in the MBTA service area there are some distinctions to be made between the different dialects, writing systems, vocabularies, and formal or informal use of each language. Based on MBTA research and the request and advice of both individuals and groups of speakers, the MBTA assigns dialect-specific translators and makes translation services as available as possible. However, there are some policies in place for each language that serve as guidelines to best serve those unique populations.

In general, the MBTA ensures that translations of vital documents are reviewed by internal and external speakers of multiple dialects of a language to ensure clarity for as many speakers of that language as possible. Blue Line announcements in Spanish, for example, were reviewed by a large number of MBTA staff and customers with many different Spanish-speaking backgrounds to minimize confusion for riders. Moreover, the MBTA often contracts for language translation or interpretation with organizations or firms that have expertise across language dialects.

The MBTA's current policy on Chinese written translation is to translate documents into both Traditional and Simplified Chinese and to provide translators of requested regional dialects to community meetings whenever possible.

In order to assist the Haitian Creole-speaking population within the service area, the MBTA generally translates vital documents into French, which is readable for a large number of Haitian Creole-speaking adults. However, Haitian Creole translators and translations are available by request.

In general, Cape Verdean (Portuguese Creole) speakers are also familiar with written and spoken Portuguese, although translations and translators for Portuguese Creole are made available as much as possible.

While dialect distinctions in Vietnamese are not as significant as they are in the top four languages, speakers of specific dialects may be provided on request whenever possible. Similar to Spanish, the MBTA makes an effort to translate documents for the greatest possible clarity across speakers of Vietnamese in the area.

Strategy to Improve Communication and Support to Smaller Safe Harbor Groups

In order to more proactively address the needs of LEP individuals in the smaller safe harbor groups, the MBTA has reached out to community based organizations, other government agencies and advocates for LEP individuals to seek input that will help the MBTA improve connectivity to all language groups.

The Massachusetts Office for Refugees and Immigrants (ORI) has provided the MBTA with ideas that have led to a new outreach initiative to provide diverse language groups with information on how to use the MBTA's services and secure language assistance, along with notice of Title VI protections against discrimination. ORI has also shared with the MBTA both contacts to partner organizations that work directly with recently arrived LEP individuals and with information on the meetings it conducts with these groups for purposes of information sharing. ORI has also articulated a need for the community members they serve to receive basic information on how to use the MBTA, which ODCR and Customer Experience are now developing for implementation.

During November and December 2018, Title VI Unit members attended four Town Hall meetings, including sessions in Lynn, Worcester and Lowell, where we presented on what the MBTA offers for services and inquired into concerns these customers faced in using MBTA services. The feedback we received confirmed that the information on the one-pager being drafted would be well-received, and that communicating the contact point through the Call Center line more broadly was especially needed.

MBTA has also reached out to the Director of Multilingual Services, to the Massachusetts Executive Office of Labor and Workforce Development, to identify groups that their office has reached out to in connection with providing notice to LEP individuals. This contact has resulted in a list of community groups at a statewide level and by language that work with 10 of the safe harbor groups that the MBTA serves. The MBTA has also conducted independent research into the community based organizations that serve all of the safe harbor language groups in the MBTA service area.

The lists that we have collected will be consolidated to support the following efforts to disseminate language assistance and other key information to community members:

- Send a bilingual one-page document to be created with the Customer Experience Department to explain basic information about using MBTA services, along with notice of Title VI rights and the availability of language assistance through the Call Center, field personnel and the MBTA police. The document will be translated into each of the MBTA's 28 safe harbor languages, and our outreach will include an invitation to meet with MBTA staff in Civil Rights to address any further questions. These informational one-pagers will also be posted to the MBTA website section on Language Assistance.

- In collaboration with the Mass Office on Refugees and Immigrants, meet with organizations that assist LEP individuals to provide train the trainer assistance to educate their clients on using the MBTA, along with the one-page document, as a means to support smaller safe harbor groups' use of the MBTA services. This strategy will include notice of the availability of funded travel training assistance to LEP seniors and individuals with disabilities supported with federal 5310 funding.
- Continue monitoring the use of both the MBTA website and contacts to the Call Center to determine the frequency and extent of contacts from among the safe harbor communities that reside in the MBTA service area.

Based on the results of these efforts, the MBTA will be in position to ensure that we have effectively reached out to all safe harbor communities and provide information on how best to communicate with the agency.

Language assistance staffing support and services available at the MBTA to minimize barriers for transit service access to customers with limited proficiency in English include the following oral and/or written assistance:

- Trained staff in the Call Center with use of Language Line for Spanish, Haitian Creole, Cape Verdean Creole, Cantonese, and Mandarin.
- Deployment of privately contracted Transit Ambassadors, some of whom are multilingual, to provide customer assistance at key transit stations and key transfer points for buses. These contractors, and in-house customer service assistants, are equipped with computer tablets that can access the MBTA website, have "I speak" cards that can be used with customers and can contact call center to access Language Line real time assistance for limited English proficient customers.
- MBTA Customer Service Attendants, some of whom are multilingual, have been equipped with tablets that use "I speak" cards to directly engage with customers, to access the Call Center and Language Line in real time.
- The MBTA Title VI Complaint Form is available in Arabic, Chinese (simplified and traditional), French, Haitian Creole, Italian, Khmer, Portuguese, Russian, Spanish, and Vietnamese, and in other languages upon request.
- Provision of notice for on-demand translation and interpretation service contracts for meetings, and interpretation and translation of written materials on timely requests, depending on the nature of the event or initiative.

- The Senior/Transit Access Pass Application has been translated into French, Haitian Creole, Portuguese, Simplified Chinese, Traditional Chinese, Vietnamese and Spanish, with translation into other languages on request.
- The CharlieCard Brochure has been translated into French, Haitian Creole, Portuguese, Simplified Chinese, Traditional Chinese, Vietnamese and Spanish, with translation into other languages upon request.
- MBTA and MassDOT employee training programs for new hires and existing employees, which include modules on Title VI Responsibilities, LEP Policies and Procedures, and Anti-discrimination and Harassment Prevention.
- “Engage” mapping software that allows MBTA staff, MPOs, and outreach coordinators to make instant comparisons of construction projects, transportation services, demographics (including populations of LEP individuals), and the proximity of accessible meeting places. This software is important to assess community impact and to assist with public participation planning. The software is located at: <http://gis.massdot.state.ma.us/maptemplate/engage>.
- Established communications and interactions with a number of community organizations in service activities, community relations, and planning efforts. Many of these community organizations directly serve LEP households and have working knowledge of neighborhood conditions and specific needs. They can be important resources in communicating with LEP individuals and engaging minority and low-income groups in MBTA policy-making and planning initiatives.
- Machine-translated content for the MBTA’s website via Google Translate with Arabic, Chinese (Simplified), Chinese (Traditional), French, Haitian Creole, Italian, Khmer, Korean, Polish, Portuguese, Russian and highlighted on the MBTA home page. The website has been developed to create better access among the top safe harbor languages in the MBTA service area. Google’s machine-based translation is also able to provide translations for all of the “safe harbor” languages in the MBTA’s service area. The MBTA has created a guide for customers to understand how we provide language assistance that is part of the Civil Rights page that is linked on the first page of the MBTA website.
- Subway station announcements provide service and courtesy information in Spanish orally and visually via LED signs at Blue Line stations.
- Safety and security information, including wayfinding, is provided at stations using universal symbols.
- Automated fare kiosks provide fare media and information in Spanish and Chinese, in addition to English.

- Service diversion notices are posted in Spanish and other languages, as appropriate, based on the community to be served. Major-service-change and fare-change information is distributed in multiple languages, including Spanish, Portuguese, Chinese, Haitian Creole, Cape Verdean Creole, and Vietnamese.
- The MBTA Transit Police has contracted with vendor Language Line to provide interpreter services. All officers, including Transit Police dispatchers, have 24-hour access to the service, which provides immediate translation service in more than 200 languages.
- The MBTA Transit Police have a number of police officers able to communicate in multiple languages. At present, 16 of the officers on staff speak Spanish. Other language capabilities within the department include Italian, French, Haitian Creole, Vietnamese, Portuguese, Chinese (Cantonese and Toisanese), and American Sign Language.
- Brochures and notices of Title VI rights and complaints procedures are translated in multiple languages, and have been posted across the MBTA service area, subject to current space limitations.
- Interpretation and translated materials are provided at public meetings.
- MBTA departments have been advised of the responsibility to obtain work orders with private vendors that provide translation services, when needed. MBTA staff is advised to make arrangements for translator services at least five business days prior to an event.
- The MBTA, through the MassDOT Government and Public Affairs department provides outreach, including notice and press information using local media. Among the prominent media publications serving minority and non-English-speaking communities are *El Mundo*, *El Planeta*, *Dorchester Reporter*, *Haitian Reporter*, *Sampan*, and *The Bay State Banner*.
- The Office of Diversity and Civil Rights (ODCR) actively provides technical assistance and guidance to all departments on Title VI issues, including assistance in serving LEP customers. Information and general assistance is available through ODCR at 617-222-3305, and language assistance is coordinated through the Call Center or independently procured, as needed.
- In April 2017, the MBTA began a pilot program for bilingual Spanish and English audio announcements and digital messages in Blue Line stations and vehicles. The program is currently running at Maverick Station and on all buses out of the Lynn Garage, chosen because they serve areas with particularly large populations of Spanish speakers. This program is being used to study the effectiveness of announcements and receive feedback on them as the MBTA

begins incorporating new Red and Orange Line vehicles that will have greater software capacity for language assistance.

MBTA Vital Materials for Translation

Vital materials are defined as information or documents that are critical for accessing MBTA services, programs, and activities, and they are prioritized for translation and distribution. The ODCR Title VI Unit developed a strategic plan to ensure any vital information considered critical for customers to access MBTA services are translated into the most commonly spoken languages in the service area. The MBTA has prioritized documents and other communications for translation across the following three tiers:

- Tier 1: Safety, Security, and Legal Rights Information
- Tier 2: Vital Customer Access Information
- Tier 3: Information Critical to Customer Involvement and Outreach

Tier 1—Safety, Security, and Civil Rights:

The documents listed in Tier 1 have been prioritized because the information to be shared is considered the most vital to customers, according to the four-factor analysis in the MBTA's 2014 Language Assistance Plan, which is also influenced by guidance from the Department of Transportation (US DOT) on LEP Implementation.

Below is a list of the documents the MBTA has translated throughout this triennial period:

MBTA Heavy- and Light-Rail Vehicles

- Subway Emergency Instructions
- Emergency Brake and Door Release Instructions
- Passenger Emergency Intercom
- Press for Ramp (Accessibility Instructions)
- MBTA Title VI Notice to the Public
- ADA Priority Seating Signage

MBTA Transit Stations

- MBTA Title VI Notice to the Public
- Elevator Out of Service Notice

Available on the MBTA Website

- MBTA Title VI Complaint Procedures
- MBTA Title VI Complaint Forms
- Title VI Notice to the Public

Tier 2—Information Critical to Access:

Tier 2 includes materials that are critical to support customer access to the MBTA's transit system. These documents include information about the MBTA, fare information, major service and fare change related information, routes and schedules, service alerts, and paratransit information. The MBTA translates documents resulting from any fare, service, or seasonal change, such as the winter resiliency program, and in cases of smaller safe harbor communities, will utilize the procedure via the Customer Experience department, for customer inquiries in the field, and/or visits to administrative offices, utilizing Language Line services to communicate, along with making referrals for more in-depth communications if an inquiry requires deeper engagement. The MBTA has defined the following materials as providing system access information:

- Service and fare change information
- Automated fare vending machines
- Americans with Disabilities Act reduced fare program application
- THE RIDE acceptance letter
- Information about the On-Demand Paratransit Pilot Program
- System maps
- Winter service impact poster (seasonal)

Tier 3—General Information for Customer Involvement:

Tier 3 relates to information important to encourage or invite customer participation in decision-making processes to improve the MBTA's system and services. For example, this element relates to information notifying customers of opportunities to attend board meetings and public meetings about construction or service improvement projects, and/or regarding fare or major service changes. These documents will help customers play a role in the short- and long-term decision-making processes that can empower community groups to voice their opinions or concerns about the quality of transit service in their communities. The MBTA has defined the following materials as providing general information for public involvement:

- Charlie Card Store documents
- Publications of MBTA policies and procedures
- Public meeting flyers and outreach material
- MBTA website promoting 15 Languages with others available
- Customer surveys

Other Materials

Other materials considered non-vital may be translated by MBTA departments upon request. Examples of non-vital materials are:

- Planning studies and reports
- Budget reports, including capital investment program
- General advertisements
- General announcements

III. Training Programs for MBTA Personnel

The MBTA's Title VI training strategy has grown initially through the incorporation of key training strategies currently in use at MassDOT. This approach provides tailored training at four distinct levels: one for all frontline staff with direct contact with the public, one for high-level managers, one for project managers, and one for any Title VI or civil rights liaisons. The objective of these trainings is to fit the specific needs of each department to ensure the message is delivered and internalized by staff and subsequently applied in a meaningful way as they carry out their daily job functions.

All training modules focus on the following elements:

1. MBTA's responsibilities under Title VI and the U.S DOT LEP guidance
2. LEP populations in the MBTA service area
3. A summary of the "four-factor analysis"
4. A description of the language assistance services made available by the MBTA, including how staff can access these resources in their jobs.
5. Cultural-competency training to instruct staff in how to communicate with LEP persons face to face, over the telephone, and in writing.
6. Instructions on how to respond to civil rights complaints.

The following section provides a summary outline of the human resource training programs that the MBTA has in place. All include a reference to the Authority's Title VI obligations, including providing access to service for customers with limited proficiency in English. Each Title VI element of the training extended to employees is facilitated with the overall goal of informing, supporting, and providing the necessary information, tools, and guidance in understanding and appreciating the Title VI requirements.

New-Hire Orientation

The MBTA's Human Resources Department provides orientation training for all new MBTA employees. Included within the orientation is a presentation by the ODCR of the Authority's policies and obligations to promote fairness, diversity, and inclusion for all employees and customers to ensure compliance with federal and state civil rights laws and regulations, including Executive Order #13166.

The Office of Diversity and Civil Rights training for new MBTA employees covers the Authority's policies and federal and state civil rights obligations related to diversity, nondiscrimination, inclusive public engagement, and workplace practices. New hires are trained in the importance of being professional, sensitive, and responsive, as well as on the need to treat all customers with equal respect regardless of language spoken. The Title VI element of the presentation includes a focus on staff responsibilities to eliminate language barriers for LEP customers looking to access the system. During spring 2016, we modified the presentation slides and script to better reflect civil rights standards under Title VI and state law and regulation, including Executive Order #13166, and expanded the coverage for language access within the MBTA,

Anti-Discrimination and Harassment Prevention (ADHP)

The MBTA's ADHP training focuses on civil rights and MBTA policies. One goal of the training is to have employees gain an understanding of supervisors' responsibilities, employees' rights and responsibilities, and customers' rights under the laws and MBTA policies. Another goal is to develop skills and best practices for focusing on legitimate reasons for all employment decisions, and accountability regarding the same; to review best practices for maintaining excellence in customer service; and to learn when to seek assistance and/or partner with ODCR and/or other appropriate representatives at the MBTA.

This mandatory training is offered in separate sessions for supervisors and non-supervisory employees. Managers and supervisors are required to take the training every two years; all frontline employees must complete the one-day training every three years. The training includes a discussion of workplace scenarios, including interactions with customers who are unable to speak English.

Training of Customer Service Representatives

The MBTA's Title VI Specialist conducted one-day Title VI training for 20 Call Center Representatives about their nondiscrimination responsibilities and the tools and protocols in place to assist passengers with limited English proficiency. The MBTA utilizes a private vendor, called Exela Technologies, to operate the Call Center. The new Call Center has access to Language Line, which offers real-time interpreter in over 200 languages to help customers who are LEP.

The objective of this training is to help Call Center Representatives raise their awareness of the policies and procedures regarding Title VI requirements.

This training provides practical tips and tools for supervisors to develop best-practice skills in areas of Title VI language access, anti-discrimination, and harassment prevention regulations. Participants gain hands-on experience in how to recognize and handle caution areas, the rules for maintaining a discrimination-free workplace, and an awareness of the LEP customer environment.

This training provides Call Center Representatives with the necessary awareness and best-practice skills for providing excellent customer service. Representatives learn the LEP policies and procedures for working with customers with limited English language skills. Employees are also taught how to identify Title VI concerns and make appropriate referrals to connect customers with ODCR. In addition, this training raises their understanding and sensitivity to their responsibilities in helping to provide meaningful access to information and services to all customers.

OCDR also provided this training to the previous contracted employees of GCS for the Call Center in spring of 2017.

MBTA Title VI Training for Transit Ambassadors

In 2017, the MBTA entered into an agreement with a private vendor to provide additional customer service in transit stations across the MBTA service area. These contracted agents, named Transit Ambassadors, play a vital role to help transform the customer experience by using technology and other resources to assist riders with fare products, scheduling, and navigating the system. However, before deploying them into the station, Transit Ambassadors participate in a robust training curriculum that involves a comprehensive presentation on preventing discrimination and assisting persons with limited English proficiency. To date, the Title VI Unit has trained over 300 Transit Ambassadors on Title VI and LEP.

The Title VI training module concentrates on two core areas that ambassadors are likely to encounter in the train station. The first is an introduction to Title VI and handling discrimination complaint situations, where we give instructions on routing discrimination complaints from the public to the Office of Diversity and Civil Rights. The second core area focuses on helping LEP customers using the tools they have available to communicate with customers who speak a different language, and more importantly, the protocols they follow in each instance, which includes the following:

1. Use of the “I Speak Card” on tablets that contains a list of 70 different languages to identify the customers preferred language.
2. For brief customer interactions, Transit Ambassadors will use the Google Translate Application on their tablets.

3. For long questions or complex instructions, Transit Ambassadors are to use the landline phone in the station to contact the call center, who has access to Language Line, which provides interpreter support in over 160 languages.
4. Lastly, they can use the “Know Your Rights” poster or reach out to a colleague in the area that may speak the customer's language.

It is noteworthy that a number of the Transit Ambassadors speak a second language, including Spanish, French, Chinese, French-Creole, Haitian-Creole, Cape Verdean-Creole, Somali, Thai, Malay, Swahili, Arabic, Hindi, Nepali, Portuguese, Vietnamese, Hindi, Gujarati, Punjabi and Patois. These contractor employees are strategically deployed, as possible, so that their location will provide linkages to the LEP communities the MBTA services.

MBTA Title VI Training for Customer Service Agents, Instructors, and Hub Monitors

ODCR participates in the recertification-training curriculum for Customer Service Agents, Training Instructors, and Hub-Monitors. Each of these roles involves providing customer service and interacting with diverse passengers in stations across the service area. The Title VI training program is similar to the one offered Transit Ambassadors and CSAs on handling discrimination complaints and assisting LEP customers. However, some positions, such as the Hub Monitors and Training Instructors do not carry tablets and cannot access the MBTA's Civil Rights webpage or utilize Google Translate to help them in the field with short interactions. Instead, the personnel in these roles use printed versions of the “I Speak Card” to identify the customers spoken language, and then connect with via landline phones in the stations to contact the Call Center, and thereby, Language Line assistance.

“How Can I Help You Today?” Customer Service Training

All frontline MBTA Operations employees, including crew members and ticketing agents operating the MBTA commuter rail system, are required to complete customer service training. The one-day training program provided by the MBTA Human Resources Department includes a module on confronting stereotypes and on employee obligations with regard to Title VI, including tools and materials for communication with customers who have limited English proficiency.

All the training programs mentioned above include:

- 1) A summary of responsibilities under the LEP guidance
- 2) A summary of the MBTA's Language Assistance Plan

- 3) A summary of the Four-Factor Analysis of language assistance needs prepared by the MBTA (Number of LEP persons, frequency of contact, importance of program, and cost factor)
- 4) A description of the language assistance services made available by the MBTA and how staff can access these services

Media resources available to be used in MBTA training programs include:

- 1) LEP videos accessed on the FTA's website, including www.lep.gov
- 2) Links to policy information, including webinars produced by the FTA's Office of Civil Rights, available at www.transit.dot.gov/regulations-and-guidance/civil-rights-ada/title-vi-civil-rights-act-1964
- 3) Best practices in engaging LEP customers, available at www.fhwa.dot.gov/planning/publications/low_limited/index.cfm

IV. Providing Notice to LEP Persons

The MBTA incorporates multiple methods and media in communicating with its customers and the general public. These include:

- Public meetings and hearing notices
- Postings on www.mbtta.com and www.massdot.state.ma.us/
- Postings on the Boston Region MPO's website at www.bostonmpo.org and distributions via email
- Distribution through community-based neighborhood organizations including those serving or representing minority and low-income groups.
- Call Center phone line
- Transit Police dispatch phone line
- Press releases, including distribution to outlets serving minority and low-income neighborhoods (for example, to the publications *El Mundo*, *The Bay State Banner*, *El Planeta*, *Mattapan Reporter*, *Dorchester Reporter*, *Sampan*, and *Haitian Reporter*)
- Bilingual announcements in stations and on vehicles. In summer 2017, the MBTA has begun a pilot program on the Blue Line, using Spanish language announcements with the intention of expanding that program in the future

V Monitoring and Updating the Language Assistance Plan

The MBTA has designated ODCR to provide oversight and coordination of the implementation of the LAP Policy and Procedure. ODCR directs the ongoing monitoring and periodic assessment of the LAP Plan's effectiveness with assistance of the interdepartmental MBTA Title VI Working Group and technical assistance from the Central Transportation Planning Staff (CTPS).

ODCR, on an ongoing basis, reviews the effectiveness of the LEP Plan using strategies that may include, but are not limited to the following:

- Solicit direct feedback from CBOs and other stakeholders by distributing a questionnaire or holding focus group sessions on communicating with LEP individuals;
- Assess the demographic composition of the MBTA service area using the most current census data or data collected from community organizations;
- Measure the actual frequency of contact by LEP persons by collecting information from the Customer Care Call Center, the MBTA website translation, and frontline operations staff interviews;
- Partnering with other Boston-region organizations and participation in regional forums and events focused on issues of diversity and social equity. Such regional collaborations include the MetroFuture planning workshops and task forces headed by the Metropolitan Area Planning Council; and
- Changes by the MBTA to this Language Assistance Plan as needed; at a minimum every three years. The three-year update will coincide with the MBTA's Title VI Program submittal to the FTA.

Table 11 outlines the MBTA's Language Assistance Implementation Schedule.

TABLE 11**Language Access Implementation Schedule**

Updated December 2018

Activity/Task	Responsibility	Historical	Ongoing	FY 18	FY 19	FY 20	Status
1. Identification of LEP Individuals Who Need Language Assistance							
A. Update to MBTA Four Factor Analysis	Central Transportation Planning Staff (CTPS); Office of Diversity and Civil Rights (ODCR)		X		X		Generally, the four factor analysis is updated every three years, but certain circumstances may require an immediate update.
B. Update inventory/information from community-based organizations	Customer Experience, ODCR		X		X		The MBTA maintains and regularly updates its lists of community-based organizations throughout the service area, include those that serve LEP populations.
2. Safety, Security, and Legal Rights Information (Tier 1)							
A. Title VI Notices, Complaint Forms, Complaint Procedures							

i. Notice - Website	ODCR, IT				X	<p>The Title VI Notice is posted on the MBTA website, easily accessible through a "Civil Rights" link on the homepage.</p> <p>Languages (full translation): EN, SP, PO, FR, HC, IT, CH, VI, KH, RU, AR*</p>
ii. Notice - Rapid Transit Stations	ODCR, Customer Experience, Charlestown Sign Shop, Operations				X	<p>The Title VI Notice is posted inside of display cases in all rapid transit stations (subject to limitations of Green Line and trolley stations).</p> <p>Languages (full translation): EN, SP, PO, CH, VI, RU</p>
iii. Notice - Commuter Rail Stations	Keolis, ODCR				X	<p>Commuter Rail passengers can find the Keolis-branded Title VI Notice (which mirrors the MBTA's full Notice) at all outlying platforms and stations throughout the network, in addition to the Boston locations: South Station, North Station, Back Bay and Ruggles.</p> <p>Languages (riders): EN, SP, PO, HC, CH, VI</p>

iv. Notice - MBTA Major Bus Terminals	ODCR, Customer Experience, Charlestown Sign Shop, Operations				X		<p>The Title VI Notice is posted in all major bus terminals.</p> <p>Languages (full translation): EN, SP, PO, CH, VI, RU</p>
v. Notice - Ferry Terminals	Customer Experience, ODCR, Contracted Service Operations				X		<p>The Title VI Notice is posed in all Ferry Terminals.</p> <p>Languages (full translation): EN, SP, PO, CH, VI, RU</p>
vi. Complaint Forms	ODCR, IT				X		<p>The Title VI Complaint Form is disseminated broadly across the Authority, including within the Title VI Program, on the MBTA website, in public facing offices, and incorporated into the Call Center intake process.</p> <p>Languages (full translation): EN, SP, PO, FR, HC, IT, CH, VI, KH, RU, AR</p>
vi. Complaint Procedure	ODCR, IT				√		<p>The Title VI Complaint Procedure is fully translated into the top 10 languages in the service area and will be disseminated during FY19.</p> <p>Languages (full translation): EN,</p>

							SP, PO, FR, HC, IT, CH, VI, KH, RU, AR
B. Emergency, Safety, and Security Information							
i. Station PA Announcements	ODCR, Customer Experience, Operations			X			Bilingual safety and courtesy announcements are available at Blue Line stations. Languages (full translation): EN, SP
ii. Bus PA Announcements	ODCR, Customer Experience, Engineering and Subway Operations			X			All MBTA buses out of the Lynn garage play bilingual schedule change announcements. Languages (full translation): EN, SP
ii. Emergency and Safety Signage	MBTA Safety Department, Customer Experience, Subway Operations, System-Wide Accessibility				√		MTBA Safety Department is in the process of updating all safety signage inside of heavy rail and light rail vehicles which includes multilingual content and/or universal symbols to communicate with LEP customers.

							Languages (full translation): EN, SP
iii. ADA Priority Seating Signage	MBTA System-Wide Accessibility				√		<p>The revised priority seating signs include both English and Spanish.</p> <p>Languages (full translation): EN, SP</p>
3. Vital Customer Access Information (Tier 2)							
i. Generalized LEP Outreach and Instructions	ODCR, Customer Experience				X		<p>The MBTA disseminates instructions, directly to LEP populations and through service organizations, to inform LEP populations in all Safe-Harbor language groups of the availability of language assistance and specific instructions to contact the Call Center through Language Line for assistance understanding any aspect of MBTA service, including understanding safety and security related matters.</p> <p>Languages (full translation): All</p>

							LEP language groups in the service area that meet or exceed 1,000 people of 5% of the population, whichever is less. (EN, SP, CH, PO, HC, VI, RU, AR, KH, FR, IT, KO, GR, PL, HI, GU, JP, PR, TA, AR, LA, GE, TH, SC, UR, HB, HM, HU, YD.)
i. Fare and Major Service Changes	Customer Experience, Planning and Schedules, Operations		X				Such changes are documented in summary documents that are translated and disseminated to facilitate public review and feedback. In most instances, summary documents are translated into the top 5 LEP languages in the service area, but additional translations are available when needed. Languages (full translation): EN, SP, PO, CH, VI, RU

ii. The RIDE Guide	Office of Transportation Access				X	<p>The RIDE Guide includes instructions in the top 10 LEP languages in the service area on requesting assistance with RIDE services. Potential RIDE customers are also provided with the Generalized LEP Outreach and Instructions document (see above) directly by the MBTA and through local service organizations.</p> <p>Languages (riders): EN, SP, PO, FR, HC, IT, CH, VI, KH, RU, AR</p>
iii. The Ride Acceptance Letter	Office of Transportation Access		X			<p>Translations of the acceptance letter is made upon request</p>
iv. Fare payment instructions	MBTA Customer Experience	X				<p>Current kiosks can be operated in English, Spanish, and Chinese. LEP customers are also provided with Generalized LEP Outreach and Instructions document (see above) that provides details on fares, including discount pass programs.</p> <p>Languages (full translation): EN, SP, CH</p>

v. Ticket vending machines with multilingual functions	MBTA AFC Department	X					<p>Fare vending machines offer instructions in English, Spanish, and Chinese. LEP customers are also provided with Generalized LEP Outreach and Instructions document (see above) that provides details on fares, including discount pass programs.</p> <p>Languages (full translation): EN, SP, CH</p>
vi. ADA Reduced Fare Application	MBTA System-Wide Accessibility			X			<p>ADA Reduced Fare Applications are available online and at the Charlie Card Store in top 6 languages. Beyond those languages, LEP customers can call the Call Center through Language Line for this information.</p> <p>Languages (full translation): EN, SP, PO, HC, FR, VI, CH</p>
vii. Senior Reduced Fare Application	MBTA Customer Experience			X			<p>Senior Reduced Fare Applications are available online and at the Charlie Card Store in top 6 languages. Beyond those languages, LEP customers can call the Call Center through Language Line for this information.</p>

							Languages (full translation): EN, SP, PO, HC, FR, VI, CH
viii. Translated information on website	ODCR, MBTA Customer Technology Department		X	X			The MBTA's Website is a key means of disseminating professionally translated information and documents to LEP customers. For general content that isn't professionally translated, the MBTA website is effectively accessed in dozens of languages by individuals with web browser settings that push machine translated content to them as end users. For those that aren't able to modify browser settings, the MBTA utilizes Google Translate as a last resort for some level of language assistance.
4. Outreach and General Information (Tier 3)							
i. Translate meeting notices and press releases	Customer Experience and Relevant Department		X				As needed; languages for translation selected on the basis of the four-factor analysis

ii. Provide interpreters at public meetings	Relevant Department		X				As needed / upon request; languages for translation selected on the basis of the four-factor analysis
5. Monitoring and Updating the LEP Plan							
A. i. Conduct LAP and PPP trainings for each individual department with public facing responsibilities	ODCR		X				ODCR continually trains key public facing MBTA/MassDOT departments on the Language Access Plan and Public Participation Plan
B. ii. Obtain feedback from community-based organizations and agency staff	ODCR		X				ODCR has structured an outreach plan to engage with community based organization to seek feedback and recommendation on the MBTA's language assistance measures
C. iii. Demographics survey of passengers, including language demographics.	ODCR		X				At least every 5 years, the MBTA conducts a survey of passengers and requests language demographics. The surveys are available in the top 10 languages in the service area and can be translated into additional languages upon request.

							Languages (full translation): EN, SP, CH, FR, PO, HC, VI, CV
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X = Completed
 V = Target Completion

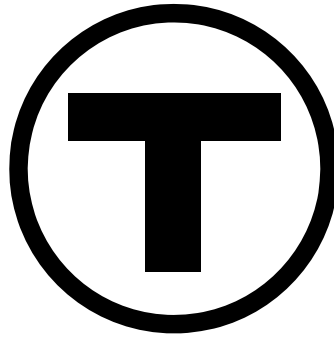
*Language Abbreviations	Language
SP	Spanish
CH	Chinese
PO	Portuguese
HC	Haitian Creole
VI	Vietnamese
RU	Russian
AR	Arabic
KH	Mon-Khmer
FR	French
IT	Italian
KO	Korean
GR	Greek
PL	Polish
HI	Hindi
GU	Gujarati
JP	Japanese
PR	Persian
TA	Tagalog
AR	Armenian
LA	Laotian

GE	German
TH	Thai
SC	Serbo-Croatian
UR	Urdu
HB	Hebrew
HM	Hmong
HU	Hungarian
YD	Yiddish
CV	Cape Verdean

Appendix 2-H

Service Delivery Policy

Service Delivery Policy



MBTA Fiscal and Management Control Board
Approved January 23, 2017

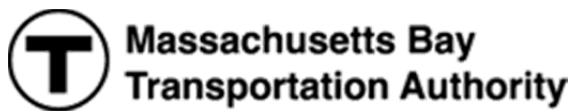


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Chapter 1: Introduction

Purpose

The Service Delivery Policy sets how the MBTA evaluates service quality and allocates transit service to meet the needs of the Massachusetts Bay region. It is consistent with the MBTA's enabling legislation and other external mandates, such as Title VI of the Civil Rights Act of 1964 (Title VI), and the Americans with Disabilities Act of 1990 (ADA). As such, the Service Delivery Policy:

- Establishes the aspects that define service availability and sets parameters for levels of provided service
- Establishes objectives that define the key performance characteristics of quality transit services
- Identifies quantifiable standards that are used to measure whether the MBTA's transit services achieve their objectives, within the context of federal, state, and local regulations
- Outlines a service planning process that applies the service standards in an objective, uniform, and accountable manner
- Sets the priorities for the service planning process by setting minimum levels and targets for the service standards
- Involves the public in the service planning process in a consistent, fair, and thorough manner

Background

This document is the 2017 update of the MBTA's Service Delivery Policy. The 2017 Service Delivery Policy takes advantage of the capabilities offered by newer technologies to collect and analyze data and to take the first steps towards creating standards from a passenger perspective. To this end, the MBTA worked with two committees to produce this document: 1) a policy advisory committee tasked with developing the service objectives, and 2) a technical advisory committee tasked with establishing standards, metrics, and thresholds designed to address the service objectives. These committees included staff from the MBTA, the Massachusetts Department of Transportation (MassDOT), and the Central Transportation Planning Staff (CTPS), along with members of academia, and various planning and advocacy groups. In addition, the MBTA engaged members of the public through a series of workshops throughout the region, via an online survey, and through public meetings.

This policy is intended to be updated regularly as the MBTA expands its ability to collect and analyze data, build out metrics, and define service parameters and targets. In addition, as priorities for service change, this policy can be updated to reflect these new priorities. Future updates will have a public input component and will be adopted by the MBTA governing board.

Document Structure

Chapter 2 lays out the service *objectives*. The service objectives include service availability and service quality. Service availability objectives describe where, when, and how often service is available to residents of the service area, and the ADA accessibility of the MBTA network. Service quality objectives describe the quality of the delivered service, from a passenger perspective whenever possible.

Since the MBTA offers a number of different types of service that play different roles in the overall network, and services also vary by time period during the service day, Chapter 2 also defines each type of service provided by the MBTA and the time periods of the service day.

Chapter 3 sets the quantifiable *standards* used to measure the objectives. These standards are divided into two categories: service planning standards used in the service planning process to evaluate and allocate service, and accessibility standards that fall outside the service planning process. The service planning standards will be evaluated in the Service Monitoring portion of the MBTA Title VI Program.

The standards for accessibility that fall outside the service planning process are set within the context of the ADA. These standards are used to inform capital and operating decisions outside of the service planning process.

Each standard has a number of components. The *definition* describes what conditions are considered passing for that standard. Within a single standard, the definition changes depending on the type of service or time period. The pass/fail condition is measured at different levels of aggregation depending on the standard. For example, whether a bus is considered on-time is measured at each time point on the route.

All standards are designed in the positive direction, so 100% would be perfect performance. This means improvement is always measured by increasing the percentage. Depending on the standard, performance can be measured at the route level, at the mode level, or for the entire network.

Each standard has a target. The targets provide a medium term goal for improving service; targets can be updated on a yearly basis as progress is made.

In addition the bus service planning standards have a *minimum*; since service planning requires trade-offs between standards the minimums are used to set priorities. If performance at a route or mode level falls below the minimum level on a standard, that

standard becomes a priority to address in the service planning process as appropriate. This document includes the 2016 performance on each of the standards to provide context for the minimums and targets.

In addition, Chapter 3 describes the methodology the MBTA uses to assess the cost-benefit ratio of bus routes. This metric is used to identify bus routes that are providing a high value for their cost and those providing a low value for their cost. This allows the MBTA to understand the characteristics of high-performing routes to emulate, and identify changes to modify or otherwise improve low-performing routes.

Chapter 4 lays out the service planning process. It includes the quarterly changes, the rolling service plan process and the annual gap analysis. Within the rolling service planning process Chapter 4 describes how the service standard minimums and targets are used to prioritize service changes.

The appendices provide additional information used to calculate the standards. Appendix D summarizes the standards and the targets, minimums, and 2016 performance levels.

Chapter 2: Services and Service Objectives

Service Objectives

The MBTA, in collaboration with stakeholders and passengers, identified the following service objectives representing the most important characteristics of a high-quality transit system. These objectives also address the requirements of the MBTA's enabling legislation.

Service Availability (Convenience)

People should be able to use the MBTA to travel throughout the service area at convenient times and frequencies.

Accessibility

As many people as possible should be able to use the entire system and all of the MBTA's services regardless of their abilities.

The MBTA will comply with ADA precepts to ensure that its services are accessible to the extent possible.

Reliability

The MBTA should operate the services it schedules.

Passengers should experience consistent headways on frequent services and on-time performance on infrequent services. Passengers should not experience excessive wait times.

Comfort

Passengers should have a reasonable amount of personal space during their trips.

Communication

Passengers should receive accurate and relevant information about the services they use in languages consistent with the MBTA's Language Access Plan (LAP) in a timely manner and in alternative formats if requested.

Safety and Security

Passengers should experience safe and secure traveling conditions.

The MBTA should operate and maintain the system with the highest regard for the safety of passengers and employees.

Rider Satisfaction

Passengers should be satisfied with the service the MBTA provides.

Environmental Benefit

The MBTA should reduce its own environmental impact and should offer passengers a

service experience that supports travel choices other than single-occupancy vehicle trips.

Service Standards

For the service planning and accessibility objectives cited above, the MBTA established quantifiable standards that allow the MBTA to evaluate the performance of its services relative to each objective. Not all objectives are addressed in this Service Delivery Policy.

Specifically, the standards for safety and security are set with the MBTA's state and federal regulatory partners and are monitored and reported outside of this policy. The standards for communication are currently being developed and will be adopted at a later date.

The MBTA monitors rider satisfaction through a monthly customer opinion panel and other survey efforts. These results are reported on the MBTA Performance Dashboard monthly. The MBTA Environmental and Energy Department monitors the MBTA's environmental impact, including measures of greenhouse gas emissions per unlinked passenger trip and greenhouse gas displacement. These results are published in the MBTA Sustainability Report.

Table 1 summarizes the remaining service objectives and standards, what types of tools the MBTA has to improve them, and the Title VI implications; Chapter 3 discusses the service standards in detail.

Table 1: MBTA Service Objectives and Standards

Service Objective	Standards	Tools to address	Title VI Implication
Service Availability	Span of service	Service planning	Service monitoring and equity analyses for major service changes
	Frequency of service		
Service Availability	Coverage: <ul style="list-style-type: none"> • Coverage of the service area • High-frequency service coverage for high-density areas • Coverage for low-income households 	Service planning, operational changes, municipal partnerships	Service monitoring
	Schedule adherence		
Reliability	Passenger wait time	Service planning, operational changes, municipal partnerships	Service monitoring
	Service operated		
Comfort	Vehicle load	Service planning, operational changes, municipal partnerships	Service monitoring
Accessibility	Platform accessibility	Capital budget, operational changes	Elevators included in service monitoring
	Vehicle accessibility		

Source: MBTA.

Services

The MBTA operates a comprehensive set of transit services. This policy addresses all of the MBTA's fixed-route services including bus, light rail, heavy rail, commuter rail, and boat, as described below¹.

Contracts with the service providers who operate The RIDE, the MBTA's paratransit service, include performance standards. Appendix C: The RIDE Service lists these requirements.

Bus

For the purposes of this policy, "bus" includes all rubber-tire vehicles regardless of the vehicle's power source. The MBTA operates several different types of bus services including:

Local Bus Routes provide full weekday service that extends beyond the morning and afternoon peak travel hours. Local routes are not necessarily designed to target any specific trip purpose. In general, stops on local routes are closely spaced, and pick-ups/drop-offs are allowed at all stops across the entire route; however, some local routes, such as the crosstown routes, operate with limited stops.

Key Bus Routes are similar to local routes, but generally operate longer hours and at higher frequencies to meet high levels of passenger demand in high-density travel corridors. Key bus routes are identified in maps and schedules.

Silver Line routes meet or exceed the characteristics of key bus routes and operate on dedicated right-of-ways for a portion of the routes.

In concert with light rail and heavy rail (discussed below), the key bus routes ensure geographic coverage of frequent service in the densest areas of Greater Boston's core, and offer intermodal connections to other MBTA services that extend throughout the region.

Commuter Bus Routes provide a limited number of peak-direction trips during periods when commuters would use the services. Commuter routes include **express bus routes**, which are identified as such in schedules and are characterized by a limited number of stops that are provided only near the ends of the routes. Some stops may be drop-off or pick-up only. Some commuter routes include closely spaced stops.

¹ Service standards also apply to all contracted services. The MBTA will take steps in all future contracts to ensure the collection of all data necessary to calculate the standards.

Community Bus Routes provide weekday service between the morning and afternoon peak hours primarily for non-work travel. Stops are closely spaced (where practical) and pick-ups/drop-offs are allowed at all stops across the entire route.

Supplemental Bus Routes either provide limited service early in the morning or are designed to support other bus routes.

Tables showing the route type for each route is in the attached Appendix A: Route Types, which is updated as changes to route designations occur.

Rapid Transit

The MBTA's rapid transit system includes its heavy rail and light rail services, described below. For the purposes of this policy the Silver Line is evaluated on Key Bus Route standards.

Light Rail

The MBTA's primary light rail system, the Green Line, provides local service in outlying areas via its surface operations and core subway services in the heart of the city. In addition, the MBTA operates the Mattapan High Speed Line, which serves as a Red Line extension from Ashmont Station to Mattapan Station via light rail.

Heavy Rail

The MBTA operates three heavy rail lines—the Red Line, the Blue Line, and the Orange Line—that provide core subway services.

Commuter Rail

The MBTA's commuter rail lines provide long-haul, primarily commuter-oriented services that link the outer portions of the region with Downtown Boston.

Boat

The MBTA provides Inner Harbor Ferry services for travel between destinations in Boston, and Commuter Boat services from the South Shore to Downtown Boston and Logan Airport.

The RIDE

The MBTA's paratransit program, The RIDE, is mandated under the ADA. It provides door-to-door, shared-ride transportation to eligible passengers who cannot use fixed-route all or some of the time because of a physical, cognitive or mental disability. The service area currently covers 58 cities and towns in and around Boston. The program provides ADA trips (trips with origins and destinations within three-quarter miles of a

fixed-route service) at one fare rate and non-ADA trips (trips with origins and destinations greater than three-quarter miles away from a fixed-route service or for same-day trip request) at a higher fare rate.

Time periods

The MBTA provides different levels of services depending on the time of day and days of the week. Table 2 provides the time periods for weekdays. Saturdays and Sundays are measured separately for most standards.

This time periods are designed for the purposes of bus service planning. Due to the different nature of the service Commuter Rail has different time periods. Its AM Peak includes all trains that arrive in their final Boston terminal between 6:00AM to 10:00AM and its PM Peak is all trains that originate in Boston and depart between 3:30PM and 7:00PM.

Table 2: MBTA Weekday Time Period Definitions

Time Period	Definition
Sunrise	3:00 AM – 5:59 AM
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	12:00 AM – 2:59 AM

Source: MBTA.

Chapter 3: Standards and Planning Tools

The service standards perform two important functions. First, they establish the acceptable levels of service that the MBTA must provide to achieve the service objectives. Second, the standards provide a framework for measuring the performance of MBTA services as a part of the service planning process, which is discussed in Chapter 4. Through the service planning process, performance data collected on MBTA services are compared against the service standards to determine whether individual existing services perform at acceptable levels and to evaluate the need for service changes. The service planning process also uses the service standards to prioritize and reallocate resources within the system.

There are a multitude of factors that can impact the performance of the MBTA services. Service planning is one of the tools the MBTA uses to improve performance. In addition, the MBTA works with our municipal partners to address factors that are in our mutual control.

The service planning process is designed to use the service standards to help ensure a cost-effective allocation of service and basic availability throughout the region within the overall amount of operations funding, which is determined through the annual budget process. This policy also provides a service planning tool to measure the cost-efficiency of bus routes. In addition, the service planning process also documents the resource gap between meeting all of the service standards at the target levels and the performance of the operated service each year.

The progress towards the performance targets is reported in the Massachusetts Department of Transportation annual performance report *Tracker*. This allows the MBTA to track progress toward targets regularly and revisit them as necessary. All of the service standard targets and minimums are listed in Appendix D: Service Standard Targets. Appendix D also lists the time frame for all the reported 2016 performance data.

Some of these standards are evaluated over a relatively short period (for example, daily or quarterly), and others are evaluated when the MBTA considers modifying service. How often each standard is evaluated is listed in Table 14.

The following is a discussion of the MBTA service standards, in the context of the service objective to which each applies. These standards address the fixed-route modes as described in Chapter 2.

Service Availability Standards

The availability standards define the levels of service that will provide meaningful access to the transit system, in terms of the length of the service day (span of service)

and the frequency of service. Each of these standards varies by mode. In addition, the MBTA measures geographic access to the system using a coverage standard with three components.

Many of the service standards differ depending on the time of day the service is offered. Table 2 defines the weekday service time periods. Because weekend travel patterns differ from weekdays, specific periods are not defined for Saturdays and Sundays.

Span of Service

Span of service refers to the hours during which service is available. The MBTA has established span of service standards that define the expected hours that any given service will operate. This provides passengers with the confidence that particular types of services will be available throughout the day. The MBTA may extend a service's span beyond the expected hours in response to customer demand.

The span of service standards, stated in Table 3 below, vary by mode and by day of the week, reflecting the predominant travel flows in the region. The standards require that the first trip in the morning in the peak direction of travel must arrive in downtown Boston, or the route terminal if the route does not serve downtown Boston, at or before the beginning span of service time (for example, 7:00 AM for local bus). At the end of the service day, the last trip in the evening in the peak direction of travel must depart downtown Boston, or the route terminal if the route does not serve downtown Boston, at or after the ending span of service time (for example, 7:00 PM for local bus).

For example, the Orange Line serves downtown Boston, so the standard requires that the first northbound and southbound trips must each reach Downtown Crossing by 6:00 AM. On the other hand, Key Bus Route 66 does not serve downtown Boston, and more passengers travel towards Harvard in the AM Peak period, so the standard requires that the first trip in the morning must arrive at Harvard before 6:00 AM.

If Table 3 does not specify an expected span of service for a mode or time period, then there is no respective standard. Service hours are set based on demand.

Table 3: Span of Service

Mode	Day	Expected Span of Service
Bus		
Local	Weekday	7:00 AM – 7:00 PM
	Saturday ¹	8:00 AM – 6:30 PM
	Sunday ¹	10:00 AM – 6:30 PM
Community	Weekday	10:00 AM – 4:00 PM
Commuter	Weekday	7:00 AM – 9:00 AM
		4:00 PM – 6:30 PM
Supplemental	Weekday	No minimum span
Key Bus Routes	Weekday	6:00 AM – midnight
	Saturday	6:00 AM – midnight
	Sunday	7:00 AM – midnight
Heavy Rail	Weekday	6:00 AM – midnight
	Saturday	6:00 AM – midnight
	Sunday	7:00 AM – midnight
Light Rail	Weekday	6:00 AM – midnight
	Saturday	6:00 AM – midnight
	Sunday	7:00 AM – midnight
Commuter Rail	Weekday	7:00 AM – 10:00 PM
	Saturday	8:00 AM – 6:30 PM
Boat	Weekday	7:00 AM – 6:30 PM
	Saturday ²	8:00 AM – 6:30 PM

¹ This is a standard for high-density areas. There is no span standard for low-density areas on weekends.

² Memorial Day–Columbus Day

Note: The RIDE generally operates from 5:00 AM to 1:00 AM. The MBTA provides extended hours for trips starting and ending within 0.75 miles of a fixed-route service that operates outside of these hours.

Source: MBTA.

During the service planning process the MBTA will evaluate vehicle loads at the beginning and end of the service day to determine whether expanding the span of service is warranted.

The MBTA's performance on this measure is weighted by ridership; passenger trips taken on services that operate at least during the expected span are counted as "passing", while trips taken on services that operate less than the expected span are counted as "failing". This weighting prioritizes meeting the expected span of service on routes and services with high ridership. Performance is evaluated for each mode.

Table 4: Span of Service Targets and Performance

Standard	Minimum	Target	2016 weekday performance
Bus	90%	95%	93%
Heavy Rail	—	100%	100%
Light Rail	—	100%	100%
Commuter Rail	—	100%	100%
Boat	—	100%	100%

Bus performance data from Spring 2016. Other data from Dec. 2016.

Source: MBTA.

Frequency of Service

To maintain access to the transportation network within a reasonable waiting time, the MBTA established expected frequency of service levels for each mode, by time of day. On less heavily-traveled services, these expected levels set the standard for the frequency of service, regardless of customer demand. Frequency of service standards are measured using either headway (minutes between trips) or frequency (trips per time period).

If Table 5 does not specify an expected frequency for a mode or time period, then there is no respective standard. Frequencies for these services are set based on demand.

Table 5: Service Frequency

Mode	Weekday Time Periods	Expected Frequency or Headway
Bus Local, Community	AM and PM Peak	Every 30 minutes
	All other periods	Every 60 minutes
	Saturday and Sunday	Every 60 minutes
Commuter	AM Peak	3 trips in the peak direction
	PM Peak	3 trips in the peak direction
Key Bus Routes	AM and PM Peak	Every 10 minutes
	Early AM and Midday Base/School	Every 15 minutes
	Evening and Late Evening	Every 20 minutes
	Saturday and Sunday	Every 20 minutes
Rapid Transit	AM and PM Peak	Every 10 minutes
	All other periods	Every 15 minutes
	Saturday and Sunday	Every 15 minutes
Commuter Rail	AM Peak	3 trips in peak direction
	PM Peak	4 trips in peak direction
	All other periods	Every 3 hours in each direction
	Saturday	Every 3 hours in each direction
Boat	AM and PM Peak	3 trips in the peak direction
	Off-Peak periods	Every 3 hours

Note: There is no frequency standard during the Sunrise or Night times or for supplemental bus service. AM Peak and PM Peak are defined differently for Commuter Rail.

Source: MBTA.

The frequency of service levels may not be sufficient to meet passenger demand on heavily used services or on services with peak ridership that is outside the traditional peak hours. When load levels indicate that additional service is warranted on a particular route, as defined in the crowding standard, the MBTA may increase that service's frequency or provide larger vehicles to provide sufficient capacity to accommodate passenger demand.

MBTA's performance on this measure is weighted by ridership in each time period; passenger trips taken on services that operate at least at the expected frequency are counted as "passing", while trips taken on services that operate less than at the expected frequency are counted as "failing". This weighting prioritizes meeting the expected frequency at peak periods and on routes and services with high ridership. Performance is evaluated for each mode.

Table 6: Service Frequency Targets and Performance

Standard	Minimum	Target	2016 weekday performance
Bus	90%	95%	90%
Rapid Transit	—	100%	100%
Boat	—	100%	100%

Bus performance data from Spring 2016. Other data from Dec. 2016.

Note: This version of the Service Delivery Policy has focused on bus service planning; future versions will address Commuter Rail service planning once more granular ridership data is available.

Source: MBTA.

Coverage Standard

An important aspect of providing the region with adequate access to transit services is the system's geographic coverage. The MBTA recognizes that coverage means different things to different markets. To address these different groups, the MBTA measures coverage in three ways:

- Base Coverage
- Frequent Service in Dense Areas Coverage
- Low-income Household Coverage

Because of constraints such as topography and street network restrictions, it is not always possible to achieve uniform geographic coverage. In addition, demand for transit does not exist uniformly across the service area; high population density and low-income households create higher demand and need for transit access.

The MBTA prioritizes high frequency service in high density area and service to areas with high proportions of low-income households, while maintaining an acceptable level of base coverage. For the coverage standard, the MBTA will set a minimum for the base coverage and targets for the coverage of frequent service in dense areas and coverage of low-income households².

The MBTA will monitor the effect of proposed service modifications on all three components of the coverage standard as part of its service planning process, described in Chapter 4.

² The base coverage will be evaluated as part of the Title VI Service Monitoring.

In order to calculate the coverage the MBTA uses walkshed distances to bus stops, rail stations, or boat docks. This means the half-mile distance is calculated based on the walking distance using the street network instead of a straight line distance that is usually impossible for pedestrians to travel. This means that another way to increase the coverage is by changes to the street network to shorten walking distances.

Base Coverage

People expect the MBTA to provide a basic level of coverage throughout its service area. Some of this service may be relatively infrequent for some or all of the service day; but people throughout the service area expect and should have a minimum level of service.

The MBTA will measure the:

Percent of the population that lives no more than 0.50 miles from a bus stop, rapid transit station, commuter rail station, or boat dock in the municipalities in the MBTA's service area, excluding municipalities that are members of a regional transit authority (RTA).

Supplemental bus routes will not be counted in the base coverage calculations.

Frequent Service in Dense Areas

Beyond a basic level of service throughout the entire service area, there are dense, urban areas where people expect frequent service. Within these urban areas, people can be reasonably sure that if they want to make a trip, they will have convenient access to frequent service.

In this section, frequent transit service is defined to include all bus stops along key bus routes, all rapid transit stations, and any bus stop that receives frequent service during its span of service.

A bus stop in the MBTA bus network is considered to receive frequent service if the average headway at that bus stop during the hours when any route serves the bus stop is less than a headway of:

- 15 minutes on weekdays (set to the expected headway for key bus routes during the midday base time period) *and*
- 20 minutes on Saturdays and Sundays (set to the expected headway for key bus routes on Saturdays and Sundays)

A bus stop can only be considered to receive frequent service if the span of service of all routes serving the bus stop meets or exceeds the span of service definitions for key bus routes.

The MBTA will measure the:

Percent of the population that lives no more than 0.50 miles away from high-frequency service in the census block groups within the MBTA's service area that have densities greater than or equal to 7,000 people per square-mile, excluding census block groups within municipalities that are members of an RTA.

The goal of this standard is to identify mostly contiguous, dense areas in the MBTA's service area that would support sufficiently effective frequent bus services. Choosing census block group densities below approximately 7,000 people per square mile creates many noncontiguous high-density "islands" throughout the MBTA's service area. At approximately 7,000 people per square mile, few high density islands remain.

Low-income Households

To reflect the importance of transit service to people who live in lower income households, the MBTA will measure the percentage of low-income households in its service areas that are located near transit.

The MBTA will measure the:

Percent of the low-income households that are located no more than 0.50 miles away from any stop or station in the municipalities in the MBTA's service area, excluding municipalities that are members of an RTA.

For all three components of the coverage standard, the MBTA will use the smallest census-based geography that is available and reliable. The distance to a transit stop will be measuring using walking distances.

Summary of Coverage Standard**Table 7: Summary of Coverage Standards**

	Numerator	Denominator	Minimum/ Target	2016 performance
Base	Population living in census block groups within 0.50 miles of transit	Population of the MBTA service area	Minimum 75%	80%
Frequent service in dense areas	Population living no more than 0.50 miles away from high-frequency service in the census block groups that have densities greater than or equal to 7,000 people per square-mile	Population living in the census block groups that have densities greater than or equal to 7,000 people per square-mile	Target 85%	80%
Low-income households	Number of low-income households located in census block groups within 0.50 miles of transit	Households in the MBTA service area	Target 85%	83%

Performance data from Fall 2016.

Note: All populations include people living in municipalities in the MBTA's service area, excluding people living in municipalities that are members of an RTA.

Source: MBTA.

Accessibility Standards**Platform Accessibility Standard**

If elevators are not available to people who need or want to use them, they may not be able to gain access to MBTA services. The MBTA's goal is for people to be able to access the platforms in each station at all times service is offered.

The MBTA will measure the:

Percent of the total platform-hours³ that are accessible.

The MBTA will measure this separately for rapid transit stations, commuter rail stations, and boat docks; and it will continue to measure progress towards this standard. The minimum will always be set as the current annual performance.

Vehicle Accessibility Standard

The MBTA should provide at least one ADA-compliant vehicle on each trip it operates. The MBTA will measure the:

Percent of trips that the MBTA provides with at least one ADA-compliant vehicle.

A trip on Commuter Rail is considered compliant if at least one ADA-compliant car/coach in the trainset matches the location of each high-level platform at stations served by the trip. ADA-compliant Commuter Rail coaches must include ADA-compliant restrooms. Trips on the Green Line are considered noncompliant if none of the vehicles in a train set is ADA-compliant. Bus trips are not measured since ramps can be deployed manually. Heavy rail and boat trips are covered in the platform standard.

The minimum will always be set as the current annual performance and the MBTA will continue to measure progress toward this standard.

Table 8: Accessibility Standards Targets and Performance

Standard	Minimum	Target	2016 performance	2016 data
Platform Accessibility (Rapid Transit stations)	92%	100%	92%	Apr 2015– Mar 2016
Vehicle Accessibility (Green Line)	98.6%	100%	98.6%	Jul 2015– Jun 2016

Rapid Transit stations, include gated Silver Line Waterfront stations, but exclude surface-level stops on Green and Silver lines.

Source: MBTA.

³ One hour of service offered to trains traveling each direction at a station. For each hour of service, a station can provide two accessible platform-hours, one hour for trains traveling in each direction. Stations with multiple platforms serving multiple branches or lines can have more than two accessible platform-hours per hour.

Reliability Service Standards

Reliability standards vary by mode and provide tools to evaluate the on-time performance of individual MBTA lines and routes. Reliability standards also vary based on frequency of service; passengers using high-frequency services generally are more interested in regular vehicle arrivals than in strict adherence to published timetables, whereas passengers who use less-frequent services expect arrivals/departures to occur as published.

Bus Reliability

Bus Timepoint Tests

To determine whether a bus is on time at an individual timepoint, such as the beginning of a route, end of a route, or a scheduled point in between, the MBTA uses two different tests based on the scheduled frequency of the service:

Scheduled-Departure Service: A trip is considered to provide scheduled-departure service when it operates with a headway longer than 15 minutes. For scheduled-departure services, passengers generally time their arrivals at bus stops to correspond with the specific published departure times.

Frequent Service: A trip is considered to provide frequent service when it operates with a headway of 15 minutes or shorter. For frequent service, passengers can arrive at a stop without looking at a schedule and expect a reasonably short wait. Key bus routes, whose passengers use the services as if they were frequent services despite occasional longer than 15 minute headways, are always evaluated using the frequent service definition even when their headways exceed 15 minutes.

Routes other than key bus routes might operate entirely with frequent service, entirely with scheduled-departure service, or with a combination of both throughout the day. Because any given route may have both types of service, each trip is considered individually to determine whether it represents scheduled-departure service or frequent service, and each timepoint crossed on that trip is measured accordingly. Therefore, there are two separate timepoint tests:

On Time Test for Scheduled-Departure Timepoints

To be considered on time at a timepoint, any trip evaluated using the scheduled-departure standard must meet one of the conditions cited below.

Origin timepoint: The trip must *depart* its origin timepoint between 0 minutes before and 3 minutes after its scheduled departure time.

Mid-route timepoint: The trip must *leave* the mid-route timepoint(s) between 1 minute before and 6 minutes after its scheduled departure time.

Destination timepoint: The trip must *arrive* at its destination timepoint no later than 5 minutes after its scheduled arrival time.

This standard allows vehicles to arrive early at their mid-route timepoints and at their destinations. The MBTA's communication standards will assesses the accuracy and timeliness of vehicle arrival predictions in order to make sure passengers have information on early mid-route arrivals.

On-Time Test for Timepoints on Frequent Services

Origin or mid-route timepoint: To be considered on time at a timepoint, a trip evaluated using the frequent service standard must leave its origin timepoint or mid-route timepoint no later than the scheduled headway plus 3 minutes.

For example, if “trip A” is scheduled to depart at 7:00 AM and the route’s next trip, “trip B,” is scheduled to depart at 7:07 AM, trip B has a 7-minute scheduled headway. Therefore, trip B must depart no more than 10 minutes (3 minutes more than the scheduled headway) after trip A actually depart for the origin timepoint to be considered on time. If trip A departs at 7:05 (5 minutes after its scheduled departure time), trip B can depart no later than 7:15 (10 minutes after trip A’s actual departure) to be considered on time.

Destination: The actual run time from the origin timepoint to the destination timepoint must be no more than 120 percent of the scheduled run time for the trip to be considered on time at the destination timepoint.

Treatment of Dropped Trips in the Bus Reliability Standard

The MBTA does not currently track dropped bus trips on a trip-by-trip basis. If the reliability data for a trip is not available, the MBTA excludes the trip from the calculation—the trip is removed from the total number of timepoints that are on time (or not on time) and from the total number of timepoints. In the case of the frequent service test, this means that the MBTA excludes headways preceding and following a trip with missing data from the calculation.

In the future, when the MBTA is able to track dropped trips on a trip-by-trip basis:

In the scheduled-departure test, dropped trips will count as failures for all timepoint crossings.

In the frequent service test, a dropped trip does not count towards the number of timepoint crossings, and the headway of the next operated trip, following the dropped trip(s), is measured from the previous operated trip.

Bus Route Test

Bus reliability is calculated as the:

Percent of each route's timepoints that meet the above definitions.

The numerator is the number of time points that met the above definitions and the denominator is the number of total time points.

Table 9: Summary of the Bus Reliability Timepoint and Route Tests

	Origin	Mid-route	Destination
Scheduled Departures (Headways > 15 min.)			
Standard	Depart 0 min. early to 3 min. late	Depart 1 min. early to 6 min. late	Arrive no more than 5 min. late
Arrival Standard	—	—	$A \leq 5.0$
Departure Standard	$0.0 \leq D \leq 3.0$	$-1.0 \leq D \leq 6.0$	—
Frequent Service Departures (Headways ≤ 15 min.)			
Standard	Depart no later than the scheduled headway plus 3 minutes		Actual run time is no more than 120% of the scheduled running time
Standard	$h_a \leq h_s + 3 \text{ minutes}$		$t_a \leq 1.2 \times t_s$

Source: MBTA.

Where:

$$A = \frac{\text{Number of arrivals meeting standard}}{\text{Total number of arrivals}}$$

$$D = \frac{\text{Number of departures meeting standard}}{\text{Total number of departures}}$$

$$h_s = \text{Scheduled headway}$$

$$h_a = \text{Actual headway}$$

$$t_s = \text{Scheduled running time}$$

$$t_a = \text{Actual running time}$$

Exceptions:

The first trip of the day on *each* route, which does not have a leading headway, is considered a scheduled-departure trip. All key bus routes are considered frequent services at all times, except for their first trip of the day.

Heavy and Light Rail Reliability

Passenger Wait Time

As with frequent bus services, passengers on light rail and heavy rail do not rely on printed schedules; rather, they expect trains to arrive at consistent headways. Therefore, schedule adherence for light rail and heavy rail is measured based on the proportion of a line's passengers who wait the scheduled headway, or less, for a train to arrive.

The passenger wait time standard is measured based on the:

Percent of passengers traveling in each time period that wait the scheduled headway, or less, at each station.

For people traveling in the trunk section of the Green Line, the headway is defined as 3 minutes.

On-Time Test for Stations on the Mattapan Line

The Mattapan Line is currently separate from the other light rail lines because the systems do not exist to evaluate the line using the passenger wait and travel time standards⁴. The Mattapan Line is evaluated using the On-Time Test for Timepoints on Frequent Services standard, used to measure the on-time performance of frequent bus services, with station departures corresponding to timepoint crossings.

The Mattapan Line reliability is measured by the:

Percent of all station departures (or arrivals for terminal stations) on the Mattapan Line over the entire service day that pass their on-time tests.

Commuter Rail Reliability

Commuter rail passengers expect to arrive at their destination station at the time posted in the schedule. The MBTA will measure the number of trains that arrive at the destination terminal no later than 5 minutes after the time published in the schedule.

Commuter rail reliability is measured as the:

Percent of trains that arrive at their destination station on time.

⁴ Once the technology systems necessary to evaluate Mattapan Trolley service is finished being implemented, it will switch over to the same standard as the Light and Heavy Rail.

The MBTA and its commuter rail operator are working to develop passenger weighted measures for commuter rail reliability.

Boat Reliability

Boat passengers expect to arrive at their destination dock at the time posted in the schedule. The MBTA will measure the number of boats that arrive at the destination terminal no later than 5 minutes after the time published in the schedule.

Boat reliability is measured as the:

Percent of boats that arrive at their destination dock on time.

Service Operated Standard

The MBTA intends to operate all of the service it schedules. A multitude of factors, including equipment failure, lack of personnel, and unforeseen delays like medical and police emergencies, can sometimes prevent the MBTA from operating scheduled service.

The MBTA will measure the:

Percent of scheduled service that is actually provided for each bus route, light rail line, heavy rail line, commuter rail line, and boat route.

Planned heavy, light, and commuter rail outages where the MBTA offers substitute service do not count against this standard. For bus this standard will also be examined at the route level to determine if some bus routes have higher dropped trips rates, so steps can be taken to address significant imbalances.

Table 10: Reliability Standards and Performance

Standard	Minimum	Target	2016 performance	2016 data
Bus Reliability (non-Key)	70%	75%	65%	Mar-Dec 2016
Key Bus	75%	80%		
Rapid Transit Passenger Wait Times	—	90%	89%	Mar-Dec 2016
Commuter Rail Reliability	Contract requires 92% adjusted		93.8% (adjusted)	Jan-Dec 2016
Boat Reliability	—	99%	98%	Jul 2015–Jun 2016
Bus Service Operated	—	99.5%	98.5%	Jul 2015–Jun 2016
Light Rail Service Operated	—	99.5%	96.5%**	March–December 2016
Heavy Rail Service Operated	—	99.5%	99.1%**	March–December 2016
Commuter Rail Service Operated	Contract sets fines for canceled service		99.8%	Jan-Dec 2016

** Data subject to change with improvements in data collection methodologies

Source: MBTA.

Comfort Standards

Passenger comfort is influenced by the number of people on the vehicle and whether or not a seat is available to each rider for all or most of the trip. Passenger comfort

standards, which vary by mode and time of day, establish the maximum number of passengers per vehicle to provide a safe and comfortable ride.

Passenger Comfort Standards

As indicated in the frequency of service standard, the level of service provided by the MBTA is primarily a function of demand, as demonstrated by the number of passengers using the service at different times during the day. On weekends and some weekday periods, most MBTA services operate with sufficient frequency to provide every passenger with a seat. However, at the heaviest weekday travel times or locations, some passengers will need to stand.

During periods when some passengers will be standing, the MBTA strives to provide sufficient service so that people are reasonably comfortable. The purpose of the passenger comfort standard is to define the levels of crowding that are acceptable by mode and time period. The periods used by the MBTA for all modes, for both frequency of service and vehicle load standards, are defined earlier in this chapter (see Table 2).

There are a number of different types of vehicles in the MBTA's fleets at any given time, and the fleets change over time. Hence, the actual seating capacity and maximum number of passengers allowed by the comfort standards for each mode changes periodically. These load standards are included in Appendix B: Vehicle Load, which is updated as the fleets change.

Bus

The MBTA will measure the passenger hours of travel experienced by comfortable bus passengers during each time period. The maximum comfortable load is expressed as a ratio of the number of passengers on the vehicle to the number of seats on the vehicle. The maximum comfortable loads are set based on Department of Public Utility (DPU) Regulation 220 CMR 155.02 (26), which states "passengers in excess of 40 percent above the seating capacity of a motor bus shall not habitually be carried... ."

High-volume Time Periods

The maximum comfortable passenger-to-seat ratio for high-volume travel periods is 140%. At loads of 140% or less of seated capacity, all passengers are considered comfortable. No passengers are considered comfortable when the vehicle load exceeds 140% of seated capacity.

Low-volume Time Periods

The maximum comfortable passenger-to-seat ratio for lower-volume travel periods is 125%. At loads up to 125% of seated capacity, all passengers are considered comfortable; above 125% and up to 140% of seated capacity, seated passengers are

considered comfortable; and no passengers are considered comfortable when the vehicle load exceeds 140% of seated capacity.

Appendix B: Vehicle Load contains the number of seats and the loading thresholds for each vehicle type.

The MBTA will measure the:

Percent of passenger travel time experienced in comfortable conditions⁵.

Table 11: Passenger Comfort Standard Targets and Performance

Standard	Minimum	Target	2015 performance
Bus Passenger Minutes in Comfortable Conditions	92%	96%	94%

Data from average weekday September 1- December 14, 2015

Source: MBTA.

Heavy and Light Rail

The MBTA currently lacks the data to accurately measure passenger loads on heavy and light rail vehicles. As of 2016, the MBTA is working to procure heavy and light rail vehicles that have Automatic Passenger Counters (APCs) installed. This will allow for a standard similar to bus that measures the passenger time in crowded conditions.

In the meantime, the MBTA is developing a capacity metric for heavy and light rail that compares the number of people entering stations over 30 minute time periods to the capacity of the number of trains operated in that time period. This capacity metric will identify segments in the system that need additional service to address overcrowding.

Commuter Rail

The MBTA currently lacks the data to accurately measure the passenger loads on individual commuter rail coaches. The MBTA and its commuter rail operator are working to collect this type of data to allow for better planning. The contract does set expectations on the number of seats the operator should provide based on expected loads.

⁵ For bus routes without enough data to model the passenger time in comfortable conditions, the proxy variable of maximum load will be used for all service planning decisions.

Boat

Federal laws prohibit boats from carrying more than their certified capacity—boats will leave people behind before they exceed their capacity. The MBTA does not have crowding-based comfort standards for its boat services. The MBTA will monitor if passengers are being regularly left-behind to determine if additional capacity is necessary.

Service Planning Tools

In addition to service standards, the MBTA can and should use diagnostic tools as part of its service planning process. For example, the MBTA needs to be able to evaluate the cost-effectiveness of its bus routes, even without establishing a cost standard. This Bus Route Cost-Benefit Ratio Tool will not be used to direct service cuts, but instead will be used to determine the cost-efficiency of the service provided and to identify service changes to improve performance.

Bus Route Cost-Benefit Ratio

Services may be valuable for different reasons; while carrying many passengers is an important characteristic, it is not the only factor that determines whether a service is effective or valuable. The MBTA considers three primary characteristics, or aspects, when evaluating whether a service is valuable to the system:

- **Ridership:** The number of people who use a service.
- **Transit Dependent Passengers:** The percentage of transit dependent people who use the service.
- **Value to Network:** Whether a service provides access to the greater network and the region. Value to the Network is composed of three characteristics:

Catchment Area: The number of people uniquely covered by each service.

Destination Coverage: The number of jobs and destinations sited near each service.

Transferring Passengers: The share of passengers who transfer to other services—these passengers contribute to the service effectiveness of other routes and modes.

Each bus route receives a benefit score for each of these aspects. Each aspect (Ridership, Transit Dependent Passengers, and Value to the Network) may be weighted depending on priorities set by the governing board. Table 12 has the current weights.

Table 12: Weighting of Components of Bus Route Benefit

Weight	Ridership	Transit Dependent	Value to the Network
	70%	15%	15%

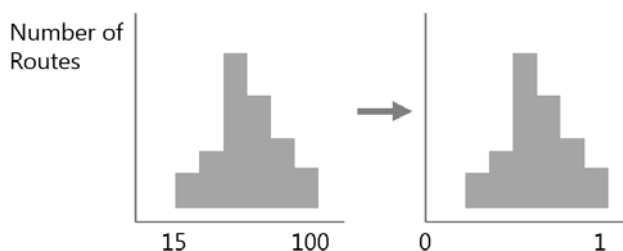
After summing the scores for each aspect, the score is divided by the net operating cost to develop a cost-benefit ratio. A cost-allocation formula uses a route's peak and off-peak service hours and the total miles of service provided to calculate the route's operating cost.

Routes in the 10th percentile or lower will be reviewed to determine what actions could be taken to improve the route's performance or to determine whether the route is a worthy use of resources. In addition, routes that perform above the 90th percentile will be analyzed to determine the characteristics of high performing routes.

The Methodology for Benefit

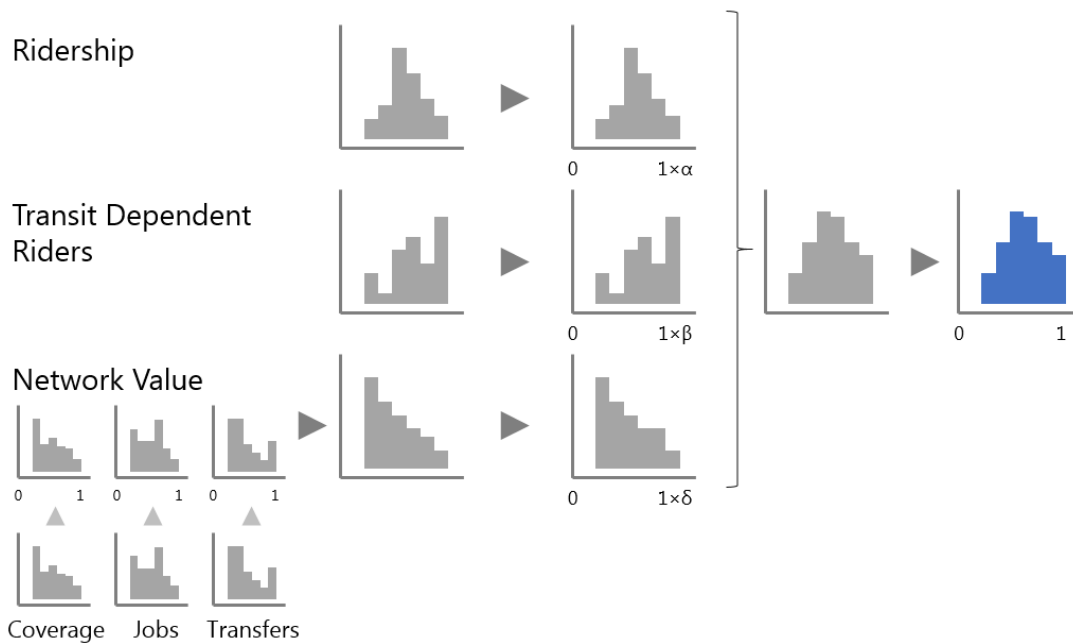
The MBTA combines the scores for each aspect to develop a single value for each service. Since the aspects have significantly different orders of magnitude⁶, they need to be standardized before they can be combined.

To scale the values to comparable values, the MBTA scales each aspect's distribution to values between 0 and 1:



Within the Value to the Network portion of this equation, the values are added together. The scores for Value to the Network are renormalized to be combined with Ridership and Transit Dependent Passengers metrics. When combining the three top-level aspects, first the weights are applied to each aspect, then the values are added and renormalized.

⁶ Ridership per route varies between 50 and 15,000 trips per day. Transit dependent passengers and transferring passengers vary between 0 and 100%. Catchment area and destination coverage can be in the tens of thousands.



For example:

Table 13: Evaluation of an Example Route

Metric	Value	Normalized	×	Weight	Final	
Ridership	13,000	0.95	×	4	3.80	
Transit Dependent Passengers	20%	0.25	×	2	0.30	
Value to the Network	1.10	0.60	×	1	0.60	
<i>Catchment Area</i>	2,000 people	0.10				
<i>Destination Coverage</i>	10,000 jobs	0.60				
<i>Transferring Passengers</i>	10%	0.40				
<i>Total Score</i>	<i>1.10 (0.10+0.60+0.40)</i>	<i>0.60</i>				
Productivity Score					4.70	
Normalized Score					0.68	

Frequency of Analysis

The MBTA measures all of the standards at different frequencies depending on the availability of data and the use of the specific metric.

Table 14 shows often each of the standards are measured.

Table 14: Frequency at which Each Standard is Typically Measured

Standard	Daily	Quarterly	Annual/ Service Plan
<i>Availability</i>			
Span of service	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Frequency	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Coverage	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<i>Accessibility</i>			
Platform accessibility	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Vehicle accessibility	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<i>Reliability</i>			
Bus and all rail reliability	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Boat reliability	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Service operated	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<i>Comfort</i>			
Crowded passenger minutes	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<i>Service Planning Metric</i>			
Bus cost benefit ratio	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Source: MBTA.

Chapter 4: Service Planning Process

The MBTA regularly evaluates performance of its services and recommends and implements service changes through the service planning process. The service planning process strives to ensure that the MBTA uses resources in the most effective manner by developing strategies to improve performance and/or to allocate service within the system. Additionally, the process also identifies the gap between actual service levels and the targets set in this policy. The service planning process includes system-wide quarterly changes, ongoing rolling Service Plan changes, and an annual evaluation to inform the MBTA's budget process.

This chapter focuses on planning for bus and subway modes; many of the processes described in this chapter may be used in planning for commuter rail and boat modes.

Service Planning Process

The service planning process takes place on two levels. One is the quarterly evaluation and implementation of incremental service changes. The other is an annual review of system performance along with rolling service plans focused on development of proposals for more substantial service changes in particular regions or on individual routes.

The primary differences between the quarterly service changes and the rolling service plans include:

- Magnitude of service changes considered (as defined below)
- Extent and type of analysis used
- Level of public participation

Quarterly service changes to transit services can be implemented with existing equipment, within the adopted budget, and without significantly affecting route structure or service delivery.

Rolling Service Plan changes have a notable effect on passengers, resource requirements, route structure, or service delivery.

Table 15: Quarterly and Service Plan Changes

Magnitude	Resource Implications	Type
Quarterly	Changes that can be implemented with existing equipment and within the adopted budget	Running time adjustments
		Departure time adjustments
		Headway changes to match ridership and service levels (provided the frequency and comfort minimums are still met)
		Changes to stop locations
		Route alignment changes
		Span of service changes within 1 hour or less
		Route extensions of 1 mile or less
		Route variation modifications
Service Plan	Changes that will have a significant effect on resources, and may potentially have a significant effect on passengers	Major service restructuring
		Implementation of new routes or services
		Elimination of a route or service
		Elimination of part of a route greater than 1 mile
		Span of service changes greater than 1 hour
		Route extensions greater than 1 mile

Source: MBTA.

Initiation of Service Planning Ideas

Service changes may be initiated in a variety of ways, including, but not limited to:

- Service requests and/or comments from the public, including municipalities and organizations through various media (public meetings or workshops, written correspondence, MBTA website, MBTA customer call center, email, Twitter, etc.)
- Proposals made by MBTA staff (Service Planning; Operations staff, such as drivers, inspectors, or garage superintendents)
- Studies completed by regional entities or municipalities

- Gaps identified between provision of MBTA services and performance targets established in this document. If, during the Quarterly or Rolling Service Plan process, a route is found to fall below the minimum on one of the established standards, it should be prioritized.

Quarterly Service Planning Process

The MBTA Service Planning Department screens potential service changes to determine whether they should be evaluated and implemented as part of the Quarterly process or Service Plan process. Potential changes are considered with respect to their impact on Service Delivery Policy standards.

Proposed changes are presented to the Service Committee, which includes representatives of the following departments:

- Service Planning
- Schedules
- Operations
- System-wide Accessibility
- Office of Performance Management and Innovation
- Other departments, as appropriate

Quarterly changes are approved by the Service Committee and implemented within the adopted budget as soon as practical.

Rolling Service Plans Process

Two inputs inform the Service Plan process, which will be performed on a continuous rolling basis in particular areas or on certain routes.

- Current service performance measured against performance targets
- Recommendations for service changes that improve route or network performance

The priorities for the rolling service plan are determined by which service planning standards fall below their minimum level. Depending on the standard, the analysis is done at the network, mode, and/or route level. If the performance level of a mode below the minimum on any standard, that standard must be prioritized. Since there are tradeoffs between standards, allocating resources to address priority standards can impact other standards. After suggested changes, the performance levels on all standards must be re-evaluated to determine if the changes lowered performance on any other standards below the minimum levels (at the route, mode, and/or network

level). Since crowding and reliability can only be measured for operated service, proxy variables can be used to model the impact of the proposed changes.

During the Rolling Service Planning process, the routes are evaluated using the Cost-Benefit Ratio tool corresponding to the most recent data available. Routes that fall below the 10th percentile are flagged for analysis. The tool is used to determine which aspect(s) of the service are driving the low ratio and could be addressed to improve the service, or how the cost could be lowered, up to and including route elimination. Routes that perform at higher than 90th percentile will also be evaluated to consider which aspect(s) may have contributed to extraordinary performance and whether they can be emulated in other services.

The Service Committee recommends service proposals to include in the Preliminary Service Plan. Each Preliminary Service Plan is made available to the public for review and comment. A list of final recommendations are then submitted to the MBTA governing board for approval before the changes are implemented, along with Title VI and environmental justice service equity analyses, if necessary.

As with the Quarterly service planning process, a goal in developing service plans is to ensure that the MBTA uses available resources effectively. However, the rolling planning process also can identify service changes and enhancements that have merit, but which cannot be provided within the existing operating budget. In such cases, additional operating funds may be requested, and the service(s) may be implemented when sufficient resources become available.

With seven bus districts and four heavy rail or light rail districts, the MBTA anticipates that the rolling process will take 2-3 years to complete an entire cycle. The MBTA may consider substantial service changes for a specific route or corridor either individually or grouped with other routes, areas, or bus districts.

Annual Service Evaluation

Once a year, the MBTA will publish a summary report of route and network performance according to the standards included in the Service Delivery Policy. Included in this report will be an analysis of the “gap” between the level of service that the MBTA is currently providing and the levels of service the MBTA would need to provide to reach the performance targets set in the Service Delivery Policy.

The MBTA will quantify gaps and identify potential actions to close the gaps. Options include those internal to the Service Planning process, such as shifting resources to benefit one service or standard over another without dropping below the minimum on any standards. The gap analysis will also consider external measures, such as securing additional operating funds, future capital investments, or more inter-governmental cooperation. Both internal and external measures will give policymakers, MBTA officials, and the public a better sense of the tradeoffs inherent in budget-constrained service

planning and suggest how additional resources could be used to provide service according to Service Delivery Policy performance targets.

Public Participation

Public participation in the general service planning process occurs both on an on-going basis and as part of the Service Plan-specific process. The purpose of public involvement in the service planning process is to promote regular dialogue with existing and potential passengers, elected officials, and communities regarding their service needs.

Public participation is always required for a Service Plan. In addition, specific changes, for example route elimination, require public participation regardless of when the change takes place.

Ongoing Public Outreach

The MBTA provides avenues for ongoing communication through its website, customer phone line, social media outlets, standing committees, and comments sent to individual MBTA officials. Service-related comments and requests are directed to the appropriate department for consideration and response. Upon request, MBTA staff also attend public meetings held by municipalities or with public officials to address specific service issues. From time to time, the MBTA may conduct specific market or route-based meetings to gather direct feedback on potential service changes. This ongoing public outreach informs both the quarterly service planning process and the rolling service plan process.

Rolling Service Plan Public Outreach

Once a Preliminary Service Plan is complete, the MBTA schedules one or more public meetings in appropriate locations. At these open meetings, the MBTA presents the analysis and issues behind the proposed service changes and solicits public comments on them. MBTA staff then assesses and analyzes the suggestions made through the public comments and, as appropriate, incorporates them into the final recommendations that go to the Board of Directors for approval.

All Service Plan public notifications and meetings conform to ADA and Title VI requirements and MBTA policies associated with these laws.

Table 16: Summary of Service Planning Processes

	Quarterly Service Planning Process	Rolling Service Plan Process
Initiation of changes:	Requests/comments from public, including public and non-profit entities Bus Operations feedback Service Planning staff Service studies	Requests/comments from public, including public and non-profit entities Bus Operations feedback Service Planning staff Service studies Public meetings
Evaluation of changes:	Route-level analysis using the evaluation criteria Review by Service Committee	Area or district-level analysis using the evaluation criteria including performance review of all services using service standards Comparative evaluation of proposed service changes and possible new services Review by Service Committee Public review and comment Title VI and Environmental Justice analysis as needed
Implementation of changes:	Quarterly with regular schedule changes	Rolling, upon approval of the Service Plan by the MBTA governing board

Source: MBTA.

Glossary of Terms and Acronyms

ADA: Americans with Disabilities Act of 1990, and as amended in 2008.

Automated Fare Collection (AFC) System: The specific instruments, such as faregates and fareboxes, and back-end infrastructure the MBTA uses to collect fares.

AVL: Automatic Vehicle Locator.

Boston Region MPO: Boston Region Metropolitan Planning Organization. The Boston Region Metropolitan Planning Organization, staffed by CTPS, is responsible for conducting the federally required metropolitan transportation-planning process (often called the 3C—continuing, cooperative, and comprehensive—process) for the Boston metropolitan area. The MPO uses this process to develop a vision for the region, then decides how to allocate federal and state transportation funds to programs and projects—roadway, transit, bicycle, and pedestrian—that support that vision.

Coverage: People living within the geographic area served by the MBTA system.

CTPS: Central Transportation Planning Staff (to the Boston Region MPO).

Dual Mode: Buses that can operate using electrical power from overhead catenary wires or a diesel engine to power the electric traction motors that turn the wheels.

Fixed-Route Service: Services that operate on designated routes with published timetables including all light rail, heavy rail, commuter rail, boat, and bus services. (The RIDE, the MBTA's paratransit service, is not a fixed-route service.)

Frequency of Service: The number of trips per hour provided on a route (for example, a route that operates every 15 minutes has a frequency of four trips per hour).

Headway: The number of minutes between scheduled trips on a route (for example, a route that operates four trips per hour has a 15-minute headway).

Heavy Rail Services: Red Line, Orange Line, and Blue Line.

Key Routes: Key bus routes are similar to local routes, but have policy standards for a longer span and higher frequency of service.

Language Access Plan (LAP): Includes the MBTA's language access needs assessment, based on the US Department of Transportation "four-factor analysis" and it prescribes:

- Methods and measures the MBTA uses to communicate with passengers with limited proficiency in English
- Training programs for educating staff about the Authority's Title VI obligations, including providing accessible services to passengers who are not proficient in English

- Methods the Authority uses to provide notice to the public of the Authority's Title VI obligations, including providing language assistance to passengers who are not proficient in English
- Plans for monitoring and updating the Language Assistance Plan.

Leading Headway: The number of minutes between a trip and the trip before it.

Light Rail Services: Green Line and Mattapan High Speed Line.

Limited English Proficiency (LEP): Individuals who have a limited ability to read, write, speak, or understand English are limited English proficient, or 'LEP. According to the American Community Survey (ACS), those who indicated they spoke English "well," "not well," or "not at all" were considered to have difficulty with English—identified also as people who speak English "less than very well."

MPO: Metropolitan Planning Organization.

Paratransit: A transit mode operating with flexible schedules and without fixed routes. Generally, paratransit operators use cars, vans, or small buses to serve passengers. The MBTA's ADA paratransit service is known as The RIDE.

Peak Direction: The direction in which most commuters are traveling on a route during the peak period (for example, toward Boston in the morning and away from Boston in the afternoon).

Public Participation Plan: The Public Participation Plan, or PPP, serves to guide agency public participation efforts, including populations that have been underserved by the transportation system and/or have lacked access to the process. The PPP guides in its efforts to offer early, continuous, and meaningful opportunities for the public to help identify social, economic, and environmental impacts of proposed transportation policies, projects and initiatives across MassDOT/MBTA.

Schedule Adherence: An indication of on-time performance, or how reliably services adhere to published schedules. Schedule adherence is the service standard that is used to measure progress toward achieving the reliability service objective.

Shared Segment: A portion of the bus network that is used by multiple bus routes.

Span of Service: Refers to the hours during which service is accessible and is defined by the times that a service begins in the morning and ends in the evening. Span of Service is one of the service standards that are used to measure progress toward achieving the availability service objective.

Timepoint: A bus stop for which the MBTA lists the scheduled arrival time on its schedules. Timepoints are frequently found at major intersections along a route. There is neither a set distance between timepoints nor a specific number of timepoints for a route.

Timepoint Crossing: The act of passing a timepoint.

Title VI: Title VI of the Civil Rights Act of 1964 requires that transit agencies that receive federal funding demonstrate that they do not discriminate based on race, color, or national origin in providing services.

Vehicle Load: Defines the level of passenger crowding that is acceptable for a safe and comfortable ride. Vehicle Load is expressed as a ratio of the number of passengers on the vehicle to the number of seats on the vehicle. Vehicle load is used to calculate the service standard for measuring progress toward achieving the comfort service objectives.

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Appendix A: Route Types

Table A1: Local Bus Routes

7	City Point – Otis and Summer Streets
8	Harbor Point /U Mass – Kenmore Station
9	City Point – Copley Square via Broadway Station
10	City Point – Copley Square Via BU Med Center
11	City Point – Downtown
14	Roslindale Square – Heath Street Loop
16	Forest Hills Station – U Mass. Or Andrew Station
17	Fields Corner Station – Andrew Station
18	Ashmont Station – Andrew Station
19	Fields Corner Station – Ruggles or Kenmore Station
21	Ashmont Station – Forest Hills Station
24	Wakefield Ave. – Mattapan Station or Ashmont
26	Ashmont Station – Norfolk and Morton Belt Line
27	Mattapan Station – Ashmont Station
29	Mattapan Station – Jackson Square or Ruggles
30	Mattapan Station – Forest Hills Station
31	Mattapan Station – Forest Hills Station
33	River and Milton Streets – Mattapan Station
34/34E	Walpole Center or Dedham Line – Forest Hills Station
35	Dedham Mall – Forest Hills Station
36	VA Hospital – Forest Hills Station Via Chas. River Loop
37	Baker and Vermont Streets – Forest Hills Station
38	Wren Street – Forest Hills Station
40	Georgetowne – Forest Hills Station
41	Centre and Eliot Streets – JFK U Mass Station
42	Forest Hills Station – Dudley or Ruggles Station
43	Ruggles Station – Park and Tremont Streets
44	Jackson Square Station – Ruggles Station
45	Franklin Park – Ruggles Station
47	Central Square Cambridge. – Broadway Station
50	Cleary Square – Forest Hills Station Via Metropolitan
51	Reservoir – Forest Hills Station
52	Dedham Mall – Watertown Yard
55	Queensberry Street – Park and Tremont Streets
59	Needham Junction – Watertown Square
60	Chestnut Hill Station – Kenmore Station
62	Bedford V.A. Hospital – Alewife Station
64	Oak Square – University Pk. Cambridge
65	Brighton Center – Kenmore Station
67	Turkey Hill – Alewife Station
68	Harvard Square – Kendall MIT Station
69	Harvard Square – Lechmere Station
70/70A	Cedarwood – Central Square Cambridge
72	Aberdeen and Mt. Auburn – Harvard Station
74	Belmont Center – Harvard Station via Concord Ave
75	Belmont Center – Harvard Station via Fresh Pond Pkwy
76	Hanscom Air Force Base – Alewife Station
78	Arlmont Village – Harvard Station
79	Arlington Heights – Alewife Station
80	Arlington Center – Lechmere Station
83	Rindge Ave. – Central Square, Cambridge
85	Spring Hill – Kendall MIT Station
86	Sullivan Station – Reservoir Station

87	Arlington Center or Clarendon Hill – Lechmere Station via Somerville Avenue
88	Clarendon Hill – Lechmere Station via Highland Avenue
89	Clarendon Hill or Davis Square – Sullivan Station via Broadway
90	Davis Square Station – Wellington Station
91	Sullivan Station – Central Square, Cambridge
92	Assembly Square Mall – Downtown Via Main Street
93	Sullivan Station – Downtown Via Bunker Hill
94	Medford Square – Davis Square Station
95	West Medford – Sullivan Station
96	Medford Square – Harvard Station
97	Malden Station – Wellington Station
99	Boston Reg. Med Center Stoneham – Wellington Station
100	Elm Street – Wellington Station
101	Malden Station – Sullivan Station Via Medford Square
104	Malden Station – Sullivan Station Via Ferry Street
105	Malden Station – Sullivan Station Via Main Street
106	Franklin Square or Lebanon Street Loop – Wellington Station
108	Linden Square – Wellington Station
109	Linden Square – Sullivan Station
110	Wonderland Station – Wellington Station
112	Wellington Station – Wood Island Station
119	Northgate Shopping Center – Beachmont Station
120	Orient Heights Station – Maverick Station
132	Redstone Shopping Center – Malden Station
134	North Woburn – Wellington Station
136	Reading Depot – Malden Station Via Lowell St
137	Reading Depot – Malden Station Via North Ave
201/202	Fields Corner Station – Fields Corner Station
210	Quincy Center Station – No. Quincy Station or Fields Corner Station
211	Quincy Center Station – Squantum
214	Quincy Center Station – Germantown
215	Quincy Center Station – Ashmont Station
216	Quincy Center Station – Houghs Neck
220	Quincy Center Station – Hingham
222	Quincy Center Station – East Weymouth
225	Quincy Center Station – Weymouth Landing or Columbian Square
230	Quincy Center Station – Montello Station
236	Quincy Center Station – South Shore Plaza
238	Quincy Center Station – Holbrook/Randolph Comm. Rail St
240	Avon Line – Ashmont Station
245	Quincy Center Station – Mattapan Station
350	North Burlington – Alewife Station
411	Malden Station – Revere/Jack Satter House
426	Central Square Lynn – Haymarket or Wonderland Station Via Clifftondale Square (Partially Express)
429	Northgate Shopping Center – Central Square Lynn
430	Malden Center Station – Saugus Center via Square One Mall
435	Liberty Tree Mall – Central Square Lynn
436	Liberty Tree Mall – Central Square Lynn
441	Marblehead – Haymarket or Wonderland Station via Paradise Rd.
442	Marblehead – Haymarket or Wonderland Station via Humphry St.
450	Salem Depot – Haymarket or Wonderland Station via Western Ave (Partially Express)
455	Salem Depot – Wonderland Station
456	Salem Depot – Central Square Lynn
465	Danvers Square – Salem Depot
553	Roberts – Downtown Boston (Partially Express)
554	Waverley Square – Downtown Boston (Partially Express)
CT1 (701)	Central Square Cambridge. – B.U. Medical Campus/Boston Medical Ctr. Via MIT
CT2 (747)	Sullivan Station – Ruggles Station via Union Square Kendall/MIT and Longwood Medical Area
CT3 (708)	Beth Israel Deaconess or B.U. Medical Campus – Andrew Station

Private Carrier Local Bus Routes

710	North Medford – Medford Square Meadow Glen Mall or Wellington Station
712/713	Point Shirley, Winthrop – Orient Heights
714	Pemberton Pt., Hull – Station St., Hingham
716	Cobbs Corner – Mattapan Station via Canton Center

Table A2: Key Bus Routes

1	Harvard Square – Dudley Station via Mass. Ave.
15	Kane Square or Fields Corner – Ruggles Station
22	Ashmont Station – Ruggles Station Via Talbot Ave
23	Ashmont Station – Ruggles Station via Washington Street
28	Mattapan Station – Ruggles Station
32	Wolcott Square or Cleary Square – Forest Hills Station
39	Forest Hills Station – Back Bay Station
57/57A	Watertown Yard – Kenmore Station
66	Harvard Square – Dudley Station via Brookline
71	Watertown Square – Harvard Station
73	Waverley Square – Harvard Station
77	Arlington Heights – Harvard Station
111	Woodlawn or Byway and Park – Haymarket Station
116	Wonderland Station – Maverick Station Via Revere (in combination with 117)
117	Wonderland Station – Maverick Station via Beach (in combination with 116)
SL1 (741)	Logan Airport – South Station
SL2 (742)	Boston Design Center – South Station
SL4 (751)	Dudley Station – South Station
SL5 (749)	Dudley Station – Downtown

Table A3: Commuter Bus Routes

4	North Station – Tide Street
84	Arlmont Loop – Alewife Station
121	Wood Island Station – Maverick Station
131	Melrose Highlands – Malden Station
170	Waltham – Dudley Station (Limited Service) (Express)
212	Quincy Center Station – North Quincy Station
217	Quincy Center Station – Ashmont Station
221	Quincy Center Station – Fort Point
325	Elm Street – Haymarket Station (Express)
326	West Medford – Haymarket Station (Express)
351	EMD Serono/Bedford Woods – Alewife Station (Express)
352	Burlington – State Street (Express)
354	Woburn Line – State Street (Express)
424	Eastern and Essex – Haymarket or Wonderland (Express)
428	Oaklandvale – Haymarket Station via Granada Highlands
434	Peabody Square – Haymarket Station via Goodwins Circle (Express)
439	Bass Point Nahant – Central Square Lynn
448	Marblehead – Downtown Crossing (Express)
449	Marblehead – Downtown Crossing (Express)
451	North Beverly – Salem Depot
459	Salem Depot – Downtown Crossing (Express)
501	Brighton Center – Downtown Boston (Express)
502	Watertown Yard – Copley Square (Express)
503	Brighton Center – Copley
504	Watertown Yard – Downtown Boston (Express)
505	Waltham Center – Downtown Boston (Express)
556	Waltham Highlands – Downtown Boston (Express)
558	Auburndale – Downtown Boston (Express)

Table A4: Community Bus Routes

5	City Point – McCormack Housing
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Table A5: Supplemental Bus Routes

114	Bellingham Square – Maverick Station
171	Dudley Station – Logan Airport via Andrew Station
191	Mattapan – Haymarket via Ashmont, Fields Corner and Dudley Station
192	Cleary Square – Haymarket via Forest Hills and Copley Square
193	Watertown Yard – Haymarket via Kenmore Station
194	Clarendon Hill – Haymarket via Sullivan Square Station
195	Shattuck Hospital – Temple Place
SLW (746)	Silver Line Way – South Station
9701	Cambridge Street at Warren Street – Ruggles Station
9702	Cambridge Street at Warren Street – Andrew Station
9703	Cambridge Street at Warren Street – Jackson Station

Appendix B: Vehicle Load

Table B1: Bus and Trackless Trolley

Vehicle Type	No. of Seats	Off-Peak Standard	Off-Peak Max Load	Peak Load Standard	Peak Max Load
RTS 40' Diesel	40	125%	50	140%	56
New Flyer 40' Emission Contr. Diesel	39	125%	48	140%	55
New Flyer 40' Compressed Natural Gas	39	125%	48	140%	55
New Flyer 40' XDE40	37	125%	46	140%	52
NABI 40' Compressed Natural Gas	39	125%	48	140%	55
Neoplan 40" Emission Controlled Diesel	38	125%	47	140%	53
Neoplan 40' Electric Trolley Bus	31	140%	43	140%	43
New Flyer 60' Diesel-Electric Hybrid	57	125%	71	140%	80
Neoplan 60' Compressed Natural Gas	57	125%	71	140%	80
Neoplan 60' Dual-Mode Articulated	47	140%	66	140%	66
Neoplan 60' Airport Dual-Mode Artic.	38	140%	53	140%	53

Note: Dual-mode vehicles used in Silver Line tunnels and electric trolley buses are always evaluated using the Peak Load Standard because of the operating characteristics of that service and because those vehicles have more standing room per seat.

Source: MBTA.

Table B2: Vehicle Load on Light Rail, Heavy Rail, Silver Line Waterfront

Vehicle Type	No. of Seats	Floor Area (sq. ft.)	Total Passengers			
			Early AM/ AM Peak	Midday Base	Midday School/ PM Peak	Evenings and Weekends
Green Line 7/8	46/44	207	100	66	100	66
Mattapan Line	41	120	73	53	73	53
Red Line 1	63	306	165	94	165	94
Red Line 2	62	297	161	92	161	92
Red Line 3	50	338	163	84	163	84
Orange Line	58	249	141	83	141	83
Blue Line	35	154	86	50	86	50

Source: MBTA.

Table B3: Commuter Rail

Vehicle Type	Fleet ID	Number of Seats	Peak Load Standard	Peak Max Load
Pullman	200–258	114	110%	125
Bombardier	350–389	127	110%	140
Bombardier	600–653	122	110%	134
Bombardier	1600–1652	122	110%	134
Kawasaki	700–749	185	110%	204
Kawasaki	750–781	182	110%	200
Kawasaki	900–932	178	110%	196
Kawasaki	1700–1724	175	110%	193
MBB	500–532	94	110%	103
MBB	1500–1533	96	110%	106
Rotem	800–846	179	110%	197
Rotem	1800–1827	173	110%	190

Source: MBTA.

Table B4: Commuter Boat (MBTA-Owned)

Vessel Name	Vessel Type	Max Load
Flying Cloud	Catamaran	149
Lightning	Catamaran	149

Source: MBTA.

Appendix C: The RIDE Service Standards

The MBTA monitors The RIDE contractors using performance metrics. If a contractor fails to meet standards set in the contracts, as well as FTA ADA requirements, they incur monetary penalties.

These metrics include:

Reliability

Missed trips (service provider at fault)

Vehicle does not show or is more than 30 minutes late.

Late trips (service provider at fault):

Pick up is more than 15 minutes late and/or drop-off is more than 10 minutes after appointment time.

Not Available trips (service provider at fault)

No Show/Late Cancellation trips (customer at fault)

Travel time

Total registered trips that violate travel time standards should not exceed 2% of all registered trips.

Percent of registered trips assigned to non-dedicated vehicles

Total registered trips assigned to non-dedicated vehicles should not exceed 5% of all registered trips, unless the Contractor has received prior approval to do so by the MBTA.

Complaint rates

The number of complaints concerning The RIDE should not exceed 0.2% of the trips requested.

Accident rates (At fault/not at fault)

All incidents and accidents should be reported.

Accessibility

Lift or ramp failures

Ramps should be operable.

Comfort**Air Conditioning/heating failures**

Air conditioners and heaters should be operable.

Communication**Telephone communication system failures**

The telephone communication system should be operable. The MBTA levies penalties for interruptions in excess of 30 minutes.

Vehicle communication system failures

The vehicle communication system should be operable. The MBTA levies penalties for interruptions in excess of 60 minutes. Any occurrence of <90% functionality of these systems for all vehicles deployed in service shall also constitute a failure/ interruption.

Computer system disruptions

The computer systems used in the delivery of services (reservations, scheduling, dispatching, reporting) should be operable. The MBTA levies penalties for interruptions in excess of 60 minutes.

Telephone hold time

The average hold time is over 1.5 minutes and/or where 5% of the total calls have a hold time that exceeds 5 minutes.

Staff uniform policy violations

Staff should abide by the uniform policy.

Failure to respond to complaints

Complaints should be responded to within 10 days.

Management and Staffing**Key senior staff vacancies**

Vacancies in one of the eight “key senior staff” positions should not last longer than 60 calendar days.

Personnel complement compliance

Each month, 100% of the proposed complement of personnel for each position should maintained.

Appendix D: Service Standard Minimums and Targets

Table D1: All Service Standards

Standard	Minimum	Target	2016 performance	2016 data
Span of Service Standards (minimums, targets, and 2016 performance apply to weekdays only)				
Bus	90%	95%	93%	Spring 2016
Heavy Rail	—	100%	100%	Dec 2016
Light Rail	—	100%	100%	Dec 2016
Commuter Rail	—	100%	100%	Dec 2016
Boat	—	100%	100%	Dec 2016
Service Frequency Standards (minimums, targets, and 2016 performance apply to weekdays only)				
Bus	90%	95%	90%	Spring 2016
Rapid Transit	—	100%	100%	Dec 2016
Boat	—	100%	100%	Dec 2016
Coverage Standards				
Base	75%	—	80%	Fall 2016
Frequent service in dense areas	—	85%	80%	Fall 2016
Low-income households	—	85%	83%	Fall 2016

Table D1 continues on next page

Table D1: All Service Standards, continued

Standard	Minimum	Target	2016 performance	2016 data
Accessibility Standards				
Platform Accessibility (Rapid Transit, gated stations)	92%	100%	92%	Apr 2015–Mar 2016
Vehicle Accessibility (Green Line)	98.6%	100%	98.6%	Jul 2015–Jun 2016
Reliability Standards				
Bus Reliability (non-Key)	70%	75%	65%	Mar–Dec 2016
Key Bus Reliability	75%	80%		
Rapid Transit Passenger Wait Times	—	90%	89%	Mar–Dec 2016
Commuter Rail Reliability	Contract requires 92% (adjusted)		93.8% (adjusted)	Jan–Dec 2016
Boat Reliability	—	99%	98%	Jul 2015–Jun 2016
Bus Service Operated	—	99.5%	98.5%	Jul 2015–Jun 2016
Light Rail Service Operated	—	99.5%	96.5%*	Mar–Dec 2016
Heavy Rail Service Operated	—	99.5%	99.1%*	Mar–Dec 2016
Commuter Rail Service Operated	Contract sets fines for canceled service		99.8%	Jan–Dec 2016
Passenger Comfort Standards				
Bus Passenger Minutes in Comfortable Conditions	92%	96%	94%	Weekdays, Sep–Dec 2015

* Data subject to change with improvements in data collection methodologies

Appendix 2-I

Title VI Subrecipient Monitoring Procedure

MBTA Title VI Subrecipient Monitoring

INTRODUCTION

Pursuant to 49 CFR 21.9 (b), it is required that all subrecipients of federal funding grantees comply with Title VI of the Civil Rights Act of 1964. To ensure that those requirements are met, the grantee, also referred to as a pass-through organization, is required to engage in subrecipient oversight and to provide these organizations with ongoing technical assistance on compliance deliverables.

Subrecipient Requirements:

1. Title VI Notice
2. Complaint and investigation procedures
3. Public participation plan
4. Language Assistance Plan
5. Other compliance related needs, including demographic and mapping data, based on the nature of the work for which they have been engaged.¹

Agency Oversight Activities:

1. Collection of Title VI Program
2. Maintenance of Subrecipient Checklist
3. Technical Assistance for Compliance Deliverables
4. Triennial Reporting on Subrecipient Title VI Compliance

MBTA SUBRECIPIENT MONITORING METHODOLOGY

An MBTA project manager, or a designee assigned to monitor a subrecipient, will conduct routine audits to ensure that project deadlines and compliance obligations meet applicable federal and state laws, including USDOT Title VI regulations. The MBTA's Title VI Specialist and MassDOT's Manager of Federal Programs play an active role in ensuring that subrecipient Title VI related requirements are monitored through coordination with the project manager to explain the requirement, set a timeframe for the submission of required Title VI documentation, and provide support to ensure that subrecipients comply with federally mandated reporting requirements, as outlined above.

Project Initiation

As part of the grant obligation process, the MBTA project manager organizes an initial meeting to review the administrative requirements and procedures for a

¹ See FTA Title VI Circular 4702.1B Chaps. II-2, 5 and III-10.

particular project, with the MBTA's Title VI Specialist, or designee, as part of these discussions to address the Title VI reporting needs that must be addressed by a subrecipient. Each subrecipient is then asked to assign a Title VI Coordinator to prepare the organization's Title VI documentation, which is submitted to the project manager and the Office of Diversity and Civil Rights, based on an agreed upon schedule. As part of this discussion, subrecipients are provided with an explanation of Title VI/Nondiscrimination requirements and are sent a sample of the Subrecipient Monitoring Checklist used by MBTA staff to ensure compliance.

Throughout this project initiation process, the MBTA Title VI Staff offers technical training for subrecipients in accordance with the Authority's public participation plan, language access strategy, complaint and investigation procedures, and Title VI notice. The purpose of scheduling a one-on-one meeting or workshop is to provide the subrecipient with guidance on which Title VI program elements apply to their specific work and the relevance of creating independent compliance documents and/or adopting the MBTA's applicable Title VI policies.

To meet the documentation requirement, the Office of Diversity and Civil Rights will coordinate with key MBTA project stakeholders involved with project delivery and subrecipient monitoring to establish an electronic point of access for document submittal. Establishment of this workflow will provide the Project Manager and Title VI Specialist the ability to share information on compliance requirements and ensures that there is a location where documents can be readily retrieved. This resource will be based on the strategy MassDOT has developed for Title VI compliance document sharing in the Highway and Rail & Transit Divisions.

Review of Draft and Final Title VI Program

Once the MBTA Office of Diversity and Civil Rights (ODCR) receive the subrecipient's proposed Title VI program documents, a review will be completed within 30 days. If there are any Title VI program elements that are not compliant, ODCR will ask the subrecipient resubmit those components to align with the governing directives. This follow-up process may be conducted informally over the phone or in person, as appropriate, or through formal written correspondence.

Modifications to Monitoring Protocol

Certain changes to the project delivery cycle that impact Title VI may result in the need to modify the MBTA's approach to monitoring, such as:

- Title VI Complaints

- Staff Changes
- Patterns of Noncompliance

In the event that an issue does arise, ODCR will assess the need for technical assistance and provide guidance to the subrecipient on addressing the matter, or undertake to address the situation under ODCR's investigative and/or compliance authority, if needed.

Subrecipient and Contractor Corrective Actions

If a subrecipient or contractor is found to be noncompliant with Title VI and fails or refuses to comply, ODCR will take one or more of the following actions:

1. Resolution of the noncompliance or potential compliance through a voluntary compliance agreement with the subrecipient or contractor.
2. Where voluntary compliance efforts are unsuccessful, the MBTA may condition further financial assistance on compliance being achieved; or
3. Consultation with the Federal Transit Administration may be initiated to, depending on the severity of noncompliance for possible federal intervention.

Appendix 6-A

Minority Classifications of MBTA Services

Table 6-A1
MBTA Bus Route Minority Classification

Route	Route Name (from MBTA Database)	Classification
1	Harvard Station - Dudley Station via BU Medical Center	Minority
4	North Station - World Trade Center	Nonminority
5★	City Point - Mary Ellen McCormick Housing	Nonminority
7	City Point - Otis and Summer Streets via Summer Street	Nonminority
8	Harbor Point/UMASS - Kenmore via South Bay and BU Medical Center	Minority
9	City Point - Copley Station	Nonminority
10★	City Point - St. James Avenue via South Bay Mall	Nonminority
11	City Point - Bedford and Chauncy Streets	Nonminority
14	Roslindale Square - Heath Street via Dudley	Minority
15	Kane Square - Ruggles Station	Minority
16	Forest Hills Station - UMASS Campus via JFK and South Bay	Minority
17	Fields Corner - Andrew Station via Uphams Corner	Minority
18★★	Ashmont Station - Andrew Station	Minority
19	Fields Corner Station - Kenmore Station	Minority
21	Ashmont Station - Forest Hills Station	Minority
22	Ashmont Station - Ruggles via Jackson Square Station	Minority
23	Ashmont Station - Ruggles Station via Washington	Minority
24★	Wakefield Avenue/Truman Parkway - Mattapan Station	Minority
26	Ashmont Station/Norfolk Street Loop via Norfolk	Minority
27	Mattapan Station - Ashmont Station	Minority
28	Mattapan Station - Ruggles via Dudley	Minority
29	Mattapan Square - Jackson Square Station	Minority
30	Mattapan - Forest Hills via Roslindale Square	Minority
31	Mattapan Square - Forest Hills Station	Minority
32	Wolcott Square - Forest Hills Station via Cleary Square	Minority
33★	River and Milton Streets, Dedham - Mattapan Station	Minority
34	Dedham Line - Forest Hills Station via Washington	Minority
35	Dedham Mall - Forest Hills via Centre and Belgrade	Nonminority
36	VA Hospital West Roxbury - Forest Hills via Charles	Minority
37	Baker and Vermont Streets - Forest Hills Station	Nonminority
38	Wren Street - Forest Hills Station	Minority
39	Forest Hills Station - Back Bay Station	Minority
40★★	Georgetown - Forest Hills Station via Alwin Street	Minority
41	Center and Elliott Streets – JFK/UMass via Dudley	Minority
42	Forest Hills - Dudley Square Terminal via Garage	Minority
43	Ruggles Station - Park and Tremont Streets	Minority
44	Jackson Square - Ruggles Station via Seaver Street	Minority
45	Franklin Park - Ruggles Station via Grove Hall	Minority
47	Central Square - Broadway Station	Nonminority
50	Cleary Square - Forest Hills Station	Minority
51	Reservoir Station - Forest Hills Station	Minority

Route	Route Name (from MBTA Database)	Classification
52	Dedham Mall - Watertown via Oak Hill	Minority
55	Jersey and Queensbury - Park and Tremont Streets	Nonminority
57	Watertown Bus Yard - Kenmore Square	Nonminority
59	Needham Junction - Watertown Square	Minority
60	Chestnut Hill Mall - Kenmore Square	Minority
62	Bedford VA Hospital - Alewife Station via Lexington Center	Nonminority
64	Oak Square - Kendall/MIT Station via Union and Central	Nonminority
65	Brighton Center - Kenmore Square	Nonminority
66	Harvard Square - Dudley Square via Union Square, Allston	Minority
67	Turkey Hill - Alewife Station via Arlington Center	Nonminority
68	Harvard Square - Kendall Station	Minority
69	Harvard Square - Lechmere Station	Minority
70	North Waltham (Lakeview) - University Park via Central Square	Minority
71	Watertown Square - Harvard Station via Mount Auburn Street	Nonminority
72	Aberdeen Avenue and Mount Auburn - Bennett Street via Huron	Nonminority
73	Waverly Square - Harvard Station via Belmont	Nonminority
74	Belmont Center - Bennett Street Alley	Nonminority
75	Belmont Center - Bennett Alley via Huron Towers	Nonminority
76	Lincoln Labs - Alewife Station via Hanscom	Minority
77	Arlington Heights - Bennett Street Alley	Nonminority
78	Arlmont Village - Bennett Alley	Nonminority
79	Arlington Heights - Alewife Station	Nonminority
80	Arlington Center - Lechmere Station	Nonminority
83	Rindge Avenue - Central Square, Cambridge	Nonminority
84	Alewife Station - Alewife Station via Arlmont Loop	Nonminority
85	Spring Hill - Kendall Station	Nonminority
86	Sullivan Station - Cleveland Circle	Nonminority
87	Arlington Center - Lechmere Station	Nonminority
88★	Clarendon Hill - Lechmere Station via Highland Avenue	Nonminority
89	Clarendon Hill - Sullivan Station	Nonminority
90★	Davis Station - Wellington Station via Sullivan	Nonminority
91	Central Square, Cambridge - Sullivan Station	Nonminority
92	Assembly Square Mall - Franklin Street via Sullivan	Nonminority
93	Sullivan Station - Downtown Boston via Bunker Hill	Nonminority
94	Medford Square - Davis Square via West Medford	Nonminority
95	West Medford - Sullivan Station via Mystic Avenue	Minority
96	Medford Square - Bennett Alley via Davis Square and George	Nonminority
97★ ★	Malden Station - Wellington Station via Commercial Street	Minority
99	Boston Regional Medical Center (Upper Highland) - Wellington Station	Minority
100	Elm Street - Wellington Station via Fellsway	Minority
101	Malden Center Station - Sullivan Station via Winter Hill	Nonminority
104	Malden Center Station - Sullivan Station via Ferry	Minority
105★ ★	Malden Station - Sullivan Station via Newland Street Housing	Minority

Route	Route Name (from MBTA Database)	Classification
106	Lebanon Loop - Wellington Station via Malden Station	Minority
108	Linden Square - Wellington Station via Malden Station	Minority
109	Linden Square - Sullivan Station via Broadway	Minority
110	Wonderland Station - Wellington Station via Woodlawn	Minority
111	Woodlawn - Haymarket via Bellingham Square	Minority
112	Wellington - Wood Island via Mystic Mall	Minority
114★	Bellingham Square - Maverick Station	Minority
116★	Wonderland - Maverick via Revere Street	Minority
117★	Wonderland - Maverick via Beach Street	Minority
119	Northgate Shopping Center - Beachmont Station	Minority
120★	Orient Heights - Maverick Station via Jeffries Point and Waldemar	Minority
121★	Wood Island Station - Maverick Station via Lexington Street	Minority
131	Melrose Highland - Oak Grove Station via East Side	Nonminority
132	Redstone Shopping Plaza - Malden Station	Nonminority
134	North Woburn - Wellington Station via Riverside Avenue	Minority
136	Reading Depot - Malden Center Station	Nonminority
137	Reading Depot - Malden Center Station	Nonminority
170★★	Oakpark - Dudley Station via Waltham and Back Bay	Minority
201★	Fields Corner Loop via Neponset Avenue	Minority
202★	Fields Corner Loop via Adams, Keystone and Puritan	Minority
210★	Quincy Center Station - Fields Corner Station	Minority
211	Quincy Center Station - Squantum via North Quincy Station	Minority
212★	Quincy Center Station - North Quincy Station	Minority
214★	Quincy Center - Germantown	Minority
215	Quincy Center - Ashmont Station via West Quincy	Minority
216★	Quincy Center - Hough's Neck	Minority
217★	Quincy Center - Ashmont Station	Minority
220★	Quincy Center - Hingham Square via Hingham Center	Nonminority
221★	Quincy Center - Fort Point via North Weymouth	Nonminority
222	Quincy Center - East Weymouth	Nonminority
225	Quincy Center - Weymouth Landing via DesMoines	Minority
230	Quincy Center - Montello Commuter Rail via Braintree	Minority
236★★	West Medford - Haymarket Station	Minority
238	Quincy Center - South Shore Plaza via Braintree Station	Minority
240	Quincy Center - Crawford Square via Holbrook/Randolph Station	Minority
245★	Avon Square - Ashmont Station	Minority
325	Quincy Center - Mattapan via Quarry Street And Edgehill Road	Nonminority
326	Elm Street, Medford - Haymarket Station via Interstate 93	Nonminority
350	Burlington (Chestnut Avenue) - Alewife Station	Minority
351★★	Oak Park/Bedford Woods - Alewife via Mall Road	Minority
352	Burlington (Chestnut Avenue) - State Street, Boston	Nonminority
354	Woburn Line - State Street, Boston via Woburn Square	Nonminority
411★	Jack Satter House (Revere) - Malden Station	Minority

Route	Route Name (from MBTA Database)	Classification
424★	Eastern Avenue/Essex Street - Haymarket Station	Minority
426★	Central Square, Lynn - Haymarket via Cliftondale Square	Nonminority
428★	Oaklandvale - Haymarket via Granada Highlands	Nonminority
429★★	Northgate Shopping Ctr., Central Square, Lynn via Square 1 Mall	Minority
430★	Saugus Center - Malden Station	Minority
434★	Neptune Towers - Central Square	Minority
435★	Main Street, Peabody - Haymarket via Goodwin Circle	Minority
436★	Liberty Tree Mall - Central Square, Lynn via Euclid	Minority
439★★	Nahant - Central Square, Lynn	Nonminority
441	Marblehead - Haymarket via Central Square and Paradise Road	Minority
442	Marblehead - Haymarket via Central Square and Humphrey Street	Minority
448★	Marblehead - Downtown Crossing Express via Paradise Road	Nonminority
449★	Marblehead - Downtown Crossing Express via Humphrey	Nonminority
450★	Salem Center - Haymarket Square via Western Avenue	Minority
451★	North Beverly - Salem Depot via Cabot Street	Nonminority
455★	Salem Depot - Wonderland via Central Square, Lynn	Minority
456★	Salem Depot - Central Square, Lynn via Highland Avenue	Minority
459★	Salem Depot - Downtown Crossing via Central Square, Lynn	Minority
465★	Danvers Square - Salem Depot via Liberty Tree Mall	Nonminority
501	Express: Brighton - Federal and Franklin Streets	Nonminority
502	Express: Watertown Square - Copley Square	Nonminority
503	Express: Brighton - Copley Square	Nonminority
504	Express: Watertown Square - Federal and Franklin Streets	Nonminority
505	Express: Waltham Center - Federal and Franklin Streets	Nonminority
553	Roberts - Federal and Franklin Streets	Nonminority
554	Waverly Square - Federal and Franklin Streets	Minority
556	Waltham Highlands - Federal and Franklin Streets	Nonminority
558	Riverside - Federal and Franklin Streets	Minority
701	CT1: Central Square, Cambridge - BU Medical Center	Nonminority
708	CT3: Beth Israel Deaconess - Andrew Station	Minority
747	CT2: Sullivan Station – Ruggles Station	Nonminority

★ This route was classified using a cluster analysis that combined survey responses for routes in close proximity to achieve a combined confidence level of 90 percent with a confidence interval of 10 percent (90/10 standards).

★★ This route did not have enough valid survey responses to provide a confidence level of 90 percent with a confidence interval of 10 percent (90/10 standards), and also could not be reasonably clustered with another route to achieve this standard.

Table 6-A2
Rapid Transit and Commuter Rail Lines Minority Classification

Line	Classification
Rapid Transit—Heavy Rail:	
Red Line – Total	Nonminority
Red Line – Shared Trunk	Nonminority
Red Line – Ashmont Branch	Minority
Red Line – Braintree Branch	Nonminority
Blue Line	Minority
Orange Line	Minority
Rapid Transit—Light Rail:	
Green Line – Total	Nonminority
Green Line – Shared Trunk	Nonminority
Green Line – B Branch	Nonminority
Green Line – C Branch	Nonminority
Green Line – D Branch	Nonminority
Green Line – E Branch	Nonminority
Mattapan (Red)	Minority
Rapid Transit—Silver Line:	
SL1/SL2 Waterfront	Nonminority
SL4/SL5 Washington Street	Minority
Commuter Rail:	
Fairmount	Minority
Fitchburg	Nonminority
Framingham/Worcester	Nonminority
Franklin	Nonminority
Greenbush	Nonminority
Haverhill/Reading	Nonminority
Lowell	Nonminority
Middleborough/Lakeville	Nonminority
Needham	Nonminority
Newburyport/Rockport	Nonminority
Plymouth/Kingston	Nonminority
Providence/Stoughton	Nonminority
Commuter Boat:	
Charlestown Ferry	Nonminority
Hingham/Hull Ferry	Nonminority

Table 6-A3
MBTA Rapid Transit Station Minority Classification

Station	Classification
Transfer Stations	
Ashmont – Red Line and Mattapan Line platforms	Minority
Downtown Crossing – Red Line and Orange Line platforms	Minority
Government Center – Blue Line and Green Line platforms	Minority
Haymarket – Orange Line and Green Line platforms	Minority
North Station – Orange Line and Green Line platforms	Nonminority
Park Street – Red Line and Green Line platforms	Nonminority
South Station – Red Line and Silver Line platforms	Nonminority
State – Orange Line and Blue Line platforms	Minority
Red Line	
Alewife	Nonminority
Davis	Nonminority
Porter	Nonminority
Harvard	Nonminority
Central	Nonminority
Kendall/MIT	Nonminority
Charles/MGH	Nonminority
Park Street – Red Line platform only	Nonminority
Downtown Crossing – Red Line platform only	Nonminority
South Station – Red Line platform only	Nonminority
Broadway	Nonminority
Andrew	Minority
JFK/UMass	Minority
Savin Hill	Nonminority
Fields Corner	Minority
Shawmut	Minority
Ashmont – Red Line platform	Minority
North Quincy	Nonminority
Wollaston	Nonminority
Quincy Center	Minority
Quincy Adams	Nonminority
Braintree	Nonminority
Mattapan High-Speed Line	
Ashmont – Mattapan Line platform only★	Minority
Cedar Grove★	Minority
Butler★	Minority
Milton★	Minority
Central Avenue★	Minority
Valley Road★	Minority
Capen Street★	Minority
Mattapan★	Minority

Station	Classification
Orange Line	
Oak Grove	Nonminority
Malden	Minority
Wellington	Minority
Assembly Square	Nonminority
Sullivan Square	Nonminority
Community College	Minority
North Station – Orange Line platform only	Nonminority
Haymarket – Orange Line platform only	Minority
State – Orange Line platform only	Minority
Downtown Crossing – Orange Line platform only	Minority
Chinatown	Nonminority
Tufts Medical Center	Minority
Back Bay	Nonminority
Massachusetts Avenue	Nonminority
Ruggles	Minority
Roxbury Crossing	Minority
Jackson Square	Minority
Stony Brook	Nonminority
Green Street	Nonminority
Forest Hills	Nonminority
Blue Line	
Wonderland	Nonminority
Revere Beach	Minority
Beachmont	Nonminority
Suffolk Downs	Nonminority
Orient Heights	Nonminority
Wood Island	Minority
Airport	Minority
Maverick	Minority
Aquarium	Nonminority
State – Blue Line platform only	Minority
Government Center – Blue Line platform only	Minority
Bowdoin	Nonminority
Green Line Shared Trunk	
Lechmere	Nonminority
Science Park	Minority
North Station – Green Line platform only	Nonminority
Haymarket – Green Line platform only	Nonminority
Government Center – Green Line platform only	Minority
Park Street – Green Line platform only	Nonminority
Boylston	Nonminority
Arlington	Nonminority

Station	Classification
Copley	Nonminority
Hynes Convention Center	Nonminority
Kenmore	Nonminority
Green Line–B	
Blandford Street★	Nonminority
BU East★	Nonminority
BU Central★	Nonminority
BU West★	Nonminority
St. Paul Street★	Nonminority
Pleasant Street★	Nonminority
Babcock Street★	Minority
Packards Corner★	Minority
Harvard Avenue★	Nonminority
Griggs Street★	Nonminority
Allston Street★	Nonminority
Warren Street★	Nonminority
Washington Street	Nonminority
Sutherland Road★	Nonminority
Chiswick Road★	Nonminority
Chestnut Hill Avenue★	Nonminority
South Street★	Nonminority
Boston College★	Nonminority
Green Line–C	
St. Marys Street★	Nonminority
Hawes Street★	Nonminority
Kent Street★	Nonminority
St. Paul Street★	Nonminority
Coolidge Corner	Nonminority
Summit Avenue★	Nonminority
Brandon Hall★	Nonminority
Fairbanks Street★	Nonminority
Washington Square★	Nonminority
Tappan Street★	Nonminority
Dean Road★	Nonminority
Englewood Avenue★	Nonminority
Cleveland Circle	Nonminority
Green Line–D	
Fenway	Nonminority
Longwood	Nonminority
Brookline Village	Nonminority
Brookline Hills★	Nonminority
Beaconsfield★	Nonminority
Reservoir	Nonminority

Station	Classification
Chestnut Hill	Nonminority
Newton Centre	Nonminority
Newton Highlands	Nonminority
Eliot	Nonminority
Waban★	Nonminority
Woodland★	Nonminority
Riverside	Nonminority
Green Line–E	
Prudential	Nonminority
Symphony	Nonminority
Northeastern	Minority
Museum of Fine Arts	Nonminority
Longwood Medical	Nonminority
Brigham Circle	Nonminority
Fenwood Road★	Nonminority
Mission Park★	Nonminority
Riverway★	Nonminority
Silver Line Waterfront and Washington Street	
South Station – Silver Line platform only	Nonminority
Court House	Nonminority
World Trade Center	Nonminority
Dudley Station	Minority
Washington Street @ Melnea Cass Blvd★	Minority
Washington Street @ Lenox Street★	Minority
Washington Street @ Massachusetts Avenue★	Minority
Washington Street @ Worcester Street	Nonminority
Washington Street @ E Newton Street★	Minority
Washington Street @ W Newton Street★	Minority
Washington Street @ Union Park★	Minority
Washington Street @ E Berkeley Street★	Minority
Washington Street @ Herald Street★	Minority

★ This station was classified using a cluster analysis that combined survey responses for stations in close proximity to achieve a combined confidence level of 90 percent with a confidence interval of 10 percent (90/10 standards).

Table 6-A4
Commuter Rail Station Minority Classification

Station	Classification
Multiline Stations	
North Station – passengers on all lines	Nonminority
South Station – passengers on all lines	Nonminority
Back Bay – passengers on all lines	Nonminority
Ruggles – passengers on all lines	Nonminority
JFK/UMass – passengers on all lines	Nonminority
Quincy Center – passengers on all lines	Nonminority
Braintree – passengers on all lines	Nonminority
Hyde Park – passengers on all lines	Nonminority
Readville – passengers on all lines	Nonminority
Newburyport/Rockport	
Rockport	Nonminority
Gloucester★	Nonminority
West Gloucester★	Nonminority
Manchester	Nonminority
Beverly Farms	Nonminority
Prides Crossing	Nonminority
Montserrat	Nonminority
Newburyport	Nonminority
Rowley	Nonminority
Ipswich	Nonminority
Hamilton/Wenham	Nonminority
North Beverly	Nonminority
Beverly	Nonminority
Salem	Nonminority
Swampscott	Nonminority
Lynn	Nonminority
River Works	Nonminority
Chelsea	Nonminority
North Station - Newburyport/Rockport passengers only	Nonminority
Haverhill	
Haverhill	Nonminority
Bradford	Nonminority
Lawrence	Nonminority
Andover	Nonminority
Ballardvale	Nonminority
North Wilmington★	Nonminority
Reading	Nonminority
Wakefield	Nonminority
Greenwood	Nonminority
Melrose Highlands	Nonminority

Station	Classification
Melrose/Cedar Park	Nonminority
Wyoming Hill	Nonminority
Malden Center	Nonminority
North Station - Haverhill/Reading passengers only	Nonminority
Lowell	
Lowell	Nonminority
North Billerica	Nonminority
Wilmington★	Nonminority
Anderson/Woburn	Nonminority
Mishawum	Nonminority
Winchester Center	Nonminority
Wedgemere	Nonminority
West Medford	Nonminority
North Station - Lowell passengers only	Nonminority
Fitchburg	
Wachusett	Nonminority
Fitchburg★	Nonminority
North Leominster★	Nonminority
Shirley	Nonminority
Ayer	Nonminority
Littleton/Route 495	Nonminority
South Acton	Nonminority
West Concord	Nonminority
Concord	Nonminority
Lincoln	Nonminority
Silver Hill★	Nonminority
Hastings★	Nonminority
Kendal Green★	Nonminority
Brandeis/Roberts	Nonminority
Waltham	Nonminority
Waverley★	Nonminority
Belmont★	Nonminority
Porter Square	Nonminority
North Station - Fitchburg passengers only	Nonminority
Framingham/Worcester	
Worcester	Nonminority
Grafton★	Nonminority
Westborough★	Nonminority
Southborough	Nonminority
Ashland	Nonminority
Framingham	Nonminority
West Natick	Nonminority
Natick	Nonminority

Station	Classification
Wellesley Square	Nonminority
Wellesley Hills★	Nonminority
Wellesley Farms★	Nonminority
Auburndale	Nonminority
West Newton★	Nonminority
Newtonville★	Nonminority
Yawkey	Nonminority
Back Bay - Framingham/Worcester passengers only	Nonminority
South Station - Framingham/Worcester passengers only	Nonminority
Needham	
Needham Heights	Nonminority
Needham Center	Nonminority
Needham Junction	Nonminority
Hersey	Nonminority
West Roxbury	Nonminority
Highland	Nonminority
Bellevue	Nonminority
Roslindale Village	Nonminority
Forest Hills	Nonminority
Ruggles - Needham passengers only	Nonminority
Back Bay - Needham passengers only	Nonminority
South Station - Needham passengers only	Nonminority
Franklin	
Forge Park/495	Nonminority
Franklin	Nonminority
Norfolk	Nonminority
Walpole	Nonminority
Plimptonville	Nonminority
Windsor Gardens	Minority
Norwood Central	Nonminority
Norwood Depot	Nonminority
Islington★	Nonminority
Dedham Corp. Center	Nonminority
Endicott★	Nonminority
Readville★	Nonminority
Hyde Park★	Nonminority
Ruggles - Franklin passengers only	Nonminority
Back Bay - Franklin passengers only	Nonminority
Providence/Stoughton	
South Attleboro	Nonminority
Attleboro	Nonminority
Mansfield	Nonminority
Sharon	Nonminority

Station	Classification
Stoughton	Nonminority
Canton Center	Nonminority
Canton Junction	Nonminority
Route 128	Nonminority
Hyde Park★	Nonminority
Ruggles - Providence/Stoughton passengers only	Nonminority
Back Bay - Providence/Stoughton passengers only	Nonminority
South Station - Providence/Stoughton passengers only	Nonminority
Fairmount	
Readville★	Nonminority
Fairmount★	Nonminority
Morton Street★	Minority
Talbot Ave★	Minority
Four Corners★	Minority
Uphams Corner★	Minority
Newmarket★	Minority
South Station - Fairmount passengers only	Minority
Middleborough	
Middleboro/Lakeville	Nonminority
Bridgewater★	Nonminority
Campello★	Nonminority
Brockton★	Minority
Montello★	Minority
Holbrook/Randolph	Nonminority
Braintree★	Nonminority
Quincy Center★	Nonminority
JFK/UMass★	Nonminority
South Station - Middleboro/Lakeville passengers only	Nonminority
Kingston/Plymouth	
Plymouth	Nonminority
Kingston	Nonminority
Halifax	Nonminority
Hanson	Nonminority
Whitman	Nonminority
Abington	Nonminority
South Weymouth	Nonminority
Braintree★	Nonminority
JFK/UMass★	Nonminority
South Station - Plymouth/Kingston passengers only	Nonminority
Greenbush	
Greenbush	Nonminority
North Scituate	Nonminority
Cohasset	Nonminority

Station	Classification
Nantasket Junction★	Nonminority
West Hingham★	Nonminority
East Weymouth★	Nonminority
Weymouth Landing/East Braintree★	Nonminority
Quincy Center★	Nonminority
JFK/UMass★	Nonminority
South Station - Greenbush passengers only	Nonminority
★ This station was classified using a cluster analysis that combined survey responses for stations in close proximity or passengers who use the same station to access multiple lines in order to achieve a combined confidence level of 90 percent with a confidence interval of 10 percent (90/10 standards).	

Appendix 6-B

Detailed Results of MBTA Service Monitoring

Detailed Results of MBTA Service Monitoring

SERVICE MONITORING RESULTS FOR SYSTEMWIDE SERVICE STANDARDS (FTA C 4702.1B, IV-3.a.(2).(c))

The following compares how minority and nonminority services for each mode adhere to the MBTA's systemwide service standards. An assessment of commuter boat services is not provided because all MBTA commuter boat services are classified as nonminority.

Vehicle Load (FTA C 4702.1B, IV-4.a.(1))

Bus

To assess bus vehicle load adherence between minority-classified routes and nonminority-classified routes, the MBTA compared the performance of each route to the overall performance of the system. On weekdays, the systemwide percentage of passenger hours of travel experienced by comfortable bus passengers, as defined by the MBTA's bus vehicle load standard, was 94.1 percent. Table 6-B1 shows that 78 of the 93 bus routes (83.9 percent) that are classified minority performed at or above the systemwide average, and 49 of the 61 bus routes (80.3 percent) that are classified nonminority performed at or above the systemwide average. The ratio of the percentage of minority-classified routes performing at or above the systemwide average to the percentage of nonminority-classified routes performing at or above the systemwide average, 1.04, is above the MBTA's disparate impact threshold of 0.80 and no disparate impact is found.

Table 6-B1
Bus Vehicle Load - Weekday

Route Classification	Number of Routes		Percentage of Routes
	Number Performing at or Above	Performing at or Above	Performing at or Above
	of Routes	Systemwide Average	Systemwide Average
Minority	93	78	83.9%
Nonminority	61	49	80.3%
Ratio of minority to nonminority			1.04
Disparate impact threshold			0.80
Result of disparate impact analysis			No Disparate Impact

Note: Data for weekdays from September 1, 2015, through December 14, 2015.

On Saturdays, the systemwide percentage of passenger hours of travel experienced by comfortable bus passengers was 97.3 percent. Table 6-B2 shows that 65 of the 74 bus routes (87.8 percent) that are classified minority

performed at or above the systemwide average, and 33 of the 35 bus routes (94.3 percent) that are classified nonminority performed at or above the systemwide average. The ratio of the percentage of minority-classified routes performing at or above the systemwide average to the percentage of nonminority-classified routes performing at or above the systemwide average, 0.93, is above the MBTA's disparate impact threshold of 0.80 and no disparate impact is found.

Table 6-B2
Bus Vehicle Load - Saturday

Route Classification	Number of Routes		Percentage of Routes	
	Number of Routes	Performing at or Above Systemwide Average	Performing at or Above Systemwide Average	
Minority	74	65	87.8%	
Nonminority	35	33	94.3%	
Ratio of minority to nonminority				0.93
Disparate impact threshold				0.80
Result of disparate impact analysis				No Disparate Impact

Note: Data for Saturdays from September 1, 2015, through December 14, 2015.

On Sundays, the systemwide percentage of passenger hours of travel experienced by comfortable bus passengers was 97.2 percent. Table 6-B3 shows that 52 of the 60 bus routes (86.7 percent) that are classified minority performed at or above the systemwide average, and 23 of the 25 bus routes (92.0 percent) that are classified nonminority performed at or above the systemwide average. The ratio of the percentage of minority-classified routes performing at or above the systemwide average to the percentage of nonminority-classified routes performing at or above the systemwide average, 0.94, is above the MBTA's disparate impact threshold of 0.80 and no disparate impact is found.

Table 6-B3
Bus Vehicle Load - Sunday

Route Classification	Number of Routes		Percentage of Routes	
	Number of Routes	Performing at or Above Systemwide Average	Performing at or Above Systemwide Average	
Minority	60	52	86.7%	
Nonminority	25	23	92.0%	
Ratio of minority to nonminority				0.94
Disparate impact threshold				0.80
Result of disparate impact analysis				No Disparate Impact

Note: Data for Sundays from September 1, 2015, through December 14, 2015.

Heavy and Light Rail

At this time, the MBTA is unable to assess passenger comfort adherence between minority-classified heavy and light rail lines and nonminority-classified

heavy and light rail lines. The MBTA is limited in its ability to estimate passenger loads on board heavy and light rail vehicles because none of the vehicles are currently equipped with APCs. In the short term, research is ongoing to develop a method for estimating the number of passengers at each platform who are unable to board as a result of crowding using AFC data and automatic vehicle location (AVL) data. In the long term, the MBTA will seek to procure new heavy and light rail rolling stock that comes equipped with APC devices.

Commuter Rail

At this time, the MBTA is unable to assess directly passenger comfort adherence between minority-classified commuter rail lines and nonminority-classified commuter rail lines because not all commuter rail vehicles are equipped with APCs. While the MBTA works to get more commuter rail coaches equipped with APCs, the MBTA conducted a supplemental assessment of vehicle load based on the percentage of trainsets on each line that had the required number of seats based on expected loads, as mandated by the MBTA's contract with its commuter rail operator. To assess adherence to the contract between minority-classified lines and nonminority-classified lines, the MBTA compared the performance of each line to the overall performance of the system.

On weekdays, the systemwide percentage of trainsets with the required number of seats was 98.1 percent. Table 6-B4 shows that the single commuter rail line that is classified minority performed at or above the systemwide average, and six of the 11 commuter rail lines (54.5 percent) that are classified nonminority performed at or above the systemwide average. The ratio of the percentage of minority-classified lines performing at or above the systemwide average to the percentage of nonminority-classified lines performing at or above the systemwide average, 1.83, is above the MBTA's disparate impact threshold of 0.80 and no disparate impact is found.

Table 6-B4
Commuter Rail Vehicle Load - Weekday

Line Classification	Number of Lines		Percentage of Lines	
	Number	Performing at or Above Systemwide Average	Performing at or Above Systemwide Average	
Minority	1	1	100%	
Nonminority	11	6	54.5%	
Ratio of minority to nonminority			1.83	
Disparate impact threshold			0.80	
Result of disparate impact analysis			No Disparate Impact	

Note: Data for weekdays from July 1, 2015, through June 30, 2016.

On Saturdays, the systemwide percentage of trainsets with the required number of seats was 100 percent. Table 6-B5 shows that the single commuter rail line

that is classified minority performed at or above the systemwide average, and 11 of the 11 commuter rail lines (100 percent) that are classified nonminority performed at or above the systemwide average. The ratio of the percentage of minority-classified lines performing at or above the systemwide average to the percentage of nonminority-classified lines performing at or above the systemwide average, 1.00, is above the MBTA's disparate impact threshold of 0.80 and no disparate impact is found.

Table 6-B5
Commuter Rail Vehicle Load - Saturday

Line Classification	Number of Lines		Percentage of Lines	
	Number of Lines	Performing at or Above Systemwide Average	Performing at or Above Systemwide Average	
Minority	1	1	100%	
Nonminority	11	11	100%	
Ratio of minority to nonminority			1.00	
Disparate impact threshold			0.80	
Result of disparate impact analysis				No Disparate Impact

Note: Data for Saturdays from July 1, 2015, through June 30, 2016.

On Sundays, the systemwide percentage of trainsets with the required number of seats was 100 percent. Table 6-B6 shows that the single commuter rail line that is classified minority performed at or above the systemwide average, and 11 of the 11 commuter rail lines (100 percent) that are classified nonminority performed at or above the systemwide average. The ratio of the percentage of minority-classified lines performing at or above the systemwide average to the percentage of nonminority-classified lines performing at or above systemwide average, 1.00, is above the MBTA's disparate impact threshold of 0.80 and no disparate impact is found.

Table 6-B6
Commuter Rail Vehicle Load - Sunday

Line Classification	Number of Lines		Percentage of Lines	
	Number of Lines	Performing at or Above Systemwide Average	Performing at or Above Systemwide Average	
Minority	1	1	100%	
Nonminority	11	11	100%	
Ratio of minority to nonminority			1.00	
Disparate impact threshold			0.80	
Result of disparate impact analysis				No Disparate Impact

Note: Data for Sundays from July 1, 2015, through June 30, 2016.

Vehicle Headway (FTA C 4702.1B, IV-4.a.(2))

Bus

To assess bus vehicle headway adherence between minority-classified routes and nonminority-classified routes, the MBTA compared the performance of each route to the overall performance of the system. On weekdays, the systemwide percentage of passengers on bus services that operated at least the expected frequency stated in the MBTA's bus service frequency standard was 94.2 percent. Table 6-B7 shows that 55 of the 93 bus routes (59.1 percent) that are classified minority performed at or above the systemwide average, and 50 of the 67 bus routes (74.6 percent) that are classified nonminority performed at or above the systemwide average. The ratio of the percentage of minority-classified routes performing at or above the systemwide average to the percentage of nonminority-classified routes performing at or above the systemwide average, 0.79, falls slightly below the MBTA's disparate impact threshold of 0.80 and a potential disparate impact is found.

Table 6-B7
Bus Vehicle Headway - Weekday

Route Classification	Number of Routes	Number of Routes Performing at or Above Systemwide Average	Percentage of Routes Performing at or Above Systemwide Average
Minority	93	55	59.1%
Nonminority	67	50	74.6%
Ratio of minority to nonminority			0.79
Disparate impact threshold			0.80
Result of disparate impact analysis			Potential Disparate Impact

Note: For the MBTA's weekday transit schedule from March 19, 2016, through June 24, 2016.

On Saturdays, the systemwide percentage of passengers on bus services that operated at least the expected frequency was 95.0 percent. Table 6-B8 shows that 62 of the 74 bus routes (83.8 percent) that are classified minority performed at or above the systemwide average, and 35 of the 43 bus routes (81.4 percent) that are classified nonminority performed at or above the systemwide average. The ratio of the percentage of minority-classified routes performing at or above the systemwide average to the percentage of nonminority-classified routes performing at or above the systemwide average, 1.03, is above the MBTA's disparate impact threshold of 0.80 and no disparate impact is found.

**Table 6-B8
Bus Vehicle Headway - Saturday**

Route Classification	Number of Routes		Percentage of Routes	
	Number of Routes	Performing at or Above Systemwide Average	Performing at or Above Systemwide Average	
Minority	74	62	83.8%	
Nonminority	43	35	81.4%	
Ratio of minority to nonminority			1.03	
Disparate impact threshold			0.80	
Result of disparate impact analysis			No Disparate Impact	

Note: For the MBTA's Saturday transit schedule from March 19, 2016, through June 24, 2016.

On Sundays, the systemwide percentage of passengers on bus services that operated at least the expected frequency was 92.3 percent. Table 6-B9 shows that 50 of the 63 bus routes (79.4 percent) that are classified minority performed at or above the systemwide average, and 22 of the 31 bus routes (71.0 percent) that are classified nonminority performed at or above the systemwide average. The ratio of the percentage of minority-classified routes performing at or above the systemwide average to the percentage of nonminority-classified routes performing at or above the systemwide average, 1.12, is above the MBTA's disparate impact threshold of 0.80 and no disparate impact is found.

**Table 6-B9
Bus Vehicle Headway - Sunday**

Route Classification	Number of Routes		Percentage of Routes	
	Number of Routes	Performing at or Above Systemwide Average	Performing at or Above Systemwide Average	
Minority	63	50	79.4%	
Nonminority	31	22	71.0%	
Ratio of minority to nonminority			1.12	
Disparate impact threshold			0.80	
Result of disparate impact analysis			No Disparate Impact	

Note: For the MBTA's Sunday transit schedule from March 19, 2016, through June 24, 2016.

Although a potential disparate impact is found for the weekday assessment using FTA's required method of comparing service on a route-by-route basis, a supplemental analysis comparing the overall percentage of passengers on minority routes that pass the service frequency standard (76.0 percent) to the overall percentage of passengers on nonminority routes that pass the frequency standard (89.2 percent) results in a ratio of 0.85, which leads to a finding of no disparate impact. An analysis conducted using this method is more reflective of the overall passenger experience, which is the philosophy under which the service standards in the MBTA's 2017 Service Delivery Policy were developed.

Furthermore, in April 2017 the MBTA started the process for a new bus service plan. Through this process the MBTA will be performing a comprehensive review of all bus routes and their adherence to the service standards. The process will identify gaps in performance for all routes, while giving specific attention towards improving performance on routes that have predominantly minority and low-income passengers.

Heavy and Light Rail

To assess heavy and light rail vehicle headway adherence between minority-classified lines and nonminority-classified lines, the MBTA compared the percentage of minority and nonminority-classified lines that adhered to the MBTA's heavy and light rail service frequency standard. Table 6-B10 shows that on weekdays four of the four heavy and light rail lines (100 percent) that are classified minority met the standard, and seven of the seven heavy and light rail lines (100 percent) that are classified nonminority met the standard. The ratio of the percentage of minority-classified lines meeting the standard to the percentage of nonminority-classified lines meeting the standard, 1.00, is above the MBTA's disparate impact threshold of 0.80 and no disparate impact is found.

Table 6-B10
Heavy and Light Rail Vehicle Headway - Weekday

Line Classification	Number of Lines	Number of Lines Meeting the Standard	Percentage of Lines Meeting the Standard
Minority	4	4	100%
Nonminority	7	7	100%
Ratio of minority to nonminority			1.00
Disparate impact threshold			0.80
Result of disparate impact analysis			No Disparate Impact

Note: For the MBTA's weekday transit schedule from March 19, 2016, through June 24, 2016.

Table 6-B11 shows that on Saturdays four of the four heavy and light rail lines (100 percent) that are classified minority met the standard, and seven of the seven heavy and light rail lines (100 percent) that are classified nonminority met the standard. The ratio of the percentage of minority-classified lines meeting the standard to the percentage of nonminority-classified lines meeting the standard, 1.00, is above the MBTA's disparate impact threshold of 0.80 and no disparate impact is found.

Table 6-B11
Heavy and Light Rail Vehicle Headway - Saturday

Line Classification	Number of Lines	Number of Lines Meeting the Standard	Percentage of Lines Meeting the Standard
Minority	4	4	100%
Nonminority	7	7	100%
Ratio of minority to nonminority			1.00
Disparate impact threshold			0.80
Result of disparate impact analysis			No Disparate Impact

Note: For the MBTA's Saturday transit schedule from March 19, 2016, through June 24, 2016.

Table 6-B12 shows that on Sundays four of the four heavy and light rail lines (100 percent) that are classified minority met the standard, and seven of the seven heavy and light rail lines (100 percent) that are classified nonminority met the standard. The ratio of the percentage of minority-classified lines meeting the standard to the percentage of nonminority-classified lines meeting the standard, 1.00, is above the MBTA's disparate impact threshold of 0.80 and no disparate impact is found.

Table 6-B12
Heavy and Light Rail Vehicle Headway - Sunday

Line Classification	Number of Lines	Number of Lines Meeting the Standard	Percentage of Lines Meeting the Standard
Minority	4	4	100%
Nonminority	7	7	100%
Ratio of minority to nonminority			1.00
Disparate impact threshold			0.80
Result of disparate impact analysis			No Disparate Impact

Note: For the MBTA's Sunday transit schedule from March 19, 2016, through June 24, 2016.

Commuter Rail

To assess commuter rail vehicle headway adherence between minority-classified lines and nonminority-classified lines, the MBTA compared the percentage of minority and nonminority-classified lines that adhered to the MBTA's commuter rail service frequency standard. Table 6-B13 shows that on weekdays the single commuter rail line that is classified minority met the standard, and 10 of the 11 commuter rail lines (90.9 percent) that are classified nonminority met the standard. The ratio of the percentage of minority-classified lines meeting the standard to the percentage of nonminority-classified lines meeting the standard, 1.10, is above the MBTA's disparate impact threshold of 0.80 and no disparate impact is found.

Table 6-B13
Commuter Rail Vehicle Headway - Weekday

Line Classification	Number of Lines	Number of Lines Meeting the Standard	Percentage of Lines Meeting the Standard
Minority	1	1	100%
Nonminority	11	10	90.9%
Ratio of minority to nonminority			1.10
Disparate impact threshold			0.80
Result of disparate impact analysis			No Disparate Impact

Note: For the MBTA's weekday transit schedule from March 19, 2016, through June 24, 2016.

Table 6-B14 shows that on Saturdays the single commuter rail line that is classified minority met the standard, and 11 of the 11 commuter rail lines (100 percent) that are classified nonminority met the standard. The ratio of the percentage of minority-classified lines meeting the standard to the percentage of nonminority-classified lines meeting the standard, 1.00, is above the MBTA's disparate impact threshold of 0.80 and no disparate impact is found.

Table 6-B14
Commuter Rail Vehicle Headway - Saturday

Line Classification	Number of Lines	Number of Lines Meeting the Standard	Percentage of Lines Meeting the Standard
Minority	1	1	100%
Nonminority	11	11	100%
Ratio of minority to nonminority			1.00
Disparate impact threshold			0.80
Result of disparate impact analysis			No Disparate Impact

Note: For the MBTA's Saturday transit schedule from March 19, 2016, through June 24, 2016.

The MBTA has no service frequency standard for commuter rail on Sundays.

On-Time Performance (FTA C 4702.1B, IV-4.a.(3))

Bus

To assess bus on-time performance of minority-classified routes and nonminority-classified routes, the MBTA compared the performance of each route to the overall performance of the system. On weekdays, the systemwide percentage of timepoints where buses were registered as on time according to the MBTA's bus on-time performance standard was 67.5 percent. Table 6-B15 shows that 32 of the 95 bus routes (33.7 percent) that are classified minority performed at or above the systemwide average, and 24 of the 68 bus routes (35.3 percent) that are classified nonminority performed at or above the systemwide average. The ratio of the percentage of minority-classified routes performing at or above the systemwide average to the percentage of nonminority-classified routes performing at or above the systemwide average,

0.95, is above the MBTA's disparate impact threshold of 0.80 and no disparate impact is found.

It is important to note that the vast majority of MBTA buses operate on roadways owned and operated by entities other than the MBTA (i.e. municipalities). Municipal traffic signals, pavement markings, and conditions dictate, to a large extent, bus on-time performance. The MBTA is working on strengthening partnerships with municipalities to improve bus service for all passengers, via improvements to municipal roadways and signals. As the MBTA does not govern the environment in which its buses operate, it is only through such partnerships that potential benefits can be realized.

Table 6-B15
Bus On-Time Performance - Weekday

Route Classification	Number of Routes		Percentage of Routes
	Number of Routes	Performing at or Above Systemwide Average	Performing at or Above Systemwide Average
Minority	95	32	33.7%
Nonminority	68	24	35.3%
Ratio of minority to nonminority			0.95
Disparate impact threshold			0.80
Result of disparate impact analysis			No Disparate Impact

Note: Data for weekdays from July 1, 2015, through June 30, 2016.

On Saturdays, the systemwide percentage of timepoints where buses were registered as on time was 70.5 percent. Table 6-B16 shows that 29 of the 76 bus routes (38.2 percent) that are classified minority performed at or above the systemwide average, and 18 of the 43 bus routes (41.9 percent) that are classified nonminority performed at or above the systemwide average. The ratio of the percentage of minority-classified routes performing at or above the systemwide average to the percentage of nonminority-classified routes performing at or above the systemwide average, 0.91, is above the MBTA's disparate impact threshold of 0.80 and no disparate impact is found.

Table 6-B16
Bus On-Time Performance - Saturday

Route Classification	Number of Routes		Percentage of Routes
	Number of Routes	Performing at or Above Systemwide Average	Performing at or Above Systemwide Average
Minority	76	29	38.2%
Nonminority	43	18	41.9%
Ratio of minority to nonminority			0.91
Disparate impact threshold			0.80
Result of disparate impact analysis			No Disparate Impact

Note: Data for Saturdays from July 1, 2015, through June 30, 2016.

On Sundays, the systemwide percentage of timepoints where buses were registered as on time was 71.3 percent. Table 6-B17 shows that 31 of the 65 bus routes (47.7 percent) that are classified minority performed at or above the systemwide average, and 13 of the 31 bus routes (41.9 percent) that are classified nonminority performed at or above the systemwide average. The ratio of the percentage of minority-classified routes performing at or above the systemwide average to the percentage of nonminority-classified routes performing at or above the systemwide average, 1.14, is above the MBTA's disparate impact threshold of 0.80 and no disparate impact is found.

Table 6-B17
Bus On-Time Performance - Sunday

Route Classification	Number of Routes		Percentage of Routes	
	Number of Routes	Number Performing at or Above Systemwide Average	Performing at or Above Systemwide Average	Performing at or Above Systemwide Average
Minority	65	31		47.7%
Nonminority	31	13		41.9%
Ratio of minority to nonminority				1.14
Disparate impact threshold				0.80
Result of disparate impact analysis			No Disparate Impact	

Note: Data for Sundays from July 1, 2015, through June 30, 2016.

Heavy and Light Rail

To assess heavy and light rail on-time performance between minority-classified lines and nonminority-classified lines, the MBTA compared the performance of each line to the overall performance of the system. On weekdays, the systemwide percentage of heavy and light rail passengers who waited the amount of time of the scheduled headway, or less, for a train to arrive was 87.5 percent. Table 6-B18 shows that three of the three heavy and light rail lines (100 percent) that are classified minority performed at or above the systemwide average, and two of the seven heavy and light rail lines (28.6 percent) that are classified nonminority performed at or above the systemwide average. The ratio of the percentage of minority-classified lines performing at or above the systemwide average to the percentage of nonminority-classified lines performing at or above the systemwide average, 3.50, is above the MBTA's disparate impact threshold of 0.80 and no disparate impact is found.

Table 6-B18
Heavy and Light Rail On-Time Performance - Weekday

Route Classification	Number of Lines		Percentage of Lines	
	Number of Lines	Performing at or Above Systemwide Average	Performing at or Above Systemwide Average	
Minority	3	3	100%	
Nonminority	7	2	28.6%	
Ratio of minority to nonminority			3.50	
Disparate impact threshold			0.80	
Result of disparate impact analysis			No Disparate Impact	

Note: Data for the Red, Orange, and Blue Lines are for weekdays from July 1, 2015, through June 30, 2016. Data for the Green Line are for weekdays from March 1, 2016 through June 30, 2016.

On Saturdays, the systemwide percentage of heavy and light rail passengers who waited the amount of time of the scheduled headway, or less, for a train to arrive was 86.3 percent. Table 6-B19 shows that three of the three heavy and light rail lines (100 percent) that are classified minority performed at or above the systemwide average, and two of the seven heavy and light rail lines (28.6 percent) that are classified nonminority performed at or above the systemwide average. The ratio of the percentage of minority-classified lines performing at or above the systemwide average to the percentage of nonminority-classified lines performing at or above the systemwide average, 3.50, is above the MBTA's disparate impact threshold of 0.80 and no disparate impact is found.

Table 6-B19
Heavy and Light Rail On-Time Performance - Saturday

Route Classification	Number of Lines		Percentage of Lines	
	Number of Lines	Performing at or Above Systemwide Average	Performing at or Above Systemwide Average	
Minority	3	3	100%	
Nonminority	7	2	28.6%	
Ratio of minority to nonminority			3.50	
Disparate impact threshold			0.80	
Result of disparate impact analysis			No Disparate Impact	

Note: Data for the Red, Orange, and Blue Lines are for Saturdays from July 1, 2015, through June 30, 2016. Data for the Green Line are for Saturdays from March 1, 2016 through June 30, 2016.

On Sundays, the systemwide percentage of heavy and light rail passengers who waited the amount of time of the scheduled headway, or less, for a train to arrive was 86.3 percent. Table 6-B20 shows that three of the three heavy and light rail lines (100 percent) that are classified minority performed at or above the systemwide average, and two of the seven heavy and light rail lines (28.6 percent) that are classified nonminority performed at or above the systemwide average. The ratio of the percentage of minority-classified lines performing at or above the systemwide average to the percentage of nonminority-classified lines

performing at or above the systemwide average, 3.50, is above the MBTA's disparate impact threshold of 0.80 and no disparate impact is found.

Table 6-B20
Heavy and Light Rail On-Time Performance - Sunday

Route Classification	Number of Lines		Percentage of Lines
	Number of Lines	Performing at or Above Systemwide Average	
Minority	3	3	100%
Nonminority	7	2	28.6%
Ratio of minority to nonminority			3.50
Disparate impact threshold			0.80
Result of disparate impact analysis			No Disparate Impact

Note: Data for the Red, Orange, and Blue Lines are for Sundays from July 1, 2015, through June 30, 2016. Data for the Green Line are for Sundays from March 1, 2016 through June 30, 2016.

This iteration of the heavy and light rail on-time performance analysis did not include the Mattapan Line (a minority-classified line). Mattapan Line timepoint adherence data was not available for this analysis because vehicle tracking hardware and software was installed after the time of this reporting period. Future analysis will include the on-time performance of the Mattapan Line.

Commuter Rail

To assess commuter rail on-time performance between minority-classified lines and nonminority-classified lines, the MBTA compared the performance of each line to the overall performance of the system. On weekdays, the systemwide percentage of commuter rail trains that arrived at their destination terminal no later than five minutes after the time published in the schedule was 90.1 percent. Table 6-B21 shows that the single commuter rail line that is classified minority performed at or above the systemwide average, and eight of the 11 commuter rail lines (72.7 percent) that are classified nonminority performed at or above the systemwide average. The ratio of the percentage of minority-classified lines performing at or above the systemwide average to the percentage of nonminority-classified lines performing at or above the systemwide average, 1.38, is above the MBTA's disparate impact threshold of 0.80 and no disparate impact is found.

Table 6-B21
Commuter Rail On-Time Performance - Weekday

Line Classification	Number of Lines	Number of Lines Performing at or Above Systemwide Average	Percentage of Lines Performing at or Above Systemwide Average
Minority	1	1	100%
Nonminority	11	8	72.7%
Ratio of minority to nonminority			1.38
Disparate impact threshold			0.80
Result of disparate impact analysis			No Disparate Impact

Note: Data for weekdays from July 1, 2015, through June 30, 2016.

On Saturdays, the systemwide percentage of commuter rail trains that arrived at their destination terminal no later than five minutes after the time published in the schedule was 90.2 percent. Table 6-B22 shows that the single commuter rail line that is classified minority performed at or above the systemwide average, and six of the 11 commuter rail lines (54.5 percent) that are classified nonminority performed at or above the systemwide average. The ratio of the percentage of minority-classified lines performing at or above the systemwide average to the percentage of nonminority-classified lines performing at or above the systemwide average, 1.83, is above the MBTA's disparate impact threshold of 0.80 and no disparate impact is found.

Table 6-B22
Commuter Rail On-Time Performance - Saturday

Line Classification	Number of Lines	Number of Lines Performing at or Above Systemwide Average	Percentage of Lines Performing at or Above Systemwide Average
Minority	1	1	100%
Nonminority	11	6	54.5%
Ratio of minority to nonminority			1.83
Disparate impact threshold			0.80
Result of disparate impact analysis			No Disparate Impact

Note: Data for Saturdays from July 1, 2015, through June 30, 2016.

On Sundays, the systemwide percentage of commuter rail trains that arrived at their destination terminal no later than five minutes after the time published in the schedule was 91.2 percent. Table 6-B23 shows that the single commuter rail line that is classified minority performed at or above the systemwide average, and eight of the 11 commuter rail lines (72.7 percent) that are classified nonminority performed at or above the systemwide average. The ratio of the percentage of minority-classified lines performing at or above the systemwide average to the percentage of nonminority-classified lines performing at or above the systemwide average, 1.38, is above the MBTA's disparate impact threshold of 0.80 and no disparate impact is found.

Table 6-B23
Commuter Rail On-Time Performance - Sunday

Line Classification	Number of Lines		Percentage of Lines	
	Number of Lines	Performing at or Above Systemwide Average	Performing at or Above Systemwide Average	
Minority	1	1	100%	
Nonminority	11	8	72.7%	
Ratio of minority to nonminority			1.38	
Disparate impact threshold			0.80	
Result of disparate impact analysis			No Disparate Impact	

Note: Data for Sundays from July 1, 2015, through June 30, 2016.

Service Availability (FTA C 4702.1B, IV-4.a.(4))

To monitor its base level of transit coverage, the MBTA measures the percentage of the population that lives no more than 0.5 miles from a bus stop, rapid transit station, commuter rail station, or boat dock in the municipalities of the MBTA's core service area, excluding municipalities that are members of another regional transit authority.

Table 6-B24 shows that on weekdays 94.4 percent of the minority population has access to transit while 77.6 percent of the nonminority population has access to transit, as defined by the MBTA's base level of transit coverage standard. The ratio of the percentage of the minority population with access to transit to the percentage of the nonminority population with access to transit, 1.22, is above the MBTA's disparate impact threshold of 0.80 and no disparate impact is found.

Table 6-B24
Service Availability - Weekday

Population	Total Population	Population with	Percentage of Population
		Access to MBTA Transit	with Access to MBTA Transit
Minority	471,945	445,439	94.4%
Nonminority	716,022	555,831	77.6%
Ratio of minority to nonminority			1.22
Disparate impact threshold			0.80
Result of disparate impact analysis			No Disparate Impact

Note: For the MBTA's weekday transit schedule from March 19, 2016, through June 24, 2016.

Table 6-B25 shows that on Saturdays 93.6 percent of the minority population has access to transit while 75.2 percent of the nonminority population has access to transit, as defined by the MBTA's base level of transit coverage standard. The ratio of the percentage of the minority population with access to transit to the percentage of the nonminority population with access to transit, 1.25, is above the MBTA's disparate impact threshold of 0.80 and no disparate impact is found.

Table 6-B25
Service Availability - Saturday

Population	Total Population	Population with Access to MBTA Transit	Percentage of Population with Access to MBTA Transit
Minority	471,945	441,965	93.6%
Nonminority	716,022	538,248	75.2%
Ratio of minority to nonminority			1.25
Disparate impact threshold			0.80
Result of disparate impact analysis			No Disparate Impact

Note: For the MBTA's Saturday transit schedule from March 19, 2016, through June 24, 2016.

Table 6-B26 shows that on Sundays 92.5 percent of the minority population has access to transit while 71.5 percent of the nonminority population has access to transit, as defined by the MBTA's base level of transit coverage standard. The ratio of the percentage of the minority population with access to transit to the percentage of the nonminority population with access to transit, 1.29, is above the MBTA's disparate impact threshold of 0.80 and no disparate impact is found.

Table 6-B26
Service Availability - Sunday

Population	Total Population	Population with Access to MBTA Transit	Percentage of Population with Access to MBTA Transit
Minority	471,945	436,551	92.5%
Nonminority	716,022	511,949	71.5%
Ratio of minority to nonminority			1.29
Disparate impact threshold			0.80
Result of disparate impact analysis			No Disparate Impact

Note: For the MBTA's Sunday transit schedule from March 19, 2016, through June 24, 2016.

Span of Service

Bus

To assess bus span-of-service adherence between minority-classified routes and nonminority-classified routes the MBTA compared the percentage of minority and nonminority-classified routes that adhered to the MBTA's bus span-of-service standard. Table 6-B27 shows that on weekdays 74 of the 93 bus routes (79.6 percent) that are classified minority met the standard and 52 of the 67 bus routes (77.6 percent) that are classified nonminority met the standard. The ratio of the percentage of minority-classified routes meeting the standard to the percentage of nonminority-classified routes meeting the standard, 1.03, is above the MBTA's disparate impact threshold of 0.80 and no disparate impact is found.

Table 6-B27
Bus Span of Service - Weekday

Route Classification	Number of Routes	Number of Routes Meeting the Standard	Percentage of Routes Meeting the Standard
Minority	93	74	79.6%
Nonminority	67	52	77.6%
Ratio of minority to nonminority			1.03
Disparate impact threshold			0.80
Result of disparate impact analysis			No Disparate Impact

Note: For the MBTA's weekday transit schedule from March 19, 2016, through June 24, 2016.

Table 6-B28 shows that on Saturdays 58 of the 77 bus routes (75.3 percent) that are classified minority met the standard and 34 of the 42 bus routes (81.0 percent) that are classified nonminority met the standard. The ratio of the percentage of minority-classified routes meeting the standard to the percentage of nonminority-classified routes meeting the standard, 0.93, is above the MBTA's disparate impact threshold of 0.80 and no disparate impact is found.

Table 6-B28
Bus Span of Service - Saturday

Route Classification	Number of Routes	Number of Routes Meeting the Standard	Percentage of Routes Meeting the Standard
Minority	77	58	75.3%
Nonminority	42	34	81.0%
Ratio of minority to nonminority			0.93
Disparate impact threshold			0.80
Result of disparate impact analysis			No Disparate Impact

Note: For the MBTA's Saturday transit schedule from March 19, 2016, through June 24, 2016.

Table 6-B29 shows that on Sundays 52 of the 63 bus routes (82.5 percent) that are classified minority met the standard and 27 of the 31 bus routes (87.1 percent) that are classified nonminority met the standard. The ratio of the percentage of minority-classified routes meeting the standard to the percentage of nonminority-classified routes meeting the standard, 0.95, is above the MBTA's disparate impact threshold of 0.80 and no disparate impact is found.

Table 6-B29
Bus Span of Service - Sunday

Route Classification	Number of Routes	Number of Routes Meeting the Standard	Percentage of Routes Meeting the Standard
Minority	63	52	82.5%
Nonminority	31	27	87.1%
Ratio of minority to nonminority			0.95
Disparate impact threshold			0.80
Result of disparate impact analysis			No Disparate Impact

Note: For the MBTA's Sunday transit schedule from March 19, 2016, through June 24, 2016.

Heavy and Light Rail

To assess heavy and light rail span-of-service adherence between minority-classified lines and nonminority-classified lines the MBTA compared the percentage of minority and nonminority-classified lines that adhered to the MBTA's heavy and light rail span-of-service standard. Table 6-B30 shows that on weekdays four of the four heavy and light rail lines (100 percent) that are classified minority met the standard, and seven of the seven heavy and light rail lines (100 percent) that are classified nonminority met the standard. The ratio of the percentage of minority-classified lines meeting the standard to the percentage of nonminority-classified lines meeting the standard, 1.00, is above the MBTA's disparate impact threshold of 0.80 and no disparate impact is found.

Table 6-B30
Heavy and Light Rail Span of Service - Weekday

Line Classification	Number of Lines	Number of Lines Meeting the Standard	Percentage of Lines Meeting the Standard
Minority	4	4	100%
Nonminority	7	7	100%
Ratio of minority to nonminority			1.00
Disparate impact threshold			0.80
Result of disparate impact analysis			No Disparate Impact

Note: For the MBTA's weekday transit schedule from March 19, 2016, through June 24, 2016.

Table 6-B31 shows that on Saturdays four of the four heavy and light rail lines (100 percent) that are classified minority met the standard, and seven of the seven heavy and light rail lines (100 percent) that are classified nonminority met the standard. The ratio of the percentage of minority-classified lines meeting the standard to the percentage of nonminority-classified lines meeting the standard, 1.00, is above the MBTA's disparate impact threshold of 0.80 and no disparate impact is found.

Table 6-B31
Heavy and Light Rail Span of Service - Saturday

Line Classification	Number of Lines	Number of Lines Meeting the Standard	Percentage of Lines Meeting the Standard
Minority	4	4	100%
Nonminority	7	7	100%
Ratio of minority to nonminority			1.00
Disparate impact threshold			0.80
Result of disparate impact analysis			No Disparate Impact

Note: For the MBTA's Saturday transit schedule from March 19, 2016, through June 24, 2016.

Table 6-B32 shows that on Sundays four of the four heavy and light rail lines (100 percent) that are classified minority met the standard, and seven of the seven heavy and light rail lines (100 percent) that are classified nonminority met the standard. The ratio of the percentage of minority-classified lines meeting the

standard to the percentage of nonminority-classified lines meeting the standard, 1.00, is above the MBTA's disparate impact threshold of 0.80 and no disparate impact is found.

Table 6-B32
Heavy and Light Rail Span of Service - Sunday

Line Classification	Number of Lines	Number of Lines Meeting the Standard	Percentage of Lines Meeting the Standard
Minority	4	4	100%
Nonminority	7	7	100%
Ratio of minority to nonminority			1.00
Disparate impact threshold			0.80
Result of disparate impact analysis			No Disparate Impact

Note: For the MBTA's Sunday transit schedule from March 19, 2016, through June 24, 2016.

Commuter Rail

To assess commuter rail span-of-service adherence between minority-classified lines and nonminority-classified lines the MBTA compared the percentage of minority and nonminority-classified lines that adhered to the MBTA's commuter rail span-of-service standard. Table 6-B33 shows that on weekdays the single commuter rail line that is classified minority met the standard, and 11 of the 11 commuter rail lines (100 percent) that are classified nonminority met the standard. The ratio of the percentage of minority-classified lines meeting the standard to the percentage of nonminority-classified lines meeting the standard, 1.00, is above the MBTA's disparate impact threshold of 0.80 and no disparate impact is found.

Table 6-B33
Commuter Rail Span of Service - Weekday

Line Classification	Number of Lines	Number of Lines Meeting the Standard	Percentage of Lines Meeting the Standard
Minority	1	1	100%
Nonminority	11	11	100%
Ratio of minority to nonminority			1.00
Disparate impact threshold			0.80
Result of disparate impact analysis			No Disparate Impact

Note: For the MBTA's weekday transit schedule from March 19, 2016, through June 24, 2016.

Table 6-B34 shows that on Saturdays the single commuter rail line that is classified minority met the standard, and six of the 11 commuter rail lines (54.5 percent) that are classified nonminority met the standard. The ratio of the percentage of minority-classified lines meeting the standard to the percentage of nonminority-classified lines meeting the standard, 1.83, is above the MBTA's disparate impact threshold of 0.80 and no disparate impact is found.

Table 6-B34
Commuter Rail Span of Service - Saturday

Line Classification	Number of Lines	Number of Lines Meeting the Standard	Percentage of Lines Meeting the Standard
Minority	1	1	100%
Nonminority	11	6	54.5%
Ratio of minority to nonminority			1.83
Disparate impact threshold			0.80
Result of disparate impact analysis			No Disparate Impact

Note: For the MBTA's Saturday transit schedule from March 19, 2016, through June 24, 2016.

Platform Accessibility

Gated Rapid Transit Stations

The MBTA measures the amount of time that platforms are accessible for all gated heavy rail, light rail, and Silver Line Waterfront stations. Assessing only stations that have platforms accessible by elevators, the systemwide percentage of platform hours that were accessible was 99.5 percent. Table 6-B35 shows that 14 of the 22 stations (63.6 percent) that are classified minority performed at or above the systemwide average, and 23 of the 33 stations (69.7 percent) that are classified nonminority performed at or above the systemwide average. The ratio of the percentage of minority-classified stations performing at or above the systemwide average to the percentage of nonminority-classified stations performing at or above the systemwide average, 0.91, is above the MBTA's disparate impact threshold of 0.80 and no disparate impact is found.

Table 6-B35
Platform Accessibility - Gated Rapid Transit Stations with Elevators

Station Classification	Number of Stations	Number of Stations Performing at or Above Systemwide Average	Percentage of Stations Performing at or Above Systemwide Average
Minority	22	14	63.6%
Nonminority	33	23	69.7%
Ratio of minority to nonminority			0.91
Disparate impact threshold			0.80
Result of disparate impact analysis			No Disparate Impact

Note: Data from April 1, 2015, through March 31, 2016.

Including stations that do not have elevators along with those that do—and which therefore have platforms that are either accessible at all times or never accessible—the systemwide percentage of platform hours that were accessible was 92.3 percent. Table 6-B36 shows that 22 of the 22 stations (100 percent) that are classified minority performed at or above the systemwide average, and 35 of the 40 stations (87.5 percent) that are classified nonminority performed at or above the systemwide average. The ratio of the percentage of minority-

classified stations performing at or above the systemwide average to the percentage of nonminority-classified stations performing at or above the systemwide average, 1.14, is above the MBTA's disparate impact threshold of 0.80 and no disparate impact is found.

Table 6-B36
Platform Accessibility - Gated Rapid Transit Stations,
Including those without Elevators

Station Classification	Number of Stations	Number of Stations Performing at or Above Systemwide Average	Percentage of Stations Performing at or Above Systemwide Average
Minority	22	22	100%
Nonminority	40	35	87.5%
Ratio of minority to nonminority			1.14
Disparate impact threshold			0.80
Result of disparate impact analysis			No Disparate Impact

Note: Data from April 1, 2015, through March 31, 2016.

Commuter Rail Stations

Because most MBTA commuter rail stations are located at surface level and very few have elevators, the MBTA compares platform accessibility between minority and nonminority commuter rail stations by comparing the percentage of minority stations that are built to be accessible to the percentage of nonminority stations that are built to be accessible. Table 6-B37 shows that seven of the eight commuter rail stations (87.5 percent) that are classified minority are built to be accessible, and 95 of the 127 commuter rail stations (74.8 percent) that are classified nonminority are built to be accessible. The ratio of the percentage of minority-classified stations built to be accessible to the percentage of nonminority-classified stations built to be accessible, 1.17, is above the MBTA's disparate impact threshold of 0.80 and no disparate impact is found.

Table 6-B37
Platform Accessibility – Commuter Rail Stations

Station Classification	Number of Stations	Number of Stations Built to be Accessible	Percentage of Stations Built to be Accessible
Minority	8	7	87.5%
Nonminority	127	95	74.8%
Ratio of minority to nonminority			1.17
Disparate impact threshold			0.80
Result of disparate impact analysis			No Disparate Impact

Note: Commuter rail station accessibility as of August 2017.

Vehicle Accessibility

Bus

Because all MBTA buses are fully accessible, there is no need to evaluate bus accessibility, and therefore there is no standard for this measure in the MBTA's Service Delivery Policy. As part of operator inspections each day, ramps are cycled on each bus to ensure they are functional before leaving the garage.

Heavy and Light Rail

A comparison of vehicle accessibility between minority and nonminority-classified heavy and light rail lines is not applicable. 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. The Mattapan Line operates as a short, stand-alone, light-rail extension of the Red Line's Ashmont Branch, and also operates with a dedicated fleet. While the Green Line is an extensive light rail system with four surface branches and a central subway portion, each of them is classified as nonminority. Therefore, there are no comparisons to be made between minority and nonminority-classified lines for vehicle accessibility.

Commuter Rail

At this time, the MBTA lacks the data to assess full commuter rail vehicle accessibility (as measured by the percentage of stops where the accessible bathroom-equipped coaches, on trains with bathrooms, line up at an accessible boarding location at each station). The MBTA is currently working to develop tools to accurately collect this data and will have the means to conduct an analysis during the next reporting period.

Service Operated

Bus

To assess the amount of scheduled bus service operated between minority-classified routes and nonminority-classified routes, the MBTA compared the performance of each route to the overall performance of the system. On weekdays, the systemwide percentage of scheduled bus service operated was 98.4 percent. Table 6-B38 shows that 79 of the 94 bus routes (84.0 percent) that are classified minority performed at or above the systemwide average, and 56 of the 67 bus routes (83.6 percent) that are classified nonminority performed at or above the systemwide average. The ratio of the percentage of minority-classified routes performing at or above the systemwide average to the percentage of nonminority-classified routes performing at or above the systemwide average, 1.01, is above the MBTA's disparate impact threshold of 0.80 and no disparate impact is found.

Table 6-B38
Bus Service Operated - Weekday

Route Classification	Number of Routes		Percentage of Routes	
	Number of Routes	Performing at or Above Systemwide Average	Performing at or Above Systemwide Average	
Minority	94	79	84.0%	
Nonminority	67	56	83.6%	
Ratio of minority to nonminority				1.01
Disparate impact threshold				0.80
Result of disparate impact analysis				No Disparate Impact

Note: Data for weekdays from July 1, 2015, through June 30, 2016.

On Saturdays, the systemwide percentage of scheduled bus service operated was 98.6 percent. Table 6-B39 shows that 60 of the 75 bus routes (80.0 percent) that are classified minority performed at or above the systemwide average, and 38 of the 43 bus routes (88.4 percent) that are classified nonminority performed at or above the systemwide average. The ratio of the percentage of minority-classified routes performing at or above the systemwide average to the percentage of nonminority-classified routes performing at or above the systemwide average, 0.91, is above the MBTA's disparate impact threshold of 0.80 and no disparate impact is found.

Table 6-B39
Bus Service Operated - Saturday

Route Classification	Number of Routes		Percentage of Routes	
	Number of Routes	Performing at or Above Systemwide Average	Performing at or Above Systemwide Average	
Minority	75	60	80.0%	
Nonminority	43	38	88.4%	
Ratio of minority to nonminority				0.91
Disparate impact threshold				0.80
Result of disparate impact analysis				No Disparate Impact

Note: Data for Saturdays from July 1, 2015, through June 30, 2016.

On Sundays, the systemwide percentage of scheduled bus service operated was 99.0 percent. Table 6-B40 shows that 53 of the 64 bus routes (82.8 percent) that are classified minority performed at or above the systemwide average, and 28 of the 31 bus routes (90.3 percent) that are classified nonminority performed at or above the systemwide average. The ratio of the percentage of minority-classified routes performing at or above the systemwide average to the percentage of nonminority-classified routes performing at or above the systemwide average, 0.92, is above the MBTA's disparate impact threshold of 0.80 and no disparate impact is found.

Table 6-B40
Bus Service Operated - Sunday

Route Classification	Number of Routes		Percentage of Routes	
	Number of Routes	Performing at or Above Systemwide Average	Performing at or Above Systemwide Average	
Minority	64	53	82.8%	
Nonminority	31	28	90.3%	
Ratio of minority to nonminority			0.92	
Disparate impact threshold			0.80	
Result of disparate impact analysis			No Disparate Impact	

Note: Data for Sundays from July 1, 2015, through June 30, 2016.

Heavy and Light Rail

To assess the amount of scheduled heavy rail and light rail service operated between minority-classified lines and nonminority-classified lines, the MBTA compared the performance of each line to the overall performance of the system. The MBTA conducted this assessment using a one-month sample of data from September 2016. For the month of data assessed, the systemwide percentage of scheduled heavy rail and light rail service operated was 98.9 percent. Table 6-B41 shows that two of the three heavy rail and light rail lines (66.7 percent) that are classified minority performed at or above the systemwide average, and one of the six heavy rail and light rail lines (16.7 percent) that are classified nonminority performed at or above the systemwide average. The ratio of the percentage of minority-classified heavy rail and light rail lines performing at or above the systemwide average to the percentage of nonminority-classified heavy rail and light rail lines performing at or above the systemwide average, 4.00, is above the MBTA's disparate impact threshold of 0.80 and no disparate impact is found.

Table 6-B41
Heavy Rail and Light Rail Service Operated

Line Classification	Number of Lines		Percentage of Lines	
	Number of Lines	Performing at or Above Systemwide Average	Performing at or Above Systemwide Average	
Minority	3	2	66.7%	
Nonminority	6	1	16.7%	
Ratio of minority to nonminority			4.00	
Disparate impact threshold			0.80	
Result of disparate impact analysis			No Disparate Impact	

Note: Data for the Red, Orange, and Blue lines are from September 2015. Data for the Green Line are from September 2016.

Commuter Rail

To assess the amount of scheduled commuter rail service operated between minority-classified lines and nonminority-classified lines, the MBTA compared the performance of each line to the overall performance of the system using state

fiscal year (SFY) 2016 data. On weekdays, the systemwide percentage of scheduled commuter rail trains that were operated was 99.8 percent. Table 6-B42 shows that the single commuter rail line that is classified minority did not perform at or above the systemwide average, and eight of the 11 commuter rail lines (72.7 percent) that are classified nonminority performed at or above the systemwide average. The ratio of the percentage of minority-classified lines performing at or above the systemwide average to the percentage of nonminority-classified lines performing at or above the systemwide average, 0.00, falls below the MBTA's disparate impact threshold of 0.80 and a potential disparate impact is found.

**Table 6-B42
Commuter Rail Service Operated - Weekday**

Route Classification	Number of Lines	Number of Lines Performing at or Above Systemwide Average	Percentage of Lines Performing at or Above Systemwide Average
Minority	1	0	0.00%
Nonminority	11	8	72.7%
Ratio of minority to nonminority			0.00
Disparate impact threshold			0.80
Result of disparate impact analysis			Potential Disparate Impact

Note: Data for weekdays from July 1, 2015, through June 30, 2016.

On Saturdays, the systemwide percentage of scheduled commuter rail trains that were operated was 99.9 percent. Table 6-B43 shows that the single commuter rail line that is classified minority did not perform at or above the systemwide average, and eight of the 11 commuter rail lines (72.7 percent) that are classified nonminority performed at or above the systemwide average. The ratio of the percentage of minority-classified lines performing at or above the systemwide average to the percentage of nonminority-classified lines performing at or above the systemwide average, 0.00, falls below the MBTA's disparate impact threshold of 0.80 and a potential disparate impact is found.

**Table 6-B43
Commuter Rail Service Operated - Saturday**

Route Classification	Number of Lines	Number of Lines Performing at or Above Systemwide Average	Percentage of Lines Performing at or Above Systemwide Average
Minority	1	0	0.00%
Nonminority	11	8	72.7%
Ratio of minority to nonminority			0.00
Disparate impact threshold			0.80
Result of disparate impact analysis			Potential Disparate Impact

Note: Data for Saturdays from July 1, 2015, through June 30, 2016.

On Sundays, the systemwide percentage of scheduled commuter rail trains that were operated was 99.6 percent. Table 6-B44 shows that the single commuter rail line that is classified minority did not perform at or above the systemwide average, and seven of the 10 commuter rail lines (70.0 percent) that are classified nonminority performed at or above the systemwide average. The ratio of the percentage of minority-classified lines performing at or above the systemwide average to the percentage of nonminority-classified lines performing at or above the systemwide average, 0.00, falls below the MBTA's disparate impact threshold of 0.80 and a potential disparate impact is found.

Table 6-B44
Commuter Rail Service Operated - Sunday

Route Classification	Number of Lines	Number of Lines Performing at or Above Systemwide Average	Percentage of Lines Performing at or Above Systemwide Average
Minority	1	0	0.00%
Nonminority	10	7	70.0%
Ratio of minority to nonminority			0.00
Disparate impact threshold			0.80
Result of disparate impact analysis			Potential Disparate Impact

Note: Data for Sundays from July 1, 2015, through June 30, 2016.

After identifying this set of potential disparate impacts that resulted from a disproportionate number of trains being cancelled in October 2016 on the MBTA's minority-classified line, the MBTA worked with Keolis to institute a new protocol for advance-notice train cancellations; decisions regarding cancellations will be reviewed by the General Manager or his senior designee to ensure the prevention of any undue burden or impact to riders on any individual line. The revised decision-making protocol takes into account a variety of operational factors coupled with line demographic classifications and recent cancellation history. An assessment of dropped trips from November 2016 through June 2017 shows that the percentage of scheduled service runs on the MBTA's minority-classified line is now well above the systemwide average for all time periods.

SERVICE MONITORING RESULTS FOR SYSTEMWIDE SERVICE POLICIES (FTA C 4702.1B, IV-3.a.(2).(c))

The following compares how minority and nonminority services for each mode adhere to the MBTA's systemwide service policies. An assessment of commuter boat services is not provided because all MBTA commuter boat services are classified as nonminority.

Distribution of Transit Amenities (FTA C 4702.1B, IV-4.b.(1))

It is important to note that the equity assessments of the distribution of transit amenities and conditions are based on one-time visual observations for purposes of service monitoring only, and should not be considered engineering-based assessments or evaluations of structural conditions, as would be determined by a professional engineer. The assessments in this review are subjective and based solely on the observations of trained CTPS field staff. In the advent of MBTA establishing online tools and maintenance accountability initiatives, the MBTA's Engineering and Maintenance Department will coordinate this assessment process with CTPS and the MBTA's Office of Disability and Civil Rights for future studies.

Furthermore, the MBTA notes that the assessment of any condition or amenity is based on a single observation and is not indicative of any persistent situation, but serves to provide a minority versus non-minority comparator that is considered in the aggregate to determine the possibility of a disparity with regard to cleanliness, condition, and/or distribution of amenities. Nor does the observation consider the era of station or amenity construction relative to today. The MBTA has made innovations in its oversight of station and lobby conditions and confirms cleanliness by performing assessments of dirt, grime, graffiti, and other measurable deficiencies. MBTA inspections have resulted in a consistent cleanliness standard, however depending on the time of day when CTPS staff may have inspected the cleanliness of the station, there may have been localized discrepancies. Reports on the condition of structural elements are based on subjective observations only; the reports do not reflect evaluations to an engineering or regulatory standard, nor are they intended to indicate safety problems or hazardous conditions.

The MBTA's Engineering and Maintenance Department will review all reported deficient conditions and evaluate the reported deficiencies. As necessary, the department will prepare the scopes of work to address the deficiencies either through maintenance or capital investment.

Bus Shelter and Bench Placement

It is important to note that although the MBTA provides service to bus stops in municipalities, in the majority of cases, bus shelters, benches, and other amenities in the dropoff/pickup location are owned and maintained by the municipalities. The MBTA strives to work with municipalities and property owners to place benches where practical and where such placement meets requirements for other applicable policies and codes such as ADA clearance, pedestrian flow,

and fire codes. The safety of MBTA customers and the public is the MBTA's primary concern.

Shelter Placement

Under the MBTA's Bus Stop Design Guidelines¹, any bus stop that has more than 70 average daily boardings is eligible for the consideration of a shelter, and stops that have fewer than 25 average daily boardings are not eligible for a shelter, pending further review of site conditions. Although this policy is typically applied only to the 15 MBTA Key Bus Routes, the MBTA used this policy to assess the placement of all shelters in minority areas as compared to the placement of shelters in nonminority areas. The MBTA conducted two analyses based on the two thresholds that are provided in the policy. It is important to note that in the majority of cases, the MBTA does not own the sidewalks where shelters, benches, or other amenities could be placed. Instead, these properties are usually owned by municipalities. The MBTA strives to work with property owners to site shelters, benches, and other amenities where practical, and where such placement meets requirements for other applicable policies and codes such as ADA clearance, pedestrian flow, and fire codes.

The first analysis compared the percentage of minority-classified bus stops with more than 70 average daily boardings that have shelters to the percentage of nonminority-classified bus stops with more than 70 average daily boardings that have shelters. Table 6-B45 shows that 319 of the 691 bus stops (46.2 percent) that have more than 70 average daily boardings and are classified minority had shelters, and 108 of the 298 bus stops (36.2 percent) that have more than 70 average daily boardings and are classified nonminority had shelters. The ratio of the percentage of minority bus stops with more than 70 average daily boardings that have a shelter to the percentage of nonminority bus stops with more than 70 average daily boardings that have a shelter, 1.27, is above the MBTA's disparate impact threshold of 0.80 and no disparate impact is found.

¹ Given fiscal and right-of-way constraints, the MBTA is not able to provide bus shelters at most of its 8,100 stops. To fairly distribute shelters systemwide, the MBTA Shelter Policy provides guidance for the placement of bus shelters and establishes a procedure for evaluating shelter requests. This policy in no way establishes a requirement for placement, since all placements will be dependent on available resources.

Table 6-B45**Shelter Placement – Bus Stops with more than 70 Average Daily Boardings**

Stop Classification	Number of Stops	Number of Stops with Shelters	Percentage of Stops with Shelters
Minority	691	319	46.2%
Nonminority	298	108	36.2%
Ratio of minority to nonminority			1.27
Disparate impact threshold			0.80
Result of disparate impact analysis			No Disparate Impact

Note: Bus stop shelter locations as of August 2017.

The second analysis compared the percentage of minority-classified bus stops with more than 25 average daily boardings that have shelters to the percentage of nonminority-classified bus stops with more than 25 average daily boardings that have shelters. Table 6-B46 shows that 419 of the 1,329 bus stops (31.5 percent) that have more than 25 average daily boardings and are classified minority had shelters, and 168 of the 695 bus stops (24.2 percent) that have more than 25 average daily boardings and are classified nonminority had shelters. The ratio of the percentage of minority-classified bus stops with more than 25 average daily boardings that have a shelter to the percentage of nonminority-classified bus stops with more than 25 average daily boardings that have a shelter, 1.30, is above the MBTA's disparate impact threshold of 0.80 and no disparate impact is found.

Table 6-B46**Shelter Placement – Bus Stops with more than 25 Average Daily Boardings**

Stop Classification	Number of Stops	Number of Stops with Shelters	Percentage of Stops with Shelters
Minority	1,329	419	31.5%
Nonminority	695	168	24.2%
Ratio of minority to nonminority			1.30
Disparate impact threshold			0.80
Result of disparate impact analysis			No Disparate Impact

Note: Bus stop shelter locations as of August 2017.

Bench Placement

Under the MBTA's Bus Stop Design Guidelines, any bus stop that has more than 50 average daily boardings and does not have a shelter is eligible for consideration for a bench, pending further review of site conditions. Although this policy is typically applied only to the 15 MBTA Key Bus Routes, the MBTA used this policy to assess the placement of all benches in minority areas compared to nonminority areas. The MBTA conducted two analyses, one for stops with more than 50 average daily boardings and no shelter, and one for all bus stops with no shelter. It is important to note that in the majority of cases, the MBTA does not own the sidewalks where shelters, benches or other amenities could be placed. Instead, these properties are usually owned by municipalities, whose permission

is required for any such placement. The MBTA strives to work with property owners to place benches where practical, and where such placement meets requirements for other applicable policies and codes such as ADA clearance, pedestrian flow, and fire codes.

The first analysis compared the percentage of minority-classified bus stops without a shelter and more than 50 average daily boardings that have benches to the percentage of nonminority-classified bus stops without a shelter and more than 50 average daily boardings that have benches. Table 6-B47 shows that 140 of the 518 bus stops (27.0 percent) without a shelter and more than 50 average daily boardings that are classified minority had benches, and 91 of the 284 bus stops (32.0 percent) without a shelter and more than 50 average daily boardings that are classified nonminority had benches. The ratio of the percentage of minority-classified bus stops without a shelter and more than 50 average daily boardings that have a bench to the percentage of nonminority-classified bus stops without a shelter and more than 50 average daily boardings that have a bench, 0.84, is above the MBTA's disparate impact threshold of 0.80 and no disparate impact is found.

Table 6-B47
Bench Placement – Bus Stops without a Shelter
and more than 50 Average Daily Boardings

Stop Classification	Number of Stops	Number of Stops with Benches	Percentage of Stops with Benches
Minority	518	140	27.0%
Nonminority	284	91	32.0%
Ratio of minority to nonminority			0.84
Disparate impact threshold			0.80
Result of disparate impact analysis			No Disparate Impact

Note: Bus stop bench locations as of May 2017.

The second analysis compared the percentage of all minority-classified bus stops without a shelter that have benches to the percentage of all nonminority-classified bus stops without a shelter that have benches. Table 6-B48 shows that 220 of the 2,809 bus stops (7.8 percent) without a shelter that are classified minority had benches, and 243 of the 4,242 bus stops (5.7 percent) without a shelter that are classified nonminority had benches. The ratio of the percentage of minority-classified bus stops without a shelter that have a bench to the percentage of nonminority-classified bus stops without a shelter that have a bench, 1.37, is above the MBTA's disparate impact threshold of 0.80 and no disparate impact is found.

Table 6-B48
Bench Placement – All Bus Stops without a Shelter

Stop Classification	Number of Stops	Number of Stops with Benches	Percentage of Stops with Benches
Minority	2,809	220	7.8%
Nonminority	4,242	243	5.7%
Ratio of minority to nonminority			1.37
Disparate impact threshold			0.80
Result of disparate impact analysis			No Disparate Impact

Note: Bus stop bench locations as of May 2017.

Bus Shelter Amenities

As stated in the MBTA's Bus Stop Design Guidelines, seating for at least three people shall be located within a bus shelter. To monitor the presence of seating fixtures in bus shelters, the MBTA relies on CTPS to assess every bus shelter in the system. CTPS field staff visited each bus shelter from July 2017 through August 2017 and recorded the presence of seating fixtures. Table 6-B49 shows that 437 of the 467 bus stops (93.6 percent) with a shelter that are classified minority had seating fixtures, and 218 of the 238 bus stops (91.6 percent) with a shelter that are classified nonminority had seating fixtures. The ratio of the percentage of minority-classified bus stops with a shelter that have seating fixtures to the percentage of nonminority-classified bus stops with a shelter that have seating fixtures, 1.02, is above the MBTA's disparate impact threshold of 0.80 and no disparate impact is found.

Table 6-B49
Seating Fixtures at Bus Stops

Stop Classification	Number of Stops with Shelters	Number of Stops with Shelters Equipped with Seating Fixtures	Percentage of Stops with Shelters Equipped with Seating Fixtures
Minority	467	437	93.6%
Nonminority	238	218	91.6%
Ratio of minority to nonminority			1.02
Disparate impact threshold			0.80
Result of disparate impact analysis			No Disparate Impact

Note: Each bus shelter was inspected once between July 10, 2017, and August 15, 2017. All amenity assessments were performed by visual inspection by several experienced CTPS field staff who received training on the criteria used in these assessments.

Bus Shelter Conditions

To monitor the conditions of bus shelters, the MBTA relies on CTPS field staff to perform observations. CTPS field staff visited each bus stop in the system from July 2017 through August 2017 and recorded the structural condition of the

shelter, the presence of vandalism, and degree of cleanliness. Table 6-B50 shows that the ratios of the percentage of minority-classified bus shelters to the percentage of nonminority-classified bus shelters with acceptable conditions of each component are all above the MBTA's disparate impact threshold of 0.80 and no disparate impacts are found.

Table 6-B50
Bus Shelter Conditions

Stop Classification	Percentage with Structure Visually Acceptable	Percentage with Vandalism Acceptable	Percentage with Cleanliness Acceptable
Minority	77.1%	89.5%	79.9%
Nonminority	82.4%	93.7%	87.4%
Ratio of minority to nonminority	0.94	0.96	0.91
Disparate impact threshold	0.80	0.80	0.80
Result of disparate impact analysis	NDI	NDI	NDI

NDI = No disparate impact.

Note: Each bus shelter was inspected once between July 10, 2017, and August 15, 2017. All condition assessments were performed by visual inspection by several experienced CTPS field staff who received training on the criteria used in these assessments.

Subway Rapid Transit Station Amenities

To monitor the distribution of subway rapid transit station amenities, the MBTA relies on CTPS to record the presence of each amenity. CTPS field staff visited each subway rapid transit station from February 2016 through March 2016 and recorded the presence of each amenity. Observations at the stations were recorded separately for three areas of each station, the exterior lobby (as applicable), the interior lobby, and the platform. The results are presented below, for each station area.

Subway Rapid Transit Lobby Amenities

In subway rapid transit lobbies, the MBTA monitors the presence of trash receptacles, recycling receptacles, seating fixtures, and up-to-date system maps. Table 6-B51 shows that the ratios of the percentage of minority-classified subway rapid transit lobbies to the percentage of nonminority-classified subway rapid transit lobbies with each amenity are all above the MBTA's disparate impact threshold of 0.80 and no disparate impacts are found.

Table 6-B51
Subway Rapid Transit Lobby Amenities

Station Classification	Percentage with Trash Receptacles	Percentage with Recycling Receptacles	Percentage with Seating Fixtures	Percentage with System Map
Minority	77.3%	59.1%	54.5%	86.4%
Nonminority	77.5%	45.0%	25.0%	97.5%
Ratio of minority to nonminority	1.00	1.31	2.18	0.89
Disparate impact threshold	0.80	0.80	0.80	0.80
Result of disparate impact analysis	NDI	NDI	NDI	NDI

NDI = No disparate impact.

Note: Each subway rapid transit station was inspected once between February 23, 2016, and March 21, 2016. All amenity assessments were performed by visual inspection by several experienced CTPS field staff who received training on the criteria used in these assessments.

Subway Rapid Transit Platform Amenities

On subway rapid transit platforms, the MBTA monitors the presence of trash receptacles, recycling receptacles, seating fixtures, and up-to-date system maps and line maps. Table 6-B52 shows that the ratios of the percentage of minority-classified subway rapid transit platforms to the percentage of nonminority-classified subway rapid transit platforms with each amenity are all above the MBTA's disparate impact threshold of 0.80 and no disparate impacts are found.

Table 6-B52
Subway Rapid Transit Platform Amenities

Station Classification	Percentage with Trash Receptacles	Percentage with Recycling Receptacles	Percentage with Seating Fixtures	Percentage with System Map	Percentage with Line Map
Minority	100%	91.3%	100%	95.7%	95.7%
Nonminority	92.5%	80.0%	97.5%	92.5%	87.5%
Ratio of minority to nonminority	1.08	1.14	1.03	1.03	1.09
Disparate impact threshold	0.80	0.80	0.80	0.80	0.80
Result of disparate impact analysis	NDI	NDI	NDI	NDI	NDI

NDI = No disparate impact.

Note: Each subway rapid transit station was inspected once between February 23, 2016, and March 21, 2016. All amenity assessments were performed by visual inspection by several experienced CTPS field staff who received training on the criteria used in these assessments.

Subway Rapid Transit Station Conditions

To monitor the conditions of subway rapid transit stations, the MBTA relies on CTPS field staff to perform observations. CTPS field staff visited each subway rapid transit station from February 2016 through March 2016 and recorded the condition of each item described in Table 6-B53.

Table 6-B53
Components of Subway Rapid Transit Station Condition Monitoring

Component	Areas Monitored	Subcomponent
Condition of structure	Exterior	Walls
	Lobby	Windows
	Platform	Doors
		Roof
Condition of floor surface	Lobby	State of repair
	Platform	Evenness
		Water present
Stairwell	Lobby	Surface condition
	Platform	Handrail condition
		Visibility
Vandalism	Exterior	Graffiti/stickers
	Lobby	Vandalism
	Platform	
Cleanliness	Exterior	Litter
	Lobby	Odor
	Platform	Trash cans emptied
Station name signage	Exterior	Present
	Platform	Visible
		Condition
Station way-finding signage	Lobby	Present
	Platform	Visible
		Condition
Lighting	Lobby	Lightbulbs: present/ functioning
	Platform	Visibility
Tactile strips	Platform	Present
		Condition

Subway Rapid Transit Exterior Station Conditions

For the exterior of subway rapid transit stations, the MBTA monitors the condition of the structure, station name signage, vandalism, and cleanliness. Table 6-B54 shows that the ratios of the percentage of minority-classified subway rapid stations to the percentage of nonminority-classified subway rapid stations with acceptable exterior structure, station name signage, and vandalism conditions are above the MBTA's disparate impact threshold of 0.80 and no disparate impacts are found for these items.

However, the ratio of the percentage of minority-classified subway rapid stations to the percentage of nonminority-classified subway rapid stations with acceptable cleanliness conditions is below the MBTA's disparate impact threshold of 0.80 and a potential disparate impact is found for this item.

In September 2016, after CTPS inspected the cleanliness of subway rapid transit stations, the MBTA entered into a new performance-based janitorial contract. Under the contract, frontline staff is trained in accordance with the Station and Bus Stop Inspection Training Manual and actively monitor station cleanliness by

conducting daily inspections on a rotating basis and reporting cleanliness performance with the use of a mobile web application. Frontline staff can also communicate in real time with the MBTA Maintenance Control Center and cleaning contractors to report incidents and deficiencies.

The real-time contract-monitoring process ensures that vendors regularly meet cleanliness standards and demonstrates the MBTA's commitment to greater accountability and responsiveness concerning the cleanliness and conditions of its stations. The MBTA will utilize the real-time inspection information to ensure that cleaning services are being conducted in an equitable manner.

Table 6-B54
Subway Rapid Transit Exterior Station Conditions

Station Classification	Percentage with Structure Visually Acceptable	Percentage with Station Name Signage Visually Acceptable	Percentage with Vandalism Acceptable	Percentage with Cleanliness Acceptable
Minority	77.3%	95.5%	100%	31.8%
Nonminority	72.5%	90.0%	100%	62.5%
Ratio of minority to nonminority	1.07	1.06	1.00	0.51
Disparate impact threshold	0.80	0.80	0.80	0.80
Result of disparate impact analysis	NDI	NDI	NDI	PDI

NDI = No disparate impact. PDI = Potential disparate impact.

Note: Each subway rapid transit station was inspected once between February 23, 2016, and March 21, 2016. All condition assessments were performed by visual inspection by several experienced CTPS field staff who received training on the criteria used in these assessments.

Subway Rapid Transit Lobby Conditions

For subway rapid transit lobbies, the MBTA monitors the condition of the structure, floor surface, stairwell, lighting, wayfinding signage, vandalism, and cleanliness. Table 6-B55 shows that the ratios of the percentage of minority-classified subway rapid stations to the percentage of nonminority-classified subway rapid stations with acceptable lobby structure, floor surface, lighting, wayfinding signage, and vandalism conditions are above the MBTA's disparate impact threshold of 0.80 and no disparate impacts are found for these items.

However, the ratios of the percentage of minority-classified subway rapid stations to the percentage of nonminority-classified subway rapid stations with acceptable lobby stairwell and cleanliness conditions are below the MBTA's disparate impact threshold of 0.80 and potential disparate impacts are found for these items.

As stated previously, the MBTA is utilizing its real-time inspection mobile tool to ensure that cleaning services are being conducted in an equitable manner. The

MBTA's Engineering and Maintenance Department will review all reported deficient conditions, and evaluate the reported deficiency and the scope of work to be prioritized for maintenance or programmed for capital investment.

Table 6-B55
Subway Rapid Transit Lobby Conditions

Station Classification	Percentage with Structure Visually Acceptable	Percentage with Floor Surface Visually Acceptable	Percentage with Stairwell Visually Acceptable	Percentage with Lighting Visually Acceptable	Percentage with Wayfinding Signage Visually Acceptable	Percentage with Vandalism Acceptable	Percentage with Cleanliness Acceptable
Minority	86.4%	68.2%	36.4%	81.8%	100%	100%	27.3%
Nonminority	70.0%	67.5%	50.0%	82.5%	100%	97.5%	65.0%
Ratio of minority to nonminority	1.23	1.01	0.73	0.99	1.00	1.03	0.42
Disparate impact threshold	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Result of disparate impact analysis	NDI	NDI	PDI	NDI	NDI	NDI	PDI

NDI = No disparate impact. PDI = Potential disparate impact.

Note: Each subway rapid transit station was inspected once between February 23, 2016, and March 21, 2016. All condition assessments were performed by visual inspection by several experienced CTPS field staff who received training on the criteria used in these assessments.

Subway Rapid Transit Platform Conditions

For subway rapid transit platforms, the MBTA monitors the condition of the structure, platform surface, tactile strips, stairwell, lighting, station name signage, wayfinding signage, vandalism, and cleanliness, as compared to the built condition. Table 6-B56 shows that the ratios of the percentage of minority-classified subway rapid stations to the percentage of nonminority-classified subway rapid stations with acceptable platform structure, tactile strips, lighting, station name signage, wayfinding signage, and vandalism conditions are above the MBTA's disparate impact threshold of 0.80 and no disparate impacts are found for these items.

However, the ratios of the percentage of minority-classified subway rapid stations to the percentage of nonminority-classified subway rapid stations with acceptable platform surface, stairwell and cleanliness conditions are below the MBTA's disparate impact threshold of 0.80 and potential disparate impacts are found for these items.

The MBTA's Engineering and Maintenance Department will review all reported deficient conditions and evaluate the deficiencies. As necessary, the department

will prepare the scopes of work to address the deficiencies either through maintenance or capital investment.

Table 6-B56
Subway Rapid Transit Platform Conditions

Station Classification	Percent tage with Structu re Visuall y Accept able	Percent tage with Platform Surfac e Visuall y Accept able	Percent tage with Tactile Strips Visuall y Accept able	Percent tage with Stairwe ll Visuall y Accept able	Percent tage with Lightin g Visuall y Accept able	Percent tage with Station Name Visuall Signag e Accept able	Percent tage with Wayfin ding Signag e Visuall y Accept able	Percent tage with Vandalis m Accept able	Percent tage with Cleanli ness Accept able
	52.2%	43.5%	78.3%	26.1%	65.2%	100%	95.7%	100%	21.7%
Minority	52.2%	43.5%	78.3%	26.1%	65.2%	100%	95.7%	100%	21.7%
Nonminority	50.0%	55.0%	90.0%	57.5%	77.5%	97.5%	100%	100%	57.5%
Ratio of minority to nonminority	1.04	0.79	0.87	0.45	0.84	1.03	0.96	1.00	0.38
Disparate impact threshold	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Result of disparate impact analysis	NDI	PDI	NDI	PDI	NDI	NDI	NDI	NDI	PDI

NDI = No disparate impact. PDI = Potential disparate impact.

Note: Each subway rapid transit station was inspected once between February 23, 2016, and March 21, 2016. All condition assessments were performed by visual inspection by several experienced CTPS field staff who received training on the criteria used in these assessments.

Surface Rapid Transit Station Amenities

To monitor the distribution of surface rapid transit station amenities, the MBTA relies on CTPS to record the presence of each amenity. CTPS field staff visited each surface rapid transit station from February 2016 through June 2016 and recorded the presence of each amenity.

For surface rapid transit stations, the MBTA monitors the presence of trash receptacles, recycling receptacles, seating fixtures, and up-to-date system maps and line maps. Table 6-B57 shows that the ratios of the percentage of minority-classified surface rapid transit stations to the percentage of nonminority-classified surface rapid transit stations with seating fixtures and up-to-date system maps and line maps are all above the MBTA's disparate impact threshold of 0.80 and no disparate impacts are found for these items.

However, the ratios of the percentage of minority-classified surface rapid transit stations to the percentage of nonminority-classified surface rapid transit stations with trash receptacles and recycling receptacles are below the MBTA's disparate

impact threshold of 0.80 and potential disparate impacts are found for these items.

The MBTA's Engineering and Maintenance Department will review and evaluate the reported distribution of trash and recycling receptacles. As necessary, the department will prepare the scopes of work to address the deficiencies either through maintenance or capital investment.

Table 6-B57
Surface Rapid Transit Station Amenities

Station Classification	Percentage with Trash Receptacles	Percentage with Recycling Receptacles	Percentage with Seating Fixtures	Percentage with System Map	Percentage with Line Map
Minority	47.6%	19.0%	66.7%	61.9%	57.1%
Nonminority	73.5%	26.5%	73.5%	44.9%	24.5%
Ratio of minority to nonminority	0.65	0.72	0.91	1.38	2.33
Disparate impact threshold	0.80	0.80	0.80	0.80	0.80
Result of disparate impact analysis	PDI	PDI	NDI	NDI	NDI

NDI = No disparate impact. PDI = Potential disparate impact.

Note: Each surface rapid transit station was inspected once between February 25, 2016, and June 18, 2016. All amenity assessments were performed by visual inspection by several experienced CTPS field staff who received training on the criteria used in these assessments.

Surface Rapid Transit Station Conditions

To monitor the conditions of surface rapid transit stations the MBTA relies on CTPS field staff to perform observations. CTPS field staff visited each surface rapid transit station from February 2016 through June 2016 and recorded the condition of each item described in Table 6-B58.

Table 6-B58**Components of Surface Rapid Transit Station Condition Monitoring**

Component	Area Monitored	Subcomponent
Condition of walkway to stop	Pedestrian access area	Condition Evenness Visibility
Pedestrian control	Pedestrian access area	Crosswalk Condition
Condition of structure	Shelter	Walls Windows Roof Present
Vandalism	Shelter	Graffiti/Stickers Vandalism
Cleanliness	Shelter	Litter Odor Trash cans emptied
Condition of platform surface	Platform	Condition Evenness
Station name signage	Platform	Present Visibility Condition
Tactile strips (surface rapid transit only)	Platform	Present Condition

Surface Rapid Transit Shelter Conditions

For surface rapid transit shelters, the MBTA monitors the condition of the structure, vandalism, and cleanliness. Table 6-B59 shows that the ratios of the percentage of minority-classified surface rapid stations to the percentage of nonminority-classified surface rapid stations with acceptable conditions of each shelter component are all above the MBTA's disparate impact threshold of 0.80 and no disparate impacts are found.

It is also important to note the many different types of rapid transit surface stops within the MBTA system. Some stops serve lines on dedicated rights of way, while others are located on municipal streets with minimal clearance for trains, passengers, and amenities. The MBTA strives to maintain a consistent level of amenities throughout its system while also keeping consistent with other applicable policies and codes such as ADA-clearance levels, fire code clearance levels, and other applicable municipal ordinances. The safety of our passengers and the general public is the MBTA's primary concern.

Table 6-B59
Surface Rapid Transit Shelter Conditions

Station Classification	Percentage with Structure Visually Acceptable	Percentage with Vandalism Acceptable	Percentage with Cleanliness Acceptable
Minority	100%	85.7%	95.2%
Nonminority	97.6%	97.6%	73.2%
Ratio of minority to nonminority	1.03	0.88	1.30
Disparate impact threshold	0.80	0.80	0.80
Result of disparate impact analysis	NDI	NDI	NDI

NDI = No disparate impact.

Note: Each surface rapid transit station was inspected once between February 25, 2016, and June 18, 2016. All condition assessments were performed by visual inspection by several trained experienced CTPS field staff who received training on the criteria used in these assessments.

Surface Rapid Transit Platform Conditions

For surface rapid transit platforms, the MBTA monitors the condition of the walkway, pedestrian control, platform surface, station name signage, and tactile strips. Table 6-B60 shows that the ratios of the percentage of minority-classified surface rapid stations to the percentage of nonminority-classified surface rapid stations with acceptable conditions of each platform component are all above the MBTA's disparate impact threshold of 0.80 and no disparate impacts are found.

It is important to note that cross walks of a public roadway are the responsibility of the roadway owner, typically the local municipality, or in some instances the Commonwealth of Massachusetts. While informative, the evaluation of municipal crosswalks and sidewalks is not an amenity for which the MBTA is responsible to maintain.

Table 6-B60
Surface Rapid Transit Platform Conditions

Station Classification	Percentage with Walkway Visually Acceptable	Percentage with Pedestrian Control Visually Acceptable	Percentage with Platform Surface Visually Acceptable	Percentage with Station Name Signage Visually Acceptable	Percentage with Tactile Strips Visually Acceptable
Minority	85.7%	85.7%	76.2%	85.7%	75.0%
Nonminority	61.2%	75.5%	63.3%	46.9%	42.9%
Ratio of minority to nonminority	1.40	1.14	1.20	1.83	1.75
Disparate impact threshold	0.80	0.80	0.80	0.80	0.80
Result of disparate impact analysis	NDI	NDI	NDI	NDI	NDI

NDI = No disparate impact.

Note: Each surface rapid transit station was inspected once between February 25, 2016, and June 18, 2016. All condition assessments were performed by visual inspection by several experienced CTPS field staff who received training on the criteria used in these assessments.

Commuter Rail Station Amenities

To monitor the distribution of commuter rail station amenities, the MBTA relies on CTPS to record the presence of each amenity. CTPS field staff visited each commuter rail station from February 2016 through March 2016 and recorded the presence of each amenity.

For commuter rail stations, the MBTA monitors the presence of trash receptacles, seating fixtures, and up-to-date system maps, line schedules, and Title VI notices. Table 6-B61 shows that the ratios of the percentage of minority-classified commuter rail stations to the percentage of nonminority-classified commuter rail stations with each amenity are all above the MBTA's disparate impact threshold of 0.80 and no disparate impacts are found.

Table 6-B61
Commuter Rail Station Amenities

Station Classification	Percentage with Trash Receptacles	Percentage with Seating Fixtures	Percentage with System Map	Percentage with Line Schedule	Percentage with Title VI Notice
Minority	100%	100%	87.5%	100%	100%
Nonminority	96.8%	97.6%	78.6%	90.5%	89.7%
Ratio of minority to nonminority	1.03	1.02	1.11	1.11	1.12
Disparate impact threshold	0.80	0.80	0.80	0.80	0.80
Result of disparate impact analysis	NDI	NDI	NDI	NDI	NDI

NDI = No disparate impact.

Note: Each commuter rail station was inspected once between February 11, 2016, and March 5, 2016. All amenity assessments were performed by visual inspection by several experienced CTPS field staff who received training on the criteria used in these assessments.

Commuter Rail Station Conditions

To monitor the conditions of commuter rail stations the MBTA relies on CTPS field staff to perform observations. CTPS field staff visited each commuter rail station from February 2016 through March 2016 and recorded the condition of each item described in Table 6-B62.

Table 6-B62
Components of Commuter Rail Station Condition Monitoring

Component	Area Monitored	Subcomponent
Condition of structure	Shelter	Walls Roof Windows Doors
Vandalism	Shelter Platform	Graffiti/Stickers Vandalism
Cleanliness	Shelter Platform	Litter Odor Trash cans emptied
Station name signage	Shelter Platform	Visibility Present Condition
Condition of floor surface	Platform	State of repair Evenness Water present
Stairwell	Platform	Surface condition Handrail condition Visibility
Station wayfinding signage	Platform	Visibility Present Condition
Tactile Strips	Platform	Presence Condition

Commuter Rail Shelter Conditions

For commuter rail shelters, the MBTA monitors the condition of the structure, station name signage, vandalism, and cleanliness. Table 6-B63 shows that the ratios of the percentage of minority-classified commuter rail stations to the percentage of nonminority-classified commuter rail stations with acceptable conditions of each shelter component are all above the MBTA's disparate impact threshold of 0.80 and no disparate impacts are found.

**Table 6-B63
Commuter Rail Shelter Conditions**

Station Classification	Percentage with Structure Visually Acceptable	Percentage with Station Name Signage Visually Acceptable	Percentage with Vandalism Acceptable	Percentage with Cleanliness Acceptable
Minority	87.5%	100%	87.5%	87.5%
Nonminority	89.7%	91.3%	93.7%	87.3%
Ratio of minority to nonminority	0.98	1.10	0.93	1.00
Disparate impact threshold	0.80	0.80	0.80	0.80
Result of disparate impact analysis	NDI	NDI	NDI	NDI

NDI = No disparate impact.

Note: Each commuter rail station was inspected once between February 11, 2016, and March 5, 2016. All condition assessments were performed by visual inspection by several experienced CTPS field staff who received training on the criteria used in these assessments.

Commuter Rail Platform Conditions

For commuter rail stations, the MBTA monitors the condition of the platform surface, tactile strips, stairwell, station name signage, wayfinding signage, vandalism, and cleanliness. Table 6-B64 shows that the ratios of the percentage of minority-classified commuter rail stations to the percentage of nonminority-classified commuter rail stations with acceptable platform surface, tactile strips, stairwell, station name signage, wayfinding signage, and vandalism conditions are above the MBTA's disparate impact threshold of 0.80 and no disparate impacts are found for these items.

However, the ratio of the percentage of minority-classified commuter rail stations to the percentage of nonminority-classified commuter rail stations with acceptable platform cleanliness conditions is below the MBTA's disparate impact threshold of 0.80 and potential disparate impact is found for this item.

The MBTA continues to work closely with Keolis on implementing its Title VI plan, including concerns related to station cleanliness. Currently, the three minority-classified stations that did not pass CTPS's cleanliness inspection (Four Corners/Geneva Avenue, Talbot Avenue, and Uphams Corner) are already cleaned more frequently than other stations in that region of the commuter rail network. The MBTA and Keolis are working together to determine if adjustments to the cleaning schedule should be made.

**Table 6-B64
Commuter Rail Platform Conditions**

Station Classification	Percentage with Platform Surface Visually Acceptable	Percentage with Tactile Strips Visually Acceptable	Percentage with Stairwell Visually Acceptable	Percentage with Station Name Signage Visually Acceptable	Percentage with Wayfinding Signage Visually Acceptable	Percentage with Vandalism Acceptable	Percentage with Cleanliness Acceptable
Minority	100%	87.5%	75.0%	87.5%	87.5%	87.5%	62.5%
Nonminority	38.9%	45.2%	87.3%	88.1%	78.6%	87.3%	81.0%
Ratio of minority to nonminority	2.57	1.93	0.86	0.99	1.11	1.00	0.77
Disparate impact threshold	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Result of disparate impact analysis	NDI	NDI	NDI	NDI	NDI	NDI	PDI

NDI = No disparate impact.

Note: Each commuter rail station was inspected once between February 11, 2016, and March 5, 2016. All condition assessments were performed by visual inspection by several experienced CTPS field staff, who received training on the criteria used in these assessments.

Automated Fare Collection

Faregates

To assess faregate operability between minority-classified stations and nonminority-classified stations, the MBTA compared faregate performance at each station to the overall performance of the system. The systemwide percentage of time that faregates were operable was 99.2 percent. Table 6-B65 shows that 20 of the 23 stations (87.0 percent) that are classified minority performed at or above the systemwide average, and 26 of the 40 stations (65.0 percent) that are classified nonminority performed at or above the systemwide average. The ratio of the percentage of minority stations at or above the systemwide average to the percentage of nonminority stations performing at or above the systemwide average, 1.34, is above the MBTA's disparate impact threshold of 0.80 and no disparate impact is found.

**Table 6-B65
Faregate Operability**

Station Classification	Number of Stations	Number of Stations Performing at or Above Systemwide Average	Percentage of Stations Performing at or Above Systemwide Average
Minority	23	20	87.0%
Nonminority	40	26	65.0%
Ratio of minority to nonminority			1.34
Disparate impact threshold			0.80
Result of disparate impact analysis			No Disparate Impact

Note: Data from March 2, 2017, through August 21, 2016.

Fare Vending Machines

To assess fare vending machine operability between minority-classified stations and nonminority-classified stations, the MBTA conducted two analyses.

The first analysis assessed the opportunity for customers to purchase fare media with cash at stations equipped with full-service fare vending machines that accept cash. This analysis was conducted by comparing the percentage of time customers could purchase fare media with cash at each station equipped with full-service fare vending machines to the systemwide average amount of time customers could purchase fare media with cash at any station equipped with full-service fare vending machines that accept cash, which was 99.92 percent of the time. Table 6-B66 shows that 21 of the 25 stations (84.0 percent) that are classified minority performed at or above the systemwide average, and 35 of the 51 stations (68.6 percent) that are classified nonminority performed at or above the systemwide average. The ratio of the percentage of minority stations at or above the systemwide average to the percentage of nonminority stations performing at or above the systemwide average, 1.22, is above the MBTA's disparate impact threshold of 0.80 and no disparate impact is found.

Table 6-B66
Availability of Full-Service Fare Vending Machines

Station Classification	Number of Stations	Number of Stations Performing at or Above Systemwide Average	Percentage of Stations Performing at or Above Systemwide Average
Minority	25	21	84.0%
Nonminority	51	35	68.6%
Ratio of minority to nonminority			1.22
Disparate impact threshold			0.80
Result of disparate impact analysis			No Disparate Impact

Note: Data from March 2, 2017, through August 21, 2016.

The second analysis assessed the opportunity for customers to purchase fare media with cash or credit at stations equipped with full-service and/or cashless fare vending machines. This analysis was conducted by comparing the percentage of time customers could purchase fare media using cash or credit at stations equipped with full-service and/or cashless fare vending machines to the systemwide average amount of time customers could purchase fare media using cash or credit at any station equipped with full-service and/or cashless fare vending machines, which was 99.99 percent of the time. Table 6-B67 shows that 23 of the 25 stations (92.0 percent) that are classified minority performed at or above the systemwide average, and 38 of the 51 stations (74.5 percent) that are classified nonminority performed at or above the systemwide average. The ratio of the percentage of minority stations at or above the systemwide average to the

percentage of nonminority stations performing at or above the systemwide average, 1.23, is above the MBTA's disparate impact threshold of 0.80 and no disparate impact is found.

Table 6-B67
Availability of Full-Service and/or Cashless Fare Vending Machines

Station Classification	Number of Stations	Number of Stations of Performing at or Above Systemwide Average	Percentage of Stations Performing at or Above Systemwide Average
Minority	25	23	92.0%
Nonminority	51	38	74.5%
Ratio of minority to nonminority			1.23
Disparate impact threshold			0.80
Result of disparate impact analysis			No Disparate Impact

Note: Data from March 2, 2017, through August 21, 2016.

CharlieCard Retail Sales Terminals

Retail sales terminals are found at a variety of locations ranging from supermarkets and convenience stores to banks and check-cashing agencies. To assess the placement of retail sales terminals in minority areas compared to nonminority areas, the MBTA calculated the demographic make-up within one-quarter mile of each retail sales terminal using 2010 US Census data. Table 6-B68 shows that 9.0 percent of the total minority population in the MBTA's service area has access to a retail sales terminal within one-quarter mile of their home location, while 3.6 percent of the total nonminority population in the MBTA's service area has access to a retail sales terminal within one-quarter mile of their home location. The ratio of the percentage of the minority population with access to retail sales terminals to the percentage of the nonminority population with access to retail sales terminals, 2.49, is above the MBTA's disparate impact threshold of 0.80 and no disparate impact is found.

Table 6-B68
Populations Served by CharlieCard Retail Sales Terminals

Population	Total Population in MBTA Service Area	Population within One-Quarter Mile of an RST	Percentage of Population within One-Quarter Mile of an RST
Minority	1,266,019	113,388	9.0%
Nonminority	3,567,587	128,282	3.6%
Ratio of minority to nonminority			2.49
Disparate impact threshold			0.80
Result of disparate impact analysis			No Disparate Impact

Note: Locations as of May 16, 2016.
RST = Retail sales terminal.

Provision of Information

Neighborhood Maps and Bus Transfer Maps in Subway Rapid Transit Stations

Through the Neighborhood Map Program, maps that show bus connections are provided at underground rapid transit stations with bus service. Neighborhood maps are also generally installed at all new or renovated underground stations, regardless of the availability of a bus connection.

Table 6-B69 shows that 15 of the 23 subway rapid transit stations (65.2 percent) that are classified minority had neighborhood maps, and 21 of the 37 subway rapid transit stations (56.8 percent) that are classified nonminority had neighborhood maps. The ratio of the percentage of minority subway rapid transit stations with neighborhood maps to the percentage of nonminority subway rapid transit stations with neighborhood maps, 1.15, is above the MBTA's disparate impact threshold of 0.80 and no disparate impact is found.

Table 6-B69
Neighborhood Maps at Subway Rapid Transit Stations

Station Classification	Number of Stations	Number of Stations with Neighborhood Map	Percentage of Stations with Neighborhood Map
Minority	23	15	65.2%
Nonminority	37	21	56.8%
Ratio of minority to nonminority			1.15
Disparate impact threshold			0.80
Result of disparate impact analysis			No Disparate Impact

Note: Each subway rapid transit station was inspected once between February 23, 2016, and March 21, 2016.

Table 6-B70 shows that 18 of the 19 subway rapid transit stations with bus connections (94.7 percent) that are classified minority had bus transfer maps, and 26 of the 31 subway rapid transit stations with bus connections (83.9 percent) that are classified nonminority had bus connection maps. The ratio of the percentage of minority subway rapid transit stations with bus connections that had neighborhood maps to the percentage of nonminority subway rapid transit stations with bus connections that had neighborhood maps, 1.13, is above the MBTA's disparate impact threshold of 0.80 and no disparate impact is found.

Table 6-B70
Bus Transfer Maps at Subway Rapid Transit Stations with Bus Connections

Station Classification	Number of Stations with Bus Transfer		Percentage of
	Number of Stations	Map	Stations with Bus Transfer Map
Minority	19	18	94.7%
Nonminority	31	26	83.9%
Ratio of minority to nonminority			1.13
Disparate impact threshold			0.80
Result of disparate impact analysis			No Disparate Impact

Note: Each subway rapid transit station was inspected once between February 23, 2016, and March 21, 2016.

Variable-Message Signs

All rapid transit stations on the Red Line, Blue Line, and Orange Line, and all commuter rail stations except for Mishawum, Silver Hill, and Hastings have variable-message signs that alert customers to the approach and arrival of trains. Since the last triennial submission in 2014, Assembly Square Station was opened and received new variable-message signs, and variable-message signs were reconfigured during renovations at Government Center Station and Orient Heights Station.

In winter 2015, the MBTA completed signal system upgrades in the Green Line central subway, which—combined with global positioning system (GPS) units on board all Type 8 trains—allowed for real-time tracking of all Green Line service (above and below ground) for the first time, available to all customers through third-party mobile device applications. In fall 2015, existing variable-message signs in Green Line central subway stations and above-ground stations on the D branch were reconfigured to display next-train information. Because of the lack of power and communication connections to above-ground stations on the B, C, and E branches of the Green Line, no variable-message signs can be installed to display next-train information at these stations in the near term.

As part of collecting station condition and amenity data from February 2016 through June 2016, CTPS field staff conducted a one-time inspection of the operability of variable-message signs at each subway rapid transit station, surface Green Line D branch station, and commuter rail station. Table 6-B71 shows that the ratios of the percentage of minority-classified subway rapid transit stations, surface Green Line D branch stations, and commuter rail stations with all variable-message signs operating to the percentage of nonminority-classified subway rapid transit stations, surface Green Line D branch stations, and commuter rail stations with all variable-message signs operating are all above the MBTA's disparate impact threshold of 0.80 and no disparate impacts are found.

Table 6-B71
Variable-Message Sign Operability

Station Classification	Percentage with VMS Operating – Subway Rapid Transit	Percentage with VMS Operating – Surface Green Line D Branch	Percentage with VMS Operating – Commuter Rail
Minority	100%	100%	100%
Nonminority	100%	92.3%	97.6%
Ratio of minority to nonminority	1.00	1.08	1.02
Disparate impact threshold	0.80	0.80	0.80
Result of disparate impact analysis	NDI	NDI	NDI

VMS = Variable-message sign. NDI = No disparate impact.

Note: Each subway rapid transit station, surface rapid transit station, and commuter rail station was inspected once between February 11, 2016, and June 18, 2016.

At the time of the last triennial submission, only Forest Hills Station had variable-message signs displaying bus arrival information. Since then, variable-message signs have been installed to display bus arrival information at Ashmont Station, Harvard Station, Maverick Station, Ruggles Station, and Sullivan Station. Bus arrival information was added to existing variable-message signs at Courthouse Station, Dudley Station, and World Trade Center Station. Variable-message signs are currently being installed at Central Station and Haymarket Station, which will display bus arrival information upon completion.

Table 6-B72 shows that five of the 19 subway rapid transit stations (26.3 percent) that are classified minority and have a bus connection had variable-message signs displaying bus arrival information, and three of the 31 subway rapid transit stations (9.7 percent) that are classified nonminority and have a bus connection had variable-message signs displaying bus arrival information. The ratio of the percentage of minority-classified subway rapid transit stations with a bus connection that have variable-message signs displaying bus arrival information to the percentage of nonminority-classified subway rapid transit stations with a bus connection that have variable-message signs displaying bus arrival information, 2.72, is above the MBTA's disparate impact threshold of 0.80 and no disparate impact is found.

Table 6-B72
Variable-Message Signs Displaying Bus Arrival Information at Subway
Rapid Transit Stations with a Bus Connection

Station Classification	Number of Stations	Number of Stations	Number of Stations
		with VMS Displaying Bus Arrival Information	with VMS Displaying Bus Arrival Information
Minority	19	5	26.3%
Nonminority	31	3	9.7%
Ratio of minority to nonminority			2.72
Disparate impact threshold			0.80
Result of disparate impact analysis			No Disparate Impact

VMS = Variable-message sign.

Note: Variable-message sign locations as of July 2017.

Escalator Operability

To assess escalator operability between minority-classified stations and nonminority-classified stations, the MBTA compared escalator performance at each station to the overall performance of the system. The systemwide percentage of time that escalators were operable was 99.5 percent. Table 6-B73 shows that 13 of the 20 stations (65.0 percent) that are classified minority performed at or above the systemwide average, and 18 of the 34 stations (52.9 percent) that are classified nonminority performed at or above the systemwide average. The ratio of the percentage of minority-classified stations at or above the systemwide average to the percentage of nonminority-classified stations performing at or above the systemwide average, 1.23, is above the MBTA's disparate impact threshold of 0.80 and no disparate impact is found.

Table 6-B73
Escalator Operability

Station Classification	Number of Stations	Number of Stations	Percentage of Stations
		of Performing at or Above Systemwide Average	Performing at or Above Systemwide Average
Minority	20	13	65.0%
Nonminority	34	18	52.9%
Ratio of minority to nonminority			1.23
Disparate impact threshold			0.80
Result of disparate impact analysis			No Disparate Impact

Note: Data from April 1, 2015, through March 31, 2016.

Vehicle Assignment (FTA C 4702.1B, IV-4.b.(2))

Bus Vehicle Age and Air Conditioning Operability

As outlined in the MBTA's FY2010- FY2020 Bus Fleet Management Plan, the MBTA is committed to maintaining a fleet with an average age of 7.5 years or less. To assess bus vehicle age between minority-classified routes and

nonminority-classified routes, the MBTA compared the percentage of minority routes that had an average bus age of less than 7.5 years to the percentage of nonminority routes that had an average bus age of less than 7.5 years. Table 6-B74 shows that 22 of the 94 bus routes (23.4 percent) that are classified minority had an average bus age of less than 7.5 years, and six of the 67 bus routes (9.0 percent) that are classified nonminority had an average bus age of less than 7.5 years. The ratio of the percentage of minority-classified bus routes that had an average bus age of less than 7.5 years to the percentage of nonminority-classified bus routes that had an average bus age of less than 7.5 years, 2.61, is above the MBTA's disparate impact threshold of 0.80 and no disparate impact is found.

**Table 6-B74
Bus Vehicle Age**

Route Classification	Number of Routes	Number of Routes with Average Bus Age Less than 7.5 Years	Percentage of Routes with Average Bus Age Less than 7.5 Years
Minority	94	22	23.4%
Nonminority	67	6	9.0%
Ratio of minority to nonminority			2.61
Disparate impact threshold			0.80
Result of disparate impact analysis			No Disparate Impact

Note: Vehicle assignments on September 8, 2015

To assess bus air conditioning operability between minority-classified routes and nonminority-classified routes the MBTA compared air conditioning performance on each route to the overall performance of the system. The systemwide percentage of trips that operated with functioning air conditioning was 97.0 percent. Table 6-B75 shows that 72 of the 94 bus routes (76.6 percent) that are classified minority performed at or above the systemwide average, and 45 of the 67 bus routes (67.2 percent) that are classified nonminority performed at or above the systemwide average. The ratio of the percentage of minority-classified bus routes at or above the systemwide average to the percentage of nonminority-classified bus routes performing at or above the systemwide average, 1.14, is above the MBTA's disparate impact threshold of 0.80 and no disparate impact is found.

Table 6-B75
Bus Air Conditioning Operability

Route Classification	Number of Routes		Percentage of Routes
	Number of Routes	Performing at or Above Systemwide Average	Performing at or Above Systemwide Average
Minority	94	72	76.6%
Nonminority	67	45	67.2%
Ratio of minority to nonminority			1.14
Disparate impact threshold			0.80
Result of disparate impact analysis			No Disparate Impact

Note: Vehicle assignments on September 8, 2015

Heavy and Light Rail Vehicle Age

A comparison of vehicle age between minority and nonminority-classified heavy and light rail lines is not applicable. 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. The Mattapan Line operates as a short, stand-alone, light-rail extension of the Red Line's Ashmont Branch, and also operates with a dedicated fleet. While the Green Line is an extensive light rail system with four surface branches and a central subway portion, each of them are classified as nonminority. Therefore, there are no comparisons to be made for vehicle age between minority and nonminority-classified lines.

Commuter Rail Vehicle Age

To assess commuter rail vehicle age between minority-classified lines and nonminority-classified lines, the MBTA compared the average coach age of trains run on each line to the overall average coach age of trains run systemwide. The systemwide average age of commuter rail trains run was 22.9 years. Table 6-B76 shows that the single commuter rail line that is classified minority had an average coach age below the systemwide average, and four of the 11 commuter rail lines (36.4 percent) that are classified nonminority had an average coach age below the systemwide average. The ratio of the percentage of minority-classified lines that had an average coach age below the systemwide average to the percentage of nonminority-classified lines that had an average coach age below the systemwide average, 2.75, is above the MBTA's disparate impact threshold of 0.80 and no disparate impact is found.

**Table 6-B76
Commuter Rail Vehicle Age**

Line Classification	Number of Lines	Number of Lines with Average Coach Age Below the Systemwide Average	Percentage of Lines with Average Coach Age Below the Systemwide Average
Minority	1	1	100%
Nonminority	11	4	36.4%
Ratio of minority to nonminority			2.75
Disparate impact threshold			0.80
Result of disparate impact analysis			No Disparate Impact

Note: Vehicle assignments on September 8, 2015.

Appendix 7-A

MBTA Disparate Impact/Disproportionate Burden Policy

Disparate Impact/Disproportionate Burden Policy

This appendix discusses the federal requirements pertaining to major service changes and fare changes, details the MBTA's DI/DB Policy that addresses those requirements, and provides definitions of relevant terms.

Requirement

FTA's Title VI Circular 4702.1B, issued in October 2012, under the authority of Title VI of the Civil Rights Act of 1964 (Title VI), directs transit providers to study proposed major service changes and all fare changes for possible disparities in impacts on minority and low-income riders and communities.

This requirement is part of the MBTA's Title VI assurance that no person shall, on the basis of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination under any program or activity receiving federal financial assistance.¹

The requirement to analyze service and fare changes at the MBTA applies to proposed changes to the MBTA's fixed-route modes; these analyses are not required for demand-response modes, including paratransit.

Purpose

The MBTA's DI/DB Policy satisfies FTA's requirement under Title VI Circular 4702.1B, Chapter IV, Section 7, to evaluate, prior to implementation, all service changes that exceed the MBTA's major service change threshold and all fare changes to determine whether those changes may have a discriminatory impact based on the finding of an adverse effect linked to race, color, or national origin, and/or a disproportionate burden based on the finding of an adverse effect linked to low-income status. All FTA requirements for conducting equity analyses are addressed within the MBTA's DI/DB Policy, including the requirement to define what constitutes a *major service change*, *adverse effect*, *disparate impact*, and *disproportionate burden*.

As a result of the unique nature of service and fare changes, the FTA recognizes that the scope of population and ridership data used to conduct each analysis often varies. For this reason, the MBTA exercises the discretion, as needed, to consult with FTA representatives for technical assistance. By consulting with

¹ 42 USC § 2000d et seq., and the Civil Rights Restoration Act of 1987 (P.L. 100.259)

FTA, in combination with public input and review by the MBTA board, the MBTA ensures its analyses will ultimately lead to equitable decision-making.

Service Equity Analysis

Major Service Change Policy

Per FTA's Title VI Circular 4702.1B, the MBTA is required to evaluate the impacts on minority and/or low-income populations of proposed major service changes to the MBTA's fixed-route services. Whether a proposed service change will be considered "major" depends on whether the proposal meets one or both of the following conditions:

- **Major service change at the modal level:** A change in revenue vehicle hours (RVH) per week of at least 10 percent by mode
- **Major service change at the route level:** For all routes, a change in route length of at least 25 percent or 3 miles; or, for routes with at least 80 RVH per week, a change in RVH per week of at least 25 percent

Once the condition of a major service change has been met at the modal and/or route level, the equity analysis must consider all concurrently proposed changes in the aggregate.

For the purposes of this Major Service Change Policy the following apply:

- The MBTA's fixed-route modes consist of fixed-route bus (including electric trolley buses), heavy rail (Red Line, Orange Line, Blue Line), light rail (Green Line, Mattapan Trolley), commuter rail, and ferry.
- The MBTA's non-bus routes are identified as each commuter rail, heavy rail, light rail, and ferry line.
- Supplemental service that adds trips along pre-existing transit routes (e.g. school trips, weekend variations) will be counted as part of the parent route.
- The complete elimination of existing routes or addition of new routes constitutes major service changes.
- Changes in RVH and/or route length produced by quarterly service adjustments will be categorized under one of two labels: (1) Summer Quarter, or (2) All Other Quarters. In determining whether these changes qualify as "major" under this policy, changes to Summer Quarter service will be compared to the previous Summer Quarter's service, and changes to any other quarter will be compared to the most recent non-summer

quarter's service (i.e., fall is compared to spring, winter is compared to fall, and spring is compared to winter).

- A change in route length includes changes in alignment.
- Changes to RVH and/or route length will be analyzed as a percentage change and as an absolute change.
- Making a service change to more than 25 percent or 3 miles of a primary variation's length would trigger the "major service change" designation.
- Making a service change to more than 25 percent or 3 miles of the combined segments of all variants (counting overlapping segments only once) would trigger the "major service change" designation.

Definition of Adverse Effects

The MBTA measures adverse effects of a major service change as follows:

- For routes with at least 80 RVHs per week, an increase or decrease in the amount of service scheduled, by route and by mode (as measured by changes to weekly RVH)
- An increase or decrease in the access to service, by route (as measured by changes to route length, in miles)

To evaluate the degree of adverse impacts resulting from major service change proposals, the MBTA will measure and compare the extent of the loss or the gain among minority and nonminority populations and among low-income and non-low-income populations when conducting the equity analysis.

Disparate Impact/Disproportionate Burden Policy for Major Service Changes

The MBTA's threshold for determining when the adverse effects of a major service change may result in disparate impacts on minority and/or disproportionate burdens on low-income populations is 20 percent. If the ratio of the impact on minority to non-minority populations/riders or low-income to non-low-income populations/riders is more than 1.20 (or 20 percent), then the proposed change would be determined to pose a potential disparate impact or disproportionate burden.

Upon finding a potential disparate impact on minority populations from a proposed major service change, the MBTA will analyze alternatives or make revisions to the proposed change to avoid, minimize, or mitigate the potential adverse effects. Any proposed alternative would also be subject to a service

equity analysis, and the MBTA would select and implement a proposal in accordance with FTA's guidance.

When potential disparate impacts are identified, the MBTA will provide a meaningful opportunity for public comment on any proposed mitigation measures, including the less discriminatory alternatives that may be available.

Upon finding a potential disproportionate burden on low-income populations from a proposed major service change, the MBTA may take steps to avoid, minimize, or mitigate these impacts, where practicable, and will describe alternatives available to the low-income passengers affected by the service changes.

Fare Equity Analysis

For all fare changes, the MBTA will compare the percentage change in the average fare for minority riders and riders overall and for low-income riders and riders overall. For fare-type changes across all modes, the MBTA will assess whether minority and low-income riders are more likely to use the affected fare type or media than riders overall. Any or all proposed fare changes will be considered in the aggregate and results evaluated using the fare DI/DB threshold, below.

Disparate Impact/Disproportionate Burden Policy for Fare Changes

The MBTA's threshold for determining when fare changes may result in disparate impacts or disproportionate burdens on minority or low-income populations is 10 percent. Upon finding a potential disparate impact on minority populations from a proposed fare change, the MBTA will analyze alternatives or make revisions to the proposed change that meet the same goals of the original proposal. Any proposed alternative fare change would be subject to a fare equity analysis, and the MBTA would select and implement a proposal in accordance with FTA's guidance.

Where potential disparate impacts are identified, the MBTA will provide a meaningful opportunity for public comment on any proposed mitigation measures, including any less discriminatory alternatives that may be available.

Upon finding a potential disproportionate burden on low-income populations from a proposed fare change, the MBTA may take steps to avoid, minimize, or mitigate these impacts, where practicable.

Definitions

The following definitions are drawn from a broader set of definitions provided by the FTA in its Title VI Circular 4702.1B:

- **Demand response system:** Any non-fixed-route system of transporting individuals that requires advanced scheduling, including services provided by public entities, non-profits, and private providers. An advance request for service is a key characteristic of demand response service.
- **Discrimination:** Any action or inaction, whether intentional or unintentional, in any program or activity of a federal-aid recipient, subrecipient, or contractor that results in disparate treatment, disparate impact, or perpetuating the effects of prior discrimination based on race, color, or national origin.
- **Disparate Impact:** A facially neutral policy or practice that disproportionately affects members of a group identified by race, color, or national origin, where the recipient's policy or practice lacks a substantial legitimate justification and where there exist one or more alternatives that would serve the same legitimate objectives but with less disproportionate effect on the basis of race, color, or national origin.
- **Disproportionate Burden:** A neutral policy or practice related to a major service change or fare modification proposal that disproportionately affects, whether by benefit or burden, low-income populations more than non-low-income populations. A finding of disproportionate burden requires the recipient to evaluate alternatives and mitigate burdens where practicable.
- **Disparate Treatment:** Actions that result in circumstances where similarly situated persons are intentionally treated differently than others because of their race, color, or national origin.
- **Fixed Route:** Public transportation service provided in vehicles operated along predetermined routes according to a fixed schedule.
- **Low-Income Individual:** An individual who lives in a household with a combined income less than twice the federal poverty level.
- **Low-Income Census Tract:** A census tract in which the low-income percentage of residents exceeds the systemwide average (23.3 percent for the commuter rail service area and 24.7 percent for the core service area in 2014, and subject to annual modification using the most recently available American Community Survey data).
- **Low-Income Population:** Any readily identifiable group of low-income persons who live in geographic proximity and, if circumstances warrant, geographically dispersed or transient persons (such as

migrant workers or Native Americans) who will be similarly affected by a proposed MBTA program, policy, or activity.

- **Minority Individual:** An individual who identifies as belonging to any one or more of the following US census categories: American Indian and Alaska Native; Asian; Black or African American; Hispanic or Latino (of any race); Native Hawaiian or Other Pacific Islander.
- **Minority Census Tracts:** A census tract in which the minority percentage of residents exceeds the systemwide average (26.2 percent for the commuter rail service area and 31.3 percent for the core service area in 2010, and subject to modification every 10 years using the most recently available decennial US Census data).
- **Minority Population:** Any readily identifiable group of minority persons who live in geographic proximity and, if circumstances warrant, geographically dispersed or transient persons (such as migrant workers or Native Americans) who will be similarly affected by a proposed MBTA program, policy, or activity.
- **Revenue Vehicle Hours (per week):** The total number of hours per week in which transit vehicles operate in revenue service.
- **Route Length:** The physical length of a transit route, as measured in miles.

Appendix 7-B

FMCB Approval of Major Service Change Policy and Disparate Impact Policy



Charles D. Baker, Governor
Karyn E. Polito, Lieutenant Governor
Stephanie Pollack, MassDOT Secretary & CEO
Brian Shortsleeve, Chief Administrator and Acting General Manager



**Fiscal and Management Control Board
Transportation Board Room
10 Park Plaza
Boston, MA
January 30, 2017
*MEETING MINUTES***

Present: Chairman Joseph Aiello, Director Lisa Calise, Director Steven Poftak (arrived at 12:25 p.m.) and Director Monica Tibbits-Nutt

Quorum Present: Yes

Others Present: Secretary Pollack, Brian Shortsleeve, John Englander, Owen Kane, Nathan Peyton, Jackie Goddard, Michael Lambert, Mike Abramo, David Block-Schachter, David Mohler,

PROCEEDINGS:

At the call of Chairman Aiello, a meeting of the Fiscal and Management Control Board was called to order at 12:06 p.m. at the State Transportation Building, Transportation Board Room, 10 Park Plaza, Boston, Massachusetts.

Next, Chair Aiello opened up the public comment session.

The first speaker was state Representative Dooley from Norfolk who spoke against the proposed new service commuter rail pilot to Foxboro.

The next speaker was Paul Matthews, Executive Director of the 495 Metrowest Partnership who spoke in favor of expanding commuter rail service to Foxboro.

The following speakers commented on the RIDE means testing agenda item: James White, ACCT Chairman; Kathy Paul, Barbara Mann, Jeanne Repoza. Helene Azanow, Dorothy Maciaone, Carolyn Villers all of the Mass Senior Action Council; Bill Henning of BCIL; Rick Morin of Bay State Council for the Blind and Harriet Ramvek from Mass Adapt.

Next, Stephen Kaiser commented on future agenda items, capacity, service delivery and on-time performance.

Next, Marc Ebuna from TransitMatters commented on anticipating live streaming of the Board meetings and overnight transit service.

The next speaker, Louise Baxter from TRU commented on late night service and the cleaning contract.

The last speakers commented on the janitorial contract update: Roxanna Rivera, Vice President of 32 BJ SEIU and David Shea, President of SJ Services.

Next, was the approval of the minutes of January 9, 2017.

On motion duly made and seconded, it was

VOTED: to approve the minutes of the January 9, 2017 meeting.

Next, Chairman Aiello called upon Acting General Manager Brian Shortsleeve to give the Report from the General Manager, Agenda Item D – a discussion of financial performance and other related matters. Mr. Shortsleeve updated the Board on the FY2017 six-month operating budget; top earners; the Governor's FY2018 Budget – House 1; 2017 employee attendance strategy and

Commuter Rail On-Time Performance, as set forth in the attached presentation labeled “GM Remarks, January 30, 2017.” Discussion ensued.

Next, Chairman Aiello called upon Chief Operating Officer Jeff Gonneville to present Agenda Item F, the Report from the Chief Operating Officer. Mr. Gonneville updated the Board on weekly reliability and Power Department Employee Safety, and introduced the recently hired Senior Director of Vehicle Fleet Maintenance & Strategy William Griffiths to continue with the COO report. Mr. Griffiths discussed “Revenue Vehicles Fleet and Facilities Plan – Strategy, Scope and Schedule,” as set forth in the attached presentation labeled “COO Remarks, January 30, 2017.” Discussion ensued.

Next, the Chair called upon Byron Lynn, Deputy Director of Policy and Analysis to present Agenda Item F, a discussion of upcoming board agenda items as outlined in the attached presentation labeled “FMCB Calendar.” Discussion ensued.

Chairman Aiello called upon Erik Stoothoff, Deputy Chief Operating Officer of Infrastructure to present Agenda Item G, an update of the Janitorial Contract. Mr. Stoothoff announced this was a follow-up from a previous briefing at the 12/5/16 FMCB meeting, and began by giving an overview of the current contract, as set forth in the attached presentation labeled “Janitorial Contract Mgmt Update.” General Counsel John Englander participated in a discussion of the future of the existing contract. Discussion ensued.

Next, the Chair called upon Michael Lambert, Deputy Administrator of Transit to present Agenda Item H, RIDE Means Testing Pilot, Mr. Lambert began by giving an overview of the pilot and said the purpose was to test whether a means tested RIDE fare was an effective way to increase mobility for low income ride customers, and said the results showed low income RIDE customer could be better served, and at lower cost, by expanding other new alternatives to traditional paratransit service, as set forth in the attached presentation labeled “RIDE Means Testing Pilot Project – Report & Recommendation, January 30, 2017.” Discussion ensued.

Next, the Chair called upon John Lozada, Manager of Federal Programs for MassDOT/MBTA to present Agenda Item J, a discussion of the Disparate Impact/Disproportionate Burden Policy. Mr. Lozada said he was going before the Board for approval of a policy used to study the equity impacts of proposed service or fare changes at the MBTA, as set forth in the attached presentation labeled “Disparate Impact/Disproportionate Burden Policy, Recommendation for FMCB Approval.” Discussion ensued.

On motion duly made and seconded, it was;

VOTED:

That the Fiscal and Management Control Board (FMCB) hereby adopts the Disparate Impact/Disproportionate Burden Policy as presented to the FMCB during the January 30, 2017 meeting and authorizes the General Manger or his designee, to take all necessary steps to implement said Policy, in the name and on behalf of the Massachusetts Bay Transportation Authority.

Next, Chair Aiello called upon Dave Mohler, MassDOT Executive Director of Planning to present Agenda Item J, the Policy on Pilots for New Service. Mr. Mohler said he was seeking to determine a process for reviewing the four proposals for pilot transit service already before the MBTA, as set forth in the attached presentation labeled “Evaluation and Selection of Pilot Transit Services *Proposed Policy for Consideration.*” Discussion ensued.

Next, Chair Aiello called upon Laurel Paget-Seekins, Director of Research and Analysis to present Agenda Item K, the results of a survey for Overnight Service, as set forth in the attached presentation labeled “Survey of Potential Overnight Service Passengers, 1/30/17.” Discussion ensued.

On motion duly made and seconded, it was by roll call;

Chair Aiello	Yes
Director Calise	Yes
Director Poftak	Yes
Director Tibbits-Nutt	Yes

VOTED: to enter into Executive Session to discuss strategy related to non-union personnel, collective bargaining and litigation at 3:20 p.m.

Documents relied upon for this meeting:

Minutes of January 9, 2017

GM Remarks, January 30, 2017

COO Remarks, January 30, 2017

FMCB Calendar

Janitorial Contract Mgmt Update

RIDE Means Testing Pilot Project – Report & Recommendation, January 30, 2017

Disparate Impact/Disproportionate Burden Policy

Evaluation and Selection of Pilot Transit Services *Proposed Policy for Consideration.*

Survey of Potential Overnight Service
Passengers, 1/30/17

Appendix 7-C

MBTA Youth Pass Pilot Evaluation

MBTA Youth Pass Pilot Evaluation

Final Report

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June 2016

ABSTRACT

The Youth Pass Pilot has increased transit access for primarily low-income and minority youth, allowing them access to recreational opportunities, work, school, and medical appointments they would not have had otherwise. Participants are 92 percent minority and 76 percent low-income, and their MBTA usage on average increased approximately 30 percent during school months and 60 percent during summer months. Participants report that without the Youth Pass they would have still taken 60 percent of their trips on the MBTA, but they would have been unable to make 13 percent of their trips. Seventy-three percent of the applicants for the Youth Pass are eligible for the existing MBTA reduced-fare Student Monthly LinkPass, but unable to access it due to their school not offering it or the limitations on summer months.

The pilot is having minimum impacts on the MBTA revenues and service because of low participation. Data does suggest it is reducing payments in cash onboard vehicles. The collaborative partnership with municipalities has yielded an auditable reduced fare program with limited administrative impact for the MBTA. However, there is a high burden on the municipal partners due to the cash handling; the recommendation to continue the program past a pilot would be to put payment for the pass on the MBTA fare vending machines.

After the mid-pilot review, the MBTA Fiscal and Management Control Board voted to extend the Student Pass year round and put access to the pass on the fare vending machines. This left two categories of youth in the pilot without access to a reduced-fare pass: 12–18 year olds not in high school or middle school and 19–21 year olds who pass a means-tested screen. Using data collected during the pilot about MBTA usage, the cost to extend the Youth Pass to these two groups was estimated. The range of lost fare revenue estimates is based on assumptions of municipal opt-in and participation rates by eligible youth.

Using an estimate of 15 percent participation, the estimated cost of a full Youth Pass program in annual lost fare revenue would range from \$406,000 for the existing partner cities to \$593,000 if all 17 MBTA core municipalities join the program. The estimated fare revenue loss at a more conservative estimate of 30 percent participation would range from \$812,000 to \$1,186,000. The impact of the additional trips on MBTA service is expected to be minimal.

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Chapter 1—Youth Pass Pilot Program Background

The Massachusetts Bay Transportation Authority (MBTA) conducted a pilot program for a Youth Pass, a reduced-fare product that complements the existing Student Monthly LinkPass. The existing Student Monthly LinkPass provides unlimited travel on MBTA rapid transit and buses for middle and high school students for \$26 per month (going to \$30 on July 1, 2016). However, youth access to the Student Monthly LinkPass was limited by the following factors:

- Boston Public Schools subsidizes the pass only for the students who meet the minimum-distance-from-school requirement.
- Many other schools in the MBTA service area do not distribute Student Monthly LinkPasses (either subsidized or for sale) to their students.
- The Student Monthly LinkPass is available only to currently enrolled full-time students, which excludes many youth who are enrolled in alternative education programs.
- Most students could not obtain reduced-fare passes during the summer months.

In order to explore ways to address some of these barriers, the MBTA, along with community stakeholders and municipal partners, developed a Youth Pass pilot program. This pilot program was designed to test the feasibility of implementing a full Youth Pass program, which would provide all eligible youth in participating municipalities with equal access to a reduced-fare product and close some of the access gaps in the current Student Pass program. This program also pilots providing the same reduced-fare pass to young people 19 to 21 years old who are either enrolled in an alternative education program or satisfy a means test. This pilot program was approved by the MBTA/MassDOT Board of Directors in December 2014 and officially launched in July 2015, with the intention of running for one year. The pilot program is scheduled to end on June 30, 2016.

1.1 MBTA and Partner Collaboration

The Youth Pass Pilot is the result of a multi-year campaign by youth transportation advocates. In the summer of 2014, the leadership of MBTA/MassDOT created a Youth Pass Working Group with members of the advocacy community to develop the details of a pilot program. The pilot was approved by the MBTA/MassDOT Board in December 2014. Four municipalities agreed to participate in the pilot: Boston, Chelsea, Malden, and Somerville (with a non-profit serving as the implementing agency in Chelsea). The details of the program were developed through a collaborative effort between the MBTA and the municipal partners. Each implementing agency signed a Memorandum of Understanding with the MBTA and agreed to follow the rules for the program laid out in

a policy handbook written by the MBTA. After the program launched on July 1, 2015, the MBTA and the municipal partners met monthly to review the program's progress.

1.2 Youth Pass Pilot Program

The Youth Pass Pilot program was limited to 1,500 participants between the ages of 12 and 21 in the cities of Boston, Chelsea, Malden, and Somerville, which serve as municipal partners in administering the program. For the pilot program, all individuals ages 12 through 18 who live in participating municipalities were eligible, and individuals 19 to 21 years old were eligible if they meet needs-based criteria by demonstrating one or more of the following: enrollment in high school, a General Education Development (GED) program, or another education program; a job training program; a state or federal public benefit program (such as the Supplemental Nutrition Assistance Program (SNAP), the Special Supplemental Nutrition program for Women, Infants, and Children (WIC), Transitional Aid for Families with Dependent Children (TAFDC), public housing or other assistance programs); or Mass Health. Youth who were accepted into the pilot program could purchase a Youth Pass product through their local municipal partner organization. The Youth Pass functions like a LinkPass (providing unlimited travel on MBTA local bus and subway), but is branded as a Youth Pass. Monthly Youth passes were sold at the Student Monthly LinkPass price of \$26. The 7-day Youth Pass cost \$7.

The Youth Pass Pilot was designed to meet the following major goals:

- Create affordable transit access for pilot participants
- Provide the data required to assess the impact of a Youth Pass on the mobility of youth and their engagement in civic and community activities
- Have a limited impact on the MBTA's revenue
- Provide the data required to estimate the impact of a permanent Youth Pass program on MBTA fare revenue and service delivery
- Assess whether municipal partners can distribute reduced fare MBTA passes in an audit-proof manner that minimizes the MBTA's administrative burden

Municipal partners were responsible for the following aspects of the program:

- Recruiting participants
- Receiving enrollment forms and verifying eligibility for the program (including the collection of required documents)
- Taking photos and producing the Youth Pass cards using card printers provided by the MBTA. The Youth Pass Card is a picture ID printed on a blank Charlie Card with its own unique design
- Administering surveys to participants

- Collecting payment from participants for passes each month (or week, if applicable) and using MBTA-provided retail sales terminals (RSTs) to add the appropriate product onto the pass
- Administering the program in a way that could be tracked and audited
- Providing language assistance, including interpretation and translation of materials into languages other than English, based on the needs of their community and consistent with the protocols identified in the MBTA's Limited English Proficiency Plan

The MBTA and the partners worked together to market the Youth Pass pilot. Youth interested in participating in the program were able to apply via an online form on the MBTA website through the end of April 2016. During the initial application period, waiting lists were established because the number of applicants exceeded the number of available pilot slots in some municipalities. All applicants were given a chance to participate after these initial waiting lists were cleared.

Youth from the applicant pool were contacted by the municipal partner agency to arrange a time to come into their office to enroll. When enrolling youth, the municipal partner determined applicant eligibility, and applicants completed an intake survey. Enrollees also filled out a permission form allowing the MBTA to anonymously track their trips for 30 days so that the MBTA would have pre-pilot trip usage data to compare to data gathered during the pilot program. If enrollees did not already have a CharlieCard that the MBTA could track, they received one without value to use to gather 30 days of pre-pilot trip data (participants had to add value to the card during the first 30 days).

After 30 days, the participant could return and have their picture taken for a Youth Pass card. Once they completed this process, participants could purchase a monthly or Youth Pass, depending on availability in each municipality. Chelsea, Malden, and Somerville offered both monthly and weekly passes, while Boston initially only offered the monthly pass, but added the weekly midway through the pilot. Participants were required to fill out a survey each month when they returned to purchase the pass.

1.3 Pilot Evaluation

The proposal for the Youth Pass Pilot, passed by the MBTA/MassDOT Board of Directors, identified research questions the pilot was designed to answer. A mid-point evaluation of the program was completed in December 2015, along with a Title VI fare equity analysis, as required by the Federal Transit Administration (FTA) for the pilot to proceed beyond six months. This report provides a final evaluation of these questions, using data collected through March 2016. It focuses on three main areas: the benefits of the program to the participants, the costs of the program to the MBTA, and the administrative feasibility of the program model.

1. *Impacts on Youth Riders*

- a. Does the Youth Pass increase use of public transit and access to opportunities for program participants?
- b. Does the Youth Pass change youth riders' attitudes toward the MBTA and public transit?

2. *Impacts on the MBTA*

- a. What is the impact of the Youth Pass program on MBTA fare revenues?
- b. Does increased ridership from the Youth pass result in violations of MBTA service standards? In particular, does the Youth Pass program result in additional trips taken during peak ridership periods?
- c. Does the Youth Pass improve MBTA service by decreasing cash handling, conflict with MBTA employees, and fare evasion?

3. *Administrative Feasibility*

- a. What are the administrative costs of the pilot program to the MBTA?
- b. What are the administrative costs to the municipal partners, and is it sustainable?
- c. Does the pilot create a procedure that is audit-proof, limits fraud, and is able to be replicated?

This report also describes two scenarios for a permanent Youth Pass program, should it be continued after June 30, 2016.

Much of the data for the analysis in this report comes from the participants, either from surveys or from the Automated Fare Collection (AFC) system records of their transit usage. A full list of the data sources used for this report is in Appendix A. MBTA staff and the Central Transportation Planning Staff (CTPS) conducted the analysis of this data.

Chapter 2—Pilot Impacts on Youth Riders

This chapter describes the characteristics of Youth Pass applicants and pilot participants, and discusses the impact of the Youth Pass on pilot participants' travel behavior.

2.1 Pilot Program Applicant Characteristics

Tables 2-1, 2-2, and 2-3 describe the applicants from each municipality and within each reported age group, or reported school-enrollment category. This data is taken from applications received as of May 1, 2016, after which applications for the pilot program were no longer accepted. In total, 4,531 youth applied to the program, and CTPS used data from 4,509 of these applicants for further analysis.¹

Table 2-1 shows that most applicants reported that they live in Boston (approximately 78 percent), and most were in the 13-to-18-year-old age group (approximately 74 percent).

TABLE 2-1
Pilot Program Applicants
by Reported Municipality and Age Group

City	13–18 Years Old	Percent	19–21 Years Old	Percent	Total
Boston	2,589	57.4%	939	20.8%	3,528
Chelsea	342	7.6%	63	1.4%	405
Malden	301	6.7%	109	2.4%	410
Somerville	103	2.3%	63	1.4%	166
Total	3,335	74.0%	1,174	26.0%	4,509

Data source: MBTA Youth Pass Pilot program application data

Note: All percentages are of total applicants.

¹ The MBTA was restricted by law from collecting data on youth ages 12 and under as part of the pilot program. According to applicant-provided birth years, 22 applicants were 12 years old or younger. Their data is not included in Tables 2-1 through 2-4.

Table 2-2 shows that approximately three quarters of applicants were enrolled in school.

TABLE 2-2
Pilot Program Applicants
by Reported Municipality and School Enrollment

City	Enrolled in School	Percent	Not Enrolled in School	Percent	Total
Boston	2,505	56.3%	983	22.1%	3,488
Chelsea	323	7.3%	76	1.7%	399
Malden	299	6.7%	102	2.3%	401
Somerville	112	2.5%	51	1.1%	163
Total	3,239	72.8%	1,212	27.2%	4,451

Data source: MBTA Youth Pass Pilot program application data.

Note: All percentages are of total applicants. Fifty-eight applicants who did not provide school enrollment data, or provided conflicting school enrollment information, were not included in this table.

Table 2-3 categorizes applicants based on both age and school enrollment. The largest group of applicants was made up of youth ages 13-18 who are enrolled in school, while the second largest group was made up of youth aged 19-21 who were not enrolled in school. About 73 percent of Youth Pass pilot program applicants were enrolled in middle or high school, though this share varied by reported age group. Approximately 90 percent of applicants under the age of 18 were enrolled in school, while 79 percent of applicants between 19 and 21 years old were not enrolled in school.

TABLE 2-3
Pilot Program Applicants
by Reported Age and School Enrollment

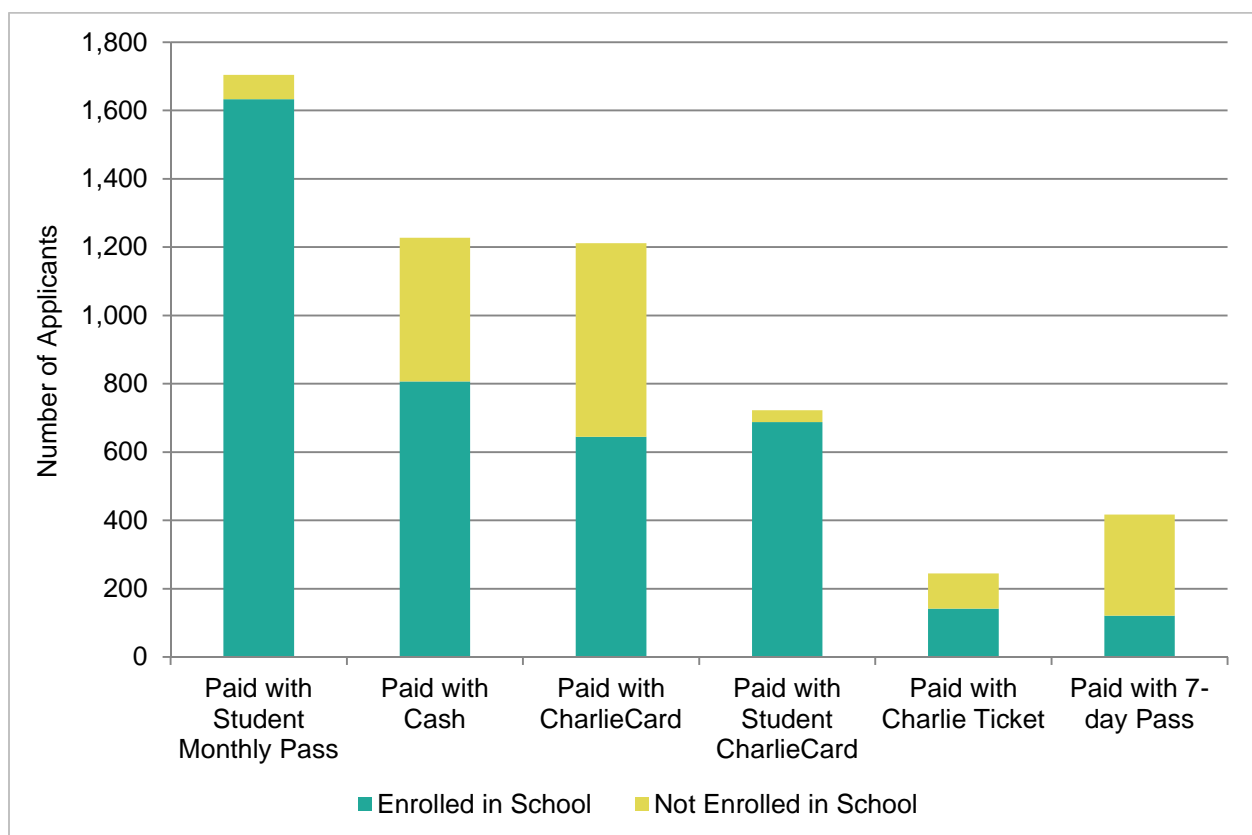
Age of Applicant	Enrolled in School	Percent	Not Enrolled in School	Percent	Total
13–18 Years Old	3,000	67.4%	319	7.2%	3,319
19–21 Years Old	239	5.4%	893	20.1%	1,132
Total	3,239	72.8%	1,212	27.2%	4,451

Data source: MBTA Youth Pass Pilot program application data

Note: All percentages are of total applicants.

Figure 2-1 describes the fare products that applicants reported using to pay MBTA fares. In general, Youth Pass pilot program applicants used different methods of payment depending on their school-enrollment status. Predictably, more school-enrolled applicants used student fare products, such as the Student Monthly LinkPass, while applicants who were not enrolled in school more commonly used a CharlieCard, cash, or a 7-Day LinkPass.

FIGURE 2-1
Fare Payment Methods used by Pilot Program Applicants



Data source: MBTA Youth Pass Pilot program application data

Note: Applicants were allowed to select more than one option.

Table 2-4 focuses more specifically on applicants who have reported paying for MBTA trips with student fare media. Approximately 50 percent of school-enrolled applicants and approximately 6 percent of out-of-school applicants reported using Student Monthly LinkPasses; fewer in each group reported using Student Stored-Value CharlieCards.

TABLE 2-4
Student Fare Media used by Pilot Program Applicants

School Enrollment Category	Have paid with a Student Monthly LinkPass		Have paid with S-Card		Have paid with S-Card or Monthly Pass		Total Applicants in Category
		Percent		Percent		Percent	
Enrolled in School	1,633	50.4%	688	21.2%	2,321	71.7%	3,239
Not Enrolled in School	71	5.9%	34	2.8%	105	8.7%	1,212
Total	1,704	38.3%	722	16.2%	2,426	54.5%	4,451

Data source: MBTA Youth Pass Pilot program application data

Note: All percentages are of the row total.

Approximately 73 percent of all applicants are enrolled in school, and are therefore eligible for student fare products, as shown in Table 2-3; youth who are not enrolled in school may be able to obtain student passes if they are enrolled in GED/High School Equivalency, adult education, or other programs. Table 2-4 shows that approximately 72 percent of the applicants who are enrolled in school reported having used a monthly Student Monthly LinkPass or having paid for trips at the student reduced fare using the stored value purse on their student CharlieCard. This suggests that there are barriers or problems that prevent some students from obtaining student-price fare products.

Table 2-4 also shows that only about half of the school-enrolled youth who applied to the program reported having paid for trips with a Student Monthly LinkPass. The MBTA and CTPS hypothesize that many applicants who have used the Student Monthly LinkPass applied to the program to get access to reduced-price passes during summer months. This hypothesis is supported by the finding that Boston experienced a large turnover of Youth Pass users when the school year started. However, the findings from the Youth Pass pilot application process, discussed above, highlight some other distribution problems that may exist in the current Student Pass program. The applicants who reported using a Student CharlieCard with a stored-value purse meet the eligibility requirements for the Student Monthly LinkPass, but likely have no easy method to obtain one. Some of the barriers they face may be institutional; for example, Malden High School provides students with Student Stored Value cards but no method to purchase the Student Monthly LinkPass. Chapter 5 discusses MBTA initiatives to address these barriers to access, and how these initiatives may affect the target market of a potential permanent Youth Pass program.

2.2 Youth Pass Participant Characteristics

Pilot Participation Rates

The MBTA and CTPS reviewed the available data on Youth Pass usage, from the end of June 2015 through March 2016.² Because pilot participants needed to provide 30 days of pre-pilot travel data prior to receiving a Youth Pass, pilot participants who used a Youth Pass throughout March 2016 would likely have had to enroll in the program on or before January 31, 2016. As of January 31, 2016, 919 applicants had taken an enrollment survey.³

To learn more about Youth pass sales and the number of people using Youth Passes, the MBTA and CTPS reviewed two sets of data for the period between June 2015 and March 2016:

- Youth Pass purchases, according to data from the Retail Sales Terminals (RSTs) provided to participating municipalities⁴
- Youth Pass usage data from the MBTA's Automated Fare Collection (AFC) system

The AFC usage data showed that 770 individuals had used monthly and/or weekly Youth Passes to make trips from July 2015 through March 31, 2016, and CTPS analyzed data from 762 of these individuals.⁵ For the period between June 25, 2015 and March 21, 2016, CTPS identified 897 individual serial numbers associated with Youth Pass purchases, according to data from the Retail Sales Terminals (RSTs) provided to participating municipalities. This time window was selected in order to better compare AFC and RST data. In general, RST sales activity increases significantly after the 21st of each month, which suggests that after this date, many people may be purchasing passes to use during the following month. The difference in the count of individual serial numbers in the RST sales data and the number of individuals appearing in the AFC usage data may occur because some youth may have lost and replaced

² Automated Fare Collection system transaction data (AFC data) is created when people interact with fare gates at MBTA stations or with fare boxes on MBTA transit vehicles. It can take several weeks to retrieve all data from MBTA stations and vehicles, so AFC data for a particular month is typically not available until several weeks after the end of that month. March 2016 was the last month with complete data that could be used in the development of this report.

³ Ten of these individuals would have been excluded from further analysis because they were 12 or younger or because they lacked information on their school enrollment.

⁴ This information likely approximates the number of individuals who are participating in the pilot program, although it may overestimate the number of total participants, as some individuals received replacement Youth Passes and thus would have more than one number in the RST records.

⁵ This information is based on data provided by the MBTA on May 3, 2016. There were a total of 770 individuals who used a Youth Pass between July 2015 and March 2016; however, eight individuals were removed from the data set because their application forms listed incomplete or conflicting school-enrollment information, or because the participants were 12 years old.

cards, or because insufficient information was available from municipal records to link purchases to specific participants. In any case, both counts are less than the number of participants who took an enrollment survey. This may indicate that a number of participants were unwilling or unable to commit the time and complete the multiple steps necessary to fully enroll in the program and receive a Youth Pass.

Throughout this report, CTPS uses the application and pass usage data available for the 762 participants identified in the AFC data to make inferences about the larger population of Youth Pass users.

Table 2-6 categorizes the Youth Pass users identified in the AFC system by their age and school-enrollment characteristics. Approximately 68 percent of these individuals are between 13 and 18 years old, while the remaining 32 percent are between 19 and 21 years old. Most are between 13 and 18 years old and are enrolled in school (60 percent). Youth who are 19 to 21 years old and are not enrolled in school make up the second largest subcategory of Youth Pass users (26 percent).

TABLE 2-6
School Enrollment and Age Characteristics
of Youth Pass Participants in AFC Data (July 2015 – March 2016)

School Enrollment	13–18 Years Old	Percent	19–21 Years Old	Percent	All Youth Pass Users
Middle School	39	5.1%	0	0.0%	39
High School	413	54.2%	45	5.9%	458
Not Enrolled in School	69	9.1%	196	25.7%	265
Total	521	68.4%	241	31.6%	762

Data sources: MBTA Youth Pass pilot program application data; MBTA Youth Pass pilot AFC data
Note: This includes those who purchased Youth Passes that were active in late June 2015. All percentages are of total applicants.

The results in Table 2-6 also show that the samples of Youth Pass participants in some of these age- and school-enrollment categories are small. To increase sample sizes for analysis and estimation purposes, CTPS examined Youth Pass user behavior according to whether or not a participant was in school. Table 2-7 shows the shares of Youth Pass participants in the AFC data by whether or not they were enrolled in school.

TABLE 2-7

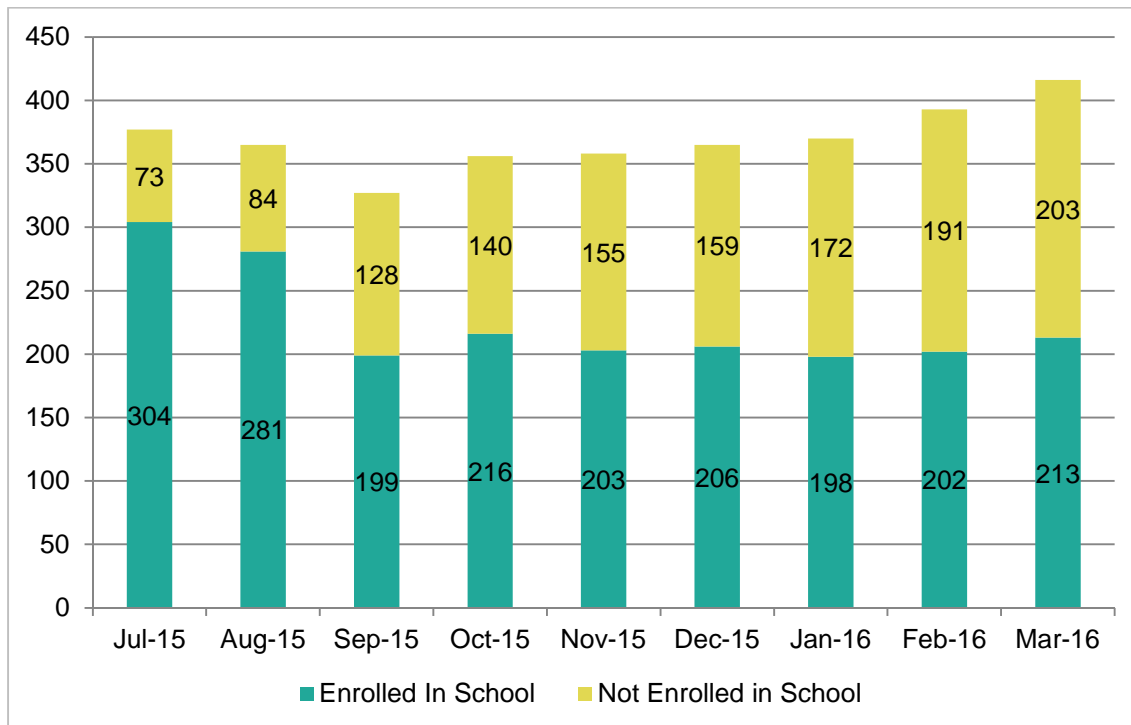
**Youth Pass Participants in AFC Data,
by School Enrollment Category (through March 2016)**

School Enrollment	Number of Participants	Percent
Enrolled in School	497	65.2%
Not Enrolled in School	265	34.8%
Total	762	100.0%

Data sources: MBTA Youth Pass pilot program application data;
MBTA Youth Pass pilot AFC data
Note: This includes participants who purchased Youth Passes
that were active in late June 2015.

Figure 2-2 shows the number of active Youth Pass users by month.

**FIGURE 2-2
Active Youth Pass Users
by School Enrollment Category, by Month**



Data sources: MBTA Youth Pass pilot program application data; MBTA Youth Pass pilot AFC data.

Note: June 2015 data is not shown. Two people were active on June 30, 2015. One used a 7-day pass solely on that day, while the other continued using their 7-day pass in July 2015.

Overall, the number of people in the Youth Pass program has grown since its launch in July 2015. During the nine months covered by this report, the number of participants who were enrolled in school peaked during summer months and stayed at a stable level during school months. This is likely because the participants who were enrolled in school may have been able to take advantage of Student Monthly LinkPasses (which cost the same as the Youth Pass), or reduced single-ride fares for students, and thus no longer found it advantageous to obtain a Youth Pass. Meanwhile, participation by youth not enrolled in school increased steadily from July 2015 to March 2016 (the end of our analysis dataset). During July 2015, approximately 19 percent of Youth Pass users were not enrolled in school. By comparison, in March 2016, approximately 49 percent of Youth Pass users were not enrolled in school. The number of youth not enrolled in school also increased over time, from 73 active during July 2015 to 203 active during March 2016.

2.3 Youth Pass Participant's Use of Public Transit

Pre-Pilot Data

As discussed in Chapter 1, youth who enrolled in the Youth Pass program were asked to provide 30 days of pre-pilot trip data so that it would be possible for the MBTA and CTPS to compare their travel behavior and expenditures before the pilot program to those during the pilot program. Each participant was given a blank CharlieCard, which they could load with passes and/or stored value. To date, 814 youth have provided pre-pilot data. Of these, only 653 provided data and later made trips with a Youth Pass, which may suggest that a large number of youth completed some steps in the Youth Pass enrollment process, but then never returned to obtain a Youth Pass product. Of these, CTPS selected a subset of 634 pre-pilot participants for further analysis; these individuals 1) were older than 12, 2) provided sufficient school-enrollment information, and 3) made trips using a Youth Pass product before March 31, 2016. Table 2-8 displays these pre-pilot participants by school enrollment status. As shown, approximately two-thirds of these pre-pilot participants are enrolled in school.

TABLE 2-8
Pre-Pilot Participants in Youth Pass Program,
by School Enrollment Category

School Enrollment	Number of Participants	Percent
Enrolled in School	408	64.4%
Not Enrolled in School	226	35.6%
Total	634	100.0%

Data sources: MBTA Youth Pass pilot program application data;
MBTA pre-pilot AFC data

CTPS hypothesized that the average number of trips youth might make in a month would vary depending on the time of year, particularly a summer month versus a school month. This was expected to be particularly true for youth enrolled in school. As part of testing this hypothesis, CTPS classified pre-pilot participants according to whether they provided data during school months (late May through June 2015, and September 2015 through March 2016), or during summer months (July and August 2015). Table 2-9 shows the breakdown of pre-pilot participants by these two time categories. Twenty-five pre-pilot data participants were excluded because their data could not be easily classified into one of these categories.⁶

TABLE 2-9
Number of Pre-Pilot Participants,
by School Enrollment and Time-of-Year Categories

School Enrollment	School Months	Percent	Summer Months	Percent	Total
Enrolled in School	314	51.6%	76	12.5%	390
Not Enrolled in School	161	26.4%	58	9.5%	219
Total	475	78.0%	134	22.0%	609

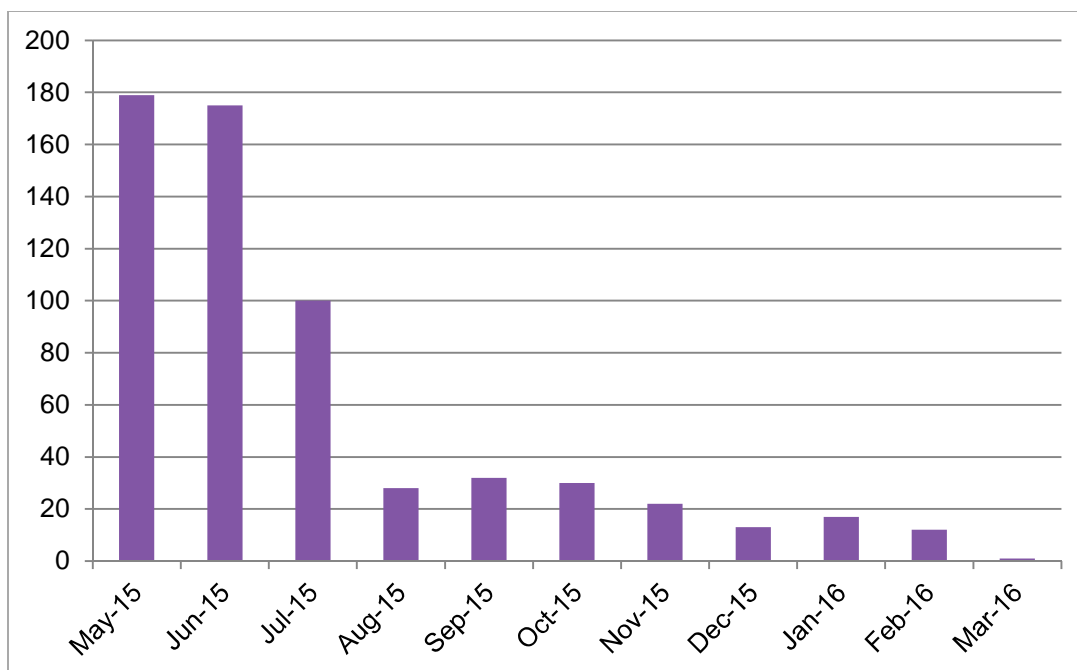
Data sources: MBTA Youth Pass pilot program application data; MBTA pre-pilot AFC data.

Note: Percentages are of total pre-pilot participants.

As shown in Table 2-9, most pre-pilot participants provided data during school months. This is likely driven by the fact that there are more school year months than summer months, and by the fact that the majority of pre-pilot participants made their first identified trip in late May or June 2015, as shown in Figure 2-3.

⁶ If data from a pre-pilot participant was split between a school and summer month, CTPS looked at whether there was a span of 21 days or greater between her first and last trips in the pre-pilot AFC data set. If so, CTPS examined whether more than two-thirds of those days fell in a school or summer month, and assigned the participant to the school month group or summer month group, accordingly. Twenty-five pre-pilot participants could not be classified using this method, and so were excluded from further analysis.

FIGURE 2-3
Pre-Pilot Participants, by Month of First-Identified Trip
in Pre-Pilot AFC Data



Data sources: MBTA Youth Pass pilot program application data; MBTA pre-pilot AFC data

General Changes in Trip Behavior

CTPS analyzed the average number of trips made by youth each month during the school year and during the summer. Comparisons between Youth Pass data and pre-pilot data show that in each school enrollment category and in general, Youth Pass participants increased their ridership once they received the pass.

Table 2-10 describes the average number of unlinked trips that youth made during a school month, using data from the “School” period category of pre-pilot participants, and Youth Pass Pilot program data for school months during the pilot program (September 2015 through March 2016).⁷ Estimates of trips made during the Youth Pass program include any trips on local buses, the Silver Line, and the rapid transit system, which are trips that are covered by LinkPasses. These estimates include trips that were made using the stored value purses on the Youth Pass CharlieCards. On average, youth using Youth Passes during a given month made one of these trips or fewer; but in some cases youth may have paid single-ride or transfer fares before they could renew their

⁷ An unlinked trip is an individual trip on any single transit vehicle; a single journey, often composed of many unlinked trips on multiple vehicles, is a “linked” trip. These estimates of unlinked trips are based on the number of times people tapped their CharlieCard to interact with an AFC faregate or farebox.

monthly or 7-day Youth Pass. Including these trips makes it possible to provide a more comprehensive picture of trip-making behavior during the Youth Pass pilot.

TABLE 2-10
Average Unlinked Trips per Month for School Months

Participant Category	Pre-Data: School Month	Youth Pass: School Month	Change (Total)	Change (Percentage)
Enrolled in School	48.3	54.1	+5.8	+12.0%
Not Enrolled in School	37.3	62.2	+24.9	+66.8%
Average for All Participants	44.6	57.6	+13.0	+29.1%

Data sources: MBTA Youth Pass pilot program application data; MBTA pre-pilot AFC data; MBTA Youth Pass pilot AFC data;

Note: The pre-pilot and Youth Pass average monthly trip estimates do not include any trips that were paid for in cash, because these cannot be tracked on the AFC system.

Participants who are not enrolled in school show the largest increase in average unlinked trips per month when the pre-pilot data and Youth Pass pilot program data are compared. In an average school month, out-of-school participants make an additional 25 unlinked trips, or an increase of 67 percent. Prior to the Youth Pass pilot program, on average, these individuals were making fewer trips per school month than those who were enrolled in school, and they are making more trips per month on average than youth enrolled in school once they are in the pilot program.

The average numbers of trips per month in Table 2-10 include all youth enrolled in school in the School pre-pilot category, regardless of the fare product that they used to pay for their trips. Table 2-11 looks more closely at trip-making by youth that did not use a monthly Student Monthly LinkPass when providing pre-data during school months.

TABLE 2-11
Average Unlinked Trips per Month for School Months
(No Student Monthly LinkPass Use in Pre-Pilot Data)

Participant Category	Pre-Data: School Month	Youth Pass: School Month	Change (Total)	Change (Percentage)
Enrolled in School (Did not use monthly Student Pass)	27.4	54.1	+26.9	+97.4%
Not Enrolled in School	37.3	62.2	+24.9	+66.8%
Average for All Participants	32.6	57.6	+25.0	+76.7%

Data sources: MBTA Youth Pass pilot program application data; MBTA pre-pilot AFC data; MBTA Youth Pass pilot AFC data.

Note: The pre-pilot and Youth Pass average monthly trip estimates do not include any trips that were paid for in cash, because these cannot be tracked on the AFC system.

When youth who used Student Monthly LinkPasses are removed from the analysis, the number of trips per month made by youth enrolled in school increases by almost 100 percent once they have access to a Youth Pass. This increase speaks to the ways that multi-trip pass products, like the Student Monthly LinkPass, may help youth increase their mobility.

Table 2-12 describes the average unlinked trips per month that youth made during a summer month, according to data from the pre-pilot participants in the “Summer” time category, and youth pass pilot program data from the Summer months of the pilot program. As for the school months, estimates of trips made during the Youth Pass program include any trips that were made using the stored value purses on the Youth Pass CharlieCards (on average, active Youth Pass participants made less than one stored-value trip per month during July or August). This table shows the net difference and percentage change in the average number of monthly trips across the two data sets.

TABLE 2-12
Average Unlinked Trips per Month for Summer Months

Participant Category	Pre-Data: Summer Month	Youth Pass: Summer Month	Change (Total)	Change (Percentage)
Enrolled in School	32.1	57.6	+25.5	+79.4%
Not Enrolled in School	43.1	63.7	+20.6	+47.8%
Average for All Participants	36.9	58.9	+22.0	+59.6%

Data sources: MBTA Youth Pass pilot program application data; MBTA pre-pilot AFC data; MBTA Youth Pass pilot AFC data

Note: The pre-pilot and Youth Pass average monthly trip estimates do not include any trips that were paid for in cash, because these cannot be tracked on the AFC system.

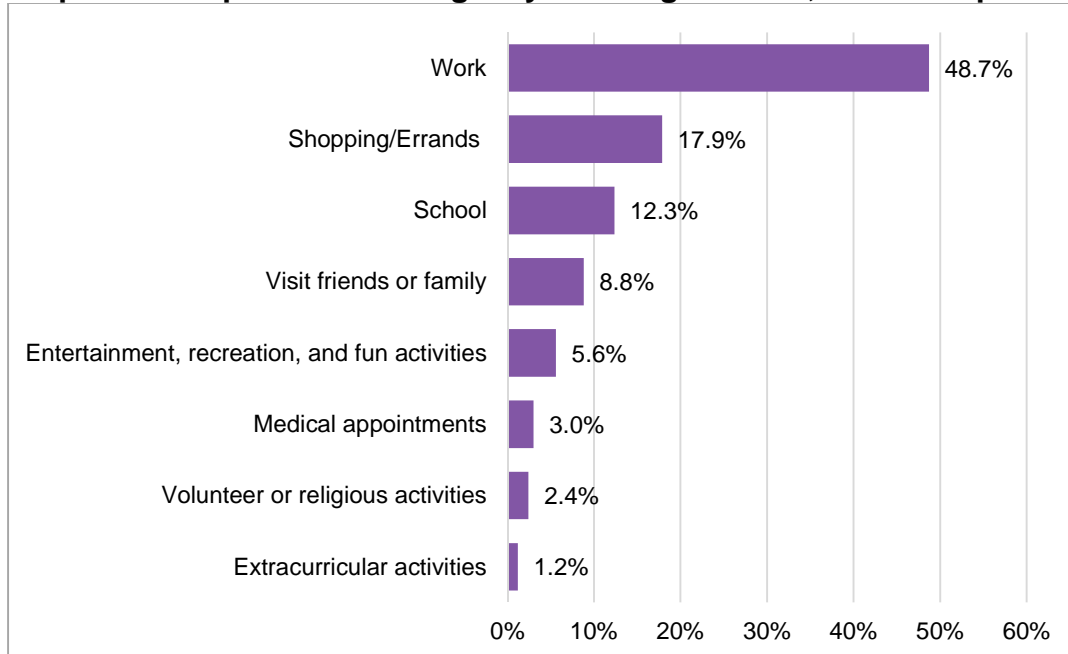
Participants who are enrolled in school made the largest increase in average monthly unlinked trips in a typical summer month, when the pre-pilot data and Youth Pass pilot program data are compared. In an average summer month, in-school participants made an additional 26 unlinked trips, or an increase of 79 percent, once they obtained a Youth Pass. However, participants who are not enrolled in school also made a significant increase in trips, making an additional 21 trips per month, on average.

2.4 Trip Purpose and Potential Foregone Trips

The MBTA conducted monthly surveys of Youth Pass participants to measure the impact of the program on their travel behavior. Each month, participants were asked questions about all of the trips they took on the day prior to the day they received the survey. Participants were asked to describe the purposes of these trips and how they would have made the trips (or whether they would have made them) if they did not have a Youth Pass. As with the other data in this report, the survey results were divided into two groups: those surveyed during the “summer” months of July and August, and those surveyed during the rest of the year (school months). The results of these surveys are displayed in Figures 2-4 through 2-7. It should be noted that since respondents were asked about the previous day, the trips in question nearly all took place from Sunday through Thursday. This is because youth would have taken these surveys at municipal partner offices, which are typically only open Monday through Friday.

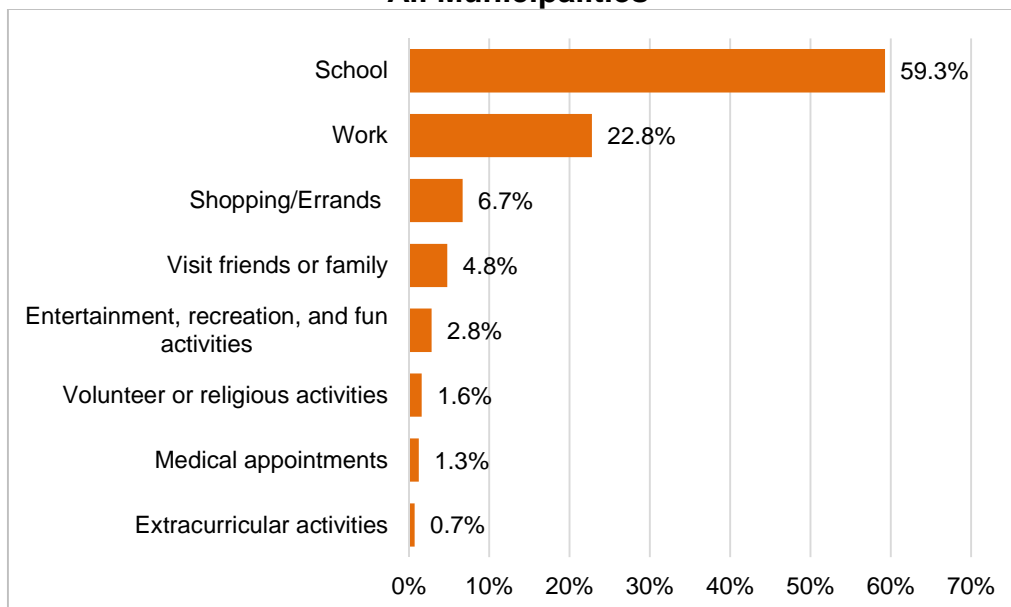
Figures 2-4 and 2-5 describe the purposes of trips taken during the summer and during the school year.

FIGURE 2-4
Purpose of Trips Taken during July and August 2015, All Municipalities



Data source: MBTA Youth Pass Pilot program July and August monthly surveys. n = 1158 trips surveyed.

FIGURE 2-5
Purpose of Trips Taken during All School-Year Months, 2015-16, All Municipalities



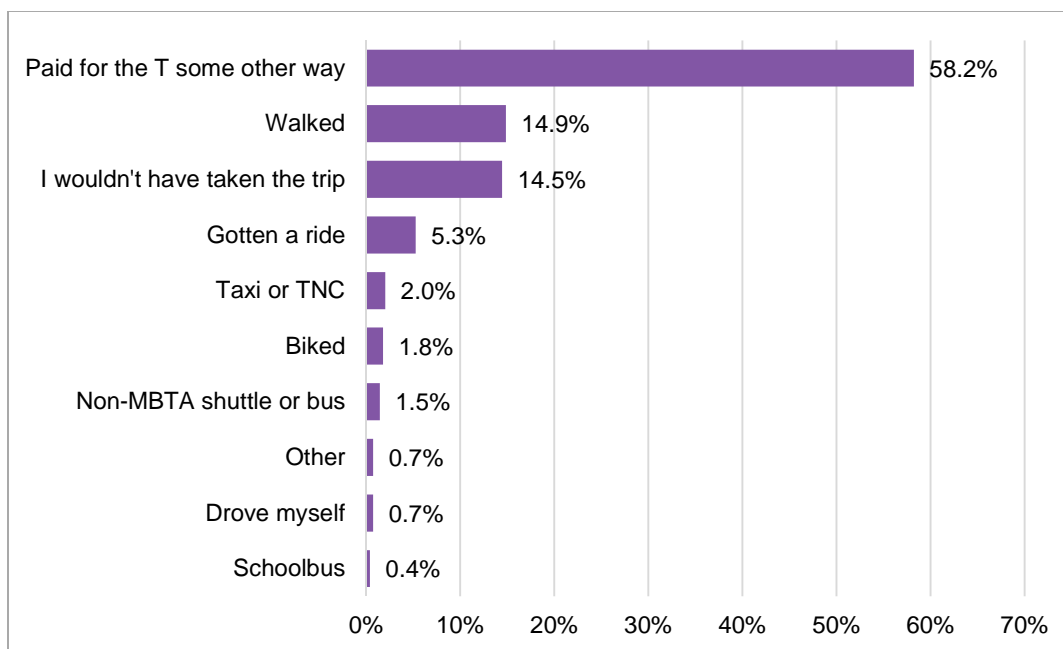
Data source: MBTA Youth Pass Pilot program school year monthly surveys. n = 4,629 trips surveyed.

Note: Data was collected through April 15, 2016, to include trips made during the month of March.

As Figures 2-4 and 2-5 show, the vast majority of trips among participants were either to or from work or school, depending on the season. These two categories combined accounted for 61 percent of the trips in the summer, and 82 percent of the reported trips during the school year. The Shopping/Errands category accounted for the next largest portion of trips.

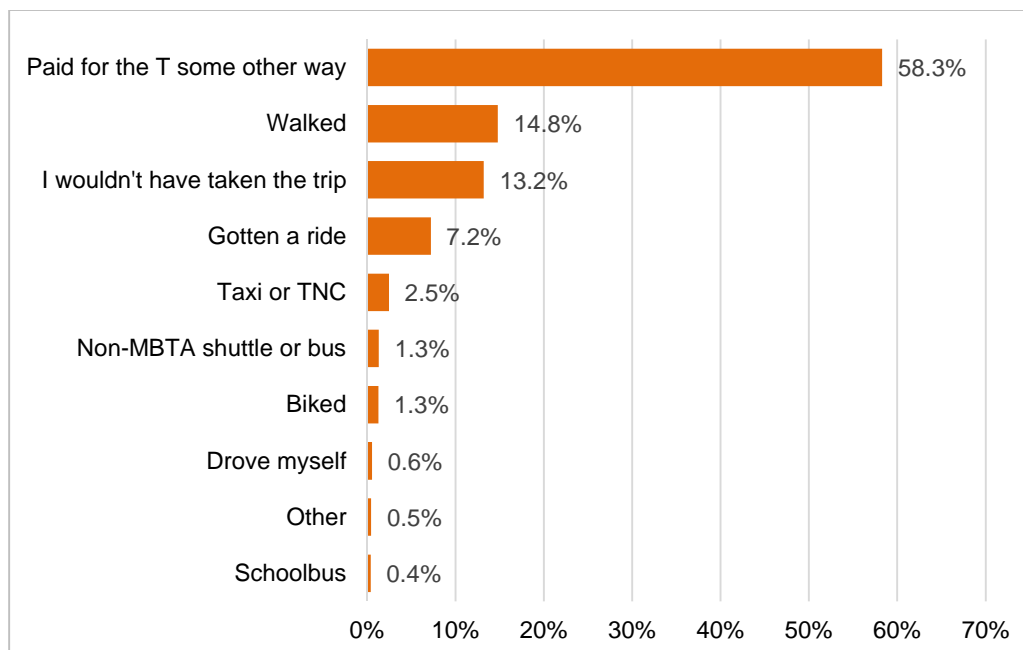
Figures 2-6 and 2-7 describe how Youth Pass participants would have otherwise made their Youth Pass trips during summer and school year months, respectively.

FIGURE 2-6
Participants' Responses to the Question
"Without a Youth Pass, how would you have made the trip?"
(All Municipalities, July and August 2015)



Data source: MBTA Youth Pass Pilot program July and August monthly surveys. n = 1,231 trips surveyed.

FIGURE 2-7
Participant Responses to the Question
“Without a Youth Pass, how would you have made the trip?”
(All Municipalities, School Months)



Data source: MBTA Youth Pass Pilot program school year monthly surveys. n = 4,705 trips surveyed.

Note: Data was collected through April 15, 2016, to include trips made during the month of March

The majority of participants responded that they would have paid to ride the MBTA system another way if they did not have a Youth Pass (approximately 58 percent respondents during both summer and school year groups, as shown in Figures 2-6 and 2-7). Approximately 15 percent of respondents said they would have walked if they did not have the Youth Pass; this was the case for both summer and school-year months. Finally, 14.5 percent of respondents in the summer and just over 13 percent during the school year responded that they wouldn't have made the trip in question at all without a Youth Pass.

In surveys administered between July 2015 and April 2016, participants responded that they would have foregone 13 to 14 percent of their reported trips if they did not have a Youth Pass. Conversely, they would have found another way to make approximately 87 percent of those trips, primarily by paying another way to ride the transit system. Although the surveys did not ask the reason why participants would forego making trips, it is likely because of their cost. Table 2-12 shows the percent of trips that survey respondents *would not* have taken, by type of trip. The highest category is school trips, followed by shopping/errands trips, and work trips.

TABLE 2-12
Trips Survey Respondents Would Not Have Taken without a Youth Pass

Trip Purpose	Percent of Trips Foregone without Youth Pass
Entertainment, recreation, and fun activities	11%
Extracurricular activities (sports, music, tutoring) or trips for your job (but not to it)	1%
Medical appointments	2%
School	24%
Shopping/Errands (for yourself or your family)	21%
Visit friends or family	14%
Volunteer or religious activities	2%
Work	17%
N/A	8%

Data source: MBTA Youth Pass Pilot program monthly surveys July 2015-April 2016.

These results indicate that the Youth Pass is increasing young people's mobility. As expected, transit usage increases with a reduced-fare pass. The first nine months of Youth Pass data show a 30 percent average increase in the number of trips for all participants during school months, and a 60 percent average increase in trips during the summer months. The survey results show that without a Youth Pass nearly 42 percent of trips would not have been taken on the MBTA, and 13 percent of trips would not have been taken at all.

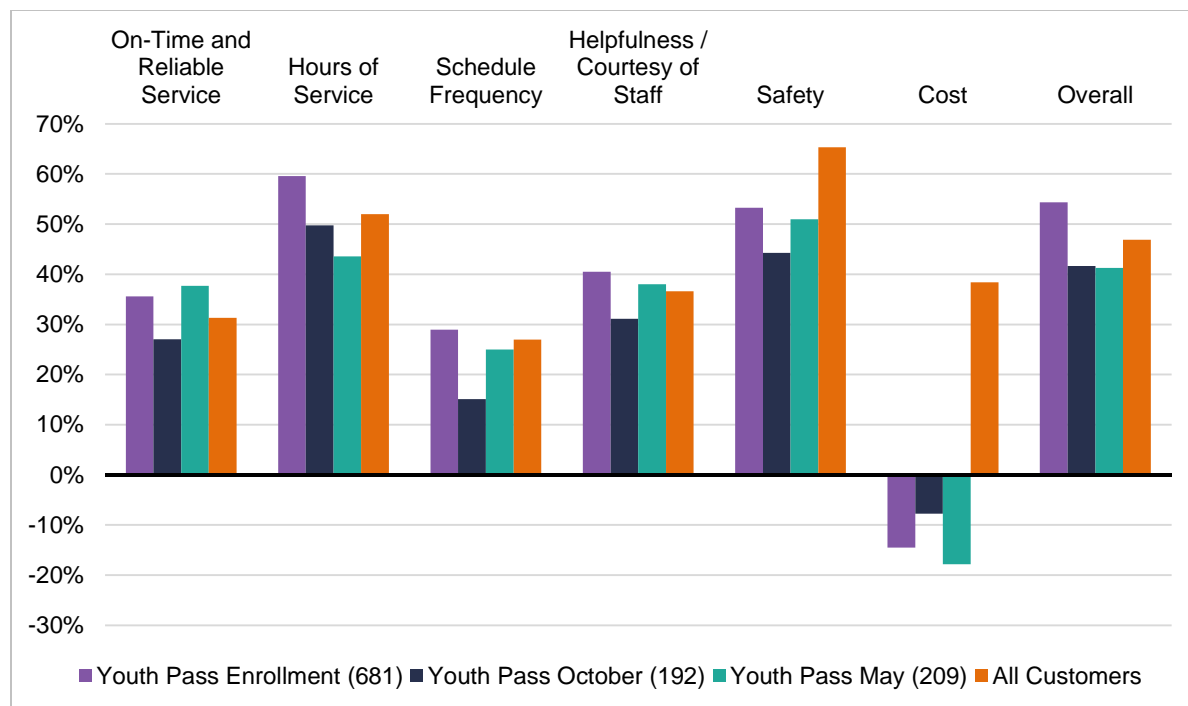
2.5 Youth Riders' Attitudes about the MBTA and Public Transit

One objective of the Youth Pass Pilot research is to determine whether or not the availability of the Youth Pass changes participants' attitudes towards the MBTA and public transit. To gather information on this, the MBTA surveyed Youth Pass participants regarding their level of satisfaction with the MBTA, both overall and in specific categories. Participants were asked to complete these surveys when they enrolled in the pilot program (the month may vary by participant), in October 2015, and then at the end of the program in May 2016. The questions in these surveys matched those that were asked of all MBTA riders during a system-wide customer satisfaction survey from earlier in 2015.

Figure 2-8 shows the net satisfaction for each category across three groups: Youth Pass participants at the time of pilot program enrollment, Youth Pass participants in October 2015 and May 2016, and all MBTA customers from the system-wide customer satisfaction survey. The MBTA determined the net satisfaction rating for each category

by subtracting the percentage of respondents answering below neutral satisfaction (1, 2, or 3) from the percentage answering better than neutral satisfaction (5, 6, or 7).

FIGURE 2-8
Net Satisfaction with Various Aspects of MBTA Service



Data sources: MBTA Youth Pass Pilot enrollment surveys; MBTA Youth Pass pilot October 2015 and May 2016 monthly surveys; MBTA 2015 System-wide Customer Satisfaction Survey

Youth Pass enrollees tended to have an equal or more favorable opinion of the MBTA than respondents to the 2015 system-wide customer satisfaction survey, except in the “cost” and “safety” categories. Youth Pass participants were slightly less satisfied with safety on the MBTA than all passengers, but the vast majority still responded positively. When asked to rate their satisfaction with the MBTA’s cost, Youth Pass participants’ responses differed somewhat from the survey of all passengers. In fact, the majority of Youth Pass participants rated their satisfaction with the MBTA’s cost as negative, which was the only net negative response for both the Youth Pass enrollment and Youth Pass October and May survey groups.

In general, satisfaction with the MBTA decreased slightly among Youth Pass participants between the enrollment survey group and the October and May survey groups, with the exception of the “cost” category. It is important to note that the two surveys do not provide a perfect comparison, as not everyone who took the first survey remained in the program long enough to participate in the second or third survey, or even completed the requirements to obtain a Youth Pass. It is possible that as their use

of the MBTA services increases, Youth Pass participant satisfaction with the MBTA will decrease. This effect appeared in the 2015 system-wide customer satisfaction survey, with regular users expressing less satisfaction than people who use the system less frequently.

Youth Pass respondents' satisfaction with the MBTA's cost improved for the mid-point survey, but then decreased again for the final survey. This could be because of the way the question was asked. Respondents were not told to assume that the Youth Pass Pilot would continue past June 30, 2016 when answering the second and third survey, so some respondents could have answered this question thinking that the program would be ending.

Chapter 3—Pilot Impacts on the MBTA

This chapter describes estimates of the impacts the Youth Pass pilot may have on MBTA revenues and service.

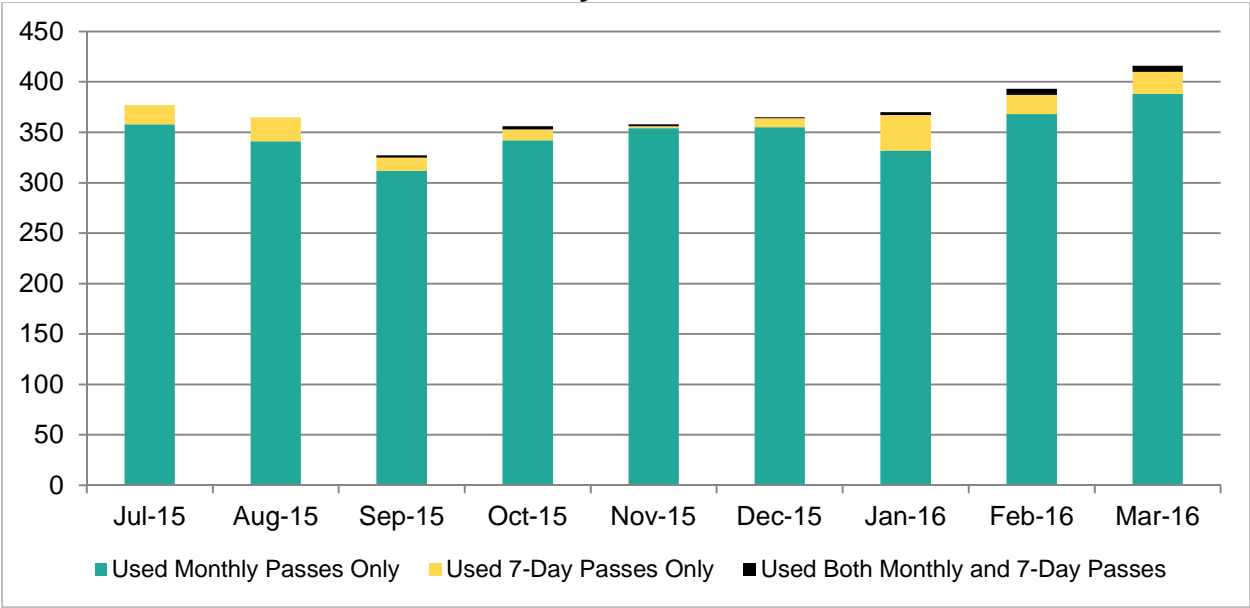
3.1 Impacts on MBTA Fare Revenues

Youth Pass Use Profile

During each month of the pilot, participants could purchase a monthly Youth Pass for \$26. Chelsea, Malden, and Somerville also offered 7-day Youth Passes throughout the pilot, while Boston began to sell these passes in January. The 7-day Youth Passes cost \$7 each.

As mentioned in Chapter 2, CTPS identified 770 individuals who used youth passes through March 2016, according to the MBTA’s AFC data for Youth Pass participants. CTPS analyzed the behavior of 762 of these individuals.⁸ Figure 3-1 shows the number of individuals who purchased each type of Youth Pass product during each month.

FIGURE 3-1
Active Participants Who Purchased 7-Day or Monthly Youth Passes, by Month



Data source: MBTA Youth Pass Pilot AFC Data
Note: The number of individuals who purchased 7-Day passes in July includes one person who purchased a 7-Day pass in June only.

⁸ Eight of these 770 youth were identified as being age 12, based on their reported date of birth, or their applications had incomplete or conflicting school enrollment data.

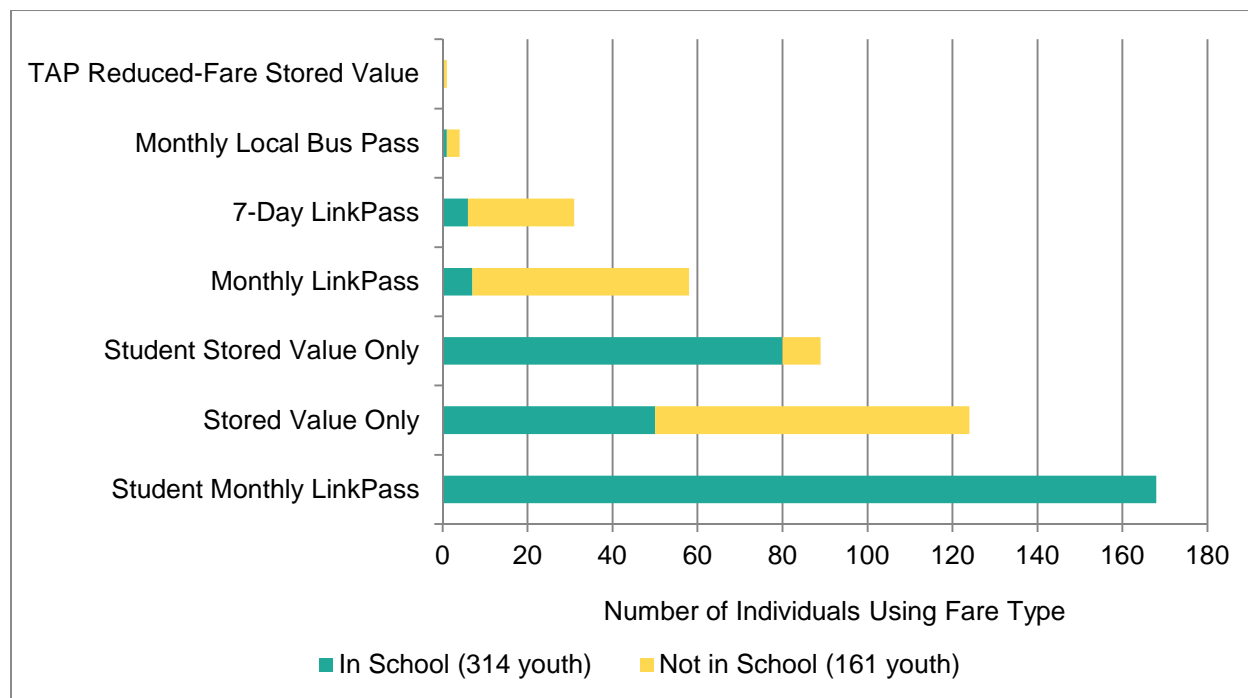
During each month of the pilot, the majority of youth that were “active,” or using at least one Youth Pass product to pay for their trips, used a monthly Youth Pass only. During most months of the pilot, fewer than seven percent of active participants used one or more 7-day Youth Passes to pay for their trips. In January 2016, Boston began offering the 7-day pass, but even during that month, only about 10 percent of all active participants used this type of pass. Of the youth who used a 7-day pass during a given month, the majority only purchased one or two passes during the month.

Estimated Youth Pass Revenues

Pre-Pilot Fare Data

Chapter 2 describes the processes that CTPS used to develop samples of pre-pilot data to represent youth travel behavior during the school year or the summer. Figure 3-2 shows the types of fare media that youth in the School pre-pilot data sample used to make trips on the MBTA system.

FIGURE 3-2
Fare Types Used By Pre-Pilot Participants (School Period)



Data source: MBTA pre-pilot AFC data

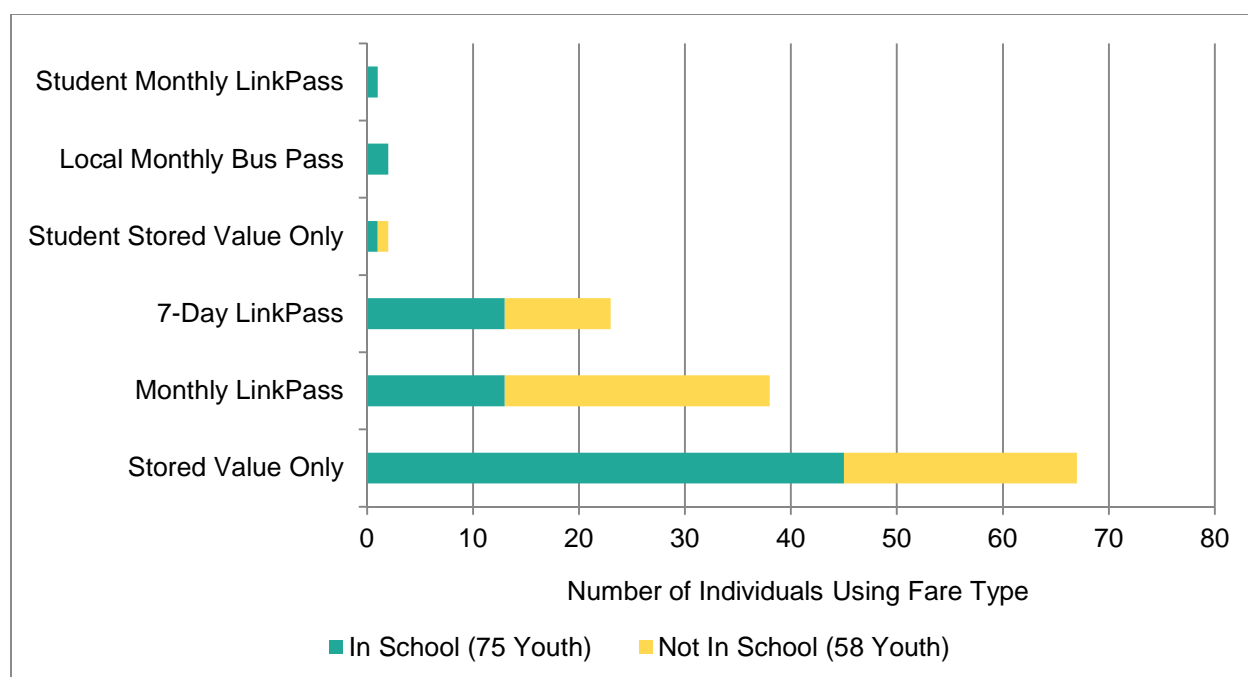
Notes: Participants may have used more than one fare type during their 30-day pre-pilot data collection period. Stored-value fare types include both trip and transfer fares. Information about fares paid in cash is unknown. Two youth in the “Not in School” group and one in the “In School” group used multiple types of passes; these results are not shown. Three youth in the “In School” group paid for trips with a combination of full-price and student fares, only; these results are not shown.

TAP = Transportation Access Pass.

Based on the data shown in Figure 3-2, of pre-pilot participants who provided data during the School period, slightly more than half of students used Student Monthly LinkPasses, while about 25 percent only paid for trips using their student stored-value purse on their CharlieCard, which enables them to obtain a reduced fare. Only a few used another type of pass (Monthly LinkPass, 7-day LinkPass, or a monthly Local Bus pass). Among youth not-enrolled in school, the largest number of participants paid for their trips using stored-value only, though approximately 32 percent used a monthly LinkPass, and approximately 16 percent used a 7-day LinkPass.

Figure 3-3 shows the types of fare media that youth in the Summer pre-pilot data sample used to ride the MBTA system.

FIGURE 3-3
Fare Types Used By Pre-Pilot Participants (Summer Period)



Data source: MBTA pre-pilot AFC data

Notes: Participants may have used more than one fare type during their 30-day pre-pilot data collection period. Stored Value fare types may include both trip and transfer fares. Information about fares paid in cash is unknown. One person was excluded from the “In School” category because they only paid for Express Bus trips during their pre-data month, which would not be covered by a LinkPass.

Figure 3-3 shows that, of pre-pilot participants who provided data during the Summer period, about 62 percent of students paid for trips using only their stored-value purse (either at standard or reduced-price fares). Approximately 17 percent of students made trips using monthly LinkPasses, while another 17 percent made trips using 7-day LinkPasses. Among youth not enrolled in school, approximately 43 percent paid for trips

using a monthly LinkPass, while another 40 percent paid for trips using their Charlie Card stored-value purse only.

Estimated Youth Pass Revenues

To estimate the net Youth Pass revenues for the first nine months of the pilot program, CTPS followed these steps:

- **Step 1:** CTPS identified each month in the pilot program as either a Summer month (July and August 2015) or a School month (September 2015 through March 2016).
- **Step 2:** CTPS identified the share of youth pass participants in each month who reported being enrolled in school, based on their Youth Pass application data.
- **Step 3:** CTPS estimated the total expenditures each Youth Pass participant made during months when they were “active,” or using a Youth Pass to pay for trips. These estimated total expenditures include the cost of Youth Passes (monthly and/or 7-day), and the cost of any stored-value trips. CTPS assumed that youth participants had purchased one monthly Youth Pass if they had made any monthly Youth Pass trips, and estimated the number of 7-day passes purchased based on the time periods during which 7-day Youth Pass trips were made, as shown in the Youth Pass pilot AFC data. As discussed in Chapter 2, on average, youth using Youth Passes during a given month made one stored-value trip or fewer; but in some cases youth may have paid single-ride or transfer fares before they could renew their monthly or 7-day youth pass. Including these trips makes it possible to provide a more comprehensive picture of trip-making behavior for a given month.

Table 3-1 shows the outputs of steps 1 through 3.

TABLE 3-1
Youth Pass Participant Spending,
by Month and School Enrollment Category

Pilot-Program Month	Month Type	Total Participants	Estimated MBTA Revenues during Youth Pass Pilot Program
July 2015	Summer	377	\$9,590
August 2015	Summer	365	\$9,390
September 2015	School	327	\$8,460
October 2015	School	356	\$9,440
November 2015	School	358	\$9,520
December 2015	School	365	\$9,700
January 2016	School	370	\$9,610
February 2016	School	393	\$10,410
March 2016	School	416	\$11,030
Total			\$87,150

Data source: MBTA Youth Pass pilot AFC Data

Notes: These amounts exclude one 7-day pass purchased in June 2015, which was only used on June 30, 2015. Amounts are rounded to the nearest \$10.

- **Step 4:** CTPS estimated the average cost a participant would have paid per month to ride the MBTA local bus or rapid transit system if they did not have a Youth Pass, depending on the time of year and the participant's school-enrollment category. CTPS used the pre-pilot data sets to develop these estimates. The average monthly cost for each participant is based on the estimated number and types of passes that the individual purchased and the cost of any trips paid for using stored-value. CTPS assumed that youth participants had purchased a certain type of monthly pass if they had had paid for any trips during the month using that pass-type, and estimated the number of 7-day passes purchased based on the time periods during which 7-day Youth Pass trips were made, as shown in the pre-pilot AFC data. Table 3-2 shows the average monthly expenditure values for each school-enrollment and time-period category.

TABLE 3-2
Average Monthly Pre-Pilot Spending,
by Month and School Enrollment Category

Category	Average Monthly Expenditure: Summer Pre-Pilot Data Group	Average Monthly Expenditure: School Pre-Pilot Data Group
Enrolled in School	\$42.00	\$26.50
Not Enrolled in School	\$52.50	\$50.00

Data source: MBTA pre-pilot AFC data

Note: Amounts are rounded to the nearest \$0.50.

- **Step 5:** For each month, CTPS multiplied the appropriate average monthly pre-pilot expenditure amount by the number of participants in the “enrolled-in-school” and “not-enrolled-in-school” categories, and summed the two categories together to get a total pre-pilot spending amount for each month. This amount will serve as an estimate of the revenue the MBTA would have earned if these youth did not have access to Youth Passes.
- **Step 6:** CTPS subtracted the total monthly foregone revenues from the Youth Pass program revenues for each month, to determine the net revenues per month. For the first nine months of the pilot program, CTPS estimates that participants in the program spent approximately \$87,200 between July 2015 and March 2016. The net revenue loss for the program for these nine months, based on the methodology described above, is about \$38,200.

TABLE 3-3
Estimated Net MBTA Foregone Revenue during the Youth Pass Pilot Program

Pilot-Program Month	Month Type	Total Participants	Estimated MBTA Revenues during Youth Pass Pilot Program	Estimated Foregone MBTA Revenues	Estimated Net MBTA Revenues
July 2015	Summer	377	\$9,580	\$16,570	(\$6,990)
August 2015	Summer	365	\$9,400	\$13,540	(\$4,150)
September 2015	School	327	\$8,470	\$11,630	(\$3,170)
October 2015	School	356	\$9,440	\$12,680	(\$3,250)
November 2015	School	358	\$9,520	\$13,090	(\$3,570)
December 2015	School	365	\$9,690	\$13,370	(\$3,680)
January 2016	School	370	\$9,610	\$13,820	(\$4,200)
February 2016	School	393	\$10,410	\$14,870	(\$4,460)
March 2016	School	416	\$11,030	\$15,760	(\$4,720)
Total			\$87,150	\$125,330	(\$38,180)

Data sources: MBTA pre-pilot AFC data, MBTA Youth Pass pilot AFC data

Note: Amounts have been rounded to the nearest \$10. The differences in the net revenues column may not be exact due to rounding.

To estimate the net revenue for a full year of the pilot program at the current participation rate, CTPS applied the number of Youth Pass users that were estimated to be active in March 2016 (416) to the remaining three months of the school year, with the same shares of youth enrolled in school and not enrolled in school. CTPS also assumed the March 2016 Youth Pass revenue amount (approximately \$11,030) and the March foregone revenue amount (approximately \$15,760) for the three remaining months. Using this approach, CTPS estimated that a full year of the pilot would generate approximately \$120,200 in revenue (Youth Pass sales plus other stored value), and a net revenue loss of approximately \$52,400 as shown in Table 3-5.

TABLE 3-5
Estimated Net Youth Pass Pilot Program Revenues
(July 2015 – June 2016)

Pilot Program Month	Youth Pass Revenues	Estimated Foregone Revenues	Net Revenues
July 2015 – March 2016	\$87,150	\$125,330	(\$38,180)
April 2016 – June 2016 (projection)	\$33,090	\$47,270	(\$14,170)
Total	\$120,240	\$172,600	(\$52,350)

Data sources: MBTA pre-pilot AFC data, MBTA Youth Pass pilot AFC data
Note: Amounts are rounded to the nearest \$10. The differences in the net revenues column may not be exact due to rounding.

When the cost of program administration by MBTA staff is included (an estimated \$200,000), the net loss of the pilot is approximately \$252,400.

3.2 Impacts on MBTA Service

Chapter 2 describes the estimated number of unlinked trips that Youth Pass participants made based on several characteristics or circumstances:

- Whether the participants were enrolled in school, or not enrolled in school
- Whether the participants were making trips before or after they had access to a Youth Pass
- Whether the trip was taking place during a school or summer month

This section looks more closely at the magnitude of additional unlinked trips per weekday, and at the magnitude of unlinked trips being made during the AM and PM peak periods, in particular. According to the MBTA's current Service Delivery Policy (2010), the AM peak period takes place between 7:00 AM and 8:59 AM, while the PM peak period takes place between 4:00 PM and 6:30 PM. CTPS also looked at participants' trips on different parts of the MBTA system (bus, rapid transit, light-rail, or Silver Line) during a given weekday.

To estimate the net change in the number of trips on the MBTA local bus and rail system on a weekday, CTPS completed the following steps:

- **Step 1:** CTPS identified each month in the pilot program as either a Summer month (July and August 2015) or a School month (September 2015 through March 2016).

- **Step 2:** CTPS identified the share of youth pass participants in each month who reported being enrolled in school, based on their Youth Pass application data.
- **Step 3:** CTPS estimated the trips per weekday made by youth using Youth Passes, by calculating the total number of trips made by active Youth Pass participants on weekdays during each month of the program. CTPS then divided these trip values by the number of weekdays during each month (excluding holidays) to determine the estimated number of trips per day, during each time period.
- **Step 4:** CTPS estimated the trips per weekday that youth may have made before they had access to a youth pass by using the pre-pilot AFC data. To estimate the total number of trips made by pre-pilot participants during a summer month, CTPS calculated the average numbers of weekday trips per month made by participants (both those enrolled in school, and not enrolled in school) during the Summer time period. These were multiplied by the number of each type of Youth Pass participant (school-enrolled, and not-school-enrolled) during each Summer month. This process was repeated for school months, using data from pre-pilot participants in the School category.
- **Step 5:** CTPS estimated the additional trips per weekday made by youth using Youth Passes by subtracting the results of step 4 from the results of step 3.

A summary of the results of steps 1 through 5 are shown in Table 3-6.

TABLE 3-6
Estimated Weekday Trips by Youth Pass Participants, by Service Period
(July 2015 – March 2016)

Month Type	Range of Trips per Weekday (from Pre-Pilot Data)	Range of Trips per Weekday (Youth Pass Participants)	Range Estimated Net Additional Trips Per Weekday	Average Estimated Net Additional Trips Per Weekday
Summer	490 – 500	800 – 900	+310 – +400	+350
School	600 – 740	770 – 950	+110 – +230	+180

Data sources: MBTA Youth Pass pilot AFC data

Note: Amounts are rounded to the nearest 10 trips.

During summer months, an estimated average 350 trips were added to the MBTA bus and rapid transit system each weekday. During school months, an estimated average 180 trips were added to the MBTA bus and rapid transit system each weekday.

Meanwhile, there were approximately 1.2 million weekday boardings on the MBTA bus and rapid transit systems in fiscal year (FY) 2013. The net growth in trips on the bus and rapid transit system from the Youth Pass pilot program is very small by comparison.⁹

AM and PM Peak Period Trip Share Changes

Table 3-7 shows changes in the share of weekday unlinked trips that youth made during the AM peak period, the PM peak period, and during non-peak periods, once they had a Youth Pass, compared to the share they made during these periods before they had a Youth Pass. These shares have been calculated for both summer (July and August 2015) and school (September 2015 to March 2016) months. To provide a pre-pilot comparison to the Youth Pass pilot shares in each period, CTPS calculated the share of weekday trips made by the Summer group of pre-pilot participants, and the School group of pre-pilot participants made in each period, respectively. This table shows the change in the share of peak period trips between the pre-pilot and Youth Pass AFC data sets in terms of both percentage points and percentage change.

TABLE 3-7
Change in Service-Period Trip Share
between Pre-Pilot and Youth Pass Data

Month Type And Service Period	Pre-Pilot Data	Youth Pass Data	Change in Percentage Points	Percentage Change
School: AM-Peak-Period Share	14.7%	14.7%	(Less than 0.1%)	(Less than 0.1%)
School: PM-Peak-Period Share	17.4%	19.8%	+2.4	+13.6%
School: Non-Peak-Period Share	67.9%	65.5%	(2.4)	(3.5%)
Summer: AM-Peak-Period Share	13.7%	15.7%	+1.9	+13.9%
Summer: PM-Peak-Period Share	21.8%	21.6%	(0.2)	(1.0%)
Summer: Non-Peak-Period Share	64.5%	62.8%	(1.7)	(2.6%)

Data sources: MBTA Youth Pass pilot AFC data, MBTA pre-pilot AFC Data

⁹ Source: Massachusetts Bay Transportation Authority. 2014. Ridership and Service Statistics: Fourteenth Edition.
<http://www.mbta.com/uploadedfiles/documents/2014%20BLUEBOOK%2014th%20Edition.pdf>.
Accessed May 24, 2015.

As shown in Table 3-7, Youth pass participants make approximately 15 percent of their trips during the AM peak period and about 20 percent during the PM peak period during school months. During summer months, these percentages rise to 16 percent and 21 percent, respectively. When comparing the Youth Pass pilot and pre-pilot data, CTPS estimates that Youth Pass participants make more of their trips during the PM Peak period during School months than before the pilot. Meanwhile, during summer months, Youth Pass participants make more of their trips during the AM peak period than they did prior to the pilot.

Table 3-8 combines the information in Tables 3-6 and 3-7 to show the approximate number of additional weekday trips taking place during the AM and PM peak periods. As shown below, there are fewer than 100 additional trips in either the AM or PM peak on an average weekday, regardless of the time of year.

TABLE 3-8
Estimated Additional Trips by Youth Pass Participants, by Service Period
(July 2015 – March 2016)

Month Type	Range of Additional AM Peak Trips Per Weekday	Average Additional AM Peak Trips Per Weekday	Range of Additional PM Peak Trips Per Weekday	Average Additional PM Peak Trips Per Weekday
Summer	60 – 70	65	70 – 80	75
School	20 – 30	27	40 – 60	52

Data source: MBTA Youth Pass pilot AFC data

Note: Ranges are rounded to the nearest 10 trips.

AM and PM Peak Period Trip Shares by Bus and Rapid Transit Line

Table 3-9 shows the change in AM peak period, PM peak period, and non-peak trip share for the local bus network as a whole, each rapid transit line, and the Silver Line during school months (September 2015 – March 2016). CTPS compared this trip-making activity to that which occurred prior to the Youth Pass pilot, using data from the School group of pre-pilot participants. The highlighted cells show an increase in trip share from the pre-pilot data set to the Youth Pass data set.

TABLE 3-9
Change in Peak-Period Trip Share
for Bus Network and Rapid Transit Lines
(Pre-Pilot and Youth Pass Pilot Data, School Month)

Service Period and Data Set	Bus: All Routes	Rapid Transit: Blue Line	Rapid Transit: Green Line	Rapid Transit: Orange Line	Rapid Transit: Red Line	Rapid Transit: Silver Line
AM-Peak-Period Share: Pre-Pilot	17.1%	17.8%	7.1%	10.9%	16.4%	18.6%
AM-Peak-Period Share: Youth Pass	16.7%	26.4%	6.8%	13.6%	14.6%	15.2%
PM-Peak-Period Share: Pre-Pilot	16.0%	10.1%	23.0%	19.0%	18.4%	13.4%
PM-Peak-Period Share: Youth Pass	20.5%	12.0%	20.1%	19.7%	19.1%	19.9%
Non-Peak-Period Share: Pre-Pilot	66.9%	72.1%	69.9%	70.1%	65.2%	68.0%
Non-Peak-Period Share: Youth Pass	62.8%	61.6%	73.1%	66.7%	66.3%	64.8%

Data sources: MBTA Youth Pass pilot AFC data, MBTA pre-pilot AFC Data

During school months, the share of trips made by Youth Pass participants increased during the AM-Peak period on bus routes and on the Blue and Orange lines. During the PM-Peak period, the share of trips made by Youth Pass participants increased on all bus routes, and the Blue, Orange, Red, and Silver lines. During non-peak periods, the share of trips made by Youth Pass participants increased on the Green and Red lines. The use of different MBTA rapid transit lines and the bus network is determined in part by the municipalities participating in the program, as Youth Pass participants will be making their home-based trips on the bus and rapid transit lines that serve their home communities.

Table 3-10 shows the change in AM Peak period, PM Peak period, and non-peak trip share for the local bus network as a whole, each rapid transit line, and the Silver Line during summer months (July and August 2015). CTPS compared this trip-making activity to that which occurred prior to the Youth Pass pilot, using data from the Summer group of pre-pilot participants. Highlighted cells show an increase from the value calculated from the pre-pilot data set to the value calculated for the Youth Pass pilot data set.

TABLE 3-10
Change in Peak-Period Trip Share
for Bus Network and Rapid Transit Lines
(Pre-Pilot and Youth Pass Pilot Data, Summer Month)

Service Period and Data Set	Bus: All Routes	Rapid Transit: Blue Line	Rapid Transit: Green Line	Rapid Transit: Orange Line	Rapid Transit: Red Line	Rapid Transit: Silver Line
AM-Peak-Period Share: Pre-Pilot	16.8%	24.6%	6.6%	11.3%	14.3%	7.8%
AM-Peak-Period Share: Youth Pass	18.3%	16.2%	6.3%	13.8%	17.6%	15.3%
PM-Peak-Period Share: Pre-Pilot	21.9%	13.7%	24.7%	21.9%	20.7%	24.1%
PM-Peak-Period Share: Youth Pass	21.2%	24.9%	27.0%	19.5%	22.3%	25.2%
Non-Peak-Period Share: Pre-Pilot	61.3%	61.7%	68.7%	66.8%	65.0%	68.1%
Non-Peak-Period Share: Youth Pass	60.6%	58.5%	66.7%	66.7%	60.2%	59.5%

Data sources: MBTA Youth Pass pilot AFC data, MBTA pre-pilot AFC Data

During summer months, the share of trips made by Youth Pass participants increased on bus routes and on the Orange, Red, and Silver lines during the AM Peak period. During the PM Peak period, the share of trips made by Youth Pass participants increased on the Blue, Green, Red and Silver lines. As mentioned previously, though there are changes in the share of trips Youth Pass participants made across modes and across service periods, the overall net impact of their trip-making activity is small.

3.3 Summary of Title VI Fare Equity Analysis

The Federal Transit Administration (FTA) requires that the MBTA conduct a fare equity analysis for any fare change that lasts longer than six months—as is the case for the Youth Pass Pilot program—to evaluate whether the fare changes would have a disparate impact based on race, color, or national origin, and whether low-income riders would bear a disproportionate burden or non-low-income riders would receive disproportionate benefits because of the changes. CTPS conducted a Title VI Fare Equity Analysis of the Youth Pass Pilot program using program data available through October 15, 2015, in order to meet these federal requirements and support continuation

of the pilot program beyond six months. This analysis is detailed in the Youth Pass Pilot Program: Title VI Fare Equity Analysis memorandum (December 15, 2015).

With respect to the analysis findings, the Youth Pass monthly and weekly fare products provide a benefit to eligible users because they provide access to the bus and rapid transit system at a significant discount compared to similar pass products. The monthly Youth Pass, which is priced the same as MBTA Student Monthly (\$26), represents a 65 percent discount compared to a full-price monthly LinkPass (\$75). When analyzing the effective per-trip costs for minority, low-income, and all Youth Pass participants, CTPS found that the two Youth Pass products (monthly and 7-day) result in no disparate benefit to non-minority youth in the program, and no disproportionate benefit to non-low-income youth in the program, according to the MBTA's Disparate Impact and Disproportionate Burden Policy.

3.4 Impacts on MBTA Service (Cash Handling, Conflicts with Employees, Fare Evasion)

In addition to the other topics discussed in this chapter, the Youth Pass Pilot was intended to examine whether the pass improved the MBTA's operations and riders' experiences on the system. The Youth Pass Working Group theorized that additional passes would:

- Reduce the amount of cash used on-board buses and above-ground trolleys, which slows boarding and increases dwell times
- Reduce the amount of fare evasion by pass-holders
- Improve interactions between MBTA staff and pilot participants

These impacts proved difficult to assess, but the preliminary data does suggest minor impacts, which are explained below.

First, it is likely that the Youth Pass decreased cash payment on-board vehicles for participants. While detailed data is not available on cash transactions as there was no way to track cash payments, youth who applied for the pass reported a high level of cash payment when compared to the population of all riders. Twenty-six percent of applicants reported that they pay for rides with cash at some point recently. While we do not know exactly how many trips were paid for with cash, this is significantly higher than the system-wide average cash payment rate of 2 percent. With a pass, participants would not use cash to board buses and other vehicles.

The MBTA also asked participants their opinions of the Youth Pass's impact on fare evasion and interactions between participants and MBTA employees. When asked if

they thought the Youth Pass reduces fare evasion, 75 percent of respondents said yes, while just 3 percent responded no (the remainder were not sure). When asked if the Youth Pass reduces conflicts between riders and employees, 59 percent believed that it did, while just 11 percent responded no. While this is subjective data, the perception is that the Youth Pass impacts both these issues positively.

Chapter 4—Pilot Administrative Feasibility

4.1 Pilot Administrative Procedures

Municipal Partnerships

The MBTA and the partner organizations worked together for six months to create the pilot program structure. Each partner signed a Memorandum of Understanding with the MBTA that specified each organization's responsibilities. The MBTA wrote a Policy Handbook that detailed the rules of the program for the partners to use in implementation. After the program was launched, the MBTA and representatives of the partner municipalities held monthly meetings to check in on the administration of the program and resolve outstanding issues.

The municipal partners were free to develop their own administration procedures, so long as these procedures could be later audited, and the municipalities collected and verified the necessary paperwork. Some scanned the necessary documents and stored them in an online filing system, while others stored hard copies in folders. The MBTA provided the partners with a spreadsheet to track participants, their enrollment, and their payment status. For the means-tested participants, municipal partners were expected to collect documentation of their enrollment in a means-tested program. They also were expected to conduct a "second-step" verification of 10 percent of their means-tested participants. This was conducted via phone calls to the organizations or programs that participants claimed they were enrolled in; the "second-step" verification revealed no cases of fraud. Staff at the MBTA also reviewed the pass-usage data and found no evidence of suspicious usage (very high numbers of trips on one pass).

The MBTA conducted site visits of each municipal office to observe operations, ensure that partners followed proper procedure, and interview partner staff about their experiences administering the Youth Pass. This section details the results of these audits. Overall, the municipal partners seemed to follow the agreed-upon procedure. While there were some slight irregularities, there were no major problems in administration, nor did MBTA oversight reveal any major errors or cases of fraud. The major concerns expressed by the partners will be largely addressed by making the pass available on fare vending machines.

Municipal Partner Feedback

Partners generally believed the Youth Pass was an important program and wanted it to become permanent, but expressed concerns about the resources required to handle the program in its current design — particularly the handling of cash.

Major positive feedback from the partners included:

- General appreciation of the program by the youth participants. This showed partners that it was a valuable program for these participants and that their work was appreciated. Additionally, the program helped partner offices to fulfill their mission and connect face-to-face with youth constituents who may be difficult to reach via other methods.
- The RSTs provided by the MBTA to refill the cards were reliable and easy to use.
- Invoicing from the MBTA was smooth, and no major errors were reported by either the MBTA or municipal partners.

Negative feedback from the partners included:

- Partners reported that the workload was highly variable. For example, the workload was very high during the initial enrollment period, but there was little to do at mid-month times when few participants were coming in.
- The card printers used to print the Youth Passes were very slow (especially for the first printing of the day) and sometimes created duplicates.
- Participants often wished they could purchase passes online or with a credit or debit card rather than cash.

Finally, partners expressed concerns about having enough staff and other resources to administer the program if continued, especially if the enrollment were expanded. It was clear from partner comments that continuing to vend passes monthly via RSTs in municipal partner offices was not only infeasible for their staff, but also presented barriers to participants, which reduced the reach of the pass and could prevent a full program from meeting its goal of providing access to those who need it.

Most of the negative feedback is addressed by having the passes available on fare vending machines throughout the MBTA system, similar to the Student Pass change approved by the Fiscal and Management Control Board.

Those enrolled in school could purchase passes without ever needing to go to a separate office. Youth who are not enrolled in school would need to visit a partner office to be approved for the program and receive a Youth Pass card, but would not have to return to the office each month because they could re-load their passes at fare vending machines. The workload would still be variable, as most participants would likely enroll in September, but would be far lower overall. The cash handling for the partners would be eliminated as well.

4.2 Administrative Feasibility

The Youth Pass Pilot proposal included three questions about the administration of the program. First, what are the administrative costs of the pilot program to the MBTA?

The administrative cost of the pilot is currently estimated at approximately \$200,000, significantly less than the \$443,000 of administrative costs presented in the December 2014 proposal. This is mostly due to changes in the structure of the pilot's administration and low participation rates.

The pilot consumes staff resources to:

- Design the program with the partners and write the legal documents
- Train the partners to use the RST and card-printer machines
- Design and order the special cards, work with Scheidt & Bachmann (the MBTA's fare systems contractor) to make tariff changes, and deal with lost cards
- Design the data collection and survey components of the research aspect of the pilot
- Analyze the data from the pilot and oversee CTPS's work
- Meet with the partners monthly to address issues
- Make site visits to audit the partners

Some of those resources would not be necessary for a full program, but the MBTA would still supply the cards and card printers to partners, provide oversight and auditing of partners, and handle lost cards and other administrative issues. This would require a new staff position dedicated to overseeing the program and assisting with the changes to the Student Pass program.

The second question posed in the proposal is, "What are the administrative costs to the municipal partners, and is it sustainable?" The interviews with the partners revealed that the current model of the Youth Pass, with participants paying at the partner's offices, is not sustainable. The City of Boston reported that they cannot continue the program after the pilot is over under this model. However, the partners believe that the program could continue if the passes are sold on the fare vending machines.

The third question posed in the proposal is, "Does the pilot create a procedure that is audit proof, limits fraud, and replicable?" The pilot created a procedure that is auditable and limits fraud. This was in part due to the collaborative nature of the development of the program so that the partners and the MBTA were in agreement with the goals.

There will likely be some challenges with extending the program to other municipal partners who were not involved in the initial program design. The requirements for the means-testing, and procedures for storing documents and verifying eligibility will need to

be standardized. The MBTA will have to develop a new Memorandum of Understanding and policy handbook for the partners.

Chapter 5—Pilot Program Evaluation and Next Steps

5.1 Summary of Program Evaluation Findings

The Youth Pass Pilot was designed to meet the following five major goals.

Goal 1: Create affordable transit access for pilot participants

The pilot has accomplished this goal for the applicants who finished all of the steps to enroll in the pilot.

Goal 2: Provide the data required to assess the impact of a Youth Pass on the mobility of youth and their engagement in civic and community activities

The pilot has collected data, and the preliminary results indicate that the Youth Pass has increased access to a range of activities for participants.

Goal 3: Have a limited impact on the MBTA's revenue

The pilot is estimated to have a very limited impact on MBTA fare revenue.

Goal 4: Provide the data required to estimate the impact of a permanent Youth Pass program on MBTA fare revenue and service delivery

The pilot has generated data to assist in the estimates of a full Youth Pass, but these estimates still require assumptions outside the scope of the pilot data collection.

Goal 5: Assess whether municipal partners can distribute reduced fare MBTA passes in an audit-proof manner that minimizes the MBTA administrative burden

The pilot has demonstrated a proof of concept for a collaborative model of administering reduced fare MBTA products that is auditable and limits the MBTA administrative burden.

5.2 Program Evaluation Challenges and Limitations

The MBTA and CTPS encountered several challenges and limitations while conducting the pilot program evaluation:

- As discussed in Chapter 2, this report uses AFC data from the start of the program in July 2015 through March 2016, which was the last month of complete data available for the development of this report, to analyze Youth Pass usage. As a result, this report does not reflect information about Youth Pass purchases and use during the spring.
- The number of steps required to enroll and participate in the pilot has resulted in limited youth participation.

- As discussed in Section 2.3, most participants began providing their 30 days of pre-pilot trip data during May and June 2015, just before the start of the Youth Pass pilot program. This means that there is limited pre-pilot data that reflects the fall, winter, and spring months of the school year.
- The AFC data and resulting analyses may be missing some of the Youth Pass users. MBTA staff worked to match municipal records of Youth Pass participants to as many pass sales recorded in the RST data as possible, but it was still not possible to match some pass sales to Youth Pass pilot program participants.

5.3 Factors Affecting the Future of the Youth Pass

The Youth Pass pilot program has provided valuable insights into youth transportation needs and behavior. It has also provided an opportunity to evaluate how to most-effectively close gaps that may prevent youth from accessing reduced-price passes, including those available through the existing Student Pass program. To date, findings from the pilot program showed that Youth Pass participants made more trips than they did prior to the pilot program, expanding their ability to be active in their communities.

However, MBTA staff also found that cash-handling created a large burden for municipalities that were administering the program, and that it may be challenging for youth to purchase and renew Youth Passes if they have to continue to return to their municipal office.

The MBTA's most recent package of fare changes addresses some of these issues for both the Youth Pass and student fare products. On March 7, 2016, the MBTA's Fiscal Management and Control Board voted on a package of fare changes, effective July 1, 2016, that includes several relevant provisions:

- The cost of a Student Monthly LinkPass (valid 7 days per week) will increase from \$26 to \$30. The price of a monthly Youth Pass would equal the cost of a Student Monthly LinkPass, and so the cost of the Youth Pass, if implemented, would increase from \$26 to \$30.
- Students will be able to purchase Student Monthly LinkPasses 12 months of the year, instead of only 10 months.
- During the 2016–17 school year, the MBTA will pilot-test sales of Student Monthly LinkPasses on MBTA fare vending machines. This would make it possible to sell monthly Youth Passes on fare vending machines as well.

In sum, these elements of the fare change package increase the price of the monthly student passes, but they also expand access to the Student Monthly LinkPass, and potentially to the Youth Pass. Students with a Student CharlieCard will be able to access a reduced-price pass through the Student Pass program year round. This will address 73 percent of the demand in the Youth Pass pilot.

These changes would make it possible to limit the scope of the Youth Pass program so that it specifically targets 12–18-year-old youth who are not enrolled in middle school or high school and 19–21-year-old means-tested youth. Youth that are eligible for Youth Passes would also be able to purchase and renew their passes at any fare vending machine, as opposed to returning to their city or town partner office each month to do so.

5.4 Full Program Recommendations

The preliminary results of the Youth Pass pilot resulted in the following recommendations for changes to the program if the Youth Pass is implemented as a full program:

- Allow sales of the monthly pass on the MBTA fare vending machines to ease the administrative burden on the municipal partners
- Continue to have municipal partners verify eligibility and provide the photo ID cards with an annual expiration date
- Allow additional municipalities to opt-in to the program
- Continue to analyze the means-testing portion of the program for future extensibility

5.5 Youth Pass Program Scenario Evaluation

To assess the possible revenue and service impacts of a full Youth Pass program, this section explores two possible scenarios for continuing or expanding the Youth Pass program beyond the 12-month pilot period. This analysis assumes that a future Youth Pass program, and the Student Pass program, would have the following structural characteristics:

- Only the monthly Youth Pass will be available in a future Youth Pass program. The 7-Day Youth Pass offered during the pilot will be discontinued.
- Monthly Youth Passes and Student Monthly LinkPasses would each cost \$30.
- Middle and high school students would be able to obtain Student Monthly LinkPasses year round, by receiving the Student S-Card from their school.
- Both monthly Youth Passes and Student Monthly LinkPasses will be available for purchase on MBTA fare vending machines (FVMs), once youth have confirmed

their eligibility for either program. Once they have enrolled, youth in the Youth Pass program would not need to return to their municipal partner office each month to pay for their pass.

As discussed in Section 5.3, the MBTA fare change package effective July 1, 2016, addresses many barriers that limit student access to Student Monthly LinkPasses. This makes it possible to limit the scope of the Youth Pass program so that it specifically targets youth who may not be able to afford a monthly pass at the full price or obtain it through another program. As a result, these two scenarios have the following features in terms of program eligibility:

- Middle and high school students would no longer be eligible to obtain monthly passes through the Youth Pass program because they would be able to obtain Student Monthly LinkPasses year-round. Youth 12–18 years old, not enrolled in middle or high school would be eligible for the Youth Pass.
- Youth in the 19-to-21-year-old age range would need to demonstrate that they meet means testing requirements to be eligible for the Youth Pass program. For the purposes of this scenario analysis, youth would need to be identified as living in a low-income household.¹⁰ This is used as a proxy for meeting the eligibility screens of enrollment in a state or federal benefit program like MassHealth, SNAP and public housing.

The two scenarios described in this report represent a low number and high number of municipalities that might participate in the program. The “Few Towns” scenario only includes the municipalities that have been participating in the pilot program. The “Many Towns” scenario includes the 14 communities that were part of the original Metropolitan Transit Authority’s (MTA) service area when the MBTA was formed, plus three additional municipalities that receive supplemental school bus service from the MBTA (Lynn, Melrose, and Quincy).¹¹ Table 5-1 lists the municipalities that were included in each scenario. The Many Towns scenario is not based on any discussion with the additional 13 municipalities; it only serves to provide a potential “upper-bound” case for a full Youth Pass program.

¹⁰ The threshold for low income is based on the median household income for the full 175-town MBTA service area estimated from 2010-2014 American Community Survey (ACS) data, which is \$73,587. The low income threshold is 60 percent of the median household income value, or \$44,152.

¹¹ The 14 communities that were part of the original Metropolitan Transit Authority’s (MTA) service area when the MBTA was formed include Arlington, Belmont, Boston, Brookline, Cambridge, Chelsea, Everett, Malden, Medford, Milton, Newton, Revere, Somerville, and Watertown.

TABLE 5-1
Possible Future Youth Pass Scenarios

Scenario	Representative Participating Municipalities
"Few Towns" (Original pilot participants)	Boston, Chelsea, Malden, Somerville
"Many Towns"	Arlington, Belmont, Boston, Brookline, Cambridge, Chelsea, Everett, Lynn, Malden, Medford, Melrose, Milton, Newton, Quincy, Revere, Somerville, Watertown

The sections below describe the three components of the scenarios:

- The market of youth eligible and likely to participate in a Youth Pass program
- The estimated net revenues for the MBTA, based on market size and various levels of program participation
- The estimated impacts to MBTA service, based on market size and various levels of program participation

Youth Eligible for a Future Youth Pass Program

To estimate the number of youth that would be eligible and likely to participate in a Youth Pass program under each scenario, CTPS applied a sequence of steps designed to capture youth that met age, school enrollment, and income (if applicable) criteria; and live near and are likely to use transit. These steps are described below. Several of the data sources mentioned in each step are described in Appendix A: Data Sources. Additional details for a number of these steps are available in Appendix B: Scenario Evaluation Methodology Details.

- **Step 1: Estimate the population of eligible youths, based on age, income, and school enrollment characteristics.** Eligible youth include those that are:
 - Ages 12 to 18 years old and are not enrolled in middle or high school or college
 - Ages 12 to 18 years old, who are enrolled in college
 - Ages 19 to 21 years old, who live in low-income households and are not enrolled in middle or high school or college
 - Ages 19 to 21 years old, who live in low-income households and are enrolled in college

CTPS developed these estimates using data from the 2014 American Community Survey (ACS), including data from the five-year summary file and

the five-year Public Use Microdata Sample (PUMS). These estimates only include youth in households; they exclude youth living in group quarters, such as college dormitories. Table B-1 in Appendix B shows the estimates for eligible youth in this group.

- **Step 2: Estimate the population of eligible youths who live near transit**

CTPS conducted a geographic information systems (GIS) analysis to determine the portion of the youth population that is eligible for a Youth Pass that lives within one-quarter mile walking distance of an MBTA bus stop or one-half mile walking distance of an MBTA rapid transit station. Table B-2 in Appendix B shows these results.

- **Step 3: Estimate the population of eligible youths who live near transit that are likely to use transit**

CTPS used data from the 2010–11 Massachusetts Travel Survey (MTS)—a statewide survey of how people use the Commonwealth’s multimodal transportation system—to estimate the percentage of people, by age group, who live in the densely-populated areas of the 17 municipalities included in the two scenarios and are likely to use transit. Appendix A provides additional details about the MTS, while Appendix B describes how information from the MTS was used to determine the share of youth, by age group, who are likely to use transit. Using the MTS data, CTPS estimated that approximately 37 percent of the 12-to-18-year-old population living near transit, and approximately 55 percent of the 19-to-21-year-old population living near transit, reported at least one transit trip as part of their survey response.¹² As a result, CTPS assumes these shares of each population segment reflect those who are likely to use transit.

Table 5-2 summarizes the results of steps 1 through 3, and shows the estimated number of people in each scenario that would be eligible, and may wish to participate, in a future Youth Pass program.

¹² The estimate of 19-21 year olds who reported at least one transit trip as part of their MTS response reflects youth in this age group, regardless of income. This estimate does not specifically reflect the transit usage of 19-21 year olds in low-income households.

TABLE 5-2
Estimated Youth Population Eligible for a Youth Pass,
Who Lives Near Transit and Uses Transit

Category	Few Towns Scenario	Many Towns Scenario
Age 12-18, Not Enrolled in School	800	1,300
Age 12-18, In College	700	1,300
Age 19-21, Low-Income, Not Enrolled in School	2,300	3,500
Age 19-21, Low-Income, In College	4,500	6,100
Total	8,400	12,200

Data sources: 2014 American Community Survey (ACS) 5-Year Summary File; 2014 ACS 5-Year Public Use Microdata Sample (PUMS); CTPS GIS Analysis; 2010-11 Massachusetts Travel Survey.

Note: Values have been rounded to the nearest 100 people. Totals may not sum due to rounding. Population values reflect youth in households only.

The populations of youth in either age group that are enrolled in school vary in comparison to the population groups shown in Table 5-2. In the Few Towns scenario, the estimated 12-to-18-year-old population enrolled in middle or high school is about 17,800. The 19-to-21 year old population that is a) enrolled in middle or high school; and b) living in low income households is about 500 people. Meanwhile, in the Many Towns scenario, the estimated 12-to-18-year-old population enrolled in middle or high school is approximately 32,900. The 19-to-21 year old population that is a) enrolled in middle or high school; and b) living in low income households is about 700 people.

Estimating Future Youth Pass Program Revenues

After estimating the markets of youth who would be eligible and may wish to participate in a Youth Pass program, CTPS applied several assumptions to calculate MBTA revenues under each program scenario. These assumptions are shaped by the MBTA fare-change package described earlier in this chapter and by the findings from the pilot program, as described in Chapters 2 and 3.

- **Youth Pass Cost:** The Youth Pass will cost \$30, the same as a Student Monthly LinkPass, based on the new fares that will go into effect on July 1, 2016.
- **Passes on Fare Vending Machines (FVMs).** When reviewing the Youth Pass AFC data, CTPS noticed cases where participants were paying single-ride and

transfer fares for trips for short periods between using their Youth Passes. They may have been paying for trips this way as a stop-gap measure until they could return to their municipal partner office to renew their pass. With the availability of passes on fare vending machines, after enrolling, participating youth will be able to buy their passes on FVMs; this will eliminate their need to pay for “between-pass” trips. As a result, youth participating in the program would only pay the cost of the pass (\$30) each month.

- **Estimates of Monthly “Foregone” Revenues per person.** CTPS used pre-pilot AFC data to estimate the amount that pilot participants would spend during either a school year month or summer month if they were not in a Youth Pass program. These monthly expenditure values, when multiplied by the estimated number of participants in the program during a given month, provide a way to estimate the amount of revenue the MBTA would take in if the Youth Pass program did not exist. Details about how CTPS created these estimates are available in Appendix B.

Table 5-3 shows the estimated monthly foregone revenue amount for each type of month (school or summer). During a given year, summer months include July and August, while school year months include September through June.

TABLE 5-3
Estimated Foregone Revenue Amounts, by Month

Groups Represented	Month Type	Foregone Revenue Amount
12-18, not enrolled in school or enrolled in college	School	\$56.50
12-18, not enrolled in school or enrolled in college	Summer	\$59.00
19-21 and low income, not enrolled in school or enrolled in college	School	\$56.50
19-21 and low income, not enrolled in school or enrolled in college	Summer	\$60.50

Data source: CTPS pre-pilot AFC data.

Note: Values have been rounded to the nearest \$0.50

- **Ongoing Participation.** CTPS assumed that youth participating in a future Youth Pass program would participate all months of the year. In reality, individual participation in the program would likely fluctuate over time, with youth entering, remaining in, or exiting the program as they learn about it, participate in it, and determine whether it continues to meet their needs.
- **Adding in passes for GED/HiSET program enrollees that would not otherwise be eligible for a Youth Pass.** Currently, some youth who are not enrolled in school may still have access to Student Monthly LinkPasses, particularly if they participate in a General Educational Development (GED) / High School Equivalency (HiSET) testing program that purchases monthly passes on behalf of their students. In the future, youth in these programs will not be able to receive reduced-price passes through the Student Pass program; MBTA staff anticipates that these individuals would be able to obtain passes through a Youth Pass program. Many of these youth are already eligible for the Youth Pass program based on other criteria, but youth aged 19 to 21 who do not live in low-income households would not be eligible based on the other criteria. CTPS estimated the number of passes that may currently be sold to youth in this category through the Student Pass program, and added this number of passes to estimated Youth Pass sales during school or summer months. Appendix B provides additional details on how CTPS estimated the number of passes for GED/HiSET program enrollees for each scenario.

To calculate estimated Youth Pass program revenues and foregone revenues, CTPS completed the following steps for each of the four market categories of participants (12 to 18 years old and not in school; 12 to 18 years old and in college; 19 to 21 years old, low-income, and not enrolled in school; and 19 to 21 years old, low-income, and in college):

- **Step 1:** CTPS developed a range of possible program participation levels, ranging from 10 percent of the eligible market participating in the program, to 100 percent (full participation).

Example: 1,000 youth in category at a 10 percent participation level
 $1,000 * 0.10 = 100 \text{ potential participants}$

- **Step 2:** CTPS estimated the pass sales for summer months by multiplying the number of expected participants at each participation level by two (2). Any Student Monthly LinkPasses that were expected to be sold to participants in GED programs during summer months were added to these total pass sales. This adjusted number of passes was multiplied by \$30 to determine the estimated program revenues for the summer.

*Example: 100 potential participants * 2 months = 200 passes.*

Add 10 pass sales for GED program enrollees during summer = 210 passes.

*210 passes * \$30 = \$6,300*

- **Step 3:** CTPS estimated the foregone revenues for summer months by multiplying the number of passes sold by the appropriate average foregone revenue amount for that market category. In this calculation, each pass represents one month of youth travel.

Example: Summer monthly foregone revenue for category: \$59.00

*210 passes * \$59.00 = \$12,390*

- **Step 4:** CTPS estimated the pass sales for school months by multiplying the number of expected participants at each participation level by ten (10). Any Student Monthly LinkPasses that were expected to be sold to participants in GED programs during school months were added to total pass sales. This adjusted number of passes was multiplied by \$30 to determine the estimated program revenues for the school year.

*Example: 100 potential participants * 10 months = 1,000 passes*

Add 50 pass sales for GED program enrollees during the school year = 1,050 passes

*1,050 passes * \$30 = \$31,500*

- **Step 5:** CTPS estimated the foregone revenues for school year months by multiplying the number of passes sold by the appropriate average foregone revenue amount for that market category. In this calculation, each pass represents one month of youth travel.

Example: School monthly foregone revenue for category: \$55.00

*1,050 passes * \$55.00 = \$57,750*

- **Step 6:** CTPS summed the Youth Pass revenues for the full year, and summed the estimated foregone revenues for the full year. The foregone revenues were subtracted from the Youth Pass revenues to determine the net program revenues at each participation level.

Example: Total Youth Pass revenues: \$6,300 + \$31,500 = \$37,800

Total foregone revenues: \$12,390 + \$57,750 = \$70,140

Total net revenue loss: \$70,140 - \$37,800 = \$32,340

CTPS followed this process for all four market categories of participants in order to develop net revenue estimates for the Few Towns scenario. This process was then repeated to develop estimates for the Many Towns scenario.

Few Towns Scenario: Net Program Revenues

Table 5-4 summarizes the ranges of net Youth Pass Program revenues for the Few Towns scenario, which includes Boston, Chelsea, Malden, and Somerville. CTPS created these ranges by varying the percent of each market category that would be likely to participate in a Youth Pass program. Values were calculated for each market category at 10 percent and at 100 percent. These ranges are shown for each individual market category, and then in total.

Under the Few Towns Scenario, net revenue losses would range from \$271,000 (at 10 percent participation) to approximately \$2.7 million (at 100 percent participation) per year, assuming all market categories are included in the program.

TABLE 5-4
Few Towns Scenario: Ranges of Estimated Net Program Revenues, by Category

Market Category	Range of Estimated Participants	Range of Youth Passes Sold, Per Year¹	Total Annual Youth Pass Program Revenues	Total Annual Foregone Revenues	Total Net Program Revenues
Age 12–18, Not Enrolled in School	100 – 800	1,000 – 9,500	\$29,000 – \$285,000	\$54,000 – \$540,000	(\$26,000 – \$255,000)
Age 12–18, In College	100 – 700	900 – 8,600	\$26,000 – \$259,000	\$49,000 – \$491,000	(\$23,000 – \$232,000)
Age 19–21, Low-Income, Not Enrolled in School	200 – 2,330	2,800 – 28,100	\$84,000 – \$843,000	\$160,000 – \$1,603,000	(\$76,000 – \$760,000)
Age 19–21, Low-Income, In College	500 - 4500	5,400 – 54,000	\$162,000 – \$1,621,000	\$308,000 – \$3,082,000	(\$146,000 – \$1,461,000)
Total	800 – 8,400	10,000 – 100,300	\$301,000 – \$3,009,000	\$572,000 – \$5,716,000	(\$271,000 – \$2,708,000)

Data sources: 2014 American Community Survey (ACS) 5-Year Summary File; 2014 ACS 5-Year Public Use Microdata Sample (PUMS); CTPS GIS Analysis; 2010–11 Massachusetts Travel Survey; CTPS pre-pilot AFC data.

Note: Participants and pass sales have been rounded to the nearest 100. Dollar values have been rounded to the nearest thousand. Totals may not sum due to rounding.

(1) The total annual pass sales have been adjusted to account for Youth Pass sales to 19-to-21-year-old youth in GED/HiSET programs that are not accounted for in the estimated range of participants.

Table 5-5 shows the estimated net program revenues for all categories combined at various participation levels. To estimate the number of eligible youth who might choose to participate in a future Youth Pass program, CTPS calculated the pilot program application rate for eligible youth in the participating municipalities. To do so, CTPS first determined the total number of youth who applied to the Youth Pass pilot program that would meet the eligibility criteria of the Youth Pass program under the scenarios (12 to 18-year-old youth not enrolled in middle or high school; and 19 to 21-year-old youth not enrolled in middle or high school, that are also low-income). These values were then compared to the total eligible youth population in the four pilot municipalities that live near transit and are estimated to use transit.

Using this approach, CTPS determined that approximately 14 percent of eligible youth expressed interest in the program under current marketing conditions. As a result, CTPS has highlighted the 15 percent participation rate row in the table to indicate the expected level of participation in a future Youth Pass program. This percentage does not account for increased interest in the program in response to availability of Youth Passes on the fare vending machines or different methods to market the program.

TABLE 5-5
Few Towns Scenario: Estimated Net Program Revenues (All Categories) at Various Participation Levels

Market (All Categories) Participation Level	Age Category	Estimated Youth Passes Sold, Per Year¹	Total Annual Youth Pass Program Revenues	Total Annual Foregone Revenues	Total Net Program Revenues
10% participation	12 to 18	1,800	\$54,000	\$103,000	(\$49,000)
	19 to 21	8,200	\$246,000	\$468,000	(\$222,000)
	All	10,000	\$301,000	\$572,000	(\$271,000)
15% participation	12 to 18	2,700	\$82,000	\$155,000	(\$73,000)
	19 to 21	12,300	\$370,000	\$703,000	(\$333,000)
	All	15,000	\$451,000	\$857,000	(\$406,000)
20% participation	12 to 18	3,600	\$109,000	\$206,000	(\$97,000)
	19 to 21	16,400	\$493,000	\$937,000	(\$444,000)
	All	20,100	\$602,000	\$1,143,000	(\$542,000)
30% participation	12 to 18	5,400	\$163,000	\$310,000	(\$146,000)
	19 to 21	24,600	\$739,000	\$1,405,000	(\$666,000)
	All	30,100	\$903,000	\$1,715,000	(\$812,000)
100% participation	12 to 18	18,100	\$544,000	\$1,032,000	(\$487,000)
	19 to 21	82,100	\$2,464,000	\$4,685,000	(\$2,220,000)
	All	100,300	\$3,009,000	\$5,716,000	(\$2,708,000)

Data sources: 2014 American Community Survey (ACS) 5-Year Summary File; 2014 ACS 5-Year Public Use Microdata Sample (PUMS); CTPS GIS Analysis; 2010-11 Massachusetts Travel Survey; CTPS pre-pilot AFC data.

Note: Pass sales have been rounded to the nearest 100. Dollar values have been rounded to the nearest thousand. Totals may not sum due to rounding.

(1) The total annual pass sales have been adjusted to account for Youth Pass sales to 19-to-21 year old youth in GED/HiSET programs.

At the 15 percent participation level, estimated net revenue losses are approximately \$73,000 for the 12-to-18-year-old group (including both youth not enrolled in school and in college), and \$333,000 for the 19-to-21-year-old group (including both youth not enrolled in school and in college). At the 15 percent participation level, the estimated net revenue loss for all categories is approximately \$406,000.

Appendix B includes four tables that provide the information shown in Table 5-5, but are specific to each of the four market categories.

Many Towns Scenario: Net Program Revenues

Table 5-6 summarizes the ranges of net Youth Pass Program revenues for the Many Towns scenario, which includes the 17 core-area communities listed in Table 5-1. CTPS created these ranges by varying the percent of each market category that would be likely to participate in a Youth Pass program from 10 percent to 100 percent. These ranges are shown for each individual market category, and in total.

TABLE 5-6
Many Towns Scenario: Ranges of Estimated Net Program Revenues, by Category

Market Category	Range of Estimated Participants	Range of Youth Passes Sold, Per Year¹	Total Annual Youth Pass Program Revenues	Total Annual Foregone Revenues	Total Net Program Revenues
Age 12–18, Not Enrolled in School	100 – 1,300	1,500 – 15,400	\$46,000 – \$464,000	\$88,000 – \$878,000	(\$41,000 – \$415,000)
Age 12–18, In College	100 – 1,300	1,600 – 16,000	\$48,000 – \$481,000	\$91,000 – \$911,000	(\$43,000 – \$431,000)
Age 19–21, Low-Income, Not Enrolled in School	300 – 3,500	4,200 – 41,800	\$125,000 – \$1,253,000	\$238,000 – \$2,382,000	(\$113,000 – \$1,129,000)
Age 19–21, Low-Income, In College	600 – 6,100	7,300 – 73,300	\$220,000 – \$2,198,000	\$418,000 – \$4,178,000	(\$198,000 – \$1,980,000)
Total	1,200 – 12,200	14,700 – 146,500	\$440,000 – \$4,396,000	\$835,000 – \$8,350,000	(\$395,000 – \$3,955,000)

Data sources: 2014 American Community Survey (ACS) 5-Year Summary File; 2014 ACS 5-Year Public Use Microdata Sample (PUMS); CTPS GIS Analysis; 2010-11 Massachusetts Travel Survey; CTPS pre-pilot AFC data. Note: Note: Participants and pass sales have been rounded to the nearest 100. Dollar values have been rounded to the nearest thousand. Totals may not sum due to rounding.

(1) The total annual pass sales have been adjusted to account for Youth Pass sales to 19-to-21 year old youth in GED/HiSET programs that are not accounted for in the estimated range of participants.

Under the Many Towns Scenario, net revenue losses would range from \$395,000 (at 10 percent participation) to approximately \$4 million (at 100 percent participation) per year, assuming all market categories are included in the program.

Table 5-7 shows the estimated net program revenues for all categories combined at various participation levels. As discussed in the Few Towns scenario section, CTPS determined that approximately 14 percent of eligible youth expressed interest in the program under current marketing conditions. As a result, CTPS has highlighted a 15 percent participation row in the table to indicate the expected level of participation in a future Youth Pass program.

TABLE 5-7
Many Towns Scenario: Estimated Net Program Revenues (All Categories) at Various Participation Levels

Market (All Categories) Participation Level	Age Category	Estimated Youth Passes Sold, Per Year¹	Total Annual Youth Pass Program Revenues	Total Annual Foregone Revenues	Total Net Program Revenues
10% participation	12 to 18	3,100	\$94,000	\$179,000	(\$85,000)
	19 to 21	11,500	\$345,000	\$656,000	(\$311,000)
	All	14,700	\$440,000	\$835,000	(\$395,000)
15% participation	12 to 18	4,700	\$142,000	\$268,000	(\$127,000)
	19 to 21	17,300	\$518,000	\$984,000	(\$466,000)
	All	22,000	\$659,000	\$1,253,000	(\$593,000)
20% participation	12 to 18	6,300	\$189,000	\$358,000	(\$169,000)
	19 to 21	23,000	\$690,000	\$1,312,000	(\$622,000)
	All	29,300	\$879,000	\$1,670,000	(\$791,000)
30% participation	12 to 18	9,400	\$283,000	\$537,000	(\$254,000)
	19 to 21	34,500	\$1,035,000	\$1,968,000	(\$933,000)
	All	44,000	\$1,319,000	\$2,505,000	(\$1,186,000)
100% participation	12 to 18	31,500	\$945,000	\$1,790,000	(\$845,000)
	19 to 21	115,000	\$3,451,000	\$6,560,000	(\$3,109,000)
	All	146,500	\$4,396,000	\$8,350,000	(\$3,955,000)

Data sources: 2014 American Community Survey (ACS) 5-Year Summary File; 2014 ACS 5-Year Public Use Microdata Sample (PUMS); CTPS GIS Analysis; 2010-11 Massachusetts Travel Survey; CTPS pre-pilot AFC data.

Note: Pass sales have been rounded to the nearest 100. Dollar values have been rounded to the nearest thousand. Totals may not sum due to rounding

(1) The total annual pass sales have been adjusted to account for Youth Pass sales to 19-to-21 year old youth in GED/HiSET programs.

At the 15 percent participation level, estimated net revenue losses are approximately \$127,000 for the 12-to-18-year-old group (including both youth not enrolled in school and in college), and \$466,000 for the 19-to-21-year-old group (including both youth not enrolled in school and in college). At the 15 percent participation level, the estimated net revenue loss for all categories is approximately \$593,000.

Appendix B includes four tables that provide the information shown in Table 5-7, but are specific to each of the four market categories.

Estimating Future Youth Pass Program Service Impacts

CTPS also estimated the additional number of unlinked weekday trips that may take place on the MBTA local bus and rapid transit system under the Few Towns and Many Towns Youth Pass program scenarios.¹³ Two sets of estimates were calculated for each scenario: one for additional weekday trips taking place during a summer month, and one for additional weekday trips taking place during a school-year month. To do this, CTPS used the estimated number of Youth Pass program participants to determine the number of passes that would be sold during a school-year or summer month.¹⁴ Each pass represents one month of youth travel. CTPS then applied several assumptions, which are determined by the MBTA fare-change package described earlier in this chapter, and by the findings from the pilot program.

- **Passes on Fare Vending Machines (FVMs).** When reviewing the Youth Pass AFC data, CTPS noticed cases where participants were paying single-ride and transfer fares for trips for short periods between using their Youth Passes. After enrolling in the Youth Pass program, participating youth will be able to buy their passes on FVMs, which will eliminate their need to make “between-pass” trips. Therefore, CTPS assumed that a monthly Youth Pass will cover all of a participant’s monthly trips on the local bus and rapid transit system.
- **Ongoing Participation.** CTPS assumed that youth participating in a future Youth Pass program would participate all months of the year.
- **Estimates of Weekday Trips per Month (Pre-Pilot Data).** CTPS used pre-pilot AFC data to estimate the number of unlinked weekday trips that youth made per month before they received a Youth Pass. These values are based on different samples of pre-pilot participants, which varied depending on:

¹³ An unlinked trip is an individual trip on any single transit vehicle; a single journey, often composed of many unlinked trips on multiple vehicles, is a “linked” trip. These estimates of unlinked trips are based on the number of times people tapped their CharlieCard to interact with an AFC fare gate or fare box.

¹⁴ These pass estimates were later adjusted to include estimates of passes for 19-to-21-year old youth (not low income) in GED/HiSET programs that would be purchased in a given month.

- Whether the participants were enrolled in school
- Whether the participants lived in a low-income household
- Whether they provided their 30-days of pre-pilot data during school months (late May through June 2015, and September 2015 through March 2016), or during summer months (July and August 2015)

Appendix B includes details about how CTPS created these estimates.

AFC data for taps against MBTA fare gates or fare boxes includes a time stamp, which makes it possible to determine the day of the week and the time of day a trip was made. CTPS used this information to determine whether trips made on weekdays were made during the AM peak period (between 7:00 AM and 8:59 AM), the PM peak period (between 4:00 PM and 6:30 PM), or during non-peak times. In addition to calculating an average number of weekday trips pre-pilot participants made per month, CTPS could also estimate the average number of weekday trips participants made during each service period, as shown in Table B-15 in Appendix B.

- **Estimates of Weekday Trips per Month (Youth Pass Data).** CTPS also used AFC data from Youth Pass participants to estimate the number of unlinked weekday trips that youth made per month with a Youth Pass. These values were calculated using a process similar to the one used to develop the pre-pilot values. CTPS created samples of Youth Pass participants based on whether or not they were enrolled in school, and whether or not they lived in low-income households. Only participants who used monthly Youth Passes were included in these samples, because only the monthly Youth Pass will be offered under these scenarios. CTPS estimated average weekday trips per month (by service period and overall) using per-person averages calculated over school months, and over summer months. These values are shown in Table B-16 in Appendix B.

Using these assumptions, CTPS calculated the net unlinked trips that would be added to the MBTA local bus and rapid transit system each weekday, depending on service period and month type, for the Few Towns and Many Towns scenarios. CTPS completed the following steps for each of the four market categories of participants (12 to 18 years old, not in school; 12 to 18 years old, in college; 19 to 21 years old, low income, and not enrolled in school; 19 to 21 years old, low income, and in college):

- **Step 1:** Using pre-pilot and Youth Pass estimates of net weekday trips per month (by service period), CTPS calculated the net number of additional trips a Youth Pass participant would make per month during each of these periods. Table 5-8 shows these values.

TABLE 5-8
Estimated Average Net Weekday Trips per Month, by Service Period

Groups Represented	Month Type	AM-Peak Period	Non-Peak Period	PM-Peak Period	Total
12–18, not-enrolled-in-school or enrolled-in-college	School	3	13	5	21
12–18, not-enrolled-in-school or enrolled-in-college	Summer	3	14	2	19
19–21 and low-income, not-enrolled-in-school or enrolled-in-college	School	3	14	5	22
19–21 and low-income, not-enrolled-in-school or enrolled-in-college	Summer	3	14	3	19

Data source: MBTA Youth Pass pilot AFC data, MBTA pre-pilot AFC data

- **Step 2:** As in the net revenue calculations, CTPS developed a range of possible program participation levels, ranging from 10 percent of the eligible market participating in the program, to 100 percent (full participation).
- **Step 3:** CTPS used the estimated number of Youth Pass program participants in each market category to determine the number of passes that would be sold during a summer month, including any passes for 19-to-21-year-old youth (not low-income) in GED/HiSET programs. As mentioned above, each pass represents one month of youth travel. CTPS then multiplied the number of passes in each market category by net weekday trip values for that category, as shown in Table 5-8.

*Example: 100 potential participants * 1 month = 100 passes.*

Add 2 pass sales for GED program enrollees during a summer = 102 passes.

*102 passes * 3 additional AM Peak weekday trips per month = 306 additional AM Peak weekday trips per month.*

- **Step 4:** CTPS divided the number of additional weekday trips per summer month, for each service period, by 20.75, which is the average number of weekdays per month when accounting for holidays. This makes it possible to determine the net additional trips in that service period on a given weekday during a summer month.

Example: 306 additional AM Peak weekday trips per month / 20.75 = 15 additional AM Peak trips per weekday.

- **Step 5:** CTPS repeated the process outlined in step 3, using data on participants, passes, and net additional weekday trips, to estimate the additional weekday trips per month (by service period) during a school year month.
- **Step 6:** CTPS repeated the process outlined in Step 4 to determine the net additional trips in that service period on a given weekday during a school year month.

Few Towns Scenario: Net Additional Weekday Trips

Tables 5-9 and 5-10 summarize the ranges of net additional weekday trips, by service period, that may be made on the MBTA local bus and rapid transit system for the Few Towns Youth Pass program scenario. Table 5-9 provides this information for a summer month, while Table 5-10 provides this information for a school year month. CTPS created these ranges by varying the percent of each market category that would be likely to participate in a Youth Pass program. Values were calculated for each market category at 10 percent and at 100 percent. These ranges are shown for each individual market category, and then in total. The columns for the peak periods are highlighted in each table.

TABLE 5-9
Few Towns Scenario: Ranges of Additional Weekday Trips per Service Period
(Summer Month)

Market Category	Range of Youth Passes Sold, Per Month¹	Additional AM Peak Period Trips	Additional Non-Peak Period Trips	Additional PM Peak Period Trips	Additional Trips (All Periods)
Age 12–18, Not-Enrolled-in-School	100 – 800	10 - 100	50 - 520	10 – 90	70 – 710
Age 12–18, In-College	100 – 700	10 – 90	50 – 470	10 – 80	70 – 650
Age 19–21, Low-Income, Not-Enrolled-in-School	240 – 2,300	30 – 290	160 – 1,580	30 – 300	220 – 2,170
Age 19–21, Low-Income, In-College	500 – 4,500	60 – 560	300 – 3,030	60 – 580	420 – 4,170
Total	800 – 8,400	100 – 1,030	560 – 5,600	110 – 1,060	770 – 7,700

Data sources: 2014 American Community Survey (ACS) 5-Year Summary File; 2014 ACS 5-Year Public Use Microdata Sample (PUMS); CTPS GIS Analysis; 2010–11 Massachusetts Travel Survey; MBTA pre-pilot AFC data.

Note: Pass sales have been rounded to the nearest 100. Additional trips, by service period, have been rounded to the nearest 10 trips. Totals may not sum due to rounding.

The total annual pass sales have been adjusted to account for Youth Pass sales to 19-to-21-year-old youth in GED/HiSET programs that are not accounted for in the estimated range of participants.

TABLE 5-10
Few Towns Scenario: Ranges of Additional Weekday Trips per Service Period
(School Month)

Market Category	Range of Youth Passes Sold, Per Month¹	Additional AM Peak Period Trips	Additional Non-Peak Period Trips	Additional PM Peak Period Trips	Additional Trips (All Periods)
Age 12–18, Not-Enrolled-in-School	100 – 800	10 – 130	50 – 500	20 – 180	80 - 800
Age 12–18, In-College	100 – 700	10 – 110	50 – 460	20 – 160	70 – 730
Age 19–21, Low-Income, Not-Enrolled-in-School	230 – 2,300	40 – 380	160 – 1,570	50 – 530	250 – 2,500
Age 19–21, Low-Income, In-College	500 – 4,500	70 – 730	300 – 3,010	100 – 1,010	480 – 4,760
Total	800 – 8,400	130 – 1,340	550 – 5,540	190 – 1,890	880 – 8,760

Data sources: 2014 American Community Survey (ACS) 5-Year Summary File; 2014 ACS 5-Year Public Use Microdata Sample (PUMS); CTPS GIS Analysis; 2010–11 Massachusetts Travel Survey; MBTA pre-pilot AFC data.

Note: Pass sales have been rounded to the nearest 100. Additional trips, by service period, have been rounded to the nearest 10 trips. Totals may not sum due to rounding.

(1) The total annual pass sales have been adjusted to account for Youth Pass sales to 19-to-21-year-old youth in GED/HiSET programs that are not accounted for in the estimated range of participants.

These tables show that under the Few Towns scenario, the additional trips that may be made during the AM peak period range from around 100 trips (at the 10 percent participation level) to around 1,340 trips (at the 100 percent participation level), depending on the month type. During the PM peak period, estimated additional trips range from around 110 trips (at the 10 percent participation level) to nearly 1,900 trips (at the 100 percent participation level), depending on the month type. These estimates show that participants would likely make more peak-period trips during school months

compared to summer months. Overall, additional weekday trips, regardless of service period, range from 770 (at the 10 percent participation level) to approximately 8,800 (at the 100 percent participation level). As mentioned in Chapter 3, there were approximately 1.2 million weekday boardings on the MBTA bus and rapid transit systems in fiscal year (FY) 2013. This projected net growth in trips on the bus and rapid transit system is very small by comparison, and would likely be dispersed throughout the bus and rapid transit networks.

Tables 5-11 and 5-12 show the estimated additional weekday trips for all categories combined at various participation levels. CTPS has highlighted a 15 percent participation-rate row in the table to indicate the expected level of participation in a future Youth Pass program, based on pilot conditions.

TABLE 5-11
Few Towns Scenario: Estimated Additional Weekday Trips at Various Participation Levels (Summer Month)

Market (All Categories) Participation Level	Estimated Youth Passes Sold, Per Month¹	Additional AM Peak Period Trips	Additional Non-Peak Period Trips	Additional PM Peak Period Trips	Additional Trips (All Periods)
10% participation	800	100	560	110	770
15% participation	1,300	160	840	160	1,150
20% participation	1,700	210	1,120	210	1,540
30% participation	2,500	310	1,680	320	2,310
100% participation	8,400	1,030	5,600	1,060	7,700

Data sources: 2014 American Community Survey (ACS) 5-Year Summary File; 2014 ACS 5-Year Public Use Microdata Sample (PUMS); CTPS GIS Analysis; 2010–11 Massachusetts Travel Survey; MBTA pre-pilot AFC data.

Note: Pass sales have been rounded to the nearest 100. Additional trips, by service period, have been rounded to the nearest 10 trips. Totals may not sum due to rounding.

(1) The total annual pass sales have been adjusted to account for Youth Pass sales to 19-to-21-year-old youth in GED/HiSET programs that are not accounted for in the estimated range of participants

TABLE 5-12
Few Towns Scenario: Estimated Additional Weekday Trips at Various
Participation Levels (School Month)

Market (All Categories) Participation Level	Estimated Youth Passes Sold, Per Month¹	Additional AM Peak Period Trips	Additional Non-Peak Period Trips	Additional PM Peak Period Trips	Additional Trips (All Periods)
10% participation	800	130	550	190	880
15% participation	1,300	200	830	280	1,310
20% participation	1,700	270	1,110	380	1,750
30% participation	2,500	400	1,660	570	2,630
100% participation	8,400	1,340	5,540	1,880	8,760

Data sources: 2014 American Community Survey (ACS) 5-Year Summary File; 2014 ACS 5-Year Public Use Microdata Sample (PUMS); CTPS GIS Analysis; 2010–11 Massachusetts Travel Survey; MBTA pre-pilot AFC data.

Note: Pass sales have been rounded to the nearest 100. Additional trips, by service period, have been rounded to the nearest 10 trips. Totals may not sum due to rounding.

(1) The total annual pass sales have been adjusted to account for Youth Pass sales to 19-to-21-year-old youth in GED/HiSET programs that are not accounted for in the estimated range of participants

Tables 5-11 and 5-12 show that, at the 15 percent participation level, CTPS estimates that Youth Pass program participants would add 160 trips to the MBTA local bus and rapid transit system during the AM and PM peak periods during summer months. During school months, they would add approximately 200 trips during the AM peak on a given weekday, and approximately 300 trips during the PM peak.

Many Towns Scenario: Net Additional Weekday Trips

Tables 5-13 and 5-14 summarize the ranges of net additional weekday trips, by service period that may be made on the MBTA local bus and rapid transit system for the Many Towns Youth Pass program scenario. Table 5-13 provides this information for a summer month, while Table 5-14 provides this information for a school-year month. CTPS created these ranges by varying the percent of each market category that would be likely to participate in a Youth Pass program. Values were calculated for each market category at 10 percent and at 100 percent. These ranges are shown for each individual market category, and then in total. The columns for the peak periods are highlighted in each table.

TABLE 5-13
Many Towns Scenario: Ranges of Additional Weekday Trips per Service Period
(Summer Month)

Market Category	Range of Youth Passes Sold, Per Month¹	Additional AM Peak Period Trips	Additional Non-Peak Period Trips	Additional PM Peak Period Trips	Additional Trips (All Periods)
Age 12–18, Not-Enrolled-in-School	100 – 1,300	20 – 160	90 – 850	20 – 150	120 – 1,160
Age 12–18, In-College	100 – 1,300	20 – 170	90 – 170	20 – 160	120 – 1,200
Age 19–21, Low-Income, Not-Enrolled-in-School	300 – 3,500	40 – 430	230 – 2,340	50 – 450	320 – 3,220
Age 19–21, Low-Income, In-College	600 – 6,100	80 – 760	410 – 4,110	80 – 790	570 – 5,650
Total	1,200 – 12,200	150 – 1,510	820 – 8,180	150 – 1,540	1,120 – 11,230

Data sources: 2014 American Community Survey (ACS) 5-Year Summary File; 2014 ACS 5-Year Public Use Microdata Sample (PUMS); CTPS GIS Analysis; 2010–11 Massachusetts Travel Survey; MBTA pre-pilot AFC data.

Note: Pass sales have been rounded to the nearest 100. Additional trips, by service period, have been rounded to the nearest 10 trips. Totals may not sum due to rounding.

The total annual pass sales have been adjusted to account for Youth Pass sales to 19-to-21-year-old youth in GED/HiSET programs that are not accounted for in the estimated range of participants.

TABLE 5-14
Many Towns Scenario: Ranges of Additional Weekday Trips per Service Period
(School Month)

Market Category	Range of Youth Passes Sold, Per Month¹	Additional AM Peak Period Trips	Additional Non-Peak Period Trips	Additional PM Peak Period Trips	Additional Trips (All Periods)
Age 12–18, Not-Enrolled-in-School	100 – 1,300	20 – 200	80 – 820	30 – 290	130 – 1,310
Age 12–18, In-College	100 – 1,300	20 – 210	90 – 850	30 – 300	140 – 1,360
Age 19–21, Low-Income, Not-Enrolled-in-School	300 – 3,500	60 - 560	230 – 2,330	80 – 790	370 – 3,680
Age 19–21, Low-Income, In-College	600 – 6,100	100 – 990	410 – 4,090	140 – 1,380	650 – 6,450
Total	1,200 – 12,200	200 – 1,960	810 – 8,070	280 – 2,760	1,280 – 12,790

Data sources: 2014 American Community Survey (ACS) 5-Year Summary File; 2014 ACS 5-Year Public Use Microdata Sample (PUMS); CTPS GIS Analysis; 2010–11 Massachusetts Travel Survey; MBTA pre-pilot AFC data.

Note: Pass sales have been rounded to the nearest 100. Additional trips, by service period, have been rounded to the nearest 10 trips. Totals may not sum due to rounding.

(1) The total annual pass sales have been adjusted to account for Youth Pass sales to 19-to-21-year-old youth in GED/HiSET programs that are not accounted for in the estimated range of participants.

These tables show that under the Many Towns scenario, the additional trips that may be made during the AM peak period range from around 150 trips (at the 10 percent participation level) to around 2,000 trips (at the 100 percent participation level), depending on the month type. During the PM peak period, estimated additional trips range from around 150 trips (at the 10 percent participation level) to nearly 2,800 trips (at the 100 percent participation level), depending on the month type. As with the Few Towns scenario, these estimates show that participants would likely make more peak-

period trips during school months compared to summer months. Overall, additional weekday trips, regardless of service period, range from 1,120 (at the 10 percent participation level) to approximately 12,800 (at the 100 percent participation level). The Many Towns scenario reflects about a 45 percent increase in average weekday trips compared to the Few Towns scenario. However, this growth would likely be dispersed throughout the bus and rapid transit networks and is still small compared to total weekday boardings for the local bus and rapid transit system as a whole.

Tables 5-15 and 5-16 show the estimated additional weekday trips for all categories combined at various participation levels. CTPS has highlighted a 15 percent participation row in the table to indicate the expected level of participation in a future Youth Pass program, based on pilot conditions.

TABLE 5-15
Many Towns Scenario: Estimated Additional Weekday Trips at Various Participation Levels (Summer Month)

Market (All Categories) Participation Level	Estimated Youth Passes Sold, Per Month¹	Additional AM Peak Period Trips	Additional Non-Peak Period Trips	Additional PM Peak Period Trips	Additional Trips (All Periods)
10% participation	1,200	150	820	150	1,120
15% participation	1,800	230	1,230	230	1,680
20% participation	2,400	300	1,630	310	2,250
30% participation	3,700	450	2,450	460	3,370
100% participation	12,200	1,510	8,180	1,540	11,230

Data sources: 2014 American Community Survey (ACS) 5-Year Summary File; 2014 ACS 5-Year Public Use Microdata Sample (PUMS); CTPS GIS Analysis; 2010–11 Massachusetts Travel Survey; MBTA pre-pilot AFC data.

Note: Pass sales have been rounded to the nearest 100. Additional trips, by service period, have been rounded to the nearest 10 trips. Totals may not sum due to rounding.

(1) The total annual pass sales have been adjusted to account for Youth Pass sales to 19-to-21-year-old youth in GED/HiSET programs that are not accounted for in the estimated range of participants

TABLE 5-16
Many Towns Scenario: Estimated Additional Weekday Trips at Various Participation Levels (School Month)

Market (All Categories) Participation Level	Estimated Youth Passes Sold, Per Year¹	Additional AM Peak Period Trips	Additional Non-Peak Period Trips	Additional PM Peak Period Trips	Additional Trips (All Periods)
10% participation	1,200	200	810	280	1,280
15% participation	1,800	290	1,210	410	1,920
20% participation	2,400	390	1,610	550	2,560
30% participation	3,700	590	2,420	830	3,840
100% participation	12,200	1,960	8,070	2,750	12,780

Data sources: 2014 American Community Survey (ACS) 5-Year Summary File; 2014 ACS 5-Year Public Use Microdata Sample (PUMS); CTPS GIS Analysis; 2010–11 Massachusetts Travel Survey; MBTA pre-pilot AFC data.

Note: Pass sales have been rounded to the nearest 100. Additional trips, by service period, have been rounded to the nearest 10 trips. Totals may not sum due to rounding.

(1) The total annual pass sales have been adjusted to account for Youth Pass sales to 19-to-21-year-old youth in GED/HiSET programs that are not accounted for in the estimated range of participants

Tables 5-15 and 5-16 show that at the 15 percent participation level, CTPS estimates that Youth Pass program participants would add 230 trips to the MBTA local bus and rapid transit system during the AM and PM peak periods during summer months. During school months, they would make approximately 290 trips during the AM peak on a given weekday, and approximately 410 trips during the PM peak.

5.6 Conclusions

The Youth Pass Pilot has increased transit access for primarily low-income and minority youth, allowing them access to recreational opportunities, work, school, and medical appointments they would not have had otherwise. The collaborative partnership with municipalities has yielded an auditable reduced-fare program with limited administrative impact for the MBTA. A key finding of the pilot is that 73 percent of the applicants were eligible for an existing MBTA reduced-fare pass, but they are unable to access it due to their school not offering it or the limitations on summer months. These problems were addressed when the MBTA Fiscal and Management Control Board voted to sell the Student Pass on the fare vending machines and make it available year round.

This decision leaves youth 12–18 years old and not in middle or high school and 19–21 year olds who meet the means-tested eligibility criteria without access to the reduced fare when the Youth Pass pilot ends. CTPS and the MBTA used data from the pilot to calculate the cost in lost fare revenue from extending the pilot to these groups and the impact on service from the additional trips they would make. The estimates for the full program range widely based on assumptions of municipal opt in and participation rates by eligible youth.

Using an estimate of 15 percent market participation, the cost of the program in annual lost fare revenue ranges from \$406,000 if the four existing partner cities continue to participate to \$593,000 if all 17 MBTA core municipalities join the program. The estimated cost at a more conservative estimate of 30 percent participation would range from \$812,000 to \$1,186,000. The impact on service of the additional trips is expected to be minimal.

Appendices

A. DATA SOURCES

Youth Pass Application, Enrollment Survey, and Monthly Survey Data

Youth who were interested in participating in the pilot program filled out an online application, as mentioned in Chapter 1. They were asked to identify their date of birth, home zip code, age group (13 to 18 years old or 19 to 21 years old), race and ethnicity, household income, and whether they were enrolled in middle or high-school.¹⁵

Applicants who were 19 to 21 years old were asked to identify whether they were enrolled in a jobs program, a benefit program (such as the Special Supplemental Nutrition program for Women, Infants, and Children (WIC) or MassHealth), or a General Education Development (GED) or other adult education program; municipal partners used this information to help municipalities determine whether these applicants met means-testing requirements. The application survey also included questions about the number of trips applicants take on the MBTA bus or rapid transit system during the school year and summer, as well as questions about how applicants currently pay MBTA fares.

All applicants, regardless of whether they were ultimately enrolled in the program, were issued a participant number. The MBTA and CTPS used these participant numbers to identify automated fare collection (AFC) system transactions made by specific individuals (without needing their CharlieCard serial numbers or their personal information), and to link this data with the participants age, household income, school-and program-enrollment, and other information included in the application survey. This information enabled the MBTA and CTPS to make comparisons between sub-groups within the overall Youth Pass population, such as between students and youth not enrolled in school.

Youth who were accepted into the Youth Pass pilot program were asked to complete additional surveys, both during the enrollment process and on a monthly basis throughout the pilot. The enrollment survey requested that participants provide information about the purposes of the trips they make on the transit system and the other modes of transportation they regularly use. It also asked participants to indicate their level of satisfaction with various aspects of MBTA service, such as safety, cost, reliability, and interactions with MBTA staff. The monthly surveys included questions about the number and purposes of the trips participants took on the transit system the day before they received the survey, as well as questions about whether and how they might have made those trips if they did not have access to a Youth Pass.

¹⁵ While youth younger than 13 were permitted to sign up for the program, data they submitted online was not included in the analyses in this report. CTPS identified whether applicants were younger than 13 by calculating their age using the date of birth they reported on the online application form.

Interviews and Audit of Partner Agencies

The MBTA conducted an audit of each partner agency to ensure they were following the procedures for the program as detailed in the MOU and Policy Handbook. The MBTA also asked staff at the partner agencies a series of qualitative questions about the administration of the program.

MBTA Data

Automated-Fare-Collection-System Data (AFC Data)

The MBTA's automated fare collection (AFC) system records information about the date, time, and location at which a rider made a transaction at a fare gate or fare box, along with information about the price of the trip and the fare product that was used to pay for the trip. The MBTA and CTPS used two sets of AFC data from the Youth Pass Pilot program:

- Transaction data generated by the fare cards enrollees used prior to the beginning of the pilot ("pre-pilot data")
- Transaction data generated by Youth Passes

Pre-Pilot AFC Data

When Youth Pass applicants enrolled in the pilot program, municipal partners provided them with a blank CharlieCard and requested that they sign a release allowing MBTA staff to access AFC data associated with the card. This allowed MBTA staff to track a participant's interactions with the AFC system for 30 days prior to that participant receiving and using a Youth Pass. This information enabled the MBTA and CTPS to analyze whether participants' travel behavior changed after they obtained a Youth Pass. To preserve anonymity, the MBTA used the Youth Pass participant numbers generated during the application process to identify individual participants, while the participant's personal information (name, email address, etc.) was kept confidential.

Youth Pass AFC Data

After they provided 30 days of pre-pilot data, Youth Pass participants could return to municipal partner offices to purchase monthly or 7-day youth passes. These passes would be loaded onto their CharlieCard, which the MBTA could track through the AFC system. The Youth Pass AFC data set included the same general content as the pre-pilot AFC data set, and included participant numbers that could be linked to Youth Pass applications and surveys.

Retail Sales Terminal (RST) Data

The MBTA and CTPS also used transaction data from the retail sales terminals (RSTs) distributed to the four participating municipalities. This Retail Sales Terminal (RST) data identifies the date and time of pass purchases, the type and price of the pass that was purchased, and the serial number associated with the card or ticket on which the pass

was loaded. Using this serial number, CTPS could determine how many and what type of Youth Passes (monthly or 7-day) individuals purchased over time. Each RST also had a unique identifier, which made it possible to determine the number of passes sold in individual cities. Unlike the AFC data, however, it was not possible to link RST transaction data to information about the person who purchased the pass. This information was used to check findings from the AFC data, and to estimate whether there are Youth Pass pilot participants that may not be reflected in the AFC data.

Scenario Data Sets

2014 American Community Survey 5-Year Summary File

The American Community Survey (ACS) is an ongoing survey that provides data every year, and covers a broad range of topics about social, economic, demographic, and housing characteristics of the U.S. population.¹⁶ CTPS used the 2014 ACS 5-year summary file to obtain total population and age information for the municipalities included in each of the scenarios. The 5-year estimates from the ACS are referred to as “period” estimates, which represent data collected over a period of time. The advantage of these multi-year estimates is the increased statistical reliability of the data for less-populated areas and small population subgroups.

2014 ACS 5-Year Public Use Microdata Sample (PUMS) Data

Public Use Microdata Sample (PUMS) data contain a sample of actual responses to the ACS, as opposed to data that has already been tabulated for specific geographic areas.¹⁷ The geography associated with Public Use Microdata (PUM) is the Public Use Microdata Area (PUMA). A PUMA is a relatively large geographic area; each PUMA contains at least 100,000 residents. While the geography is large and imprecise, the Census Bureau provides extremely detailed American Community Survey (ACS) data that is not available for smaller geographies. A PUMA may contain more than one municipality, and a municipality can contain more than one PUMA. For example, PUMA 2700 encompasses Arlington, Belmont, Lexington, Watertown, and Waltham; Boston includes PUMAs 3301–3305.

CTPS used 2014 5-Year PUMS data to estimate Youth Pass eligible-populations in relevant municipalities based on school-enrollment and age characteristics, and based on the number of youth in low-income households.

¹⁶ Powell, Logan T. “American Community Survey 5-Year Data (2005-2009 to 2010-2014).” 2016. <http://www.census.gov/data/developers/data-sets/acs-survey-5-year-data.html>. Accessed May 31, 2016.

¹⁷ Source 1: U.S. Census Bureau, American Community Survey Office. American Community Survey 2010-2014 ACS 5-Year PUMS files Readme. 2016. http://www2.census.gov/programs-surveys/acs/tech_docs/pums/ACS2010_2014_PUMS_README.pdf. Accessed May 31, 2016. Source 2: American Community Survey. “Public Use Microdata Sample (PUMS) Documentation.” 2015. <https://www.census.gov/programs-surveys/acs/technical-documentation/pums.html>. Accessed May 31, 2016.

2010-2011 Massachusetts Travel Survey

CTPS determined the percentage of youths who live within walking distance of transit in the scenario study areas who might purchase a Youth Pass using the Massachusetts Travel Survey (MTS). The MTS was a large-scale, statewide survey that collected data on people's travel patterns. The survey was distributed to over 15,000 households between June 2010 and November 2011. From this survey, CTPS determined the percentage of the survey's respondents by age that lived within the study area who used transit on any of their trips, as they should be more likely to purchase a Youth Pass than those who did not use transit. The level of geography associated with the MTS for this analysis is the "ring"—two roughly concentric circles emanating from downtown Boston extending out to Route 128. CTPS used these rings because of their relationship to the study areas associated with the scenarios. Ring 0 and the dense portions of Ring 2 are included because they roughly overlap with people who live near transit in the 17 municipalities that are included in the two scenarios.

Data on Student Monthly LinkPass (M-7) sales to GED/Non-Middle or High School Programs

CTPS obtained MBTA data on sales of Student Monthly (M-7) LinkPasses to General Educational Development (GED) / High School Equivalency (HiSET), alternative education, and other programs outside of middle and high schools. This data was used in the scenarios discussed in Chapter 5 to develop estimates of the number of Youth Passes that may be sold to youth aged 19 to 21 and enrolled in GED/HiSET programs, who previously received passes through the Student Pass program.

B. SCENARIO EVALUATION METHODOLOGY DETAILS

This section provides some additional detail on the three steps used in the scenario evaluation process:

- The market of youth eligible and likely to participate in a Youth Pass program
- The estimated net revenues for the MBTA, based on market size and various levels of program participation
- The estimated impacts to MBTA service, based on market size and various levels of program participation

Youth Eligible for a Future Youth Pass Program

To estimate the number of youth that would be eligible and likely to participate in a Youth Pass program under each scenario, CTPS applied a sequence of steps designed to capture youth that met age, school-enrollment, and income (if applicable) criteria; and that live near and are likely to use transit. These steps are described below. Several of the data sources mentioned in each step are described in Appendix A: Data Sources.

- **Step 1: Estimate the population of eligible youths, based on age, income, and school-enrollment characteristics**

Eligible youth include those that are:

- Ages 12 to 18, who are not in middle or high school and are not enrolled in college
- Ages 12 to 18, who are enrolled in college
- Ages 19 to 21, who live in low-income households and are not enrolled in middle or high school or in college
- Ages 19 to 21, who live in low-income households and are enrolled in college

CTPS developed these estimates using data from the 2014 American Community Survey (ACS), including data from the five-year summary file and the five-year Public Use Microdata Sample (PUMS). The ACS Summary file provides information about the overall population in the relevant municipalities, while the PUMS data provides detailed information about large geographic areas, called Public Use Microdata Areas (PUMAs). Age, school-enrollment, and income factors were calculated using the PUMS data and then applied to the populations of each set of municipalities, depending on the overlap between these municipalities and particular PUMAs.

Table B-1 shows the population in each school-enrollment category for the Few Towns and Many Towns scenarios. These estimates only include youth in households; they exclude youth living in group quarters, such as college dormitories.

TABLE B-1
Estimated Youth Population Eligible for a Youth Pass, based on Age, School Enrollment and Income Characteristics

Category	Few Towns Scenario	Many Towns Scenario
Age 12–18, Not Enrolled in School	2,200	3,700
Age 12–18, In College	2,000	3,900
Age 19–21, Low Income, Not Enrolled in School	4,300	6,600
Age 19–21, Low Income, In College	8,300	11,800
Total	16,800	26,000

Data sources: 2014 American Community Survey (ACS) 5-Year Summary File; 2014 ACS 5-Year Public Use Microdata Sample (PUMS).

Note: Values have been rounded to the nearest 100 people. Totals may not sum due to rounding. Population values reflect youth in households only.

The populations of youth in either age group that are enrolled in school vary in comparison to the population groups shown in Table B-2. In the Few Towns scenario, the estimated 12-to-18-year-old population enrolled in middle or high school is about 49,000. The 19-to-21 year old population that is a) enrolled in middle or high school; and b) living in low income households is about 900 people. Meanwhile, in the Many Towns scenario, the estimated 12-to-18-year-old population enrolled in middle or high school is approximately 97,900. The 19-to-21 year old population that is a) enrolled in middle or high school; and b) living in low income households is about 1,300 people.

- **Step 2: Estimate the population of eligible youths who live near transit**
 CTPS conducted a geographic information systems (GIS) analysis to determine the portion of the youth population that is eligible for a Youth Pass and lives within one-quarter mile walking distance of an MBTA bus stop or one-half mile walking distance of an MBTA rapid transit station. Table B-2 shows these results.

TABLE B-2
Estimated Youth Population Eligible for a Youth Pass,
Who Lives Near Transit

Category	Few Towns Scenario	Many Towns Scenario
Age 12–18, Not Enrolled in School	2,100	3,500
Age 12–18, In College	2,000	3,600
Age 19–21, Low-Income, Not Enrolled in School	4,300	6,300
Age 19–21, Low-Income, In College	8,200	11,200
Total	16,600	24,600

Data sources: 2014 American Community Survey (ACS) 5-Year Summary File; 2014 ACS 5-Year Public Use Microdata Sample (PUMS); CTPS GIS Analysis.

Note: Values have been rounded to the nearest 100 people. Population values reflect youth in households only.

The populations of youth in either age group that are enrolled in school vary in comparison to the population groups shown in Table B-3. In the Few Towns scenario, the estimated 12-to-18-year-old population enrolled in middle or high school is about 49,000. The 19-to-21 year old population that is a) enrolled in middle or high school; and b) living in low income households is about 900 people. Meanwhile, in the Many Towns scenario, the estimated 12-to-18-year-old population enrolled in middle or high school is approximately 89,100. The 19-to-21 year old population that is a) enrolled in middle or high school; and b) living in low income households is about 1,300 people.

- **Step 3: Estimate the population of eligible youths who live near transit that are likely to use transit**

CTPS used data from the 2010–11 Massachusetts Travel Survey (MTS)—a statewide survey of how people use the Commonwealth’s multimodal transportation system—to estimate the percentage of people, by age group, who live in the densely-populated areas of the 17 municipalities included in the two scenarios and are likely to use transit. Appendix A provides additional details about the MTS. Using the MTS data, CTPS estimated that approximately 37 percent of the 12-to-18-year-old population living near transit, and 55 percent of the 19-to-21-year-old population living near transit, reported at least one transit

trip as part of their survey response.¹⁸ As a result, CTPS assumes these shares of each population segment reflect those who are likely to use transit.

Table B-3 summarizes the results of steps 1 through 3, and shows the estimated number of people in each scenario that would be eligible, and may wish to participate, in a future Youth Pass program.

TABLE B-3
Estimated Youth Population Eligible for a Youth Pass,
Who Lives Near Transit and Uses Transit

Category	Few Towns Scenario	Many Towns Scenario
Age 12–18, Not Enrolled in School	800	1,300
Age 12–18, In College	700	1,300
Age 19–21, Low-Income, Not Enrolled in School	2,300	3,500
Age 19–21, Low-Income, In College	4,500	6,100
Total	8,400	12,200

Data sources: 2014 American Community Survey (ACS) 5-Year Summary File; 2014 ACS 5-Year Public Use Microdata Sample (PUMS); CTPS GIS Analysis; 2010-11 Massachusetts Travel Survey.

Note: Values have been rounded to the nearest 100 people. Totals may not sum due to rounding. Population values reflect youth in households only.

The populations of youth in either age group that are enrolled in school vary in comparison to the population groups shown in Table B-4. In the Few Towns scenario, the estimated 12-to-18-year-old population enrolled in middle or high school is about 17,800. The 19-to-21 year old population that is a) enrolled in middle or high school; and b) living in low income households is about 500 people. Meanwhile, in the Many Towns scenario, the estimated 12-to-18-year-old population enrolled in middle or high school is approximately 32,900. The 19-to-21 year old population that is a) enrolled in middle or high school; and b) living in low income households is about 700 people.

¹⁸ The estimate of 19-21 year olds who reported at least one transit trip as part of their MTS response reflects youth in this age group, regardless of income. This estimate does not specifically reflect the transit usage of 19-21 year olds in low-income households.

Revenue Estimation Methodology

After estimating the markets of youth who would be eligible and may choose to participate in a Youth Pass program, CTPS applied several assumptions to calculate MBTA revenues under each program scenario. These assumptions are shaped by the MBTA fare-change package described earlier in this chapter, and by the findings from the pilot program, as described in Chapters 2 and 3.

- **Youth Pass Cost:** The Youth Pass will cost \$30, the same as a Student Monthly LinkPass, based on the new fares that will go into effect on July 1, 2016.
- **Passes on Fare Vending Machines (FVMs).** When reviewing the Youth Pass AFC data, CTPS noticed cases where participants were paying single-ride and transfer fares for trips for short periods between using their Youth Passes. They may have been paying for trips this way as a stop-gap measure until they could return to their municipal partner office to renew their pass. With the availability of passes on fare vending machines, after enrolling, participating youth will be able to buy their passes on FVMs; this will eliminate their need to pay for “between-pass” trips. As a result, youth participating in the program would only pay the cost of the pass (\$30) each month.
- **Estimates of Monthly “Foregone” Revenues per person.** CTPS used pre-pilot AFC data to estimate the amount that pilot participants would spend during either a school year month or summer month if they were not in a Youth Pass program. These monthly expenditure values, when multiplied by the estimated number of participants in the program during a given month, provide a way to estimate the amount of revenue the MBTA would take in if the Youth Pass program did not exist.

To create these estimates, CTPS examined the trips that pre-pilot participants made and whether they paid for these trips using particular types of passes or at particular stored-value rates, and applied fare and pass prices that will be in effect after July 1, 2016. CTPS then determined monthly expenditure values using samples of participants who were not enrolled in school and did not use Student Monthly LinkPasses or Student CharlieCards to pay for their trips. To reflect the spending of low-income participants who are not enrolled in middle or high school, CTPS created a separate set of monthly expenditure values using samples of low-income pre-pilot participants.¹⁹

¹⁹ Youth pass applicants reported their household income level on the Youth Pass application form. Youth who identified their household income as less than \$42,000 were flagged as being from low-income households, because at the start of the pilot program, the threshold used to identify low

Table B-4 shows the estimated monthly foregone revenue amount for each type of month (school or summer). During a given year, summer months include July and August, while school year months include September through June.

TABLE B-4
Estimated Foregone Revenue Amounts, by Month

Groups Represented	Month Type	Foregone Revenue Amount
12–18, not enrolled in school or enrolled in college	School	\$56.50
12–18, not enrolled in school or enrolled in college	Summer	\$59.00
19–21 and low-income, not enrolled in school or enrolled in college	School	\$56.50
19–21 and low-income, not enrolled in school or enrolled in college	Summer	\$60.50

Data source: CTPS pre-pilot AFC data.

Note: Values have been rounded to the nearest \$0.50

- **Ongoing Participation.** CTPS assumed that youth participating in a future Youth Pass program would participate all months of the year. In reality, individual participation in the program would likely fluctuate over time, with youth entering, remaining in, or exiting the program as they learn about it, participate in it, and determine whether it continues to meet their needs.
- **Adding in passes for GED/HiSET program enrollees that would not otherwise be eligible for a Youth Pass.** Currently, some youth who are not enrolled in school may still have access to Student Monthly Link Passes, particularly if they participate in a General Educational Development (GED) / High School Equivalency (HiSET) testing programs that purchases monthly

income households was 60 percent of the median 2011 household income in the MBTA 175 town service area, or \$41,636. Since the start of the pilot program, a new low income threshold of \$44,162 has been established using 2014 American Community Survey (ACS) data. As a result, the income threshold used to flag Youth Pass participants as low income, and the threshold to identify the low-income population that may participate in a future Youth Pass program are close, but do not match exactly.

passes on behalf of their students. In the future, youth in these programs will not be able to receive reduced-price passes through the Student Pass program; MBTA staff anticipates that these individuals would be able to obtain these passes through a Youth Pass program. Many of these youth are already eligible for the Youth Pass program based on other criteria, though youth aged 19 to 21 who do not live in low-income households would not be eligible based on the other criteria. CTPS estimated the number of passes that may currently be sold to youth in this category through the Student Pass program, and added this number of passes to estimated Youth Pass sales during school or summer months.

CTPS obtained MBTA data on sales of Student Monthly LinkPasses to GED/HiSET, alternative education, and other programs outside of middle and high schools, and attempted to identify GED/HiSET programs from this list based on internet research into the programs. CTPS used information on passes sold to these programs during summer 2015 and the 2015–16 academic year, through May 26. This may underestimate the number of passes that are sold to these programs, as they are currently able to purchase passes for a given academic year through June 15.

Of the estimated pass sales to GED/HiSET programs, CTPS assumed that approximately 50 percent are being sold to youth. This is based on a 1997 study, using data from the 1995 National Household Education Survey, which estimated that from a national survey, 16-to-24 year olds made up approximately 47 percent of those enrolled in GED or other high school completion programs.²⁰ This study did not contain information about the income levels of youth participating in GED/HiSET programs in the United States. In the absence of available information, CTPS assumed that 60 percent of these passes for GED/HiSET programs are being sold to youth who are not low-income. This assumption is based on the share of the youth population in Boston, Chelsea, Malden, and Somerville (where many of these programs are based), near transit, that is not enrolled in school and not low-income. Approximately 80 percent of these passes were expected to go to 19-to-21 year olds, as these make up about 80 percent of the share of youth who are not low-income and not enrolled in school. Tables B-5 and B-6 show estimates of passes sales during summer and school months, respectively.

TABLE B-5

²⁰ Kim, K., M. Collins, P. Stowe. Participation in Basic Skills Education: 1994-95. 1997. U.S. Department of Education National Center for Education Statistics. <http://nces.ed.gov/pubs97/97325.pdf>. Accessed June 1, 2016.

**Estimated Student Monthly LinkPass Sales to 19 to 21 Year Olds in
GED/HiSET Programs (Summer Months)**

	Total Summer M-7 passes sold	Total Passes expected to be sold to youth (50% of previous column)	Total Passes expected to be sold to youth who are not low- income (60% of previous column)	Total Passes expected to be sold to youth who are 19- 21 years old and not low-income (80% of previous column)
Few Towns	90	45	27	22
Many Towns	90	45	27	22

Data Source: MBTA data on Student Monthly LinkPass sales to GED/Non-Middle and High School Programs, as of May 26, 2016.

**TABLE B-6
Estimated Student Monthly LinkPass Sales to 19 to 21 Year Olds in
GED/HiSET Programs (School Months)**

	Total Summer M-7 passes sold	Total Passes expected to be sold to youth (50% of previous column)	Total Passes expected to be sold to youth who are not low income (60% of previous column)	Total Passes expected to be sold to youth who are 19-21 and not low income (80% of previous column)
Few Towns	288	144	86	69
Many Towns	438	219	131	105

Data Source: MBTA data on Student Monthly LinkPass sales to GED/Non-Middle and High School Programs, as of May 26, 2016.

In the net revenue calculations, the estimated number of GED pass programs is then adjusted to reflect a particular market participation level. For example, if 30 passes would be sold at full market participation, three (3) passes would be sold at 10 percent participation. Ultimately, this adjusted number of passes is added to the total count of passes that would be sold through the Youth Pass program

during either the summer or school year. CTPS has made the assumptions in the absence of more detailed data about the number and characteristics of people participating in GED/HiSET programs in the MBTA service area, and recommends that more detailed data on these programs be collected if the MBTA chooses to implement a permanent Youth Pass program.

Chapter 5 also provides information on estimated net revenues under the Few Towns and Many Towns Youth Pass program scenarios. Tables B-7 through B-10 provide detail on net revenues specific to each of the four market categories in the Few Towns scenario presented in Chapter 5.

TABLE B-7
Few Towns Scenario: Estimated Net Program Revenues (12 to 18 Years Old, Not-in-School Category) at Various Participation Levels

Market (All Categories) Participation Level	Estimated Youth Passes Sold, Per Year¹	Total Annual Youth Pass Program Revenues	Total Annual Foregone Revenues	Total Net Program Revenues
10% participation	1,000	\$29,000	\$54,000	(\$26,000)
15% participation	1,400	\$43,000	\$81,000	(\$38,000)
20% participation	1,900	\$57,000	\$108,000	(\$51,000)
30% participation	2,900	\$86,000	\$162,000	(\$77,000)
100% participation	9,500	\$285,000	\$540,000	(\$255,000)

Data sources: 2014 American Community Survey (ACS) 5-Year Summary File; 2014 ACS 5-Year Public Use Microdata Sample (PUMS); CTPS GIS Analysis; 2010–11 Massachusetts Travel Survey; CTPS pre-pilot AFC data.

Note: Pass sales have been rounded to the nearest 100. Dollar values have been rounded to the nearest thousand. Totals may not sum due to rounding.

(1) The total annual pass sales have been adjusted to account for Youth Pass sales to 19-to-21-year-old youth in GED/HiSET programs.

TABLE B-8
Few Towns Scenario: Estimated Net Program Revenues (19 to 21 Years Old, Low-Income, Not-in-School Category) at Various Participation Levels

Market (All Categories) Participation Level	Estimated Youth Passes Sold, Per Year¹	Total Annual Youth Pass Program Revenues	Total Annual Foregone Revenues	Total Net Program Revenues
10% participation	2,800	\$84,000	\$160,000	(\$76,000)
15% participation	4,200	\$126,000	\$240,000	(\$114,000)
20% participation	5,600	\$169,000	\$321,000	(\$152,000)
30% participation	8,400	\$253,000	\$481,000	(\$228,000)
100% participation	28,100	\$843,000	\$1,603,000	(\$760,000)

Data sources: 2014 American Community Survey (ACS) 5-Year Summary File; 2014 ACS 5-Year Public Use Microdata Sample (PUMS); CTPS GIS Analysis; 2010–11 Massachusetts Travel Survey; CTPS pre-pilot AFC data.

Note: Pass sales have been rounded to the nearest 100. Dollar values have been rounded to the nearest thousand. Totals may not sum due to rounding.

(1) The total annual pass sales have been adjusted to account for Youth Pass sales to 19-to-21-year-old youth in GED/HiSET programs.

TABLE B-9
Few Towns Scenario: Estimated Net Program Revenues (12 to 18 Years Old, In-College Category) at Various Participation Levels

Market (All Categories) Participation Level	Estimated Youth Passes Sold, Per Year¹	Total Annual Youth Pass Program Revenues	Total Annual Foregone Revenues	Total Net Program Revenues
10% participation	860	\$26,000	\$48,000	(\$23,000)
15% participation	1,300	\$39,000	\$72,000	(\$35,000)
20% participation	1,700	\$52,000	\$96,000	(\$46,000)
30% participation	2,600	\$78,000	\$145,000	(\$70,000)
100% participation	8,600	\$259,000	\$482,000	(\$232,000)

Data sources: 2014 American Community Survey (ACS) 5-Year Summary File; 2014 ACS 5-Year Public Use Microdata Sample (PUMS); CTPS GIS Analysis; 2010–11 Massachusetts Travel Survey; CTPS pre-pilot AFC data.

Note: Pass sales have been rounded to the nearest 100. Dollar values have been rounded to the nearest thousand. Totals may not sum due to rounding.

(1) The total annual pass sales have been adjusted to account for Youth Pass sales to 19-to-21-year-old youth in GED/HiSET programs.

TABLE B-10
Few Towns Scenario: Estimated Net Program Revenues (19 to 21 Years Old, Low-Income, In-College Category) at Various Participation Levels

Market (All Categories) Participation Level	Estimated Youth Passes Sold, Per Year¹	Total Annual Youth Pass Program Revenues	Total Annual Foregone Revenues	Total Net Program Revenues
10% participation	5,400	\$162,000	\$308,000	(\$146,000)
15% participation	8,100	\$243,000	\$462,000	(\$219,000)
20% participation	10,800	\$324,000	\$616,000	(\$292,000)
30% participation	16,200	\$486,000	\$925,000	(\$438,000)
100% participation	54,000	\$1,621,000	\$3,082,000	(\$1,461,000)

Data sources: 2014 American Community Survey (ACS) 5-Year Summary File; 2014 ACS 5-Year Public Use Microdata Sample (PUMS); CTPS GIS Analysis; 2010–11 Massachusetts Travel Survey; CTPS pre-pilot AFC data.

Note: Pass sales have been rounded to the nearest 100. Dollar values have been rounded to the nearest thousand. Totals may not sum due to rounding.

(1) The total annual pass sales have been adjusted to account for Youth Pass sales to 19-to-21-year-old youth in GED/HiSET programs.

Tables B-11 through B-14 provide detail on net revenues specific to each of the four market categories in the Many Towns scenario presented in Chapter 5.

TABLE B-11
Many Towns Scenario: Estimated Net Program Revenues (12 to 18 Years Old, Not-in-School Category) at Various Participation Levels

Market (All Categories) Participation Level	Estimated Youth Passes Sold, Per Year¹	Total Annual Youth Pass Program Revenues	Total Annual Foregone Revenues	Total Net Program Revenues
10% participation	1,500	\$46,000	\$88,000	(\$41,000)
15% participation	2,300	\$70,000	\$132,000	(\$62,000)
20% participation	3,100	\$93,000	\$176,000	(\$83,000)
30% participation	4,600	\$139,000	\$264,000	(\$124,000)
100% participation	15,500	\$464,000	\$878,000	(\$415,000)

Data sources: 2014 American Community Survey (ACS) 5-Year Summary File; 2014 ACS 5-Year Public Use Microdata Sample (PUMS); CTPS GIS Analysis; 2010–11 Massachusetts Travel Survey; CTPS pre-pilot AFC data.

Note: Pass sales have been rounded to the nearest 100. Dollar values have been rounded to the nearest thousand. Totals may not sum due to rounding.

- (1) The total annual pass sales have been adjusted to account for Youth Pass sales to 19-to-21-year-old youth in GED/HiSET programs.

TABLE B-12

Many Towns Scenario: Estimated Net Program Revenues (19 to 21 Years Old, Low-Income, Not-in-School Category) at Various Participation Levels

Market (All Categories) Participation Level	Estimated Youth Passes Sold, Per Year¹	Total Annual Youth Pass Program Revenues	Total Annual Foregone Revenues	Total Net Program Revenues
10% participation	4,200	\$125,000	\$238,000	(\$113,000)
15% participation	6,300	\$188,000	\$357,000	(\$169,000)
20% participation	8,400	\$251,000	\$476,000	(\$226,000)
30% participation	12,500	\$376,000	\$715,000	(\$339,000)
100% participation	41,800	\$1,253,000	\$2,382,000	(\$1,129,000)

Data sources: 2014 American Community Survey (ACS) 5-Year Summary File; 2014 ACS 5-Year Public Use Microdata Sample (PUMS); CTPS GIS Analysis; 2010–11 Massachusetts Travel Survey; CTPS pre-pilot AFC data.

Note: Pass sales have been rounded to the nearest 100. Dollar values have been rounded to the nearest thousand. Totals may not sum due to rounding.

- (1) The total annual pass sales have been adjusted to account for Youth Pass sales to 19-to-21-year-old youth in GED/HiSET programs.

TABLE B-13

Many Towns Scenario: Estimated Net Program Revenues (12 to 18 Years Old, In-College Category) at Various Participation Levels

Market (All Categories) Participation Level	Estimated Youth Passes Sold, Per Year¹	Total Annual Youth Pass Program Revenues	Total Annual Foregone Revenues	Total Net Program Revenues
10% participation	1,600	\$48,000	\$91,000	(\$43,000)
15% participation	2,400	\$72,000	\$137,000	(\$65,000)
20% participation	3,200	\$96,000	\$182,000	(\$86,000)
30% participation	4,800	\$144,000	\$273,000	(\$129,000)
100% participation	16,000	\$481,000	\$911,000	(\$431,000)

Data sources: 2014 American Community Survey (ACS) 5-Year Summary File; 2014 ACS 5-Year Public Use Microdata Sample (PUMS); CTPS GIS Analysis; 2010–11 Massachusetts Travel Survey; CTPS pre-pilot AFC data.

Note: Pass sales have been rounded to the nearest 100. Dollar values have been rounded to the nearest thousand. Totals may not sum due to rounding.

(1) The total annual pass sales have been adjusted to account for Youth Pass sales to 19-to-21-year-old youth in GED/HiSET programs.

TABLE B-14
Many Towns Scenario: Estimated Net Program Revenues (19 to 21 Years Old, Low-Income, In-College Category) at Various Participation Levels

Market (All Categories) Participation Level	Estimated Youth Passes Sold, Per Year¹	Total Annual Youth Pass Program Revenues	Total Annual Foregone Revenues	Total Net Program Revenues
10% participation	7,300	\$220,000	\$418,000	(\$198,000)
15% participation	11,000	\$330,000	\$627,000	(\$297,000)
20% participation	14,700	\$440,000	\$836,000	(\$396,000)
30% participation	22,000	\$659,000	\$1,253,000	(\$594,000)
100% participation	73,300	\$2,198,000	\$4,178,000	(\$1,980,000)

Data sources: 2014 American Community Survey (ACS) 5-Year Summary File; 2014 ACS 5-Year Public Use Microdata Sample (PUMS); CTPS GIS Analysis; 2010–11 Massachusetts Travel Survey; CTPS pre-pilot AFC data.

Note: Pass sales have been rounded to the nearest 100. Dollar values have been rounded to the nearest thousand. Totals may not sum due to rounding.

(1) The total annual pass sales have been adjusted to account for Youth Pass sales to 19-to-21-year-old youth in GED/HiSET programs.

Service Impacts Estimation Methodology

Chapter 5 describes the process CTPS followed to estimate the additional weekday trips that might be made under the Few Towns and Many Towns Youth Pass program scenarios, along with the results of that process. This appendix provides some additional detail on several assumptions that CTPS applied to make these calculations, particularly those related to estimates of weekday trips per month that were drawn from the pre-pilot and Youth Pass AFC data.

- **Estimates of Weekday Trips per Month (Pre-Pilot Data).** CTPS used pre-pilot AFC data to estimate the number of unlinked weekday trips that youth made per month before they received a Youth Pass. These values are based on samples of pre-pilot participants, which varied depending on:
 - Whether the participants were enrolled in school
 - Whether the participants lived in a low-income household

- Whether they provided their 30-days of pre-pilot data during school months (late May through June 2015, and September 2015 through March 2016), or during summer months (July and August 2015)

CTPS then determined an average number of unlinked trips per month for each sample, excluding any participants who used Student Monthly LinkPasses or Student CharlieCards to pay for their trips. To reflect the spending of low-income participants who are not enrolled in middle or high school, CTPS created a separate set of average monthly trip values using samples of low-income pre-pilot participants.²¹

AFC data for taps against MBTA fare gates or fare boxes includes a time stamp, which makes it possible to determine the day of the week and the time of day a trip was made. CTPS used this information to determine whether trips made on weekdays were made during the AM peak period (between 7:00 AM and 8:59 AM), the PM peak period (between 4:00 PM and 6:30 PM), or during non-peak times. In addition to calculating an average number of weekday trips pre-pilot participants made per month, CTPS could also estimate the average number of weekday trips participants made during each service period, as shown in Table B-15.

TABLE B-15
Pre-Pilot Data: Estimated Average Weekday Trips per Month, by Service Period

Groups Represented	Month Type	AM Peak Period	Non-Peak Period	PM Peak Period	Total
12–18, not-enrolled-in-school or enrolled-in-college	School	4	21	6	31
12–18, not-enrolled-in-school or enrolled-in-college	Summer	5	22	9	36
19–21 and low-income, not-enrolled-in-school or enrolled-in-college	School	5	21	6	32

²¹ For more information about how these participants were identified, see the section in Appendix B titled “Revenue Estimation Methodology.”

19–21 and low-income, not-enrolled-in-school or enrolled-in-college	Summer	5	22	9	36
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Data source: MBTA pre-pilot AFC data.

- Estimates of Weekday Trips per Month (Youth Pass Data).** CTPS also used AFC data from Youth Pass participants to estimate the number of unlinked weekday trips that youth made per month with a Youth Pass. These values were calculated using a process similar to the one used to develop the pre-pilot values. CTPS created samples of Youth Pass participants based on whether or not they were enrolled in school, and whether or not they lived in low-income households. Only participants who used monthly Youth Passes were included in these samples, because only the monthly Youth Pass will be offered under these scenarios. CTPS estimated average weekday trips per month (by service period and overall) using per-person averages calculated over school months, and over summer months. These values are shown in Table B-16.

TABLE B-16
Youth Pass Data: Average Estimated Weekday Trips per Month, by Service Period

Groups Represented	Month Type	AM Peak Period	Non-Peak Period	PM Peak Period	Total
12–18, not-enrolled-in-school or enrolled-in-college	School	8	34	10	53
12–18, not-enrolled-in-school or enrolled-in-college	Summer	7	36	11	55
19–21 and low-income, not-enrolled-in-school or enrolled-in-college	School	8	35	10	53
19–21 and low-income, not-enrolled-in-school or enrolled-in-college	Summer	8	36	11	55

Data source: MBTA Youth Pass pilot AFC data

Please see Chapter 5 for details on how CTPS applied these values to estimate the number of additional weekday trips, by service period, under the two Youth Pass program scenarios.

Appendix 7-D

CTPS Fare Equity Analysis of MBTA Youth Pass Pilot

TECHNICAL MEMORANDUM

DATE: December 15, 2015

TO: Laurel Paget-Seekins, Ph.D., Director of Strategic Initiatives, MBTA
Office of Performance Management and Innovations

FROM: Andrew Reker, Transit Analyst, CTPS

RE: Youth Pass Pilot Program: Title VI Fare Equity Analysis

This memorandum presents the results of the Title VI fare equity analysis, required by the Federal Transit Administration (FTA), which was conducted by the Central Transportation Planning Staff (CTPS) for the MBTA's Youth Pass Pilot program. The results of the analysis, which applied the MBTA's Disparate Impact and Disproportionate Burden Policy, show that the fare product categories introduced by the Youth Pass Pilot program did not result in disparate impacts on minority populations or disproportionate burdens on low-income populations.

This memorandum includes two appendices. Appendix A presents additional equity analyses which are not required by the FTA, and Appendix B defines the Title VI terminology used in this memorandum.

1 INTRODUCTION

1.1 Description of the Youth Pass Pilot Program

The Massachusetts Bay Transportation Authority (MBTA) is currently conducting a pilot program for a Youth Pass, a new reduced-fare product that complements Student Pass products. As stated in the December 2014 report *Pilot Project Outline and Financial Impacts Youth Pass (YPass) Program*, which the MBTA presented to the MBTA/MassDOT (Massachusetts Department of Transportation) Board of Directors, "the reduced-fare Youth Pass is expected to improve youth access to opportunities to learn, work, thrive, and contribute."¹ The Youth Pass Pilot program was developed by a working group composed of MBTA staff and community stakeholders.

¹ The same report states "The Youth Way Campaign conducted a survey that showed that a lack of money for MBTA fares meant that 27 percent of youth missed or were late for school, and 29 percent missed or were late for work. Other youth missed health care appointments, GED classes, and a host of other necessities and opportunities for enrichment."

While some youth in Greater Boston currently have access to reduced-fare Student Pass products, access to these passes is limited by the following factors:

- Boston Public Schools subsidizes the pass only for students who meet the minimum-distance-from-school requirement.
- Many other municipal school systems and private schools in the MBTA service area do not distribute Student Passes.
- The Student Pass fare products are available only to currently enrolled full-time students, and this excludes youth who are enrolled in alternative education programs.
- Most students cannot obtain reduced-fare passes during the summer months.

The Youth Pass provides students equal access to the same reduced fare as the existing Student Pass product and closes some of the access gaps in the Student Pass program. The Youth Pass pilot program also provides young people who are 19-to-21 years old with access to the same reduced-fare as the Student Pass if they are in an alternative education program or meet means-testing criteria.

The MBTA is offering the Youth Pass in conjunction with municipal partners, who are responsible for administering the program. A monthly Youth Pass costs \$26.00 (the same as the cost of a reduced-fare monthly Student Pass), and a 7-Day Youth Pass costs \$7.00. Both passes are valid on the MBTA's local bus and rapid-transit system, as is the LinkPass. For the pilot program, all individuals ages 12 through 18 who live in participating municipalities are eligible, and individuals 19 to 21 years old are eligible if they meet needs-based criteria by demonstrating enrollment in high school, a GED program, or another education program; a job training program; a state or federal public benefit program (such as SNAP, WIC, TAFDC, public housing or other assistance programs); or Mass Health.

The Youth Pass Pilot program is limited to 1,500 participants between the ages of 12 and 21 in the cities of Boston, Chelsea, Malden, and Somerville. The pilot program began in July 2015 and is scheduled to run through June 2016. Data collection is ongoing; however, for the purposes of this analysis, CTPS used data that had been collected from pilot program participants through October 15, 2015.

1.2 Federal Requirements for a Fare Equity Analysis

The Federal Transit Administration (FTA) Circular 4702.1B provides guidelines and requirements for implementing US Department of Transportation regulations

pertaining to Title VI of the Civil Rights Act of 1964 (49 CFR 21). The circular requires the MBTA to conduct a fare equity analysis for any fare reduction that lasts longer than six months—as is the case for the Youth Pass Pilot program—to evaluate whether the fare changes would have a discriminatory impact based on race, color, or national origin, and whether low-income populations would bear a disproportionate burden or non-low-income populations would receive disproportionate benefits because of the changes (see Appendix B for definitions of these terms). The circular also requires: 1) briefing the MBTA Board of Directors on the fare change and the equity impacts of the change, and 2) documenting that the board considered and approved the fare equity analysis.

This document presents the FTA-required fare equity analysis of the Youth Pass Pilot program. Appendix A describes the methodology and results of additional analyses of potential disparate impacts on minority populations and disproportionate burdens on low-income populations. These analyses provide important information for the MBTA to consider when deciding whether to extend the pilot program or to launch a full-scale program. Pursuant to FTA guidance, if the MBTA chooses to continue the program, it will have to update the fare equity analysis any time that there is a significant change to the Youth Pass program, including the addition of new municipal partners.

1.3 Summary of MBTA Disparate Impact and Disproportionate Burden Policy for Fare Changes

The MBTA's Disparate Impact and Disproportionate Burden Policy establishes thresholds for evaluating the equity impacts and the distribution of benefits and burdens caused by any fare change or major service change. For fare changes, the policy requires that the MBTA compare the percentage of difference between the average fare of minority and all riders, and the percentage difference between the average fare of low-income and all riders. For fare type changes, the policy requires the MBTA to assess whether minority and low-income customers are disproportionately more likely to use the affected fare type or media than nonminority and non-low-income customers, respectively. For fare changes, the policy sets different thresholds for major or minor fare changes.

As defined in the MBTA's policy "Public Process for Changing MBTA Fares, and/or Fare Structure or Major Service Reductions," minor fare increases are defined as:

- Minor changes to the MBTA fare structure; or
- A systemwide fare increase in which the percent increase in fare revenue realized by the MBTA would be less than 10 percent; or

- A systemwide fare increase of less than 10 percent that results in a cumulative increase in fare revenue of less than 10 percent within a three year period.

Because the Youth Pass represents a minor change to the MBTA fare structure, the MBTA Disparate Impact and Disproportionate Burden Policy thresholds (directly quoted from the MBTA's policy) for a minor fare change are used in the equity analysis:

- A disparate benefit would be found if the minority riders (population) are projected to receive less than 80 percent of the benefit that all customers (population) receive.
- A disproportionate benefit would be found if the low-income customers (population) are projected to receive less than 80 percent of the benefits that all customers (population) receive.

This policy could be represented by the following:

A disparate impact would be found if:

- Projected benefit to minority $< 0.8 \times$ projected benefit to all, for minor fare changes

A disproportionate burden would be found if:

- Projected benefit to low-income $< 0.8 \times$ projected benefit to all, for minor fare changes

Appendix B provides definitions for the Title VI terminology used above.

2 FARE EQUITY ANALYSIS

2.1 Proposed Fare Change

Table 1 compares the price of the monthly Youth Pass with the price of other fare products that available to or targeted to this age group. These fare products include the monthly LinkPass, the discounted monthly Student Pass, and an additional fare product for college and university students, the Semester Pass. Table 2 compares the price of the 7-Day Youth Pass with the price of other fare products available to or targeted at this age group.

TABLE 1
Prices of Monthly Passes Available
to Youth Pass Pilot Program Participants

Monthly Pass Product	Cost	Discount
LinkPass	\$75.00	0%
[College] Semester Pass	\$66.75	11.0%
LinkPass Student Pass	\$26.00	65.3%
Proposed Youth Pass	\$26.00	65.3%

Data source: MBTA.

TABLE 2
Prices of Weekly Passes Available to
Youth Pass Pilot Program Participants

Weekly Pass Product	Cost	Discount
LinkPass	\$19.00	0%
Proposed Youth Pass	\$7.00	63.2%

Data source: MBTA.

In the circular, the FTA provides examples of the tables that are required for presenting the results of a fare equity analysis. These tables depict, for existing and proposed fare media, the existing cost, the proposed cost, the change in fare (absolute and percentage), and the number and percentage of minority, low-income, and all riders using each fare type. Tables 3 and 4 in this memorandum follow the FTA examples. Table 3 presents the fare change and includes annual usage by numbers of minority, low-income, and all riders. Table 4 presents the fare change and includes the percentage of annual usage by minority, low-income, and all riders. The FTA also requires a graphic display of the fare payment distributions by group—low-income, minority, and all riders. —which is shown in Figure 1.

TABLE 3
Proposed Fare Change: Comparison of the Changes in Cost and Usage

Fare Type	Existing Cost	Proposed Cost	Absolute Change	Percent Change	Low-Income Usage	Minority Usage	All-Rider Usage
Local Bus Adult	\$1.60	\$1.60	\$0	0%	3,082,000	2,402,000	5,216,000
Rapid Transit Adult	\$2.10	\$2.10	\$0	0%	9,162,000	7,880,000	17,432,000
Local Bus + Rapid Transit Adult	\$2.10	\$2.10	\$0	0%	3,355,000	3,008,000	8,129,000
Bus Student	\$0.80	\$0.80	\$0	0%	1,315,000	1,276,000	1,711,000
Rapid Transit Student	\$1.05	\$1.05	\$0	0%	741,000	604,000	1,150,000
Bus + Rapid Transit Student	\$2.10	\$2.10	\$0	0%	299,000	278,000	408,000
CharlieTicket/Cash Bus	\$2.10	\$2.10	\$0	0%	1,345,000	1,351,000	2,264,000
CharlieTicket/Cash Rapid Transit	\$2.65	\$2.65	\$0	0%	4,711,000	4,832,000	12,789,000
CharlieTicket/Cash Inner Express Bus	\$4.75	\$4.75	\$0	0%	236,000	210,000	564,000
CharlieTicket/Cash Outer Express Bus	\$6.80	\$6.80	\$0	0%	4,400	NR	8,000
Monthly Local Bus Pass	\$50.00	\$50.00	\$0	0%	3,082,000	2,402,000	5,216,000
Monthly LinkPass	\$75.00	\$75.00	\$0	0%	30,775,000	21,246,000	93,563,000
Monthly LinkPass Student Pass	\$26.00	\$26.00	\$0	0%	10,116,000	126,700	15,295,000
7-Day LinkPass	\$19.00	\$19.00	\$0	0%	20,153,000	21,282,000	36,411,000
1-Day LinkPass	\$12.00	\$12.00	\$0	0%	623,000	463,000	748,000
Inner Express Pass	\$115.00	\$115.00	\$0	0%	663,000	367,000	2,268,000
Outer Express Pass	\$168.00	\$168.00	\$0	0%	124,000	36,900	512,000
Monthly Youth Pass*	\$75.00	\$26.00	-\$49.00	-65.3%	225,000	275,000	289,000
7-Day Youth Pass*	\$19.00	\$7.00	-\$12.00	-63.2%	25,000	46,000	91,000

Data source: FERRET 2015, tool used by CTPS to analyze MBTA fare changes.

* The adult monthly LinkPass and the 7-Day Link Pass were used to represent the existing costs of the monthly Youth Pass and 7-Day Youth Pass, respectively, because they provide the same access to MBTA services as the Youth Pass products. The estimated usage of the Youth Pass products is based on the average number of monthly trips made by pilot program participants.

NR = not reliable. MBTA did not collect enough data during its 2008–09 Systemwide Passenger Survey to calculate a minority usage value for this fare product.

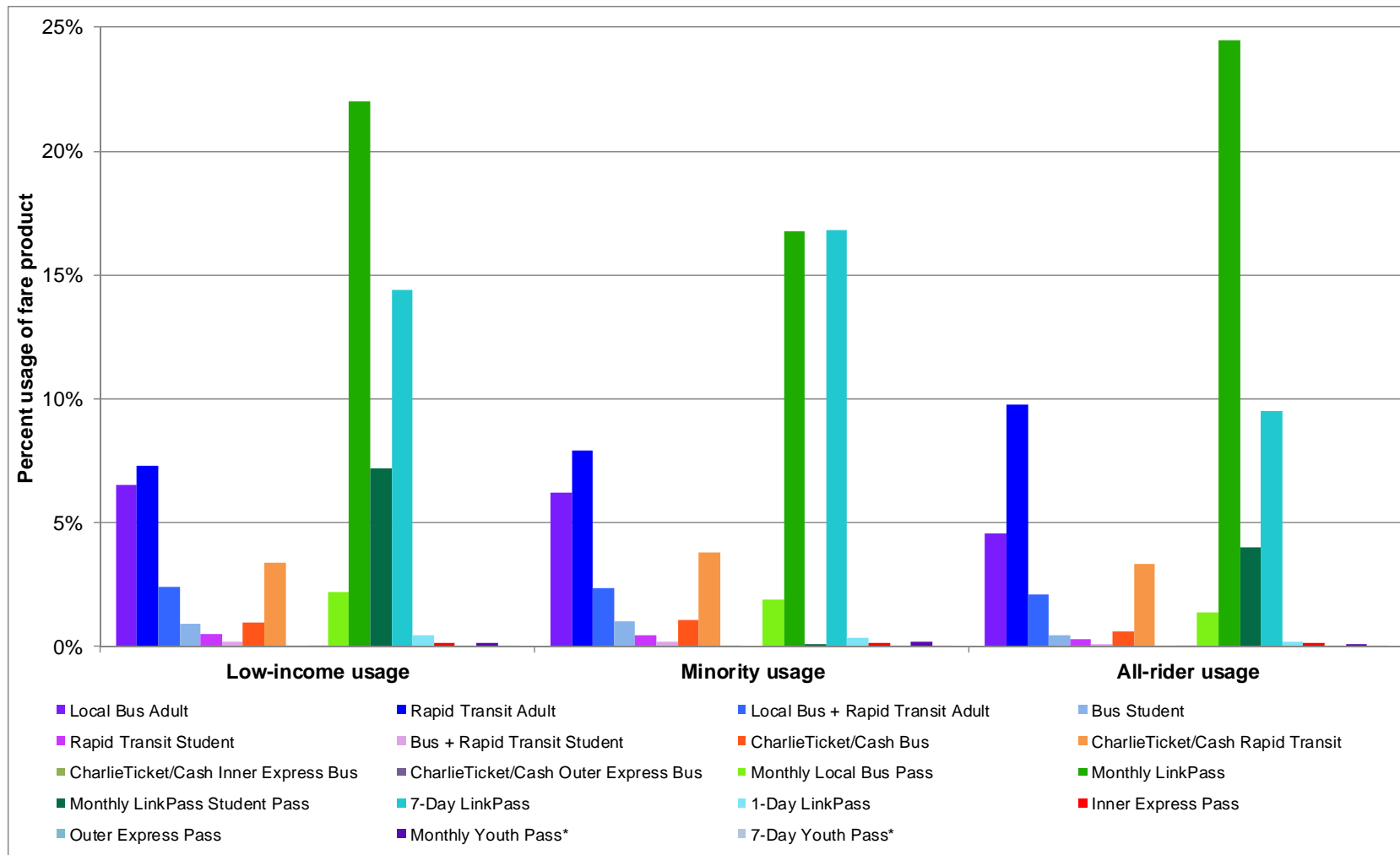
TABLE 4
Proposed Fare Change: Comparison of the Percentages of Change in Cost and Usage

Fare Type	Existing Cost	Proposed Cost	Absolute Change	Percent Change	Low-Income Usage	Minority Usage	All-Rider Usage
Local Bus Adult	\$1.60	\$1.60	\$0.00	0%	3.7%	3.6%	2.6%
Rapid Transit Adult	\$2.10	\$2.10	\$0.00	0%	4.1%	4.6%	5.5%
Local Bus + Rapid Transit Adult	\$2.10	\$2.10	\$0.00	0%	1.4%	1.4%	1.2%
Bus Student	\$0.80	\$0.80	\$0.00	0%	0.5%	0.6%	0.3%
Rapid Transit Student	\$1.05	\$1.05	\$0.00	0%	0.3%	0.3%	0.2%
Bus + Rapid Transit Student	\$2.10	\$2.10	\$0.00	0%	0.1%	0.1%	0.1%
CharlieTicket/Cash Bus	\$2.10	\$2.10	\$0.00	0%	0.5%	0.6%	0.3%
CharlieTicket/Cash Rapid Transit	\$2.65	\$2.65	\$0.00	0%	1.9%	2.2%	1.9%
CharlieTicket/Cash Inner Express Bus	\$4.75	\$4.75	\$0.00	0%	0.0%	0.0%	0.0%
CharlieTicket/Cash Outer Express Bus	\$6.80	\$6.80	\$0.00	0%	0.0%	0.0%	0.0%
Monthly Local Bus Pass	\$50.00	\$50.00	\$0.00	0%	1.2%	1.1%	0.8%
Monthly LinkPass	\$75.00	\$75.00	\$0.00	0%	12.4%	9.8%	13.9%
Monthly LinkPass Student Pass	\$26.00	\$26.00	\$0.00	0%	4.1%	0.1%	2.3%
7-Day LinkPass	\$19.00	\$19.00	\$0.00	0%	8.1%	9.8%	5.4%
1-Day LinkPass	\$12.00	\$12.00	\$0.00	0%	0.3%	0.2%	0.1%
Inner Express Pass	\$115.00	\$115.00	\$0.00	0%	0.3%	0.2%	0.3%
Outer Express Pass	\$168.00	\$168.00	\$0.00	0%	0.1%	0.0%	0.1%
Monthly Youth Pass*	\$75.00	\$26.00	-\$49.00	-65.33%	0.0%	0.0%	0.0%
7-Day Youth Pass*	\$19.00	\$7.00	-\$12.00	-63.16%	0.0%	0.0%	0.0%

Data source: FERRET 2015, tool used by CTPS to analyze MBTA fare changes.

* The adult monthly LinkPass and the 7-Day Link Pass were used to represent the existing costs of the monthly Youth Pass and 7-Day Youth Pass, respectively, because they provide the same access to MBTA services as the Youth Pass products. The estimated usage for the Youth Pass products is based on average monthly trips made by pilot participants.

FIGURE 1
Fare Product Use by Rider Group



2.2 Assessment of Disparate Impacts and Disproportionate Burdens

As stated in the MBTA's Disparate Impact and Disproportionate Burden Policy, an assessment of disparate impacts requires a comparison of the impacts on minority riders or minority population of the MBTA service area to the impacts on all riders or population of the service area, respectively. The MBTA's policy also states that an assessment of disproportionate burdens requires a comparison of the burdens on low-income riders or the low-income population in the service area to the burdens on all riders or the population in the service area, respectively. For this analysis, only an assessment of disparate benefits for nonminority riders or the nonminority population, and disproportionate benefits for non-low-income riders or the non-low-income population, was required because the Youth Pass Pilot program is considered a benefit. To assess the potential disparate benefits for nonminority populations and/or disproportionate benefits for non-low-income populations of the Youth Pass Pilot program, CTPS conducted a two-part analysis, using the methodology described in FTA Circular 4702.1B. For the first part of the analysis, CTPS compared the percentage of minority and low-income youth in the municipalities participating in the pilot program to the percentage of minority and low-income youth enrolled in the pilot program who made transit trips using a Youth Pass product (Youth Pass participants). For the second part of the analysis, CTPS compared the average cost per trip for minority and low-income Youth Pass participants to the average cost per trip for Youth Pass participants overall.

Disparate and Disproportionate Benefit Analysis: Pilot Program Participation

The Youth Pass monthly and weekly fare products provide a benefit to eligible users because they provide access to the bus and rapid transit system at a cost significantly lower than that of similar pass products. To calculate the number and proportion of minority and low-income youth among Youth Pass participants, CTPS used demographic information—including minority and low-income household status—that participants provided in the Youth Pass Pilot program application form. CTPS then used US Census Public Use Micro Area (PUMA) and decennial US Census data to estimate the number and proportion of minority and low-income youth between the ages of 12 and 21 in the pilot program's four partner municipalities: Boston, Chelsea, Malden and Somerville.

Table 5 shows the percentage of minority and low-income youth among the Youth Pass participants and among the population of eligible youth in the four partner municipalities.

TABLE 5
Minority and Low-Income Characteristics of Youth Pass Pilot Program
Participants and Eligible Youth in Participating Municipalities

	Minority	Percentage Minority	Low-Income	Percentage Low-Income	Total
Youth Pass participants	402	93.3%	314	72.9%	431
Population of eligible youth	74,716	56.3%	60,834	50.2%	131,671

Data sources: MBTA and US Census.

A significantly larger percentage (93.3 percent) of the Youth Pass Pilot program participants are minority than the percentage of minority youth among the eligible population in the four partner municipalities (56.3 percent). This indicates that the Youth Pass Pilot program is not likely to generate a disparate benefit to the nonminority population, and that the benefit of discounted passes is more likely to accrue to minority youth than to nonminority youth. Similarly, approximately 72.9 percent of Youth Pass Pilot program participants live in low-income households, but only 50.2 percent of youth ages 12–21 live in the four partner municipalities. This indicates that there is not likely to be a disproportionate benefit to the non-low-income population and that the benefit of discounted passes is more likely to accrue to low-income youth.

Disparate and Disproportionate Benefit Analysis: Cost per Trip

The MBTA uses the average cost per trip when conducting the disparate impact and disproportionate burden analysis because there is extensive use of multi-trip pass products in the MBTA's system.

CTPS used the following data to conduct this analysis:

- Pre-pilot-program trip data:** The MBTA collected data on the trips made by the Youth Pass Pilot program participants before the participants were issued Youth Passes. Applicants provided the number of their current CharlieCard, if available, and signed a release allowing MBTA staff to access automated-fare-collection (AFC) data associated with their individual card. To preserve anonymity, each applicant was assigned an identification number to link their existing CharlieCard data to their demographic information, while the CharlieCard numbers and personal information were kept confidential.
- Youth Pass trip data:** The MBTA analyzed the AFC data associated with Youth Pass cards to determine how Youth Pass participants made trips during the pilot program. The MBTA also assigned identification numbers to the Youth Pass cards, and kept the actual card numbers and personal information confidential in order to preserve anonymity.

CTPS used the identification numbers to link the AFC data to the demographic information that the participants had supplied through the Youth Pass Pilot program application form in order to compare the cost of trips of minority and low-income youth in the program to those of all of the participants in the program.

Table 6 presents the pre-program and program average cost per trip for minority youth and for all of the youth enrolled in the Youth Pass Pilot program.

TABLE 6
Disparate Benefit Analysis: Cost per Trip

	Cost per Trip before Youth Pass	Cost per Trip with Youth Pass	Percentage Increase or Decrease
Minority participants	\$1.15	\$0.88	-23.5%
All participants	\$1.14	\$0.88	-22.8%
Ratio			1.03
Threshold			0.80
Result of analysis	No disparate benefit		

Data source: MBTA.

Ratio = The ratio of the percentage change in average cost per trip for minority participants to the percentage change in the average cost per trip for all participants.

Threshold = The analysis threshold for minor fare changes.

The average cost per trip for minority Youth Pass Pilot program participants decreased by \$0.27 (23.5 percent), while for all Youth Pass participants the average cost per trip decreased by \$0.26 (22.8 percent). There is a slightly larger decrease in the per-trip cost for minority Youth Pass participants than for all Youth Pass participants, resulting in a ratio of 1.03 (the change in the average cost per trip for minority participants divided by the change in the average cost per trip for all participants). This ratio of the benefit for minority participants to all participants demonstrates that minority Youth Pass participants are meeting the policy threshold for minor fare changes (receiving more than 80 percent of the benefits). Therefore, there is no disparate benefit for nonminority participants.

Table 7 presents the pre-program and program average cost per trip for low-income Youth Pass participants and for all Youth Pass Pilot program participants overall.

TABLE 7

Disproportionate Benefit Analysis: Cost per Trip

	Cost per Trip before Youth Pass	Cost per Trip with Youth Pass	Percentage Increase or Decrease
Low-income participants	\$1.16	\$0.84	-27.6%
All participants	\$1.14	\$0.88	-22.8%
Ratio			1.21
Threshold			0.80
Result of analysis	No disproportionate benefit		

Data source: MBTA.

Ratio = The ratio of the percentage change in the average cost per trip for low-income participants to the percentage change in the average cost per trip for all participants.

Threshold = The appropriate analysis threshold for minor fare changes.

For low-income Youth Pass Pilot program participants, the average cost per trip decreased by \$0.32 (27.6 percent), while for all Youth Pass Pilot program participants, the decrease in average trip cost was \$0.26 (22.8 percent). There is a larger decrease in the average cost per trip for low-income Youth Pass participants than for all Youth Pass participants, resulting in a ratio of 1.21 (the change for low-income participants divided by the change for all participants). This ratio of the benefit for low-income participants to the benefit for all participants demonstrates that low-income Youth Pass participants are meeting the threshold for minor fare changes of receiving more than 80 percent of the benefits. Therefore, there is no disproportionate benefit for non-low-income participants.

2.3 Conclusions

The Youth Pass monthly and weekly fare products would provide a benefit to eligible users because they provide access to the bus and rapid transit system at a significant discount when compared to similar pass products. Based on data collected prior to and during the pilot program (through October 15, 2015), CTPS found that the percentages of minority youth and low-income youth participating in the Youth Pass Pilot program are higher than the percentages of minority youth and low-income youth living in the four municipalities that are participating in the pilot program (Boston, Chelsea, Malden, and Somerville). This suggests that there is no disparate benefit to nonminority youth in the program, and no disproportionate benefit to non-low-income youth in the program. When analyzing the average trip cost for minority, low-income, and all Youth Pass Pilot program participants, CTPS found that the two Youth Pass products result in no disparate benefit to nonminority youth in the program, and no disproportionate benefit to non-low-income youth in the program.

APPENDIX A: ADDITIONAL FARE EQUITY ANALYSES

In addition to the FTA-required fare equity analyses presented above, CTPS conducted analyses to examine:

- The percentage of participants in the Youth Pass Pilot program in each municipality who are minority and the percentage who are low-income, and the percentage of the whole youth population of each municipality who are minority and who are low-income
- The percentage of minority and low-income Youth Pass participants at each stage of pilot program enrollment
- Changes in the average number of monthly trips made by minority and low-income participants before and during the Youth Pass Pilot program
- Change in the share of monthly bus trips from the period before the Youth Pass Pilot program to the share during the program for minority and low-income participants, respectively, and the same analysis for monthly rapid transit trips

Percentage of Minority and Low-Income Pass Participants by Municipality

The four municipalities participating in the Youth Pass Pilot program—Boston, Chelsea, Malden, and Somerville—have different demographic characteristics. This section examines the minority and low-income status of program participants by municipality and compares the demographics of the program participants to those of all youth in each municipality.

Using the participant identification number, CTPS linked each participant's automated-fare-collection (AFC) system data to their demographic information. Table A-1 provides information on the percentage of Youth Pass Pilot program participants who are minority and low-income youth for each municipality and among people aged 12–21 in each municipality. Very few participants from Chelsea and Somerville appeared in the MBTA AFC datasets, so these municipalities are not represented in Table A-1 or in other tables.

TABLE A-1
Youth Pass Pilot Program Participants by Minority
and Low-Income Status by Municipality

	Percentage of Minority Youth Pass Participants	Percentage of Minority Youth in Municipality	Percentage of Low-Income Youth Pass Participants	Percentage of Low-Income Youth in Municipality
Boston	93.0%	57.9%	75.2%	52.9%
Chelsea	NR	88.3%	NR	37.5%
Malden	94.7%	59.1%	65.3%	30.1%
Somerville	NR	44.60%	NR	38.6%
Average	93.3%	58.4%	72.9%	50.2%

Data source: MBTA and US Census.

NR = not reliable. There was not a large enough sample to provide a meaningful or statistically-significant statistic. The average Youth Pass minority percentage and the average Youth Pass low-income percentages reflect data from Boston and Malden only.

Table A-1 shows that the percentage of minority and low-income youth among Youth Pass participants from Boston and Malden is higher than the percentage of minority and low-income youth living in those two municipalities. This supports the conclusion that the pilot program does not create disparate benefits to nonminority youth or disproportionate benefits to non-low-income youth.

Percentage of Minority and Low-Income Youth Pass Participants in Various Pilot Program Enrollment Stages

Youth in the Youth Pass Pilot program need to complete the following steps in order to participate in the program:

- All applicants fill out the program application, which collects data on applicant demographic and school-enrollment characteristics, and on the use of past MBTA fare products
- Applicants who are admitted to the pilot program (up to 1,500) fill out an enrollment survey, which collects data on trip-making behavior and on satisfaction with the MBTA system and services, and then sign (or have a parent or guardian sign) a release form to allow data collection, including trip-making data
- All participants receive a CharlieCard with no pre-loaded stored value or pass products. Each participant adds value or a non-Youth Pass product

to his or her card and uses the card in order for pre-pilot-program data to be collected for 30 days

- All participants return to the municipal office after 30 days to receive a Youth Pass CharlieCard, and purchase a monthly or 7-Day Youth Pass that they can use to make trips, which are logged through the MBTA's automated-fare-collection (AFC) system
- All participants return to the municipal office to renew the Youth Pass and fill out a monthly survey

For each step, a participant needs to either spend time completing a form and/or travel to a municipal office. These requirements may create barriers to participation in the Youth Pass Pilot program.

CTPS examined the demographic characteristics of the youth who completed each step to determine if the enrollment process resulted in a disparate benefit for nonminority populations or a disproportionate benefit for non-low-income populations. For this memorandum, CTPS did not examine the effect of the fourth step—return to the municipal office to renew the Youth Pass—because a majority of Youth Pass Pilot program users are enrolled in middle and high school (77.5 percent), and a calculation of the length of time in the Youth Pass Pilot program would be heavily skewed by students who return to using either a self-purchased or school-provided Student Pass products. Table A-2 shows the percentages of Youth Pass participants by minority and low-income status at each step of the pilot program.

TABLE A-2
Youth Pass Pilot Program Participants by Minority and Low-Income Status at Each Enrollment Step

	Minority	Percentage Minority	Low-Income	Percentage Low-Income	Total
Completed application	3,575	90.3%	3,035	76.6%	3,961
Completed enrollment survey	788	92.9%	631	74.4%	848
Purchased and used Youth Pass	402	93.3%	314	72.9%	431
Total youth population	74,716	56.3%	60,834	50.2%	131,671

Data source: MBTA.

As shown in Table A-2, there is an increase in the proportion of minority participants at each successive step; there is a larger percentage of minority

youth among those using the Youth Pass (93.3 percent) than among those who completed the enrollment survey (92.9 percent), which is itself larger than the percentage of minority youth in the applicant pool (90.3 percent). The increase in the proportion of minority participants at each successive step indicates that there is no disparate barrier for minority populations to entering this program and therefore no disparate benefit for nonminority populations.

Table A-2 also shows that there is a decrease in the proportion of low-income participants at each subsequent step; there is a smaller percentage of low-income youth in the population of people using a Youth Pass (72.9 percent) than the percent of low-income youth in the population of participants who took the enrollment survey (74.4 percent), which is itself smaller than the percentage of low-income youth in the applicant pool (76.6 percent). This trend is the opposite of the one identified for minority youth.

However, the percentage of low-income youth at all stages of the Youth Pass Pilot program—application, enrollment survey, and pass use—is higher than the percentage of low-income youth in the participating municipalities (50.2 percent). CTPS found a disproportionate benefit to non-low-income youth with respect to the enrollment process, and the trend suggests that there is a need to monitor these statistics to determine if the enrollment process is a potential barrier to entry to the pilot program for low-income youth. Most of these enrollment steps will be eliminated in the full Youth Pass program implementation, removing this potential barrier to low-income youth participation.

Changes in Overall Monthly Trip-Making by Minority and Low-Income Youth

The MBTA's unlimited-ride passes provide a benefit to pass holders because the average cost per trip is generally lower than if the user paid for individual trips. These passes, however, require a significant up-front cost, especially the adult Monthly LinkPass (\$75.00) and the 7-Day LinkPass (\$19.00). This up-front cost may prevent some riders, particularly low-income riders, from taking advantage of the lower per-trip costs available with a pass. The Youth Pass Pilot program provides youth riders with the benefits of 7-day and monthly pass products at a significantly lower cost (\$7.00 for a 7-Day pass and \$26.00 for a monthly pass). CTPS analyzed Youth Pass usage to see if participants made more trips per month, on average, using the Youth Pass than before they obtained a Youth Pass. Tables A-3 and A-4 summarize this analysis for minority and low-income youth, respectively.

TABLE A-3
Average Monthly Trips by Minority Youth Pass Pilot Program
Participants before and during the Pilot Program

	Average Monthly Trips before Youth Pass	Average Monthly Trips with Youth Pass	Percentage Increase or Decrease
Minority youth	43	58	+ 34.9%
All youth	44	57	+ 29.5%
Ratio			1.18
Result of analysis			No disparate benefit

Data source: MBTA.

Ratio = The ratio of the percentage change in the average number of monthly trips for minority participants to the percentage change in the average number of monthly trips for all participants.

TABLE A-4
Average Monthly Trips by Low-Income Youth Pass Pilot
Program Participants before and during the Pilot Program

	Average Monthly Trips before Youth Pass	Average Monthly Trips with Youth Pass	Percentage Increase or Decrease
Low-income youth	46	61	+ 32.6%
All youth	44	57	+ 29.5%
Ratio			1.10
Result of analysis			No disproportionate benefit

Data source: MBTA.

Ratio = The ratio of the percentage change in the average number of monthly trips of low-income participants to the percentage change in the average number of monthly trips of all participants.

Tables A-3 and A-4 show that the average number of trips per month for all Youth Pass participants increased by 30 percent once they had access to a Youth Pass. The average number of trips per month for minority participants increased by 35 percent when they participated in the Youth Pass Pilot program, while the average number of trips per month for low-income participants increased by 33 percent. These findings indicate that both minority and low-income Youth Pass participants accrue more benefit from the Youth Pass, in terms of the number of trips they make, than nonminority and non-low-income Youth Pass participants, respectively. The findings also indicate that there is no disparate benefit for nonminority Youth Pass participants and no disproportionate benefit for non-low-income participants.

Changes in Monthly Trip Making by Minority and Low-Income Participants by Mode

Fares for the MBTA rapid transit system are higher than those for local buses. The Youth Pass allows participants to make unlimited trips on both buses and rapid transit, effectively reducing the cost of rapid transit trips. This effective reduction in fare may improve participants' access to the rapid transit system and their mobility. It may decrease their travel times because, in some cases, rapid transit service runs more frequently than bus service, and, because rapid transit operates on its own right-of-way, it often provides faster service. CTPS examined whether Youth Pass participants made a larger share of their trips on rapid transit once they had access to a Youth Pass.

Tables A-5 and A-6 present the average share of monthly trips that minority, low-income, and all Youth Pass participants made by bus before and during the Youth Pass Pilot program.

TABLE A-5
Average Share of Monthly Trips by Bus before and during the Youth Pass Pilot Program by Minority Youth

	Average Share of Monthly Trips Made by Bus: before Youth Pass	Average Share of Monthly Trips Made by Bus: with Youth Pass	Percentage Increase or Decrease
Minority youth	37.3%	34.7%	-6.8%
All youth	37.4%	35.4%	-5.3%
Ratio			1.29
Result of analysis			No disparate benefit

Data source: MBTA.

Ratio = The ratio of the percentage change in the share of monthly trips made by bus by minority participants to the percentage change in the share of monthly trips made by bus by all participants.

TABLE A-6
Average Share of Monthly Trips by Bus before and during
the Youth Pass Pilot Program by Low-Income Youth

	Average Share of Monthly Trips Made by Bus: before Youth Pass	Average Share of Monthly Trips Made by Bus: with Youth Pass	Percentage Increase or Decrease
Low-income youth	37.0%	33.5%	-9.3%
All youth	37.4%	35.4%	-5.3%
Ratio			1.76
Result of analysis	No disproportionate benefit		

Data source: MBTA.

Ratio = The ratio of the percentage change in the share of monthly trips made by bus for low-income participants to the percentage change in the share of monthly trips made by bus by all participants.

As shown in Tables A-5 and A-6, there is a decrease in the share of trips made on the bus network by minority Youth Pass participants (- 6.8 percent), low-income Youth Pass participants (-9.3 percent), and all Youth Pass participants (-5.3 percent). All Youth Pass participants are likely to be benefiting from the better frequency and improved travel time of rapid transit services when they decrease the share of trips they make by bus each month and increase the share made by rapid transit. This analysis indicates that both minority and low-income Youth Pass participants are benefiting more than Youth Pass participants overall; therefore the pilot program is not creating a disparate benefit to nonminority participants or a disproportionate benefit to non-low-income participants.

Tables A-7 and A-8 present the average share of monthly trips that minority, low-income, and all Youth Pass participants made by rapid transit before and during the Youth Pass Pilot program.

TABLE A-7
Average Share of Monthly Trips by Rapid Transit before
and during the Youth Pass Pilot Program by Minority Youth

	Average Share of Monthly Trips Made by Rapid Transit: before Youth Pass	Average Share of Monthly Trips Made by Rapid Transit: with Youth Pass	Percentage Increase or Decrease
Minority youth	62.7%	65.3%	+ 4.0%
All youth	62.7%	64.6%	+ 3.1%
Ratio			1.29
Result of analysis			No disparate benefit

Data source: MBTA.

Ratio = The ratio of the percentage change in the share of monthly trips made by rapid transit for minority participants to the percentage change in the share of monthly trips made by rapid transit for all participants.

TABLE A-8
Average Share of Monthly Trips by Rapid Transit before
and during the Youth Pass Pilot Program by Low-income Youth

	Average Share of Monthly Trips Made by Rapid Transit: before Youth Pass	Average Share of Monthly Trips Made by Rapid Transit: with Youth Pass	Percentage Increase or Decrease
Low-income youth	63.1%	66.5%	+ 5.4%
All youth	62.7%	64.6%	+ 3.1%
Ratio			1.73
Result of analysis			No disproportionate benefit

Data source: MBTA.

Ratio = The percentage change in the share of monthly trips made by rapid transit for low-income participants to the percentage change in the share of monthly trips made by rapid transit for all participants.

There is an increase in the share of trips made on the rapid transit network for minority (4.0 percent), low-income (5.4 percent), and Youth Pass participants overall (3.1 percent). Youth Pass participants are most likely benefiting from increasing the share of trips they make by rapid transit each month. This analysis indicates that both minority and low-income Youth Pass participants are benefiting more than Youth Pass participants overall; therefore the pilot program is not creating a disparate benefit to nonminority participants or a disproportionate benefit to non-low-income participants.

APPENDIX B: DEFINITIONS

The sections below define some of the terminology used in this memorandum. The definitions and explanations are directly quoted from the FTA Title VI Circular 4702.1B and the MBTA Disparate Impact and Disproportionate Burden Policy, except where otherwise noted.

Terminology from FTA Circular 4702.1B

Disparate impact refers to a facially neutral [neutral on its face] policy or practice that disproportionately affects members of a group identified by race, color, or national origin, where the [FTA funding] recipient's [MBTA's, in this case] policy or practice lacks a substantial legitimate justification and where there exists one or more alternatives that would serve the same legitimate objectives but with less disproportionate effect on the basis of race, color, or national origin.

Disproportionate burden refers to a neutral policy or practice that disproportionately affects low-income populations more than it affects non-low-income populations. A finding of disproportionate burden requires the recipient to evaluate alternatives and mitigate burdens where practicable.

Low-income population refers to any readily identifiable group of low-income persons who live in geographic proximity, and, if circumstances warrant, geographically dispersed/transient persons (such as migrant workers or Native Americans) who will be similarly affected by a proposed FTA program, policy, or activity.

Minority persons [abbreviated definition] include the following groups: 1) American Indian and Alaska Native, 2) Asian, 3) Black or African American, 4) Hispanic or Latino, and 5) Native Hawaiian or Other Pacific Islander.

Minority population means any readily identifiable group of minority persons who live in geographic proximity and, if circumstances warrant, geographically dispersed/transient populations (such as migrant workers or Native Americans) who will be similarly affected by a proposed DOT program, policy, or activity.

Terminology from the MBTA Disparate Impact and Disproportionate Burden Policy

Adverse Effects. The MBTA will define and analyze adverse effects related to proposed fare changes or major service changes. The MBTA will measure the

loss (the adverse impact), or the gain (benefit), among minority and nonminority populations and among low-income and non-low-income populations, when conducting the equity analysis of proposed major service changes, and among minority and overall users and among low-income and overall users for any fare changes.

Fare Equity Analysis. Per FTA Circular C4702.1, the fare equity analysis is the required study conducted by large, urban transit agencies prior to the enactment of a fare increase or decrease. The analysis examines the impact that the fare change will have on minority and low-income users, based on each individual fare type (e.g., cash, CharlieCard, CharlieTicket, 1-day pass, weekly pass), when compared to the impact the fare change will have on all users.

Low-Income. The FTA Title VI guidelines define “low-income” as “a person whose median household income is at or below the US Department of Health and Human Services poverty guidelines.” As of 2013, the base level for a one-person household is \$11,490 annually, with a \$4,020 increase per household member. Because median incomes in the MBTA service area are high in comparison to national levels, the MBTA uses a more inclusive definition for low-income. The median household income for the years 2007 through 2011 for the 175-municipality MBTA service area was \$69,393. A low-income census tract is defined as one in which the median household income in 2011 was less than 60% of that level, or \$41,636.²

Major Fare Increase. As defined in the "Public Process for Changing MBTA Fares, and/or Fare Structure or Major Service Reductions" policy, major fare increases are defined as:

- Major changes to the fare structure; or
- A systemwide fare increase in which the percent increase in fare revenue realized by the MBTA would be 10 percent or more; or
- A systemwide fare increase of less than 10 percent that results in a cumulative increase in fare revenue of 10 percent or more within a three-year period.

² In its analyses, CTPS used the 2013 household income threshold (using data from the US Census American Community Survey) to define low-income households because this was the threshold in place when the pilot program launched in July 2015. In September 2015, the MBTA updated the household income threshold with new American Community Survey data; this new threshold will be used in future Title VI fare equity analyses.

Minor Fare Increase. As defined in the "Public Process for Changing MBTA Fares, and/or Fare Structure or Major Service Reductions" policy, minor fare increases are defined as:

- Minor changes to the MBTA fare structure; or
- A systemwide fare increase in which the percent increase in fare revenue realized by the MBTA would be less than 10 percent; or
- A systemwide fare increase of less than 10 percent that results in a cumulative increase in fare revenue of less than 10 percent within a three year period.

Policy Thresholds. [Summary from the MBTA's Disparate Impact and Disproportionate Burden Policy.] Policy thresholds are levels of impact that require the MBTA to conduct additional analysis, mitigation, or other actions to resolve potential disparate impacts or disproportionate burdens. These policy thresholds are described below for minor and major fare changes. There are also policy thresholds for service changes.

For minor fare changes:

- A disparate benefit would be found if the minority riders (population) are projected to receive less than 80 percent of the benefit that all customers (population) receive.
- A disproportionate benefit would be found if the low-income customers (population) are projected to receive less than 80 percent of the benefits that all customers (population) receive.
- A disparate burden would be found if the minority customers (population) are projected to sustain more than 20 percent additional burden than the total burden that all customers (population) sustain.
- A disproportionate burden would be found if the low-income customers (population) are projected to sustain more than 20 percent additional burden than the total burden that all customers (population) sustain.

For major fare changes:

- A disparate benefit would be found if the minority customers (population) are projected to receive less than 90 percent of the benefit that all customers (population) receive.
- A disproportionate benefit would be found if the low-income customers (population) are projected to receive less than 90 percent of the benefits that all customers (population) receive.

- A disparate burden would be found if the minority customers (population) are projected to sustain more than 10 percent additional burden than the total burden that all customers (population) sustain.
- A disproportionate burden would be found if the low-income customers (population) are projected to sustain more than 10 percent additional burden than the total burden that all customers (population) sustain.

For fare changes, the MBTA will compare the percentage change in the average fare for minority and nonminority riders and for low-income and non-low-income riders. For fare type changes, the MBTA will assess whether minority and low-income customers are disproportionately more likely to use the affected fare type or media than nonminority and non-low-income customers, respectively.

This policy could be represented by the following:

A disparate impact would be found if:

- Projected benefit to minority $< 0.8 \times$ projected benefit to all, for minor fare changes
- Projected benefit to minority $< 0.9 \times$ projected benefit to all, for major fare changes
- Projected burden to minority $> 1.2 \times$ projected burden to all, for fare minor changes
- Projected burden to minority $> 1.1 \times$ projected burden to all, for fare major changes

A disproportionate burden would be found if:

- Projected benefit to low-income $< 0.8 \times$ projected benefit to all, for minor fare changes
- Projected benefit to low-income $< 0.9 \times$ projected benefit to all, for major fare changes
- Projected burden to low-income $> 1.2 \times$ projected burden to all, for minor fare changes
- Projected burden to low-income $> 1.1 \times$ projected burden to all, for major fare changes

Appendix 7-E

FMCB Approval of MBTA Youth Pass Pilot Fare Equity Analysis



Charles D. Baker, Governor
Karyn E. Polito, Lieutenant Governor
Stephanie Pollack, MassDOT Secretary & CEO
Frank DePaola, General Manager
Brian Shortsleeve, Chief Administrator



Fiscal and Management Control Board

December 21, 2015
MassDOT Boardroom
10 Park Plaza, Suite 3830
Boston, MA

MEETING MINUTES

Members: Chairman Joseph Aiello, Director Lisa Calise, Director Brian Lang, Director Steven Poftak, and Director Monica Tibbits-Nutt

Present: Chairman Joseph Aiello, Director Lisa Calise, Director Steven Poftak, and Director Monica Tibbits-Nutt

Quorum Present: Yes

Other Participants: Secretary Stephanie Pollack, General Manager Frank DePaola, Chief Administrator Brian Shortsleeve, General Counsel John Englander, First Assistant General Counsel Marie Breen

PROCEEDINGS:

Call to Order by Chairman Aiello

The Chair called the meeting to order of business at 1:05pm.

The Chair opened up the meeting for public comment.

The first speaker was James White, chairman of ACCT who commented on options for the RIDE and elimination of service. Mr. White submitted a joint letter of opposition to the elimination or reconfiguration of the RIDE's premium service from AACT, BCIL, Mass. Senior Action Council, Disability Policy Consortium and the Bay State Council of the Blind

Next was Rick Morin from the Bay State Council for the Blind and ACCT Vice Chairman who also commented on the RIDE.

Next was Helen Azanow from Mass Senior Action who commented on the fare increase and elimination of the RIDE premium service. She also asked the Board to commit to meet with Mass Senior Action to create a task force to look at those issues.

Next was Josh Ostroff from Transportation for Mass. who commented on the fare policy. He also submitted to the Board 2,500 petitions to keep fares affordable and protect current MBTA service.

Next was Jeremy Mendelson from Transit Matters who commented on the fare policy. Mr. Mendelson also submitted a letter to the Board.

The next speaker was Louise Baxter from the TRU who stated she was against any fare increase and supported the youth pass.

Next was Maria Belen Power from the Chelsea Collaborative who spoke in support of the youth pass.

The next speaker was Cate Maas from the Chelsea Collaborative and the Chelsea Board of Health who commented on and was in support of the Arts on the T Program.

Next was Marilyn McNab who commented on the RIDE.

The last speaker was David Jenkins, Coordinator of the Youth Affordability Coalition who spoke in support of the youth pass.

PROCEDURAL ITEMS

Next was the approval of the minutes from the meeting of November 18, 2015.

On motion duly made and seconded, it was:

Voted to approve the minutes of the November 18, 2015 meeting.

PRESENTATIONS/DISCUSSION

Next Chairman Aiello asked Chief Administrator Brian Shortsleeve to give his report. Mr. Shortsleeve began his report by discussing overtime paid to MBTA employees through the operating and capital budget as of 12/15/15, as set forth in the attached presentation made to the board labeled "Chief Administrator's Report: MBTA FY 2015 Payroll Data."

Next General Manager Frank DePaola gave his report. He updated the board on the previous week's operations of heavy rail and commuter rail and said he would continue to look at on-time-performance. Mr. DePaola said he was working on the GLX 90-day look ahead schedule that would be presented at the January 4, 2016 FMCB meeting. He said he also received proposals to hire a new project manager for the GLX project and asked the board to authorize him to engage interim project management services for the project.

On motion duly made and seconded, it was:

VOTED: That the General Manager, or his designee, is hereby authorized to execute in the name of and on the behalf the Massachusetts Bay Transportation Authority (the "MBTA"), and in a form approved by the General Counsel, agreements and ancillary documents to effectuate the

following pertaining to the management, design and construction of the Green Line Extension (“GLX”) Project:

- 1. The engagement of interim project management services for the GLX Project; and**
- 2. Such other extra work orders and other agreements, including the engagement of an executive search firm for project management leadership, associated with the GLX Project, that require action between this date and the next meeting of the Fiscal Management and Control Board on January 4, 2016, in a total amount not to exceed \$250,000.**

And further voted, that the General Manager shall report to the FMCB on January 4, 2016 on expenditures made pursuant to this authorization.

Next, Chairman Aiello re- opened the public comment session to accommodate a speaker, Fred Lew from AACT who spoke against any fare increase to the RIDE.

The fourth item on the agenda was the discussion and action on the FMCB Annual Report as required by Section 207 of Chapter 46 of the Acts of 2015.

On motion duly made and seconded, it was:

VOTED: That the Fiscal and Management Control Board (the “FMCB”) approve the report entitled “MBTA Fiscal and Management Control Board First Annual Report (the “Report”), including any amendments and revisions as directed by the FMCB; and

VOTED FURTHER: That the Report as amended, shall be submitted on December 22, 2015 in the name of and on behalf of the FMCB, to the Legislature, pursuant to Section 207(b) of Chapter 46 of the Session laws of 2015.

Chairman Aiello asked Laurel Paget-Seekins, Director of Strategic Initiatives to present the next agenda item, the discussion and action on the Fare Policy. Ms. Paget-Seekins said the policy will set forth guidelines for establishing and restructuring fares by the MBTA and will provide guidance with respect to charging fares as authorized by Chapter 161A of the Massachusetts General Laws. The policy addresses fare levels, including discounts, fare equity, and a fare structure, including but not limited to fare media and passes, and includes a system for free or substantially price-reduced transfer privileges, as set forth in the attached presentation made to the board labeled "Fare Policy Revisions, December 21, 2015."

On motion duly made and seconded, it was:

VOTED: That the Fiscal and Management Control Board (the "FMCB") hereby adopts the Authority's revised 2016 MBTA Fare Policy, as presented to this Board on December 21, 2015, including any amendments and revisions as directed by the FMCB.

Next, Chairman Aiello recognized a speaker who did not make it to the earlier public comment session. Bill Henning, Executive Director from BCIL, commented on the RIDE premium service and stated he looked forward to working with the MBTA on funding solutions for that service.

Next, the Chair asked Laurel Paget-Seekins, Director of Strategic Initiative to present the next item, the discussion of the Youth Pass Pilot Mid-Year Report. Ms. Paget-Seekins said the Youth Pass Pilot has increased transit

access for primarily low-income and minority youth allowing them access to recreational opportunities, work, school and medical appointments they would not have had otherwise. The collaborative partnership with municipalities has yielded an auditable reduced fare program with limited administrative impact of the MBTA. A key result of the pilot was that three-quarters of the participants were eligible for an existing MBTA reduced fare pass, but unable to access it due to their school not offering it or the limitations on summer months.

Ms. Paget-Seekins said the pilot has provided data to measure the impacts of the pilot, but the estimates for the full program range widely based on assumptions of municipal opt in and participation rates by eligible youth. These estimates also included the cost of effectively increasing the access to the existing Student Pass, as set forth in the attached presentation made to the board labeled "Youth Pass Pilot Mid-Year Report, December 21, 2015."

Chairman Aiello stated that it was noted that the FMCB has received and accepted the Youth Pass Title VI Report and there was no need for a formal vote.

Next, Chairman Aiello asked CA Brian Shortsleeve to present the next item, an update of the Automated Fare Collection Systems. Mr. Shortsleeve said the key goals were to improve customer experience, increase revenue, reduce cost of fare collection and provide regional mobility and access, as set forth in the attached presentation made to the board labeled "Fare Collection Technology."

Next, the Chair asked Jerry Polcari, Chief Procurement Officer to update the board on the Red and Orange Line car construction. Bill Wolfgang, Director of Vehicle Engineering also participated in the discussion, as set forth in the attached presentation made to the board labeled “Red/Orange Line Procurement Update, December 21, 2015.”

After motion duly made and seconded, it was:

VOTED: To adjourn at 3:38pm.

DOCUMENTS RELIED ON IN THE MEETING

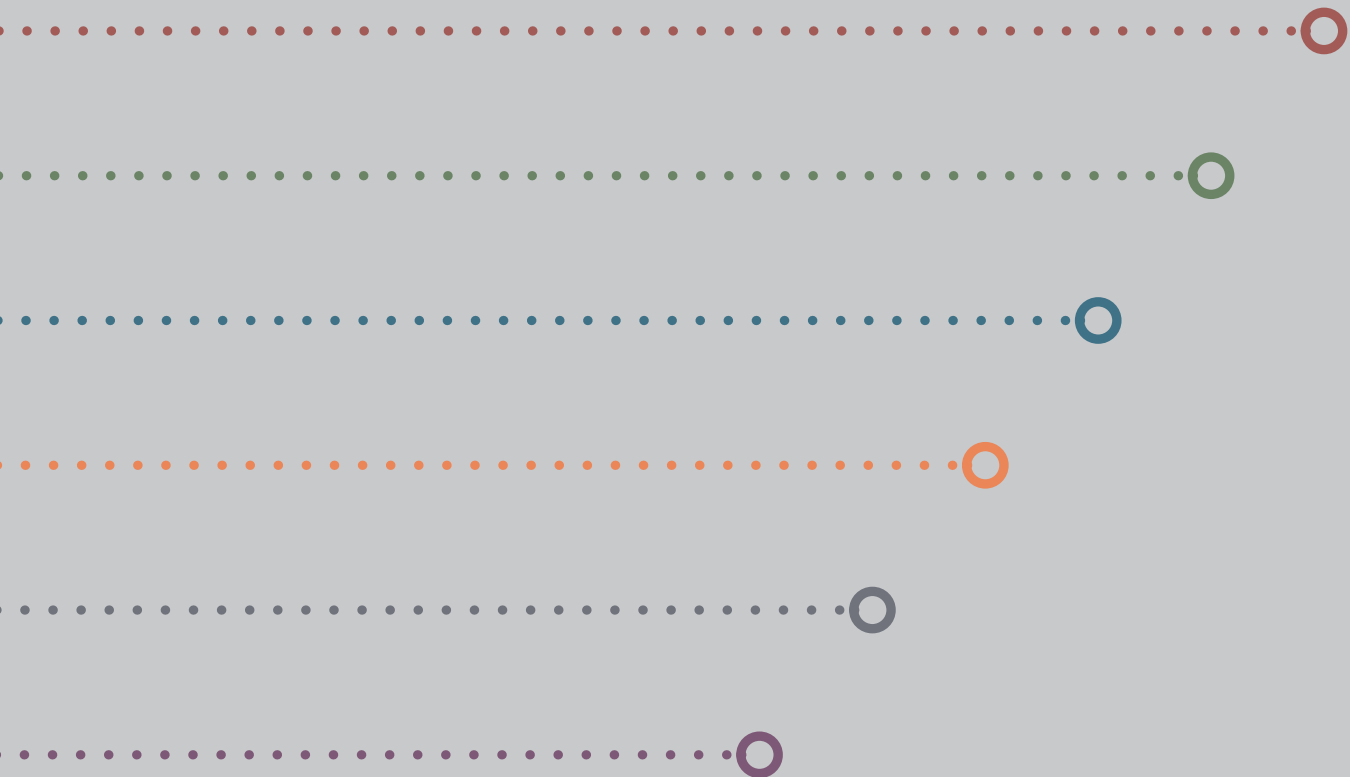
Minutes of November 18, 2015 meeting
DRAFT MBTA Fare Policy
Fare Policy Revisions PPP
MBTA Youth Pass Pilot Evaluation Preliminary Report
CTPS Youth Pass Pilot Program: Title VI Fare Equity Analysis
Youth Pass Pilot Mid-Year Report PPP
Fare Collection Technology PPP
Red/Orange Line Procurement Update PPP

Appendix 7-F

CTPS Fare Equity Analysis of SFY 2017 MBTA Fare Change

Potential MBTA Fare Changes in SFY 2017

Final Option: Impact Analysis



Potential MBTA Fare Changes in SFY 2017

Final Option: Impact Analysis

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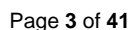
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ABSTRACT

This study analyzes the various effects of a potential MBTA fare-pricing scenario aimed at raising revenue to help meet revenue targets in state fiscal year (SFY) 2017. The proposed scenario would raise new revenue stemming from a nearly 9.3% average fare increase.

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Executive Summary

Before considering any changes in fares, the MBTA undertakes a comprehensive process to model the impacts of the changes. This modeling is done with the assistance of the Central Transportation Planning Staff (CTPS), which is the staff of the Boston Region Metropolitan Planning Organization (MPO). CTPS examines the impacts on ridership, revenue, and fare equity.

CTPS used an elasticity-based spreadsheet model known as the Fare Elasticity, Ridership, and Revenue Estimation Tool (FERRET) to estimate projected ridership loss associated with the proposed fare increase, and the net revenue change that would result from lower ridership and higher fares. CTPS produced a range of estimates of potential impacts on ridership and revenue and conducted a Title VI of the Civil Rights Act of 1964 (Title VI) fare-equity analysis to determine if the fare changes would result in disparate impacts for minority populations or disproportionate burdens for low-income populations.

Table 1 presents a summary of total ridership and revenue projections for SFY 2017. As the table indicates, revenue should increase by approximately 7.1% with a ridership loss of 1.5%.

TABLE 1
Revenue and Ridership Projections
for the Proposed Fare Increase: SFY 2017

Analysis Category	Existing Values	SFY 2015 Projections	Projected Change	Projected Pct. Change
Ridership	389.5 M	383.5 M	(5.9) M	(1.5)%
Revenue	\$647.3 M	\$693.1 M	\$45.8 M	7.1%

Source: Central Transportation Planning Staff.

M= Million. SFY = State fiscal year.

Saved operating costs from trips no longer made on the MBTA's paratransit service, THE RIDE, are projected to be \$929,000. Treating this saved cost as revenue yields an 7.7% increase.

In CTPS's fare-equity analysis, staff compared the absolute and relative fare increases between riders who are minorities and all riders, and between low-income riders and all riders. We applied the MBTA's disparate-impact and disproportionate-burden policies and found neither the presence of a disparate impact nor a disproportionate burden.

Chapter 1. Introduction

In recent years, the MBTA has managed to balance its budget through cost reductions, special appropriations by the Legislature, and fare and fee increases. In 2007, simultaneous with the introduction of the Automated Fare Collection (AFC) technology, the MBTA restructured its fare system and raised fares an average of 21%. The Authority did not raise fares again until July 2012 (SFY 2013), when it implemented a 23% average increase. Almost a year later, the state Legislature—in Chapter 46, An Act Relative to Transportation Finance—required that the MBTA attain revenue benchmarks, which it could satisfy by changing fares, fees, or any other funds directly collected by the Authority. In response, the MBTA established a pattern of modest, regularly scheduled fare changes, as needed, beginning with a minor fare increase in SFY 2015. As planned, the MBTA is continuing this pattern by increasing its fares in SFY 2017. The MBTA expects that modest, predictable fare increases would be less disruptive for the Authority and its customers compared to past major fare increases.

In January and February 2016, the MBTA hosted public meetings and a public hearing with customers and service-area residents regarding two proposed fare-change packages: Option 1, a smaller fare increase and Option 2, a larger fare increase. Those meetings resulted in some refinements to the previous fare-change packages. MBTA staff presented a refined version of Option 2 to the Fiscal Management Control Board, who recommended a final set of changes. In the pages that follow, the results of the final fare change package are presented.

1.1 Document Structure

The remainder of this document is organized as follows:

- Review of the methodology used for the analysis (Chapter 2)
- Description of the proposed fare changes (Chapter 3)
- Results of ridership and revenue analyses (Chapter 4)
- Results of a fare-equity analysis (Chapter 5)
- Conclusions (Chapter 6)

A detailed description of the FERRET methodology is provided in Appendix A.

Chapter 2. Methods Used to Estimate Ridership and Revenue

In consultation with the MBTA, CTPS used the spreadsheet application, FERRET, specifically to perform fare-change calculations to estimate the impact of the proposed fare increase on MBTA's ridership and revenue.

2.1 CTPS FERRET Approach

FERRET estimates the revenue and ridership impacts of the proposed fare-increase scenario. This model reflects the many fare-payment categories of the MBTA pricing system and applies price elasticities to analyze various changes across these categories. CTPS determined that this methodology met expectations through two post-fare increase analyses: 1) following the SFY 2007 fare restructuring, and 2) following the SFY 2013 fare increase.

Modeling of Existing Ridership and Revenue

Inputs to FERRET include existing ridership in the form of unlinked trips by mode, fare-payment method, and fare-media type. An unlinked trip is an individual trip on any single transit vehicle; a single journey, often composed of many unlinked trips on multiple vehicles, is a "linked trip."

The MBTA provided CTPS with existing ridership statistics (to which FERRET applies price elasticity values) for local bus, express bus, and rapid transit networks in the form of AFC data.¹ These data are for station, fare payment type (for example, cash, monthly pass, and weekly pass), fare media (for example, CharlieCard, CharlieTicket, cash), day of the week, and routes for buses and the light rail system.

Because the MBTA has not deployed AFC equipment on the commuter rail or commuter boat systems, CTPS estimated the number of trips made on these modes using sales figures. Single-ride trips on commuter rail and ferry were set equal to the number of single-ride fares sold. Staff estimated the number of trips made using passes on these modes by multiplying the number of pass sales by the estimated average number of trips made using the respective pass type (calculated using survey responses from a corporate pass-users survey conducted in spring 2008).

¹ "Existing ridership" is for SFY 2015 (July 1, 2014–June 30, 2015).

The MBTA also provided data for the number of trips made on THE RIDE by fare payment type, and the number of cars parked at MBTA parking lots. FERRET calculates revenue for single-ride trips by multiplying the number of trips in each fare/mode category by that category's price.² FERRET calculates revenue for pass trips by pass type by multiplying the number of pass sales by the pass price.³ The model distributes pass revenue between mode categories based on each category's ridership and most-equivalent single-ride fare (generally, the lowest-priced adult fare).

Estimation of Ridership Changes Resulting from a Fare Increase

Fares are one of many factors that influence the level of ridership on transit services. Price elasticity is a measure of the rate of change in ridership relative to a change in fares if all other factors remain constant. On a traditional demand curve that describes the relationship between price, on the y-axis, and demand, on the x-axis, elasticities are equivalent to the slope along that curve. Price elasticities are usually negative, meaning that a price increase will lead to a decrease in demand (with a price decrease having the opposite effect). The larger the negative value of the price elasticity (the greater its distance from zero), the greater the projected affect demand. Larger (more negative) price elasticities are said to be relatively "elastic," while smaller negative values (closer to zero), are said to be relatively "inelastic."⁴ Thus, if the price elasticity of the demand for transit were relatively elastic, a given fare increase would cause a greater loss of ridership than if demand were relatively inelastic. Appendix A.5 presents an example of how the concept of price elasticity is applied.

FERRET permits the use of various ranges of elasticities to estimate different possible ridership impacts of price increases. Performing calculations in FERRET with the same prices but with a range of higher and lower elasticities provides a range of estimates. In the present analysis, the model uses the middle range of elasticities, called the base elasticities, as these represent the best estimate of where the elasticities should be set based on past experience and a post-SFY

² For example, if there were 30 million adult CharlieCard fares paid at stations, the revenue generated is equal to 30 million multiplied by \$2.10—the adult CharlieCard fare—or \$63 million.

³ The MBTA offered discounted prices during May 2015. This analysis used the full price rather than the discounted price to estimate the total revenue generated by a pass type.

⁴ More specifically, an elasticity of less than -1 is considered "elastic"—a 1% increase in price will cause a greater-than 1% decrease in demand; an elasticity of -1 is called "unit elasticity"—a 1% increase in price will cause a 1% reduction in demand; and an elasticity greater than -1 is called "inelastic"—a 1% increase in price will result in a lower-than 1% decrease in demand; an elasticity of 0 is called "perfectly elastic demand"—an increase in price does not affect demand.

The elasticity of transit ridership with respect to small fares changes is generally considered inelastic.

2013-fare increase analysis. For a description of how we determined the base elasticities, see Appendix A.4. However, we also use both more inelastic and more elastic elasticity values to determine a range of possible effects; the lower and higher ranges are plus or minus 0.10 the base value. If subtracting 0.10 from the base elasticity would result in an elasticity of 0.00, we subtracted 0.05 instead. This serves as a sensitivity analysis of the model's projections of the ridership losses and revenue gains. Table 2 presents the three elasticity ranges used in FERRET for this study's analysis.

FERRET also uses ridership diversion factors. These factors reflect estimates of the likelihood of a switch in demand from one MBTA product type or mode to another resulting from a change in the relative prices of product types or modes. The diversion factors essentially work to redistribute demand between two product types or modes after the model applies the respective price elasticities. Appendix A.5 presents examples of applying diversion factors and the methodology for using combined price elasticities and diversion factors. While diversion factors estimate the migration of riders between MBTA product types and modes based on their price, FERRET can only estimate the total loss of riders from the MBTA transit system, not the diversion of riders to specific non-MBTA modes such as driving, biking, or walking.

TABLE 2
Single-Ride and Pass Elasticities by Fare Type and Mode

Mode Category	Low	Base	High
Cash Elasticities			
<i>Bus and Trackless Trolley</i>			
Bus-Adult	(0.15)	(0.25)	(0.35)
Bus-Senior	(0.10)	(0.20)	(0.30)
Bus-Student	(0.05)	(0.15)	(0.25)
<i>Subway</i>			
Subway-Adult	(0.15)	(0.25)	(0.35)
Subway-Senior	(0.05)	(0.15)	(0.25)
Subway-Student	(0.05)	(0.10)	(0.20)
<i>Surface Light Rail</i>			
Surface Light Rail-Adult	(0.20)	(0.30)	(0.40)
Surface Light Rail-Senior	(0.10)	(0.20)	(0.30)
Surface Light Rail-Student	(0.05)	(0.15)	(0.25)
<i>Commuter Rail</i>			
Commuter Rail-Adult	(0.10)	(0.20)	(0.30)
Commuter Rail-Senior	(0.05)	(0.15)	(0.25)
<i>Commuter Boat</i>			
Commuter Boat-Adult	(0.20)	(0.30)	(0.40)
Commuter Boat-Senior	(0.15)	(0.25)	(0.35)
THE RIDE	(0.25)	(0.35)	(0.45)
Parking	(0.10)	(0.20)	(0.30)
Pass Elasticities			
Bus	(0.05)	(0.15)	(0.25)
Inner Express	(0.15)	(0.25)	(0.35)
Outer Express	(0.15)	(0.25)	(0.35)
LinkPass	(0.05)	(0.15)	(0.25)
1-Day LinkPass	(0.05)	(0.15)	(0.25)
7-Day LinkPass	(0.05)	(0.15)	(0.25)
Commuter Rail	(0.05)	(0.10)	(0.20)
Commuter Boat	(0.10)	(0.20)	(0.30)
Senior	(0.05)	(0.10)	(0.20)
Student	(0.05)	(0.10)	(0.20)

Source: FERRET.

Chapter 3. Description of Proposed Fare Increase Scenario

This chapter describes proposed changes in the MBTA's fare structure and the proposed SFY 2017 fares.

3.1 Fare Structure Changes

The MBTA proposed several fare structure changes for SFY 2017, including:

- Setting the cash and CharlieTicket fares to convenient-to-pay prices; that is, values that are multiples of \$0.25
- Setting all discounted monthly LinkPasses (senior, Transportation Access Pass (TAP), and student) to the same price
- Eliminating the 10-ride tickets for boats and the commuter rail system
- Transferring all 5-day validity monthly student passes to 7-day validity monthly student passes, then discontinuing the redundant, less-beneficial 5-day validity student pass

3.2 Fare Changes: Single-Ride Fares and Pass Prices

Table 3 cites key existing and proposed single-ride fares for each fare category, along with the percentage change from existing to proposed price. Table 4 cites the same information for the pass prices. Table 5 presents the value of monthly passes in terms of their single-ride equivalents, a concept discussed at the end of this section. The MBTA is not implementing parking fee increases as part of this fare and fee structure change.

The overall price increase across all modes and fare/pass categories is 9.3%. This systemwide average is based on the percentage change between the existing average fare (total revenue divided by existing ridership) and the proposed average fare (total projected revenue divided by total projected ridership). Table 5 presents these average percentage increases by mode category. Percentage changes in price can differ between modes that are similarly priced, such as local bus and the Silver Line–Washington Street, or subway and surface light rail, because of differences in how riders on these modes pay for their trips (more riders use a monthly pass on the subway than on the surface light rail system, for example).

The percentage changes in prices are relatively consistent across fare payment types. The most notable departures from the baseline are:

- Neither commuter rail interzone 1–3 fares nor one-day LinkPass prices increase—a result of these products having relatively high fare increases in SFY 2015.
- The cross-harbor ferry fare decreases to match the commuter ferry fares.
- Neither the outer express single-ride CharlieCard fares nor the outer express pass price increases
- The local bus CharlieTicket and cash fares decrease by \$0.10 to \$2.00 to simplify payment

Another factor the MBTA considers when raising fares is the pass-ride value, or multiple, which is the number of trips required at the lowest-cost single-ride fare to match the cost of the pass.⁵ Lower multiples indicate that a passenger needs to make fewer trips to make the pass financially worthwhile.

⁵ For example, the monthly LinkPass currently costs \$75.00. The lowest price single-ride rapid transit fare is \$2.10, which a passenger may obtain by using a CharlieCard. Thus, a \$75.00 monthly LinkPass is equal to 35.71 single-ride CharlieCard rapid transit trips.

TABLE 3
Key Single-Ride Fares: Existing and Proposed

Fare Category	Existing Fare	Proposed Fare	Percent Change	Absolute Change
CharlieCard				
Adult				
Local Bus	\$1.60	\$1.70	6.3%	\$0.10
Rapid Transit	2.10	2.25	7.1%	0.15
Bus and Rapid Transit	2.10	2.25	7.1%	0.15
Inner Express	3.65	4.00	9.6%	0.35
Outer Express	5.25	5.25	0.0%	0.00
Senior				
Local Bus	\$0.80	\$0.85	6.3%	\$0.05
Rapid Transit	1.05	1.10	4.8%	0.05
Bus and Rapid Transit	1.05	1.10	4.8%	0.05
Student				
Local Bus	\$0.80	\$0.85	6.3%	\$0.05
Rapid Transit	1.05	1.10	4.8%	0.05
Bus and Rapid Transit	1.05	1.10	4.8%	0.05
CharlieTicket or Cash				
Adult				
Local Bus	\$2.10	\$2.00	(4.8)%	\$(0.10)
Rapid Transit	2.65	2.75	3.8%	0.10
Bus and Rapid Transit	4.75	4.75	0.0%	0.00
Inner Express	4.75	5.00	5.3%	0.25
Outer Express	6.80	7.00	2.9%	0.20
Commuter Rail				
Zone 1A	\$2.10	\$2.25	7.1%	\$0.15
Zone 1	5.75	6.25	8.7%	0.50
Zone 2	6.25	6.75	8.0%	0.50
Zone 3	7.00	7.50	7.1%	0.50
Zone 4	7.50	8.25	10.0%	0.75
Zone 5	8.50	9.25	8.8%	0.75
Zone 6	9.25	10.00	8.1%	0.75
Zone 7	9.75	10.50	7.7%	0.75
Zone 8	10.50	11.50	9.5%	1.00
Zone 9	11.00	12.00	9.1%	1.00
Zone 10	11.50	12.50	8.7%	1.00
Interzone 1	\$2.75	\$2.75	0.0%	\$0.00
Interzone 2	3.25	3.25	0.0%	0.00
Interzone 3	3.50	3.50	0.0%	0.00
Interzone 4	3.75	4.00	6.7%	0.25
Interzone 5	4.25	4.50	5.9%	0.25
Interzone 6	4.75	5.00	5.3%	0.25
Interzone 7	5.25	5.50	4.8%	0.25
Interzone 8	5.75	6.00	4.3%	0.25
Interzone 9	6.25	6.50	4.0%	0.25
Interzone 10	6.75	7.00	3.7%	0.25
Ferry				
F1: Hingham	\$8.50	\$9.25	8.8%	\$0.75
F2: Boston	8.50	9.25	8.8%	0.75
F2: Cross Harbor	13.75	9.25	(32.7)%	(4.50)
F2: Logan	17.00	18.50	8.8%	1.50
F4: Inner Harbor	3.25	3.50	7.7%	0.25
THE RIDE				
ADA Service Area	\$3.00	\$3.15	5.0%	\$0.15
Premium Service Area	5.00	5.25	5.0%	0.25

Source: Central Transportation Planning Staff.

TABLE 4
Pass Prices: Existing and Proposed

Pass Category	Existing Fare	Proposed Fare	Percent Change	Absolute Change	Existing Multiple	Proposed Multiple
Local Bus	\$50.00	\$55.00	10.0%	\$5.00	31.25	31.43
LinkPass	75.00	84.50	12.7%	9.50	35.71	37.56
Senior/TAP	29.00	30.00	3.4%	1.00	27.62	27.27
Student 5-Day Validity	26.00	30.00	15.4%	4.00	24.76	27.27
Student 7-Day Validity	26.00	30.00	15.4%	4.00	24.76	27.27
1-Day	12.00	12.00	0.0%	0.00	5.71	5.33
7-Day	19.00	21.25	11.8%	2.25	9.05	9.44
Inner Express	115.00	128.00	11.3%	13.00	31.51	32.00
Outer Express	168.00	168.00	0.0%	0.00	32.00	32.00
<i>Commuter Rail</i>						
Zone 1A	\$75.00	\$84.50	12.7%	\$9.50	35.71	37.56
Zone 1	182.00	200.25	10.0%	18.25	31.65	32.04
Zone 2	198.00	217.75	10.0%	19.75	31.68	32.26
Zone 3	222.00	244.25	10.0%	22.25	31.71	32.57
Zone 4	239.00	263.00	10.0%	24.00	31.87	31.88
Zone 5	265.00	291.50	10.0%	26.50	31.18	31.51
Zone 6	289.00	318.00	10.0%	29.00	31.24	31.80
Zone 7	306.00	336.50	10.0%	30.50	31.38	32.05
Zone 8	330.00	363.00	10.0%	33.00	31.43	31.57
Zone 9	345.00	379.50	10.0%	34.50	31.36	31.63
Zone 10	362.00	398.25	10.0%	36.25	31.48	31.86
Interzone 1	\$86.00	\$90.25	4.9%	\$4.25	31.27	32.82
Interzone 2	105.00	110.25	5.0%	5.25	32.31	33.92
Interzone 3	114.00	119.75	5.0%	5.75	32.57	34.21
Interzone 4	124.00	130.25	5.0%	6.25	33.07	32.56
Interzone 5	141.00	148.00	5.0%	7.00	33.18	32.89
Interzone 6	159.00	167.00	5.0%	8.00	33.47	33.40
Interzone 7	175.00	183.75	5.0%	8.75	33.33	33.41
Interzone 8	193.00	202.75	5.1%	9.75	33.57	33.79
Interzone 9	211.00	221.50	5.0%	10.50	33.76	34.08
Interzone 10	229.00	240.50	5.0%	11.50	33.93	34.36
Commuter Boat	\$275.00	\$308.00	12.0%	\$33.00	23.08	24.14

Source: Central Transportation Planning Staff.

TABLE 5
Weighted Average Percentage Change in Average Fares,
by Mode Category, for Unlinked Passenger Trips

Mode Category	Percent Change
Bus	8.6%
Rapid Transit	9.5%
Subway	9.6%
Silver Line–Washington St.	8.2%
Silver Line–Waterfront	9.8%
Surface Light Rail	9.4%
Commuter Rail	9.2%
Zone 1A	11.8%
Zone 1	9.8%
Zone 2	9.5%
Zone 3	9.2%
Zone 4	10.2%
Zone 5	9.7%
Zone 6	9.5%
Zone 7	9.3%
Zone 8	9.8%
Zone 9	9.8%
Zone 10	9.7%
Interzone	4.1%
Onboard	6.0%
Ferry	9.5%
F1: Hingham-Boston	9.7%
F2: Boston	9.5%
F2: Cross Harbor	(32.3)%
F2: Logan	9.7%
F4: Inner Harbor	8.6%
THE RIDE	4.8%
ADA Service Area	4.8%
Premium Service Area	4.8%
Total System	9.3%

Source: FERRET.

Chapter 4. Ridership and Revenue Impacts

4.1 Overview of Results

We estimate that these proposed fare changes would increase the MBTA's revenue by \$45.8 million and decrease unlinked passenger trips by 5.9 million—excluding decreased utilization of MBTA parking lots.

4.2 FERRET Estimates

Projections

Table 6 presents CTPS's estimates of the fare revenue and ridership impacts of the fare increase produced using FERRET and its base elasticities.⁶ The existing fare revenue and ridership numbers in the table represent adjusted existing conditions prior to the fare increase. The MBTA offered discounted passes in May 2015; the existing total revenue accounted for these discounted passes as full-price passes.

The total estimated fare revenue increase in this scenario is \$45.8 million, a 7.1% increase. We estimate that the total estimated ridership loss would be 6.0 million unlinked passenger trips (including parking reductions), a 1.5% decrease. The estimated revenue increases are, on a relative basis, similar for all modes. The MBTA will derive the plurality of its new fare revenue from the heavy rail system (\$16.2 million).

We expect THE RIDE's fare increase to result in decreased use of the service, and estimate a decline of approximately 31,000 trips on THE RIDE. The current average variable cost of operating a trip on THE RIDE is approximately \$30.⁷ Not providing these trips would save the MBTA approximately \$929,000 in operating costs.

⁶ See Chapter 2 for a discussion of the range of elasticities used in this analysis.

⁷ A variable cost is a cost that changes as the quantity of service provided changes. This includes fuel costs and driver wages. Fixed costs do not change with change in quantity of service. Fixed costs could include those associated with storage facilities and certain administrative costs.

TABLE 6
FERRET Estimates of Annual Ridership Impacts
(in Unlinked Passenger Trips)

Mode	Existing Fare Revenue	Revenue Change	Revenue Change	Existing Ridership	Ridership Change	Ridership Change
Bus	\$117,473,918	\$8,396,557	7.1%	119,200,567	(1,603,251)	(1.3)%
Heavy Rail	205,419,713	16,216,994	7.9%	188,772,433	(3,113,054)	(1.6)%
Light Rail	71,521,262	5,213,467	7.3%	46,915,412	(804,603)	(1.7)%
Commuter Rail	196,410,110	15,610,697	7.9%	31,360,269	(370,937)	(1.2)%
Ferry	8,322,312	588,251	7.1%	1,181,046	(25,933)	(2.2)%
THE RIDE	5,805,368	183,595	3.2%	2,029,533	(30,866)	(1.5)%
Parking	42,379,890	(413,213)	(1.0)%	7,896,388	(74,391)	(0.9)%
Total System	647,332,573	45,796,346	7.1%	397,355,649	(6,023,035)	(1.5)%

Source: FERRET.

Notes: The average variable cost of each RIDE trip to the MBTA is \$30.10. The combined changes in THE RIDE's fares would decrease ridership, causing the MBTA to save approximately \$929,000 in operating expenses. Adding these saved operating costs to the new revenue, the net fiscal impact would be \$46,725,000.

Parking ridership and revenue losses are not a result of parking price increases; rather they are a result of riders who once parked no longer parking because another part of their trip became more expensive. In this table, "Fare Revenue" represents the gross revenue generated from parking at lots where the MBTA retains the revenue. "Ridership" includes the number of vehicles that parked at these lots.

Sensitivity Analysis

Table 6 cites the results of FERRET using the base elasticities. Table 7 presents a sensitivity analysis of the model's results, showing the range of estimated fare revenue and ridership impacts using the range of elasticities shown in Table 2. In the ranges of ridership-change estimates in the table, the greater losses are those resulting from a higher range of elasticities; while in the ranges of fare-revenue-increase estimates, the greater increases are those resulting from a lower range of elasticities.

The use of higher-range elasticities results in much greater estimates of ridership losses: 9.75 million unlinked trips, compared to 2.65 million using the lower-range elasticities; using the base-range elasticities results in a loss of 6.02 million unlinked passenger trips (including parking reductions). As a result, the projected revenue gain from the fare increase estimated using the higher-range elasticities is approximately \$39.3 million, compared to \$51.5 million using the lower-range elasticities; using the base-range elasticities results in an increase of \$45.8 million, as shown in Table 6.

TABLE 7
FERRET Estimate Ranges of Annual Ridership and
Fare Revenue Impacts using Low and High Elasticities

Mode	Range of Increases in Revenue (\$ in Millions)	Range of Revenue Percent Increases	Difference between Maximum and Minimum	Range of Ridership Changes (Trips in Millions)	Range of Ridership Percent Changes	Difference between Maximum and Minimum
Bus	\$7.2 to 9.5	6.4 to 8.3%	\$2.3	(2.66) to (0.65)	(2.2) to (0.7)%	2.01
Heavy Rail	\$14.0 to 18.4	5.3 to 7.0%	\$4.3	(4.97) to (1.37)	(2.0) to (0.5)%	3.60
Light Rail	\$4.5 to 5.9	5.0 to 6.7%	\$1.4	(1.25) to (0.38)	(2.1) to (0.6)%	0.87
Commuter Rail	\$13.6 to 16.9	6.8 to 8.5%	\$3.3	(0.67) to (0.18)	(2.1) to (0.6)%	0.49
Ferry	\$0.5 to 0.7	5.7 to 7.6%	\$0.2	(0.04) to (0.02)	(3.0) to (1.3)%	0.02
THE RIDE	\$0.2 to 0.2	4.4 to 6.3%	\$0.1	(0.04) to (0.02)	(3.4) to (1.9)%	0.02
Parking	\$(0.7) to (0.2)	(1.4) to (0.3)%	\$0.6	(0.13) to (0.03)	(1.4) to (0.3)%	0.10
Total System	\$39.3 to 51.5	5.5 to 7.2%*	\$12.2	(9.75) to (2.65)	(2.1) to (0.6)%*	7.10

Source: FERRET.

*These values refer to the percentage increase for the total changes in revenue or ridership systemwide compared to existing systemwide values. That is, the 7.2% revenue increase means that the total revenue increase for the low-elasticity iteration of FERRET represents a 7.2% increase systemwide in revenue over the existing systemwide revenue. The 7.2% relative increase corresponds to a \$51.5-million increase. In this table, "Fare Revenue" includes revenue generated from parking at lots where the MBTA retains the revenue. "Ridership" includes the number of vehicles that parked at these lots.

Where applicable, the MBTA also accounts for the cost of changing the system's levels of service. While the MBTA recognizes the inherent value to its customers of each trip made on its system, it is necessary to consider the cost associated with changes in THE RIDE usage—a significant item in the MBTA's budget. Table 8 explores the change in the cost of operating THE RIDE based on riders' reaction to fare changes.

Although we account for decreased operating costs caused by the loss of ridership on THE RIDE, we do not account for decreased operating costs resulting from lessened ridership on other modes. Decreased demand on the other modes would only translate to savings in operating costs if the MBTA were to reduce service levels, which would require a separate analysis that is not factored into this analysis.⁸

⁸ It is relatively easy to save on operating costs with THE RIDE: If a trip is not taken, the MBTA does not pay the incremental cost to provide the service. On the MBTA's other modes, in the short term, if a passenger does not take a trip, the bus, train, or boat still must operate to serve the remaining passengers.

TABLE 8
FERRET Estimates of Annual Ridership and Fare Revenue Impacts Using
Low, Base, and High Elasticities (THE RIDE)

Analysis Category	Low Elasticity	Base Elasticity	High Elasticity
Change of Ridership	(22,047)	(30,866)	(39,685)
Change of Revenue	\$214,073	\$183,595	\$153,117
Saved Operating Costs	663,613	929,058	1,194,504
Net Impact (Revenue + Saved Operating Costs)	\$877,686	\$1,112,653	\$1,347,620

Source: FERRET.

Chapter 5. Fare Equity Analysis

5.1 Requirements

Title VI of the Civil Rights Act of 1964 prohibits discrimination, either intentionally or unintentionally, by recipients of federal financial assistance based on race, color, or national origin. To comply with 49 CFR Section 21.5(b) (2), 49 CFR Section 21.5(b) (7), and Appendix C to 49 CFR Part 21, the MBTA must evaluate any fare changes to *fixed-route* modes prior to implementing them to determine if the proposed changes would have a discriminatory effect. This requirement applies to any fare change. The FTA provides guidance for conducting fare equity analyses in FTA Circular 4702.1B (“Circular”), Section IV.7.b. Prior to a fare change, the MBTA must analyze any available information generated from ridership surveys that indicates whether minority and/or low-income riders disproportionately more likely would use the mode of service, payment type, or payment media that would be subject to fare change. In addition, the MBTA must describe the datasets and collection methods used in its analysis.

The Circular states that the transit provider shall:

- Determine the number and percentage of users of each fare media subject to change
- Review fares before and after the change
- Compare the relative cost burden impacts of the proposed fare change between minority and overall users for each fare media
- Compare the relative cost burden impacts of the proposed fare change between low-income and overall users for each fare media

Under Title VI and other directives, the FTA requires that transit agencies develop a policy to assess whether a proposed fare change would have a “disparate impact” on minority populations or “disproportionate burden” on low-income populations. The FTA Title VI guidelines define “disparate impact” as “a facially neutral policy or practice that disproportionately affects members of a group identified by race, color, or national origin, where the recipient’s policy or practice lacks a substantial legitimate justification and where there exists one or more alternatives that would serve the same legitimate objectives, but with less disproportionate effects on the basis, of race, color, or national origin,” and “disproportionate burden” as “a neutral policy or practice that disproportionately affects low-income populations more than non-low income populations.” A finding of disproportionate burden requires the recipient to evaluate alternatives and mitigate burdens where practicable.

5.2 MBTA Title VI Disparate-Impact and Disproportionate-Burden Policy

Policy Thresholds

The MBTA established the following policy thresholds for determining a disparate impact or disproportionate burden from a **major fare change**:

- A disparate benefit would be found if minority riders receive less than 90 percent of the benefit that all riders receive.
- A disproportionate benefit would be found if low-income riders receive less than 90 percent of the benefit that all riders receive.
- A disparate burden would be found if minority riders sustain more than 10 percent additional burden than the total burden that all riders sustain.
- A disproportionate burden would be found if low-income riders sustain more than 10 percent additional burden than the total burden that all riders sustain.

The policy thresholds are encapsulated in the following equations:

A disparate impact would be found if:

$$\text{Minority Benefit} < 90\% \times \text{All-Rider Benefit}$$

$$\text{Minority Burden} > 110\% \times \text{All-Rider Burden}$$

A disproportionate burden would be found if:

$$\text{Low-income Benefit} < 90\% \times \text{All-Rider Benefit}$$

$$\text{Low-income Burden} > 110\% \times \text{All-Rider Burden}$$

Upon finding a disparate impact or disproportionate burden based on a Title VI evaluation using the above threshold policy definition, the MBTA shall consider modifying the proposed changes in order to avoid, minimize, or mitigate the disparate impacts or disproportionate burdens of the proposed changes.

Demographics and Definitions

Demographics

The systemwide demographic profile in Table 9 below shows how the MBTA's ridership characteristics in terms of minority and income status vary by mode. Minority and low-income profile data of the MBTA's ridership is from the MBTA 2008–09 Systemwide Passenger Survey report published in July 2010.

TABLE 9
Demographic Profiles of MBTA Riders by Mode

Mode	Minority	Non-minority	No Response	Low-Income	Non-Low-Income	No Response
Rapid Transit	27.4%	68.7%	3.9%	21.6%	68.2%	10.2%
Bus and Trackless Trolley	45.0%	49.8%	5.1%	35.3%	49.9%	14.7%
Commuter Rail	13.7%	81.4%	4.9%	6.3%	81.0%	12.7%
Commuter Ferry and Boat	5.6%	89.1%	5.3%	3.8%	80.4%	15.8%
Total	32.4%	63.1%	4.5%	25.1%	62.8%	12.2%

Source: 2008–2009 MBTA Systemwide Passenger Survey.

Minority- and Low-Income Populations

The MBTA uses both United States Census data and passenger-survey data to define minority- and low-income populations. The census data are used when considering impacts on area residents. The survey data are used to assess impacts on riders.

Using US Census data, the MBTA defines minority- and low-income populations based on the average percentage of minority residents and average income levels for the service area. For the MBTA service area, these were identified for each census tract. Minority census tracts were defined as those in which the percentage of the non-white population (including the Hispanic population) was greater than the average for the MBTA service area. The average percentage of minority residents is 26.2% in the service area. A census tract is classified as low-income if its income level is at or below 60% of the median household income in the service area. For the 175-community MBTA service area, 60% of household median income is \$43,415.⁹

When using the MBTA Systemwide Passenger Survey as a basis for analysis, the definition of a minority rider mirrors the definition provided above: a minority rider is a person who is non-white or Hispanic. A low-income individual is a person whose household income is less than \$40,000—the income category from the survey that most closely matched the US Census-defined low-income threshold.

⁹ Median household income was determined based on the 2009–13 American Community Survey. Minority percentages were determined based on the 2010 US Census.

5.3 Datasets, Data Collection Efforts, and Descriptions

CTPS used several datasets in the fare equity analysis:

- 2010 US Census and 2009–13 American Community Survey demographic data
- CTPS FERRET
- MBTA 2008–09 Systemwide Passenger Survey, published in July 2010
- The 2012 Rhode Island Commuter Rail Service Passenger Surveys Summary Report

The US Census provides a count of total population and population by ethnicity every 10 years; the most recent US Census occurred in 2010. Data on population by income level no longer is collected as part of the decennial US Census. Instead, we used more recent estimates from the American Community Survey (ACS)—that has replaced the long form of the decennial US Census, and provides estimates of total population as well as population by ethnicity and income level. We used ACS five-year estimates for the 2009–13 period—the most recently available data at the time we began our Title VI analysis. We used data from these sources to determine whether the units of analysis (census tracts) were minority, nonminority, low-income, or non-low-income.

FERRET is an elasticity-based spreadsheet model. CTPS has used this model in the past to provide inputs to the fare-increase analysis process. FERRET takes existing ridership in the form of unlinked trips by mode, fare-payment type, and fare media as inputs. The MBTA provides CTPS with ridership data from the automated fare collection system. For modes that are not yet part of the AFC system, the MBTA provides data (most notably, sales data for transit passes) to estimate ridership. Using these input data, FERRET employs elasticities and diversion factors to model a range of possible impacts resulting from changes in the MBTA's fares. (See Chapter 2 and Appendix A for further detail.)

The MBTA 2008–09 Systemwide Passenger Survey report, published in July 2010, included all of the transit modes operated by the MBTA—the Red, Blue, Orange, and Green Lines; commuter rail system; bus system; and ferry system. The survey questions asked for each mode varied based on the specific characteristics of the given mode; but common among all of the surveys were questions regarding origins, destinations, frequency of travel, and most important to this equity analysis, fare payment method, usage frequency, race, and income. In general, CTPS staff distributed the surveys from early morning until midafternoon. Each survey result was expanded to represent typical boardings during the survey hours. The systemwide survey was used in conjunction with

FERRET to estimate the number of riders using each fare type, and the fare changes for low-income, minority, and all riders.

The Rhode Island Department of Transportation (RIDOT) published the Rhode Island Commuter Rail Service Passenger Surveys Summary Report in August 2012.¹⁰ RIDOT conducted the survey in June 2012. It distributed 245 surveys containing questions about race, ethnicity, and income at two MBTA stations (Wickford Junction and T.F. Green); 195 surveys were returned. Assuming the agency attempted to hand a survey to each rider, this represents an 80% return rate.

5.4 Equity Analysis and Results

CTPS used the MBTA Systemwide Survey in conjunction with FERRET to determine the number of riders using each fare type and the price change by fare type for minority, low-income, and all riders. Because the model's ridership values are in trips and the survey's values are in riders, CTPS used the survey responses for the frequency of travel, fare type, and minority/income status to translate surveyed riders into trips per surveyed rider by fare type by minority status and income status.

We used the equation below to determine the number of days per week a fare is used by a demographic classification. We weighted each survey response by the number of days per week the pass is used—data we also obtained from the systemwide survey. If 1,000 minority riders use monthly passes five days per week and 200 minority riders use monthly passes seven days per week, the average weighted usage per week for the minority riders using passes is equal to 5.33 days per week:

$$\text{Minority Pass Usage} = \frac{1,000 \times 5 + 200 \times 7}{1,000 + 200} = 5.33$$

If minority riders used passes 5.33 days per week, and nonminority riders used passes 4.25 days per week, and minority riders made up 25% of the total pass fares, the percentage of minority riders using that fare type is:

$$\text{Minority Pass Percentage} = \frac{5.33 \times 25\%}{(5.33 \times 25\%) + (4.25 \times 75\%)} = 29.5\%$$

We used this procedure for each type of pass to estimate the share of riders by demographic classification who use each fare type. We multiplied the resulting

¹⁰ Rhode Island Commuter Rail Service Passenger Surveys: Summary Report. August, 2012, www.dot.ri.gov/documents/intermodal/2012_Commuter_Rail_Survey.pdf.

percentage by the total number of trips made using a fare type to estimate the number of riders by classification by fare. If the MBTA recorded 50 million total trips made using passes, the minority usage would be:

$$\text{Total Minority Usage} = 29.5\% \times 50 \text{ million trips} = 14.8 \text{ million trips}$$

Table 10 provides a snapshot of fare type usage by demographic group.¹¹ Low-income riders are somewhat more likely to use single-ride fares. When using a single-ride fare, minority riders and low-income riders are more likely to be on a bus and paying a student or senior fare. In an effort to minimize the impact of the fare increase on minority and low-income riders, the MBTA increased senior and student bus fares as little as possible—\$0.05. The single-ride CharlieCard bus fare was increased \$0.10, which is slightly less than the increase in the rapid transit single-ride fare on a relative basis. Further, the MBTA proposal includes fare decreases for the local bus cash and CharlieTicket fares—fare types used disproportionately more by minority and low-income riders. Riders who currently use a CharlieTicket or pay cash can obtain a CharlieCard to gain access to lower single-ride fares.

Minority and low-income riders are more likely to use a 7-Day LinkPass than a monthly LinkPass compared to all riders.¹² The MBTA added the 7-Day LinkPass during the 2007 fare structure changes to allow passengers who cannot afford to—or for some other reason do not—purchase a monthly pass at the beginning of the month to spread their purchases out over a longer period. Four 7-Day LinkPasses essentially cost the same as a monthly LinkPass. The 7-Day LinkPass is also somewhat more flexible—if someone knows they are not going to make enough trips in a given week for the pass to be worthwhile (say, during the winter holidays or school vacation), they can choose not to purchase it for that week.

¹¹ Minority and low-income riders share some of the same payment characteristics; however, the difference between how low-income riders and all riders pay is significantly more notable than the difference between payment trends of minority riders and all riders.

¹² The 7-Day LinkPass and the monthly LinkPass provide unlimited access to all local bus and rapid transit services.

TABLE 10
Minority, Low-Income, and All Riders Using
Each Principal Fare-Payment Type

Fare-Payment Type	Price		Change		Annual Usage in Unlinked Trips			Annual Usage Share of Group Total		
	Existing	Proposed SFY 2017	Absolute	Percent	Minority	Low-Income	All Riders	Minority	Low-Income	All Riders
Local Bus										
Local Bus Pass	\$ 50.00	\$ 55.00	\$ 5.00	10.0%	3,082,000	2,402,000	5,216,000	2.2%	1.8%	1.4%
Local Bus (Adult)	1.60	1.70	0.10	6.3%	9,162,000	7,880,000	17,432,000	6.5%	5.8%	4.6%
Local Bus (Senior)	0.80	0.85	0.05	6.3%	1,548,000	3,107,000	4,128,000	1.1%	2.3%	1.1%
Local Bus (Student)	0.80	0.85	0.05	6.3%	1,315,000	1,276,000	1,711,000	0.9%	0.9%	0.4%
Local Bus (CharlieTicket)	2.10	2.00	(0.10)	(4.8)%	632,000	627,000	1,024,000	0.5%	0.5%	0.3%
Local Bus (Cash)	2.10	2.00	(0.10)	(4.8)%	714,000	724,000	1,241,000	0.5%	0.5%	0.3%
Express Bus										
Inner Express Pass	115.00	128.00	13.00	11.3%	663,000	367,000	2,268,000	0.5%	0.3%	0.6%
Inner Express (Adult)	3.65	4.00	0.35	9.6%	236,000	210,000	564,000	0.2%	0.2%	0.1%
Inner Express (Senior)	2.35	2.50	0.15	6.4%	4,200	37,100	73,200	0.0%	0.0%	0.0%
Inner Express (Student)	2.35	2.50	0.15	6.4%	20,900	32,300	34,400	0.0%	0.0%	0.0%
Inner Express (CharlieTicket)	4.75	5.00	0.25	5.3%	6,900	3,500	26,000	0.0%	0.0%	0.0%
Inner Express (Cash)	4.75	5.00	0.25	5.3%	27,200	34,700	52,200	0.0%	0.0%	0.0%
Outer Express Pass	168.00	168.00	0.00	0.0%	124,000	36,900	512,000	0.1%	0.0%	0.1%
Outer Express (Adult)	5.25	5.25	0.00	0.0%	26,500	13,300	109,000	0.0%	0.0%	0.0%
Outer Express (Senior)	3.40	3.50	0.10	2.9%	NR	NR	14,400	0.0%	0.0%	0.0%
Outer Express (Student)	3.40	3.50	0.10	2.9%	NR	NR	700	0.0%	0.0%	0.0%
Outer Express (CharlieTicket)	6.80	7.00	0.20	2.9%	0	NR	3,500	0.0%	0.0%	0.0%
Outer Express (Cash)	6.80	7.00	0.20	2.9%	4,400	0	4,500	0.0%	0.0%	0.0%
Bus and Rapid Transit										
Bus and Rapid Transit (Adult)	2.10	2.25	0.15	7.1%	3,355,000	3,008,000	8,129,000	2.4%	2.2%	2.1%
Bus and Rapid Transit (Senior)	1.05	1.10	0.05	4.8%	478,000	988,000	1,462,000	0.3%	0.7%	0.4%
Bus and Rapid Transit (Student)	1.05	1.10	0.05	4.8%	299,000	278,000	408,000	0.2%	0.2%	0.1%
Bus and Rapid Transit (CharlieTicket)	4.75	4.75	0.00	0.0%	6,700	6,700	12,000	0.0%	0.0%	0.0%
Rapid Transit										
LinkPass	75.00	84.50	9.50	12.7%	30,775,000	21,246,000	93,563,000	22.0%	15.7%	24.5%
Senior/TAP Pass	29.00	30.00	1.00	3.4%	4,448,000	8,561,000	12,988,000	3.2%	6.3%	3.4%
Student 5-Day	26.00	30.00	4.00	15.4%	140,000	126,000	209,000	0.1%	0.1%	0.1%
Student 7-Day	26.00	30.00	4.00	15.4%	9,976,000	9,037,000	15,086,000	7.1%	6.7%	3.9%
1-Day Pass	12.00	12.00	0.00	0.0%	623,000	463,000	748,000	0.4%	0.3%	0.2%
7-Day Pass	19.00	21.25	2.25	11.8%	20,153,000	21,282,000	36,411,000	14.4%	15.7%	9.5%
Rapid Transit (Adult)	2.10	2.25	0.15	7.1%	10,210,000	10,041,000	37,311,000	7.3%	7.4%	9.8%
Rapid Transit (Senior)	1.05	1.10	0.05	4.8%	954,000	2,110,000	3,863,000	0.7%	1.6%	1.0%
Rapid Transit (Student)	1.05	1.10	0.05	4.8%	741,000	604,000	1,150,000	0.5%	0.4%	0.3%
Rapid Transit (CharlieTicket)	2.65	2.75	0.10	3.8%	4,711,000	4,694,000	12,558,000	3.4%	3.5%	3.3%
Rapid Transit (Cash)	2.65	2.75	0.10	3.8%	47,700	138,000	231,000	0.0%	0.1%	0.1%
Commuter Rail										
Zone 1A–10 Pass	\$75.00– \$362.00	\$84.50– \$398.25	\$9.50– \$36.25	10.0%– 12.7%	4,793,000	1,661,000	28,943,000	3.4%	1.2%	7.6%
Zone 1A	\$75.00	\$ 84.50	\$ 9.50	12.7%	910,000	483,000	3,004,000	0.7%	0.4%	0.8%
Zone 1	182.00	200.25	18.25	10.0%	265,000	82,600	1,759,000	0.2%	0.1%	0.5%
Zone 2	198.00	217.75	19.75	10.0%	553,000	180,000	4,483,000	0.4%	0.1%	1.2%
Zone 3	222.00	244.25	22.25	10.0%	630,000	171,000	4,429,000	0.5%	0.1%	1.2%
Zone 4	239.00	263.00	24.00	10.0%	770,000	240,000	4,267,000	0.6%	0.2%	1.1%
Zone 5	265.00	291.50	26.50	10.0%	350,000	110,000	2,492,000	0.2%	0.1%	0.7%
Zone 6	289.00	318.00	29.00	10.0%	650,000	164,000	4,276,000	0.5%	0.1%	1.1%
Zone 7	306.00	336.50	30.50	10.0%	367,000	114,000	2,069,000	0.3%	0.1%	0.5%
Zone 8	330.00	363.00	33.00	10.0%	289,000	109,000	2,080,000	0.2%	0.1%	0.5%
Zone 9	345.00	379.50	34.50	10.0%	7,600	6,400	60,000	0.0%	0.0%	0.0%
Zone 10	362.00	398.25	36.25	10.0%	1,600	1,800	23,500	0.0%	0.0%	0.0%

Fare-Payment Type	Price		Change		Annual Usage in Unlinked Trips			Annual Usage Share of Group Total		
	Existing	Proposed SFY 2017	Absolute	Percent	Minority	Low-Income	All Riders	Minority	Low-Income	All Riders
Zone 1A–10 Single Ride	\$2.10– \$11.50	\$2.25– \$12.50	\$0.15– \$1.00	7.1%– 10.0%	1,086,000	769,000	8,273,000	0.8%	0.6%	2.2%
Interzone 1–10 Pass	\$86.00– \$229.00	\$90.25– \$240.50	\$4.25– \$11.50	4.9%– 5.1%	21,600	6,400	140,800	0.0%	0.0%	0.0%
Interzone 1–10 Single Ride	\$2.75– \$6.75	\$2.75– \$7.00	\$0.00– \$0.25	0.0%– 6.7%	29,300	20,700	223,000	0.0%	0.0%	0.1%
Ferry										
Commuter Boat Pass	\$275.00	\$308.00	\$33.00	12.0%	8,000	6,600	298,000	0.0%	0.0%	0.1%
F1: Hingham	8.50	9.25	0.75	8.8%	14,200	5,500	403,000	0.0%	0.0%	0.1%
F2: Boston	8.50	9.25	0.75	8.8%	1,400	32,900	215,000	0.0%	0.0%	0.1%
F2: Cross Harbor	13.75	9.25	(4.50)	(32.7)%	0	100	400	0.0%	0.0%	0.0%
F2: Logan	17.00	18.50	1.50	8.8%	1,900	5,000	17,600	0.0%	0.0%	0.0%
F4: Inner Harbor	3.25	3.50	0.25	7.7%	22,700	15,900	238,000	0.0%	0.0%	0.1%
Free Transfers and Other Fares										
In-station Transfers	Free	Free	-	-	17,651,000	17,041,000	52,567,000	12.6%	12.6%	13.8%
AFC Noninteraction ¹	Free	Free	-	-	9,039,000	13,769,000	25,462,000	6.5%	10.1%	6.7%
Free trips ²	Free	Free	-	-	1,039,000	1,142,000	3,563,000	0.7%	0.8%	0.9%
Short fares ³	Variable	Variable	-	-	1,705,000	1,943,000	3,315,000	1.2%	1.4%	0.9%

Source: Central Transportation Planning Staff.

¹ AFC noninteraction is an estimate of the number of riders who do not interact with the AFC. The noninteraction categories include children aged 11 or younger, who are not required to pay a fare when riding with an adult; MBTA employees who are waved onto vehicles or otherwise bypass the AFC equipment; passengers who are allowed by MBTA employees to enter the paid area of a station without interacting with the AFC equipment; passengers who show an operator a valid pass rather than interacting with the farebox; passengers who board certain vehicles via the rear door; and passengers who simply do not pay a fare (not all of these categories apply to every mode). ² Free trips include people who are not required to pay a fare. Some of these people pay with the Blind Access Card; others are PCAs. ³ Short fares are fares paid less than the full fare.

AFC = Automated fare collection. NR = No riders. PCAs = Personal care assistants. TAP = Transportation Access Pass.

Notes: Values greater than 100,000 are rounded to the nearest 1,000. Values less than 100,000 are rounded to the nearest 100. Percentages are calculated using unrounded values. NR indicates that no riders from a given classification responded to the survey.

Minority Riders Compared to All Riders and Low-income Riders Compared to All Riders

Table 11 presents existing and proposed average fares, and absolute and relative price changes for minority riders, low-income riders, and all riders. As the Circular indicates, fare equity analyses are applicable only to fixed-route modes; neither THE RIDE nor parking is included in the following analysis. Minority and low-income riders pay lower average fares compared to the overall average fare for all riders. This is largely because nonminority and non-low-income riders use the commuter rail system and other more expensive modes more than minority and low-income riders. At the proposed fare levels, minority and low-income riders would continue to pay lower average fares.

Results from Applying the Disparate-Impact and Disproportionate-Burden Policy Thresholds

The results of the analysis, shown in Table 11, show that there is no disparate impact on minority riders and no disproportionate burden on low-income riders when considering both the absolute and relative fare changes.

Application of the disparate-impact policy threshold shows:

The **absolute increase** in the average fare for minority riders is **82%** of the **absolute increase** in the average fare for all riders.

The **relative increase** (or the change taken as a percentage of the initial fare) in the average fare for minority riders is **101%** of the **relative increase** in the average fare for all riders.

Application of the disproportionate-burden policy threshold shows:

The **absolute increase** in the average fare for low-income riders is **62%** of the **absolute increase** in the average fare for all riders.

The **relative increase** in the average fare for low-income riders is **90%** of the **relative increase** in the average fare for all riders.

Because all differences in impacts are less than the 10% threshold in the disparate-impact and disproportionate-burden policy, we do not find a disparate impact on minority populations or disproportionate burden for low-income populations.

TABLE 11
Existing and Proposed Average Fares and Price Changes
(Weighted by Fare Usage Frequency)

Rider Classification	Existing Average Fare	Proposed Average Fare	Absolute Price Change	Percentage Price Change
Minority	\$1.24	\$1.36	\$0.12	9.49%
Low-income	\$1.06	\$1.15	\$0.09	8.46%
All Riders	\$1.55	\$1.69	\$0.14	9.35%

Source: FERRET.

Note: The values in this table are rounded to the nearest cent or the nearest hundredth of a percent. All calculations were performed using unrounded values.

Chapter 6. Conclusions

CTPS conducted an analysis of the impacts of fare changes on ridership and revenue using a methodology based on established data inputs. These analyses show that the MBTA fare proposal would generate approximately \$45.8 million of additional revenue, with an anticipated ridership decrease of 5.9 million trips annually. The resulting reduction of trips made on THE RIDE system should decrease operating costs by approximately \$929,000 annually. The SFY 2017 fare changes likely would generate the additional revenue required to help meet the SFY 2017 revenue targets. The MBTA has made smaller, more regular fare increases a fare policy goal.

Staff applied the MBTA's disparate-impact and disproportionate-burden policy thresholds to assess the estimated Title VI and regional equity impacts of the proposed fare changes. We do not expect the fare increase to cause disparate impacts or disproportionate burdens.

Appendix A: FERRET Methodology

A.1 Apportionment of Existing Ridership

One of the first steps in starting a new iteration of FERRET is collecting new AFC and pass sales data—this data represent the largest share of the MBTA's ridership and revenue—and revenue and ridership reports for the ferries, THE RIDE, and the MBTA's parking lots.

The MBTA provides CTPS with AFC data summarized by hour, by day, for the various combinations of fare type, fare mode, and fare media (Table 12). After processing, AFC data can be attributed to each mode, fare type, and station (or Green Line branch). The fares for approximately 85% of all trips made on the system are paid using the AFC system.

The remaining trips are made using transit modes on which fares are not paid using the AFC system: commuter rail, commuter boat, THE RIDE, and parking. For these modes, we rely on fare-mix reports (that indicate how riders pay), various CTPS passenger surveys, and other ridership and revenue reports provided by the MBTA.

TABLE 12
AFC Fare Categories

Fare Type	Fare Mode	Fare Media
Adult/Senior/TAP/Student/Free	Single-Ride	CharlieCard CharlieTicket Onboard Cash
Adult/Senior/TAP/Student	Transfer	CharlieCard CharlieTicket
Short (fares below the full value)	Single-Ride	Onboard Cash
Bus/Inner Express/Outer Express	Pass	CharlieCard CharlieTicket
LinkPass: Monthly/1-Day/7-Day	Pass	CharlieCard CharlieTicket
Commuter Rail Zone and Interzone/Commuter Boat	Pass	CharlieCard CharlieTicket
Senior/TAP/Student	Pass	CharlieCard CharlieTicket

Source: Central Transportation Planning Staff.

A.2 Price Elasticity

Price elasticity measures the rate of change in ridership relative to a change in fares if all other factors remain constant. On a traditional demand curve that describes the relationship between price, on the y-axis, and demand, on the x-axis, elasticities are equivalent to the slope along that curve. Therefore, price elasticities generally are expected to be negative, meaning that a positive price increase would lead to a decrease in demand (with a price decrease having the opposite effect). The more negative (farther from zero) the value of a price elasticity, the larger the projected decrease in demand. More negative price elasticities are said to be relatively “elastic,” while smaller negative values, closer to zero, are said to be relatively “inelastic.” Thus, if the price elasticity of the demand for transit is assumed to be elastic, a given fare increase would cause a greater loss of ridership than if demand were assumed to be inelastic.

At its most elemental, FERRET is based on this simple price elasticity relationship, and requires four inputs: 1) original demand, 2) original fare, 3) new fare, and 4) price elasticity. The formula for calculating new demand is:

$$\text{New Demand} = \text{Original Demand} \times [1 + \text{Price Elasticity} \times (\text{New Fare} \div \text{Old Fare} - 1)]$$

As an example, assume that original demand equals 100 and that the impact we are modeling is a 10 percent fare increase from \$1.00 to \$1.10. Also assume that the price elasticity is -0.25.

$$\text{New Demand} = 100 \times [1 + -0.25 \times (\$1.10 \div \$1.00 - 1)] = 97.50$$

Thus, using an elasticity of -0.25, a simple price elasticity model projects that a 10 percent increase in price will lead to a 2.50 percent decrease in demand. With the fare increased from \$1.00 to \$1.10, this simplified example projects a 7.25 percent increase in revenue (\$100.00 to \$107.25).

A.3 Diversion Factors

FERRET’s calculations are more comprehensive than a simple elasticity calculation. The model’s greater detail lays in its use of ridership diversion factors. Diversion factors reflect estimates of the likelihood of a switch in demand for one type of good or service to another resulting from a change in the relative prices of those goods or services. In FERRET, we use such factors to estimate the number of riders who would choose to divert from one fare/mode to another.

Using cash tickets and passes as an example, assume that original ridership equals 100 cash riders and 1,000 pass riders. Also assume that original prices for cash tickets and passes equal \$2.00 and \$100.00, respectively, and that the

new prices are set at \$1.50 for cash tickets and \$50.00 for passes, representing price decreases of 25 percent and 50 percent, respectively. Assume that the cash price elasticity equals -0.35 and the pass price elasticity equals -0.25. Finally, assume a cash-to-pass diversion factor of 0.05 and a pass-to-cash diversion factor of 0.00.

In these calculations, one of the diversion factors must always equal zero, indicating that the diversion is expected to occur in one direction only. The direction of the diversion, and thus the diversion factor value, depends on the respective price changes of the two types of goods. The category with the greater relative price decrease (or the smaller relative price increase)—in this case, passes, for which the price decrease is 50 percent, compared to cash tickets, for which the price decrease is 25 percent—would gain riders from the diversion, while the other category, with the smaller relative price decrease (or the greater relative price increase), would lose riders from the diversion. Therefore, one would therefore expect that cash customers would switch to passes, but not that pass customers would switch to cash tickets, resulting in the 0.05 cash-to-pass and 0.00 pass-to-cash diversion factors.

The diversion factors essentially work to redistribute demand between the two categories after the respective price elasticities have been applied. For instance, after the cash fare is decreased from \$2.00 to \$1.50, the projected effect of price elasticity is that cash demand grows to 108.75 riders. Similarly, the pass price decrease from \$100 to \$50 leads to a projected increase in pass demand, because of price elasticity, to 1,125, for a total ridership of 1,233.75. However, the percentage decrease in the pass price is larger than that in cash fares (50 percent versus 25 percent); thus, one would expect some customers to switch from cash to pass.

This diversion is estimated by taking the ratio of new-to-original cash prices ($\$1.50 \div \2.00 , or 75 percent), dividing that ratio by the ratio of new-to-original pass prices ($\$50 \div \100 , or 50 percent), subtracting 1, and multiplying this result by the 0.05 diversion factor and the price-elasticity-estimated cash ridership (108.75). The number of riders “diverted” from cash to pass equals 2.72, giving final ridership estimates of 106.03 for cash and 1,127.72 for pass (still summing to a total ridership of 1,233.75).

New Cash Demand (Price Effect):

$$C_p = 100 \times [1 + -0.35 \times (\$1.50 \div \$2.00 - 1)] = 108.75$$

New Pass Demand (Price Effect):

$$P_p = 1,000 \times [1 + -0.25 \times (\$50 \div \$100 - 1)] = 1,125.00$$

$$\text{Total Demand} = 108.75 + 1,125.00 = 1,233.75$$

$$\text{Diverted Riders from Cash to Pass} = \left(\frac{\$ \text{NewCash} / \$ \text{OldCash}}{\$ \text{NewPass} / \$ \text{OldPass}} - 1 \right) \times \text{Diversion} \times C_p$$

$$\text{Diverted Riders from Cash to Pass} = \left(\frac{\$1.50 / \$2.00}{\$50 / \$100} - 1 \right) \times 0.05 \times 108.75 = 2.72$$

$$\text{New Cash Demand} = C_p - \text{Diverted Riders from Cash to Pass} = 106.03$$

$$\text{New Pass Demand} = P_p + \text{Diverted Riders from Cash to Pass} = 1,127.72$$

$$\text{Total Demand} = 106.03 + 1,127.72 = 1,233.75$$

We used diversion factors to estimate diversions between

- Cash and pass categories (for example, bus cash versus bus pass, subway cash versus subway pass)
- Bus and rapid transit (in other words, bus cash versus subway cash, bus pass versus subway pass)
- CharlieTicket/onboard cash and CharlieCard (for example, bus onboard cash versus bus CharlieCard, subway CharlieTicket versus subway CharlieCard)

Initially, we developed a range of diversion factors based on results of the 2007 Post-Fare Increase Impacts Analysis. We used these factors in the SFY 2013 fare increase analysis, and continued to use them in the SFY 2015 analysis. After reviewing the impacts of the SFY 2013 fare increase, we found sufficient evidence that the willingness of people to divert between passes and cash on the subway and light rail system would increase slightly.

Given that the fare increases are relatively level across all modes and fare media, these factors have a negligible effect on the results.

A.4 Price Elasticity Estimation

CTPS estimated the price elasticity of demand for the both the SFY 2015 and the SFY 2017 versions of the fare increase model based on a review of the changes in ridership, revenue, and price following implementation of the SFY 2013 fare increase. We used the demonstrated elasticities, which we calculated following our analysis of the impact of the SFY 2013 fare increase to guide our decisions about modifying the previously used set of elasticities. However, because factors in addition to fare changes also likely influenced the changes in ridership, we did not use the demonstrated elasticities for the SFY 2015 or SFY 2017 iterations of FERRET directly.

The following sections explain the process CTPS used to modify elasticities for the SFY 2015 and SFY 2017 iterations of FERRET, using the SFY 2013 demonstrated elasticities.

A.5 Calculating the Demonstrated Elasticity of Each Fare Type

Before we performed projections using the latest iteration of FERRET, we reviewed how ridership changed after past price changes to calculate demonstrated elasticities.

To calculate the demonstrated elasticity for a given fare, we used two pieces of information: the percentage change in fares and the percentage change in ridership. For each fare payment type on each mode, we calculated the percentage change between full SFY 2012 (before the fare increase) and full SFY 2013 (after the fare increase) ridership and fares using the formula:

$$\text{Percentage Change} = \frac{X_2 - X_1}{\left(\frac{X_2 + X_1}{2}\right)}$$

Where:

X_1 = SFY 2012 value (the year before the fare changes)

X_2 = SFY 2013 value (the year after the fare changes)

This formula provides the percentage change between X_1 and X_2 relative to the midpoint of X_1 and X_2 . If $X_1 = 10$ and $X_2 = 20$, the formula would indicate that the percentage change relative to the midpoint (15) is equal to 66%.

For example, in SFY 2012, single-ride bus ridership was 22,441,080. SFY 2013 ridership was 21,237,096. The percentage change in ridership between these two years is:

$$\text{Percentage Change} = \frac{21,237,096 - 22,441,080}{\left(\frac{21,237,096 + 22,441,080}{2}\right)} = -5.5\%$$

For each relevant fare payment type, we calculated the demonstrated elasticity with respect to fares using the following formula:

$$\text{Elasticity} = \frac{\Delta \text{Ridership (in \%)}}{\Delta \text{Fare (in \%)}}$$

For example, the percentage change in single-ride ridership on MBTA buses from SFY 2012 to SFY 2013 was -5.5%. The percentage change in the fare was 19.5%. The demonstrated elasticity is calculated as follows:

$$\text{Elasticity} = \frac{\Delta \text{Ridership (in \%)}}{\Delta \text{Fare (in \%)}} = \frac{-5.5\%}{19.5\%} = -0.28$$

As another example, the total change in LinkPass ridership was -0.3%. The change in the average LinkPass trip price was 17.4%. The demonstrated elasticity is calculated as follows:

$$\text{Elasticity} = \frac{\Delta \text{Ridership (in \%)}}{\Delta \text{Fare (in \%)}} = \frac{-0.3\%}{17.4\%} = -0.02$$

Modifying the Elasticities of Each Fare Type for the Current Projection

Because the demonstrated elasticity values only incorporate the changes in fares and do not account for other factors that affect transit ridership—such as gas prices, employment levels, and development—we do not advise using the elasticities calculated based on results of the SFY 2013 fare increase in the SFY 2017 model. Some of the demonstrated elasticities could indicate that other factors are affecting ridership, especially for those results with positive values that appeared to indicate that ridership increased in response to the fare increase. Therefore, we only used the demonstrated elasticities, along with the following heuristics, to inform the modification of the SFY 2012 elasticities:

- If the value of a demonstrated elasticity was close to zero or positive, we modified the value to make it more inelastic (closer to zero)
- No elasticity was set to be greater than -0.10 (closer to zero)
- If an elasticity was used in SFY 2012 and the demonstrated elasticity was roughly similar, we did not modify the elasticity
- If the demonstrated elasticity was significantly more negative than the one we used in SFY 2012, we decreased the elasticity (made it more negative or more elastic)

Table 13 presents the elasticities we used to predict what might have happened following the SFY 2013 fare increase, the elasticities we calculated based on the actual changes between SFY 2012 and SFY 2013, the elasticities we used to project the effects of the SFY 2015 fare changes, and the estimated 2017 base elasticity.

TABLE 13
SFY 2012, Demonstrated, and SFY 2015 and SFY 2017 Elasticities

Mode Category	Estimated SFY 2013 Elasticity	Demonstrated SFY 2013 Elasticity	Estimated SFY 2015 and SFY 2017 Base Elasticity
Cash Elasticities			
Bus and Trackless Trolley			
Bus-Adult (<i>from example</i>)	(0.20)	(0.28)	(0.25)
Bus-Senior	(0.15)	(0.26)	(0.20)
Bus-Student	(0.15)	0.30	(0.15)
Subway			
Subway-Adult	(0.25)	(0.26)	(0.25)
Subway-Senior	(0.15)	(0.18)	(0.15)
Subway-Student	(0.15)	1.80	(0.10)
Surface Light Rail			
Surface Light Rail-Adult	(0.25)	(0.29)	(0.30)
Surface Light Rail-Senior	(0.20)	(0.19)	(0.20)
Surface Light Rail-Student	(0.20)	1.96	(0.15)
Commuter Rail			
Commuter Rail-Adult	(0.35)	0.01	(0.20)
Commuter Rail-Senior	(0.25)	0.37	(0.15)
Commuter Boat			
Commuter Boat-Adult	(0.30)	(0.34)	(0.30)
Commuter Boat-Senior	(0.20)	(0.75)	(0.25)
THE RIDE	(0.12)	(0.39)	(0.35)
Parking	(0.20)	(0.18)	(0.20)
Pass Elasticities			
Bus	(0.30)	(0.09)	(0.15)
Inner Express	(0.20)	(0.33)	(0.25)
Outer Express	(0.20)	(0.33)	(0.25)
LinkPass (<i>from example</i>)	(0.30)	(0.02)	(0.15)
1-Day LinkPass	(0.35)	0.41	(0.15)
7-Day LinkPass	(0.35)	0.09	(0.15)
Commuter Rail	(0.10)	(0.17)	(0.10)
Commuter Boat	(0.25)	(0.17)	(0.20)
Senior	(0.15)	0.23	(0.10)
Student	(0.15)	(0.04)	(0.10)

Source: Central Transportation Planning Staff.

Notes: The estimated SFY 2013 elasticity is the one we used to estimate the effects of the SFY 2013 fare increase.

The demonstrated SFY 2013 elasticity is the one we calculated based on ridership changes following the SFY 2013 fare increase.

The estimated SFY 2015 and SFY 2017 base elasticity is the elasticity we used to estimate the effects of the SFY 2015 and SFY 2017 fare increases.

A.6 Examples of Ridership and Revenue Calculations

Simple Example: Price Elasticity Only

Given:

Original Demand: 100,000

Original Fare: \$1.50

New Fare: \$2.50

Price Elasticity: -0.05

New Demand =

Original Demand $\times [1 + \text{Price Elasticity} \times (\text{New Fare} \div \text{Old Fare} - 1)]$

New Demand = $100,000 \times [1 + -0.05 \times (\$2.50 \div \$1.50 - 1)] = 96,666.67$

More Complex Example: Price Elasticity plus Ridership Diversion — Cash to Pass

Given:

Original Cash Demand: 10,000

Original Cash Fare: \$2.25

New Cash Fare: \$2.00

Cash Price Elasticity: -0.30

New Demand =

Original Demand $\times [1 + \text{Price Elasticity} \times (\text{New Fare} \div \text{Old Fare} - 1)]$

New Cash Demand (Price Effect),

$C_p = 10,000 \times [1 + -0.30 \times (\$2.00 \div \$2.25 - 1)] = 10,333.33$

Given:

Original Pass Demand: 5,000

Original Pass Price: \$71.00

New Pass Price: \$50.00

Pass Price Elasticity: -0.25

New Pass Demand (Price Effect),

$P_p = 5,000 \times [1 + -0.25 \times (\$50 \div \$71 - 1)] = 5,369.72$

Total Demand = $10,333.33 + 5,369.72 = 15,703.05$

Percentage Change in Cash Price: \$2.25 to \$2.00: -11%

Percentage Change in Pass Price: \$71 to \$50: -30%

Given:

Cash-to-Pass Diversion Factor: 0.05

Pass-to-Cash Diversion Factor: 0.00

Diverted Riders from Cash to Pass = $\left(\frac{\$NewCash/\$OldCash}{\$NewPass/\$OldPass} - 1 \right) \times \text{Diversion} \times C_p$

Diverted Riders from Cash to Pass = $\left(\frac{\$2.00/\$2.25}{\$50/\$71} - 1 \right) \times 0.05 \times C_p = 135.48$

New Cash Demand = $C_p - \text{Diverted Riders from Cash to Pass} = 10,197.85$

New Pass Demand = P_p + Diverted Riders from Cash to Pass = 5,505.20
 Total Demand = 10,197.85 + 5,505.20 = 15,703.05

Another Complex Example: Price Elasticity plus Two Ridership Diversions —
 Single-Ride CharlieCard (SR-CC) to Pass, and Single-Ride CharlieTicket (SR-CT) to Single-Ride CharlieCard (SR-CC)

Given:

Original Single-Ride CharlieCard Demand: 10,000
 Original Single-Ride CharlieCard Fare: \$2.20
 New Single-Ride CharlieCard Fare: \$3.50
 Single-Ride CharlieCard Price Elasticity: -0.30
 New SR-CC Demand (Price Effect),
 $CC_p = 10,000 \times [1 + -0.30 \times (\$3.50 \div \$2.20 - 1)] = 8,227.27$

Given:

Original Pass Demand: 50,000
 Original Pass Price: \$71.00
 New Pass Price: \$90.00
 Pass Price Elasticity: -0.25
 New Pass Demand (Price Effect),
 $P_p = 50,000 \times [1 + -0.25 \times (\$90 \div \$71 - 1)] = 46,654.93$

Given:

Original Single-Ride CharlieTicket Demand: 5,000
 Original Single-Ride CharlieTicket Fare: \$2.50
 New Single-Ride CharlieTicket Fare: \$4.50
 Single-Ride CharlieTicket Price Elasticity: -0.30
 New SR-CT Demand (Price Effect),
 $CT_p = 5,000 \times [1 + -0.30 \times (\$4.50 \div \$2.50 - 1)] = 3,800.00$
 Total Demand = 8227.27 + 46,654.93 + 3,800.00 = 58,682.20

Given:

Single-Ride CharlieCard-to-Pass Diversion Factor: 0.05
 Pass-to-Single-Ride CharlieCard Diversion Factor: 0.00
 Single-Ride CharlieCard to Single-Ride CharlieTicket Diversion Factor: 0.00
 Single-Ride CharlieTicket to Single-Ride CharlieCard Diversion Factor: 0.25

Note:

Percentage Change in Single-Ride CharlieCard Fare: \$2.20 to \$3.50: 59.09%
 Percentage Change in Pass Price: \$71 to \$90: 26.76%
 Percentage Change in Single-Ride CharlieTicket Fare: \$2.50 to \$4.50: 80.00%
 Diverted Riders from SR-CC to Pass = $\left(\frac{\$3.50/\$2.20}{\$90/\$71} - 1 \right) \times 0.05 \times CC_p = 104.92$

$$\text{Diverted Riders from SR-CT to SR-CC} = \left(\frac{\$4.50/\$2.50}{\$3.50/\$2.20} - 1 \right) \times 0.25 \times CT_p = 124.86$$

New Single-Ride CharlieCard Demand =

$CC_p - \text{Diverted Riders from SR-CC to Pass} + \text{Diverted Riders from SR-CT to SR-CC} = 8,247.21$

New Pass Demand = $P_p + \text{Diverted Riders from SR-CC to Pass} = 46,759.85$

New Single-Ride CharlieTicket Demand =

$CT_p - \text{Diverted Riders from SR-CT to SR-CC} = 3,675.14$

Total Demand = $8,202.15 + 46,759.85 + 3,720.20 = 58,682.20$

As we introduce additional ridership diversion factors, and more cells in the spreadsheet become linked, the complexity of FERRET increases significantly. However, the basics of the methodology explained above regarding price elasticities and ridership diversion factors remain the same.

Appendix 7-G

FMCB Approval of Fare Equity Analysis of SFY
2017 MBTA Fare Change



Charles D. Baker, Governor
Karyn E. Polito, Lieutenant Governor
Stephanie Pollack, MassDOT Secretary & CEO
Frank DePaola, General Manager
Brian Shortsleeve, Chief Administrator



**Joint Meeting of MassDOT Board of Directors and the
Fiscal and Management Control Board
March 16, 2016**

Transportation Building
Conference Rooms 1,2 and 3
10 Park Plaza
Boston, MA

MEETING MINUTES

Members: Chairman Joseph Aiello, Director Lisa Calise, Director Brian Lang, Director Steven Poftak, and Director Monica Tibbits-Nutt

Present: Chairman Joseph Aiello, Director Lisa Calise, Director Steven Poftak and Director Monica Tibbits-Nutt

Quorum Present: Yes

Others Present: General Manager Frank DePaola, Chief Administrator Brian Shortsleeve, General Counsel John Englander, Registrar Erin Deveney, Highway Administrator Tom Tinlin, Rail & Transit Administrator Astrid Glynn, Assistant General Manager of Rail Operations Jody Ray and Senior Counsel to the Board Owen Kane, Laurel Paget-Seekins, Charles Planck

At the call of the Chair, a meeting of the Fiscal and Management Control Board was called to order at 11:00 a.m. at 10 Park Plaza, Conference Rooms 1,2 & 3, Boston, Massachusetts.

After motion duly made and seconded, it was voted to immediately enter into executive session to discuss strategy related to pending litigation.

By roll call:

Chair Aiello	yes
Directory Poftak	yes
Director Calise	yes
Director Tibbits-Nutt	yes

VOTED: To enter into executive session at 11:03 a.m.

The Fiscal and Management Control Board returned from Executive Session and reconvened the Open Session at 11:45 a.m.

Next Chair Aiello, began item F, a Special Presentation from the Mayors of Cambridge, Medford and Somerville regarding the Green Line Extension. Mayor Curtatone of Somerville, introduced Senator Jehlen, a leader in the state delegation for the City, who spoke in support of extending the Green Line Extension to Route 16 in Winchester.

Next, Mayor Curtatone introduced Medford Mayor Stephanie Burke and Councillor Cheung, representing the Mayor of Cambridge. Mayor Curtatone also recognized all the elected officials who had advocated in support of the project. Mayor Curtatone praised the Governor and the Secretary, and the interim team for their diligence and determination in developing a fiscally responsible plan for the Green Line Extension that will move the project forward.

Next, Mayor Burke restated Medford's support of the project. Mayor Burke indicated that the public engagement and planning process must include the local communities to review the design, the financing alternatives and implementation schedule.

Next, Leland Cheung from the Cambridge City Council spoke on delivered remarks on behalf of Mayor Simmons of Cambridge. Ms. Cheung commented

that they need to be asking for a more information and more data, to figure out how to get this project back on track before asking residents to make sacrifices.

PROCEDURAL:

Next, was the approval of the Fiscal and Management Control Board minutes of February 1, 2016.

On motion duly made and seconded, it was

VOTED: To approve the minutes of February 1, 2016

Next, was the approval of the Fiscal and Management Control Board minutes of February 10, 2016.

On motion duly made and seconded, it was

VOTED: To approve the minutes of February 10, 2016

Next, Chair Aiello asked General Manager Frank DePaola to give the Report of the General Manager, Agenda Item D. Mr. DePaola commenting on the Washington Metro's one-day suspension of service to conduct a series of inspections of their electrical distribution system. Mr. DePaola stated that the MBTA already has a regular inspection protocol in place. Additionally the T is experimenting with thermal imaging cameras, a pilot program, which can detect defects before they are visible to the naked eye.

Next, Chief Administrator Shortsleeve, presented Agenda Item E. Mr. Shortsleeve gave a brief update on hedging strategy as well as a monthly update on overtime, as set forth in the attached presentation entitled "CA Report".

PRESENTATIONS:

Next, Brian Kane presented Agenda Item G, a review of upcoming FMCB agenda items as forth in the attached presentation entitled “Fiscal and Management Control Board: Public Meeting Agenda Items”.

ACTION ITEMS:

Next, Laurel Paget-Seekins began Agenda Item H, a discussion and possible vote regarding equity analysis related to the fare increase. Ms. Paget-Seekins informed the Board they had received the final equity analysis that included all of the changes discussed at the March 7, 2016 Board Meeting, attached hereto and entitled “Potential MBTA Fare Changes in SFY 2017 Final Option: Impact Analysis”.

On motion duly made and seconded, it was

VOTED:

WHEREAS, on March 7, 2016, the Fiscal and Management Control Board (the “Board”) approved Massachusetts Bay Transportation Authority (“MBTA”) fare changes to be effective July 1, 2016, which approval included modifications to Option 2 as presented (“FY 17 Fare Changes”); and

WHEREAS, The Board directed MBTA staff to complete a Title VI fare equity analysis (“Equity Analysis”) to evaluate the effects of the modifications to Option 2, amend the Equity Analysis and provide the results to the Board for review and acceptance;

NOW, THEREFORE, it is hereby

VOTED:

That the Board hereby accepts the Equity Analysis for the FY 17 Fare Changes as presented.

Next, Chair Aiello called upon General Counsel John Englander and Charles Planck, to present Agenda Item I, Late Night Service Equity Analysis, as forth in the attached presentation entitled “MBTA Late-Night Service – Equity Analysis”.

On motion duly made and seconded, it was

VOTED:

WHEREAS, the Fiscal and Management Control Board (the “Board”) voted on February 29, 2016 to terminate the Massachusetts Bay Transportation Authority’s (the “MBTA”) Late Night Service Pilot Program; and

WHEREAS, the MBTA has completed service equity analyses on the termination of the Late Night Service Pilot Program using available alternative data, comparators and methodologies under Federal Transit Authority guidance producing mixed results; and

WHEREAS, the Board has determined that the MBTA should consider service mitigation that meets the legitimate business needs of the Authority to limit cost and provide efficient service, provide greater access for infrastructure and equipment maintenance and allows the MBTA to measure the impact of change;

NOW, THEREFORE, IT IS HEREBY

VOTED:

The Board hereby accepts the Late Night Service Pilot Program equity analyses as presented.

FURTHER VOTED:

The Board hereby directs MBTA staff to design service mitigation that addresses the service needs of the targeted population, based upon the following criteria:

1. Mitigation must serve the MBTA's legitimate business needs by limiting any additional cost and preserving the maximum feasible access for maintenance activities.
2. Consider mitigating the loss of work trips for minority or low-income workers, by providing targeted, efficient improvements to quality or quantity of service for minority and/or low income riders;
3. Consider any additional no cost or low-cost changes that will improve service to minority or low-income riders, including partnering with private sector ride share and other transportation service providers.

FURTHER VOTED:

The Board hereby directs MBTA staff to take all steps necessary within the thirty days to provide a meaningful opportunity for public comment on the proposed mitigation measures with clear adherence to the principles identified in the previous vote.

Next, Michael Abramo presented Agenda Item K, Fiscal 2017 Operating Budget as forth in the attached presentation entitled "FY17 Preliminary Itemized Budget". Mr. Abramo prefaced his presentation acknowledging the proposed budget is extremely aggressive, but he was confident it could be achieved by following the steps as outlined in the presentation.

On motion duly made and seconded, it was

VOTED:

That the Fiscal and Management Control Board hereby approves the Authority's preliminary itemized budget of current operating expenses and debt service costs for a one year period—July 1, 2016 through June 30, 2017—in the amount of \$2,021,884,129 in the form submitted at this meeting; and

FURTHER VOTED:

That the General Manager and Chief Administrator are hereby authorized and directed to submit the preliminary itemized budget, in the name and on behalf of the Authority, to the MBTA Advisory Board for review.

At 1:00 p.m., the Fiscal and Management Control Board was joined by the MassDOT Board of Directors in a Joint Meeting.

At the call of the Chair Pollack, a joint meeting of the Board of Directors of the Massachusetts Department of Transportation and the Fiscal and Management Control Board was called to order at 1:10 p.m. at the State Transportation Building in Conference Rooms 1,2 & 3, 10 Park Plaza, Boston, Massachusetts.

Those present were Secretary Pollack, Chair, Directors Ruth Bonsignore, Betsy Taylor, Russell Gittlen, Dean Mazzarella, Joseph Sullivan, Dominic Blue, Monica Tibbits-Nutt and Steven Poftak, being a quorum of the Board of Directors of the Massachusetts Department of Transportation.

Also present were the members of the Fiscal and Management Control Board, Chairman Joseph Aiello as well as Directors Steven Poftak and Monica Tibbits-Nutt who also serve as members of the Massachusetts Department of Transportation Board.

Next Chair Pollack opened up the public comment period.

The following commented in support of the Green Line Extension going forward: Ms. Emily Reichert of Greentown Labs; Jim McGinnis, STEP; Representative Christine Barber; Representative Denise Provost; Representative Tim Toomey; Alderman Katyana Ballantyne; Rafael Mares, CLF; Joseph Barr on behalf of City Manager Richard Rossi; John McDougall 350 Mass Transportation Working Group; Elizabeth Boyle, Medford; Mike Connolly, Cambridge Resident Alliance; John Elliott, Medford; David Bauer Somerville; Ian Hardy, Somerville; Meredith Levy, Somerville; Ellin Reisner, STEP; Saul Tannenbaum, Cambridge; Louise Baxter, TRU; Esther Hanig, Union Square Main Streets; Greg Karczewski, US2; Charlie Ticotsky, TYMA; Bill Shelton, Somerville Times; Stephen Mackey, Somerville and Mr. Derby.

Mike Stanley, TransitX, opposes the Green Line Extension.

David Senatillaka, Malden commented that ABC counters would help with fare evasion and the non-collection of fares.

Tom Ryan, ABC, commented on the MassDOT Capital plan.

Steven Kaiser, Citizen Engineer, commented on the lockbox, and in support of the Green Line Extension Public Process.

Alex Feldman, Alan Moore and Lynn Weissman, of Friends of the Community Path support the Green Line Extension and Community Path

Mary Vogel, supports pre-apprenticeship programs in the MassDOT five-year capital plan

Wig Zamore, STEP, spoke in support of Late night bus service, and the Green Extension.

Claudia Murrow commented on eminent domain process.

Next, was the approval of the December 9, 2015 and December 14, 2015 minutes.

On motion duly made and seconded, it was

VOTED: to approve the MassDOT's minutes of December 9, 2015 and December 14, 2015.

Next, Chairman Aiello gave the update of the Fiscal and Management Control Board to the MassDOT Board of Directors. Chair Aiello began his report by going through the presentation the FMCB that was delivered to Legislature's Joint Committee on Transportation as set forth in the attached presentation labeled "MBTA Fiscal and Management Control Board, Joint Committee on Transportation Oversight Hearing".

Next, the Chair moved to agenda item #2, an update of the Green Line Extension project (GLX). Jack Wright, the interim project manager of the GLX began the discussion, as set forth in the attached presentation labeled "Green Line Extension, Joint Board Meeting GLX March 16, 2016".

Next, General Manager DePaola contributed to the GLX discussion concerning the design/build manual submitted to the Inspector General.

Next, on motion duly made and seconded, it was

**VOTED: to adjourn the Fiscal & Management Control Board at 2:51
p.m.**

DOCUMENTS RELIED ON IN THE MEETING

FMCB Public Meeting Agenda Items

CA Report

Commuter Rail Schedules Initiative Public Comment Summary

FY17 Preliminary Itemized Budget

Late-Night Discontinuance SEA to Board

Late-Night Service Equity Analysis

Potential MBTA Fare Changes in SFY 2017 Final Option: Impact Analysis

Appendix 7-H

CTPS Service Equity Analysis for the Termination of MBTA Late Night Service Pilot

TECHNICAL MEMORANDUM

DATE: March 15, 2016

**TO: Frank DePaola, General Manager
MBTA**

**FROM: Annette Demchur, Manager
CTPS Transit Service Planning Group**

**RE: Service Equity Analysis of the Proposed Discontinuation of MBTA
Late-Night Service**

1

INTRODUCTION

The Massachusetts Bay Transportation Authority (MBTA) began a pilot program of extended weekend late-night hours of service on Friday, March 28, 2014. This program was initially intended to operate for one year, through March 27, 2015. However, because the MBTA wanted the pilot program to last long enough to provide sufficient data to evaluate the program, and vehicle operator schedules are set well in advance of each new schedule-rating period, the program was continued without changes through June 26, 2015. On April 15, 2015, the Massachusetts Department of Transportation (MassDOT) board of directors, which then governed the MBTA, voted to implement the fiscal year 2016 budget which assumed certain changes in the late-night program that would become effective in June of 2015. These changes consisted of discontinuing all late-night trips that had been added to five bus routes in March of 2014 and reducing the span of hours of late-night service on the bus and rapid transit routes in the pilot program that were being retained.

In July of 2015, governance of the MBTA was transferred to a new fiscal and management control board. On December 14, 2015, that board directed the MBTA staff to pursue discontinuation of the remaining late-night service as part of a series of cost-reduction measures. The attachment to this memorandum shows the late-night service that is proposed for elimination and the demographics of the MBTA service area population.

The Federal Transit Administration (FTA) Circular 4702.1B provides guidelines and requirements for implementing US Department of Transportation regulations pertaining to Title VI of the Civil Rights Act of 1964 (49 CFR 21). The Circular requires the MBTA to conduct a service equity analysis to evaluate, prior to implementation of any major service change, whether the major service changes

would have a discriminatory impact based on race, color, or national origin and whether low-income populations would bear a disproportionate burden or non-low-income populations would receive disproportionate benefits because of the changes. These requirements do not apply to temporary service changes—those that last less than one year. However, because the late-night pilot program extended beyond the FTA's 12-month limit for a temporary addition of service, FTA considers it a permanent service and requires an equity analysis of its elimination.

This memorandum presents the results of a service equity analysis of the proposed elimination of late-night service.

1.1 Late-Night Service History and Service Proposal

Historically, MBTA services have run daily from approximately 5:30 AM until approximately 1:00 AM, which allows time for maintaining and inspecting the system during the night. In 2001, the MBTA implemented “Night Owl” service, which provided bus service every weekend at 30-minute intervals from 1:00 AM to 2:30 AM along nine routes that paralleled MBTA subway lines, and along seven heavily used daytime bus routes—Routes 1, 9, 28, 57, 66, 77, and 111. This service was reduced over the following few years until it was suspended in 2005 to help close a projected budget deficit in state fiscal year (SFY) 2006. At the time of its suspension, Night Owl service cost the MBTA \$7.53 per passenger trip (net), whereas daytime bus service cost \$1.37 per passenger trip (net).

Effective March 28, 2014, the MBTA implemented the late-night service pilot program discussed above, which extended the hours of service on the rapid transit system and on the most heavily used bus routes on Friday and Saturday nights. The goal was to provide a transit alternative for patrons and employees of late-night businesses, including the restaurant, entertainment, hospitality, and health-care sectors. The MBTA's hours of service were extended by 90 minutes for the rapid transit system (the Red, Orange, Green, Blue, Mattapan, and Silver lines except SL2) and for the Key Bus Routes (Routes 1, 15, 22, 23, 28, 32, 39, 57, 66, 71, 73, 77, 111, and 116/117). In the pilot program, late-night service operated approximately every 15 to 20 minutes, and, in most cases, it served the same stations and stops and charged the same fares as regular daytime service.

The service changes implemented in June of 2015 included ending late-night service on the rapid transit system 30 minutes earlier, and discontinuing late-night service on 5 of the 15 bus routes that were included in the program (Routes 15, 22, 71, 73, and 77). The elimination of all remaining late-night service would return the departure times of the last inbound and outbound trips on all MBTA rapid transit and bus routes to their corresponding departure times that were scheduled immediately prior to the implementation of late-night service in March 2014.

1.2 Major Service Changes

The MBTA's Service Delivery Policy defines major service changes at the individual route level as changes that would have a significant effect on riders, resource requirements, route structure, or service delivery. This includes:

- Major service restructuring
- Implementation of new routes or services
- Elimination of a route or service
- Elimination of part of a route
- Span of service changes greater than one hour
- Route extension of greater than one mile

The discontinuance of late-night service changes the span-of-service on two nights a week by more than one hour, and so can be considered a major service change that requires a service equity analysis.

1.3 Identification of Adverse Effects

The MBTA's Disparate Impact and Disproportionate Burden Policy states that the MBTA will define and analyze adverse effects related to proposed fare changes or major service changes. Because the late-night service operating since the start of the pilot program, in March of 2014, did not involve any fare changes, only service equity analyses (no fare equity analyses) are necessary. These service equity analyses evaluate the possible disparate impacts on minority populations and disproportionate burdens on low-income populations.

The MBTA uses the following thresholds for assessing disparate burdens and disproportionate burdens:

- A disparate burden would be found if the minority customers (population) sustain more than 20 percent additional burden than the total burden that the nonminority customers (population) sustain.
- A disproportionate burden would be found if the low-income customers (population) sustain more than 20 percent additional burden than the total burden that the non-low-income customers (population) sustain.

2 ASSESSMENT OF DISPARATE BURDENS AND DISPROPORTIONATE BURDENS

2.1 Analysis Framework

As presented in the MBTA's Disparate Impact and Disproportionate Burden Policy, assessment of disparate burdens requires a comparison of:

- The burdens imposed on minority customers using the service to the burdens imposed on nonminority customers using the service

OR

- The burdens imposed on the minority population living in the market area of the service to the burdens imposed on the nonminority population living in the market area of the service

And the assessment of disproportionate burdens requires a comparison of:

- The burdens imposed on low-income customers using the service to non-low-income customers using the service

OR

- The burdens imposed on the low-income population living in the market area of the service to the burdens imposed on the non-low-income population living in the market area of the service

During the final month of the original one-year pilot period for the late-night service program, the MBTA surveyed riders using this service on March 6, 7, 13, and 14, 2015, to determine the trip-making characteristics and the minority and income status of the ridership, consistent with the definitions below.

Minority

FTA Title VI guidelines define a minority person as one who identifies as any of the following:

- American Indian and Alaska Native, which refers to people having origins in any of the original peoples of North and South America (including Central America), and who maintain tribal affiliation or community attachment.
- Asian, which refers to people having origins in any of the original peoples of the Far East, Southeast Asia, or the Indian subcontinent, including, for example, Cambodia, China, India, Japan, Korea, Malaysia, Pakistan, the Philippine Islands, Thailand, and Vietnam.
- Black or African American, which refers to people having origins in any of the Black racial groups of Africa.
- Hispanic or Latino, which includes persons of Cuban, Mexican, Puerto Rican, South or Central American, or other Spanish culture or origin, regardless of race.
- Native Hawaiian or Other Pacific Islander, which refers to people having origins in any of the original peoples of Hawaii, Guam, Samoa, or other Pacific Islands.

Low-Income

FTA Title VI guidelines define a “low-income” person as “a person whose median household income is at or below the US Department of Health and Human Services poverty guidelines.” As of 2013, the national low-income level for a one-person household was \$11,490 annually, with an additional \$4,020 per household member. Because median incomes in the MBTA service area are higher than national levels, the MBTA uses a more inclusive definition of low-income. The MBTA Title VI program defines a low-income rider as one whose household income is less than 60 percent of the median household income of the MBTA service area. The median household income for the years 2008 through 2012 for the 175-municipality MBTA service area was \$69,393. Therefore, for the MBTA Title VI program, a low-income rider is defined as one whose household income is less than 60 percent of that level, or \$43,159.

Under FTA guidance and the MBTA Disparate Impact and Disproportionate Burden Policy, a service equity analysis can be performed using either actual ridership (survey) data, or population (census) data concerning persons who would potentially ride the system. In this case, the MBTA used the late-night survey data along with data from the MBTA 2008–09 Systemwide Passenger Survey to conduct the equity analysis. However, because the composition of the service area population has changed over the six to seven years since the systemwide survey, the MBTA also conducted an equity analysis using census data. Because late-night service has a broad base of potential riders, many of whom use the service infrequently, using population data may be more appropriate for the late-night service equity analysis. The results of each of these analyses, using ridership and population data, are presented below.

The MBTA use the Central Transportation Planning Staff (CTPS) to conduct the equity analyses using the data sources discussed above.

2.2 Assessment of Disparate Burdens and Disproportionate Burdens: Ridership Data

To assess the potential disparate burdens and/or disproportionate burdens that might be imposed by the proposed MBTA late-night service reductions, CTPS staff analyzed ridership using a methodology described in FTA Circular 4702.1B. This methodology compares the proportion of minority and low-income late-night-service riders with the proportion of minority and low-income riders using the MBTA system as a whole, for each mode of transit service.

The MBTA’s March 2015 survey of late-night passengers was designed to obtain results at a 90 percent confidence level and a 5 percent confidence interval for overall late-night rapid transit riders and for overall late-night bus riders. It was not

feasible to obtain statistically reliable results at the individual route or station level. The data for the proportions of minority and low-income riders using the MBTA system as a whole were based on the results of the MBTA 2008–09 Systemwide Passenger Survey, which provided composite one-day samples of weekday ridership for the hours of 6:00 AM to 3:30 PM.

Although the 2008-09 survey included demographic questions comparable to those in the 2015 survey on late-night service, the demographics are not necessarily the same in 2015 as they were in 2008–09 for passengers traveling between 6:00 AM and 3:30 PM or for those using late-night service on the same routes. To identify such differences, CTPS compared the minority and low-income percentages for all of the bus routes combined that were included in the late-night survey, with the minority and low-income percentages obtained from the 2008–09 survey. For this group of routes, the percentage of minority passengers in the 2015 late-night survey (59.9 percent) was similar to the percentage in the 2008–09 survey (61.3 percent). However, the percentage of low-income riders was much higher in the 2015 late-night survey (70.9 percent) than in the 2008–09 survey (48.2 percent)—a difference of 22.7 percentage points and a ratio of the 2015 percentage to the 2008–09 percentage of 1.47.

To estimate the percentage of minority riders on the 10 bus routes on which late-night service was retained after June of 2015, the average combined Friday late-night and Saturday late-night ridership on each route for all weekends in July, August, September, and October 2015 was multiplied by the percentage of minority riders on the same route in the 2008–09 survey. As shown in Table 1, for the 10 routes combined, average weekend late-night ridership from July through October 2015 was 2,056, with an estimated 1,119 minority riders (54.4 percent minority ridership).

TABLE 1
Estimation of Late-Night Bus Minority Ridership

Route	Late-Night Ridership	Percentage Minority	Number Minority
Route 1	305	42.3	129
Route 23	156	90.6	141
Route 28	258	96.5	249
Route 32	118	62.5	74
Route 39	153	39.9	61
Route 57	293	32.2	95
Route 66	292	39.1	114
Route 111	277	56.3	156
Route 116	75	58.3	44
Route 117	128	44.0	56
Total	2,056	54.4	1,119

Note: Late-night ridership is the average ridership on Friday and Saturday late-night trips on all of the weekends in July through October 2015. The percentage of minority ridership of each route was estimated by using the same percentage that was found in the results of the MBTA 2008–09 systemwide passenger survey.

The late-night rapid transit survey was conducted at 15 stations that accounted for approximately 70 percent of all late-night rapid transit station entries. Of the survey respondents reporting ethnicity, 43.4 percent were classified as minorities applying the federal standards described above. In the MBTA 2008–09 Systemwide Passenger Survey, only 24.1 percent of the respondents from the same 15 stations were minorities. These figures imply that the minority share of late-night ridership at these stations was 1.8 times the share during the span of hours when the 2008–09 survey was conducted.

Discontinuing late-night rapid transit service would impact the number of entries at all stations, not just the 15 stations included in the 2015 late-night survey. Applying the same factor of 1.8 to the minority percentage at each rapid transit station in the 2008–09 survey, and applying those minority percentages to the average late-night entries per weekend for the corresponding stations from July through October 2015, an estimated 47.1 percent of late-night rapid transit passengers were minorities.

Similar methods were used to estimate the percentages of low-income riders on late-night bus and rapid transit services. For each of the 10 bus routes with late-night service, the 2008–09 percentage of low-income riders was multiplied by a factor of 1.47 (the ratio of the percentage of low-income riders on the routes that were included in the 2015 late-night survey to the percentage on the same routes in the 2008–09 survey) to adjust for the difference between daytime and late-night rates of low-income ridership, with a limit of 100 percent on the result for any

individual route. As shown in Table 2, for the 10 bus routes combined, the average weekend late-night ridership from July through October 2015 was 2,056, with an estimated 1,324 (64.4 percent) low-income riders.

TABLE 2
Estimation of Late-Night Bus Low-Income Ridership

Route	Late-Night Ridership	Percentage Low-Income	Number Low-Income
Route 1	305	55.6	169
Route 23	156	85.3	133
Route 28	258	100.0	258
Route 32	118	66.6	79
Route 39	153	48.8	75
Route 57	293	37.7	110
Route 66	292	67.2	196
Route 111	277	55.4	153
Route 116	75	78.0	59
Route 117	128	71.7	92
Total	2,056	64.4	1,324

Note: Late-night ridership is the average ridership on Friday and Saturday late-night trips on all of the weekends in July through October 2015. The percentage of low-income ridership of each route was estimated by using the same percentage that was found in the results of the MBTA 2008–09 Systemwide Passenger Survey by a factor of 1.50.

Of the late-night rapid transit survey respondents who reported household income, 54.0 percent were classified as low-income under the federal standards described above. In the MBTA 2008–09 Systemwide Passenger Survey, only 22.0 percent of the respondents from the same 15 stations that were surveyed in 2015 were low-income. These figures imply that the low-income share of late-night ridership at these stations was 2.45 times as great as the share during the span of hours when the 2008–09 survey was conducted.

Applying the same factor of 2.45 to the low-income percent at each station in the 2008–09 survey, and applying these percentages to the average late-night entries per weekend at each system station from July through October 2015, an estimated 59.2 percent of late-night rapid transit passengers were low-income.

TABLE 3
Assessment of Disparate Burdens on Minority Riders If Late-Night Service on 10 MBTA Bus Routes Is Discontinued using Ridership Data

Metric	Valuation
MBTA bus system – 2008–09 weighted percentage minority	47.5%
Late-night service, 10 bus routes – percentage minority	54.4%
Ratio of late-night to systemwide minority ridership	1.15
Disparate burden threshold	>1.20
Result of disparate burden analysis	No disparate burden

Sources: The 2015 MBTA late-night service survey and the MBTA 2008–09 Systemwide Passenger Survey.

TABLE 4
Assessment of Disproportionate Burdens on Low-Income Riders If Late-Night Service on 10 MBTA Bus Routes Is Discontinued using Ridership Data

Metric	Valuation
MBTA bus system – 2008–09 weighted percentage low-income	41.5%
Late-night service – 10 bus routes, percentage low-income	64.4%
Ratio of late-night to systemwide low-income ridership	1.55
Disproportionate burden threshold	>1.20
Result of disproportionate burden analysis	Disproportionate burden

Sources: The 2015 MBTA late-night service survey and the MBTA 2008–09 Systemwide Passenger Survey.

TABLE 5
Assessment of Disparate Burdens on Minority Riders If Late-Night Service on MBTA Rapid Transit Lines Is Discontinued using Ridership Data

Metric	Valuation
Rapid transit system – 2008–09 weighted percentage minority	28.5%
Late-night rapid transit service – percentage minority	47.1%
Ratio of late-night to systemwide minority ridership	1.65
Disparate burden threshold	>1.20
Result of disparate burden analysis	Disparate burden

Sources: The 2015 MBTA late-night service survey and the MBTA 2008–09 Systemwide Passenger Survey.

TABLE 6
Assessment of Disproportionate Burdens on Low-Income Riders If Late-Night Service on MBTA Rapid Transit Lines Is Discontinued Using Ridership Data

Metric	Valuation
Rapid transit system – 2008–09 weighted percentage low-income	24.1%
Late-night rapid transit service – percentage low-income	59.2%
Ratio of late-night to systemwide low-income ridership	2.46
Disproportionate burden threshold	>1.20
Result of disproportionate burden analysis	Disproportionate burden

Sources: The 2015 MBTA Late-Night Service Survey and the MBTA 2008–09 Systemwide Passenger Survey.

Table 3 shows that the proportion of minority riders using the 10 late-night bus routes that the MBTA proposes to discontinue (54.4 percent) is higher than the proportion of minority riders using MBTA bus service systemwide (47.5 percent). The resulting ratio of the proportion of minority riders using the 10 late-night bus routes that the MBTA proposes to discontinue to the proportion of minority riders using MBTA bus service systemwide, 1.15, is less than the threshold of 1.20 for a disparate burden.

Table 4 shows that the proportion of low-income riders using the 10 late-night bus routes (64.4 percent) is higher than the proportion of low-income riders using MBTA bus service systemwide (41.5 percent). The resulting ratio of the proportion of low-income riders using the 10 late-night bus routes to the proportion of low-income riders using MBTA bus service systemwide, 1.55, is greater than the threshold of 1.20 for a disproportionate burden.

Table 5 shows that the proportion of minority riders using the late-night rapid transit service that the MBTA proposes to discontinue (47.1 percent) is higher than the proportion of minority riders using MBTA rapid transit service systemwide (28.5 percent). The resulting ratio of the proportion of minority riders using the late-night rapid transit service that the MBTA proposes to discontinue to the proportion of minority riders using MBTA rapid transit service systemwide, 1.65, is greater than the threshold of 1.20 for a disparate burden.

Table 6 shows that the proportion of low-income riders using late-night rapid transit service (59.2 percent) is higher than the proportion of low-income riders using MBTA rapid transit service systemwide (24.1 percent). The resulting ratio of the proportion of low-income riders using the late-night rapid transit service to the proportion of low-income riders using MBTA rapid transit service systemwide, 2.46, is greater than the threshold of 1.20 for a disproportionate burden.

2.3 Assessment of Disparate Burdens and Disproportionate Burdens: Population Data

To assess the potential disparate burdens and/or disproportionate burdens that might be imposed by the proposed MBTA late-night service reductions, CTPS staff conducted a second form of analysis using population data. The Circular requires that the transit provider consider the degree of adverse effects when conducting the equity analysis. CTPS staff is working with the MBTA to develop a procedure that considers the degree of adverse effect by incorporating a measure of access to the system. This methodology compares the proportion of minority and low-income population with access to late-night-service with the proportion of minority and low-income population with access to the MBTA system as a whole.

To determine the proportion of minority and low-income population with access to late-night service and to the MBTA system as a whole, the population of each municipality was weighted by its share of systemwide service hours (including bus, rapid transit, and commuter rail service hours) divided by its share of systemwide population. These weights were applied to determine the proportion of minority and low-income populations with access to late-night service and to the MBTA system as a whole, shown in Table 7 and Table 8.

TABLE 7
Assessment of Disparate Burdens on Minority Population
If Late-Night Service Is Discontinued using Weighted Population Data

Metric	Valuation
Late-night minority percentage	46.6%
MBTA systemwide minority percentage	42.0%
Ratio of late-night to systemwide minority population	1.11
Disparate burden threshold	>1.20
Result of disparate burden analysis	No disparate burden

TABLE 8
Assessment of Disproportionate Burdens on Low-Income Population
If Late-Night Service Is Discontinued using Weighted Population Data

Metric	Valuation
Late-night low-income percentage	39.1%
MBTA systemwide low-income percentage	37.1%
Ratio of late-night to systemwide low-income population	1.05
Disproportionate burden threshold	>1.20
Result of disproportionate burden analysis	No disproportionate burden

Table 7 shows that the proportion of minority population with access to late-night service (46.6 percent) is higher than the proportion of minority population with access to the MBTA system as a whole (42.0 percent). The resulting ratio of the proportion of minority population with access to the late-night service that the MBTA proposes to discontinue to the proportion of minority population with access to the MBTA system as a whole, 1.11, is less than the disparate burden threshold of 1.20.

Table 8 shows that the proportion of low-income population with access to late-night service (39.1 percent) is higher than the proportion of low-income population with access to the MBTA system as a whole (37.1 percent). The resulting ratio of the proportion of low-income population with access to the late-night service that the MBTA proposes to discontinue to the proportion of low-income population with access to the MBTA system as a whole, 1.05, is less than the disproportionate burden threshold of 1.20.

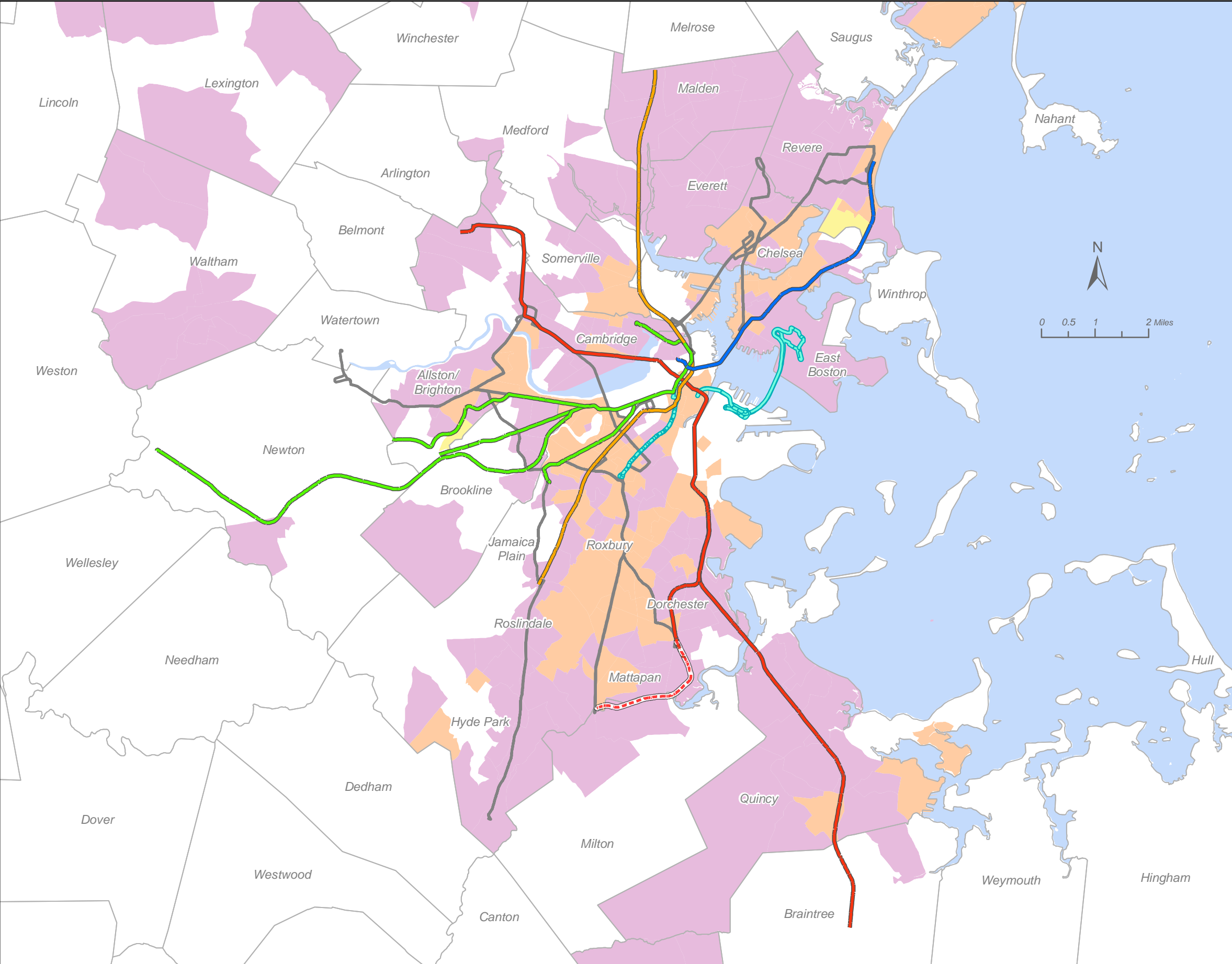
3 CONCLUSION

The results of the service equity analysis using ridership data indicate that discontinuing the late-night service that has been operated on 10 MBTA bus routes would not result in a disparate burden on minority riders, but would result in a disproportionate burden on low-income riders. Discontinuing the late-night service that has been operated on all MBTA rapid transit lines since July 1, 2015, would result in a disparate burden on minority riders and a disproportionate burden on low-income riders.

The results of the service equity analysis using population data indicate that the overall discontinuance of late-night service would not result in a disparate burden on minority populations and would not result in a disproportionate burden on low-income populations.

AD/TJH/tjh

cc: Charles Planck, MBTA
Melissa Dullea, MBTA
John Lozada, MassDOT
Greg Sobczynski, MassDOT
Miles Walters, MBTA



MBTA Late Night Service Equity Analysis

Late Night Service to be
Eliminated March 2016

MBTA Transit

- Blue Line
- Green Line
- Orange Line
- Red Line
- Mattapan High-Speed Line
- Silver Line
- Bus

Minority and/or Low-Income Status

- Minority tract
- Minority and low-income tract
- Low-income tract
- Not minority or low-income

NOTES:

In the 175 municipalities of the MBTA service area, 26.19% of the residents were members of minority groups in 2010. A minority census tract is defined as one in which the minority percentage exceeds 26.19%.

The median household income for the years 2007 through 2011 for the 175-municipality MBTA service area was \$69,393. A low-income census tract is defined as one in which the median household income in 2011 was less than 60% of that level, or \$41,636.

Appendix 7-I

FMCB Approval of Service Equity Analysis for the Termination of MBTA Late Night Service Pilot



Charles D. Baker, Governor
Karyn E. Polito, Lieutenant Governor
Stephanie Pollack, MassDOT Secretary & CEO
Frank DePaola, General Manager
Brian Shortsleeve, Chief Administrator



**Joint Meeting of MassDOT Board of Directors and the
Fiscal and Management Control Board
March 16, 2016**

Transportation Building
Conference Rooms 1,2 and 3
10 Park Plaza
Boston, MA

MEETING MINUTES

Members: Chairman Joseph Aiello, Director Lisa Calise, Director Brian Lang, Director Steven Poftak, and Director Monica Tibbits-Nutt

Present: Chairman Joseph Aiello, Director Lisa Calise, Director Steven Poftak and Director Monica Tibbits-Nutt

Quorum Present: Yes

Others Present: General Manager Frank DePaola, Chief Administrator Brian Shortsleeve, General Counsel John Englander, Registrar Erin Deveney, Highway Administrator Tom Tinlin, Rail & Transit Administrator Astrid Glynn, Assistant General Manager of Rail Operations Jody Ray and Senior Counsel to the Board Owen Kane, Laurel Paget-Seekins, Charles Planck

At the call of the Chair, a meeting of the Fiscal and Management Control Board was called to order at 11:00 a.m. at 10 Park Plaza, Conference Rooms 1,2 & 3, Boston, Massachusetts.

After motion duly made and seconded, it was voted to immediately enter into executive session to discuss strategy related to pending litigation.

By roll call:

Chair Aiello	yes
Directory Poftak	yes
Director Calise	yes
Director Tibbits-Nutt	yes

VOTED: To enter into executive session at 11:03 a.m.

The Fiscal and Management Control Board returned from Executive Session and reconvened the Open Session at 11:45 a.m.

Next Chair Aiello, began item F, a Special Presentation from the Mayors of Cambridge, Medford and Somerville regarding the Green Line Extension. Mayor Curtatone of Somerville, introduced Senator Jehlen, a leader in the state delegation for the City, who spoke in support of extending the Green Line Extension to Route 16 in Winchester.

Next, Mayor Curtatone introduced Medford Mayor Stephanie Burke and Councillor Cheung, representing the Mayor of Cambridge. Mayor Curtatone also recognized all the elected officials who had advocated in support of the project. Mayor Curtatone praised the Governor and the Secretary, and the interim team for their diligence and determination in developing a fiscally responsible plan for the Green Line Extension that will move the project forward.

Next, Mayor Burke restated Medford's support of the project. Mayor Burke indicated that the public engagement and planning process must include the local communities to review the design, the financing alternatives and implementation schedule.

Next, Leland Cheung from the Cambridge City Council spoke on delivered remarks on behalf of Mayor Simmons of Cambridge. Ms. Cheung commented

that they need to be asking for a more information and more data, to figure out how to get this project back on track before asking residents to make sacrifices.

PROCEDURAL:

Next, was the approval of the Fiscal and Management Control Board minutes of February 1, 2016.

On motion duly made and seconded, it was

VOTED: To approve the minutes of February 1, 2016

Next, was the approval of the Fiscal and Management Control Board minutes of February 10, 2016.

On motion duly made and seconded, it was

VOTED: To approve the minutes of February 10, 2016

Next, Chair Aiello asked General Manager Frank DePaola to give the Report of the General Manager, Agenda Item D. Mr. DePaola commenting on the Washington Metro's one-day suspension of service to conduct a series of inspections of their electrical distribution system. Mr. DePaola stated that the MBTA already has a regular inspection protocol in place. Additionally the T is experimenting with thermal imaging cameras, a pilot program, which can detect defects before they are visible to the naked eye.

Next, Chief Administrator Shortsleeve, presented Agenda Item E. Mr. Shortsleeve gave a brief update on hedging strategy as well as a monthly update on overtime, as set forth in the attached presentation entitled "CA Report".

PRESENTATIONS:

Next, Brian Kane presented Agenda Item G, a review of upcoming FMCB agenda items as forth in the attached presentation entitled “Fiscal and Management Control Board: Public Meeting Agenda Items”.

ACTION ITEMS:

Next, Laurel Paget-Seekins began Agenda Item H, a discussion and possible vote regarding equity analysis related to the fare increase. Ms. Paget-Seekins informed the Board they had received the final equity analysis that included all of the changes discussed at the March 7, 2016 Board Meeting, attached hereto and entitled “Potential MBTA Fare Changes in SFY 2017 Final Option: Impact Analysis”.

On motion duly made and seconded, it was

VOTED:

WHEREAS, on March 7, 2016, the Fiscal and Management Control Board (the “Board”) approved Massachusetts Bay Transportation Authority (“MBTA”) fare changes to be effective July 1, 2016, which approval included modifications to Option 2 as presented (“FY 17 Fare Changes”); and

WHEREAS, The Board directed MBTA staff to complete a Title VI fare equity analysis (“Equity Analysis”) to evaluate the effects of the modifications to Option 2, amend the Equity Analysis and provide the results to the Board for review and acceptance;

NOW, THEREFORE, it is hereby

VOTED:

That the Board hereby accepts the Equity Analysis for the FY 17 Fare Changes as presented.

Next, Chair Aiello called upon General Counsel John Englander and Charles Planck, to present Agenda Item I, Late Night Service Equity Analysis, as forth in the attached presentation entitled “MBTA Late-Night Service – Equity Analysis”.

On motion duly made and seconded, it was

VOTED:

WHEREAS, the Fiscal and Management Control Board (the “Board”) voted on February 29, 2016 to terminate the Massachusetts Bay Transportation Authority’s (the “MBTA”) Late Night Service Pilot Program; and

WHEREAS, the MBTA has completed service equity analyses on the termination of the Late Night Service Pilot Program using available alternative data, comparators and methodologies under Federal Transit Authority guidance producing mixed results; and

WHEREAS, the Board has determined that the MBTA should consider service mitigation that meets the legitimate business needs of the Authority to limit cost and provide efficient service, provide greater access for infrastructure and equipment maintenance and allows the MBTA to measure the impact of change;

NOW, THEREFORE, IT IS HEREBY

VOTED:

The Board hereby accepts the Late Night Service Pilot Program equity analyses as presented.

FURTHER VOTED:

The Board hereby directs MBTA staff to design service mitigation that addresses the service needs of the targeted population, based upon the following criteria:

1. Mitigation must serve the MBTA's legitimate business needs by limiting any additional cost and preserving the maximum feasible access for maintenance activities.
2. Consider mitigating the loss of work trips for minority or low-income workers, by providing targeted, efficient improvements to quality or quantity of service for minority and/or low income riders;
3. Consider any additional no cost or low-cost changes that will improve service to minority or low-income riders, including partnering with private sector ride share and other transportation service providers.

FURTHER VOTED:

The Board hereby directs MBTA staff to take all steps necessary within the thirty days to provide a meaningful opportunity for public comment on the proposed mitigation measures with clear adherence to the principles identified in the previous vote.

Next, Michael Abramo presented Agenda Item K, Fiscal 2017 Operating Budget as forth in the attached presentation entitled "FY17 Preliminary Itemized Budget". Mr. Abramo prefaced his presentation acknowledging the proposed budget is extremely aggressive, but he was confident it could be achieved by following the steps as outlined in the presentation.

On motion duly made and seconded, it was

VOTED:

That the Fiscal and Management Control Board hereby approves the Authority's preliminary itemized budget of current operating expenses and debt service costs for a one year period—July 1, 2016 through June 30, 2017—in the amount of \$2,021,884,129 in the form submitted at this meeting; and

FURTHER VOTED:

That the General Manager and Chief Administrator are hereby authorized and directed to submit the preliminary itemized budget, in the name and on behalf of the Authority, to the MBTA Advisory Board for review.

At 1:00 p.m., the Fiscal and Management Control Board was joined by the MassDOT Board of Directors in a Joint Meeting.

At the call of the Chair Pollack, a joint meeting of the Board of Directors of the Massachusetts Department of Transportation and the Fiscal and Management Control Board was called to order at 1:10 p.m. at the State Transportation Building in Conference Rooms 1,2 & 3, 10 Park Plaza, Boston, Massachusetts.

Those present were Secretary Pollack, Chair, Directors Ruth Bonsignore, Betsy Taylor, Russell Gittlen, Dean Mazzarella, Joseph Sullivan, Dominic Blue, Monica Tibbits-Nutt and Steven Poftak, being a quorum of the Board of Directors of the Massachusetts Department of Transportation.

Also present were the members of the Fiscal and Management Control Board, Chairman Joseph Aiello as well as Directors Steven Poftak and Monica Tibbits-Nutt who also serve as members of the Massachusetts Department of Transportation Board.

Next Chair Pollack opened up the public comment period.

The following commented in support of the Green Line Extension going forward: Ms. Emily Reichert of Greentown Labs; Jim McGinnis, STEP; Representative Christine Barber; Representative Denise Provost; Representative Tim Toomey; Alderman Katyana Ballantyne; Rafael Mares, CLF; Joseph Barr on behalf of City Manager Richard Rossi; John McDougall 350 Mass Transportation Working Group; Elizabeth Boyle, Medford; Mike Connolly, Cambridge Resident Alliance; John Elliott, Medford; David Bauer Somerville; Ian Hardy, Somerville; Meredith Levy, Somerville; Ellin Reisner, STEP; Saul Tannenbaum, Cambridge; Louise Baxter, TRU; Esther Hanig, Union Square Main Streets; Greg Karczewski, US2; Charlie Ticotsky, TYMA; Bill Shelton, Somerville Times; Stephen Mackey, Somerville and Mr. Derby.

Mike Stanley, TransitX, opposes the Green Line Extension.

David Senatillaka, Malden commented that ABC counters would help with fare evasion and the non-collection of fares.

Tom Ryan, ABC, commented on the MassDOT Capital plan.

Steven Kaiser, Citizen Engineer, commented on the lockbox, and in support of the Green Line Extension Public Process.

Alex Feldman, Alan Moore and Lynn Weissman, of Friends of the Community Path support the Green Line Extension and Community Path

Mary Vogel, supports pre-apprenticeship programs in the MassDOT five-year capital plan

Wig Zamore, STEP, spoke in support of Late night bus service, and the Green Extension.

Claudia Murrow commented on eminent domain process.

Next, was the approval of the December 9, 2015 and December 14, 2015 minutes.

On motion duly made and seconded, it was

VOTED: to approve the MassDOT's minutes of December 9, 2015 and December 14, 2015.

Next, Chairman Aiello gave the update of the Fiscal and Management Control Board to the MassDOT Board of Directors. Chair Aiello began his report by going through the presentation the FMCB that was delivered to Legislature's Joint Committee on Transportation as set forth in the attached presentation labeled "MBTA Fiscal and Management Control Board, Joint Committee on Transportation Oversight Hearing".

Next, the Chair moved to agenda item #2, an update of the Green Line Extension project (GLX). Jack Wright, the interim project manager of the GLX began the discussion, as set forth in the attached presentation labeled "Green Line Extension, Joint Board Meeting GLX March 16, 2016".

Next, General Manager DePaola contributed to the GLX discussion concerning the design/build manual submitted to the Inspector General.

Next, on motion duly made and seconded, it was

**VOTED: to adjourn the Fiscal & Management Control Board at 2:51
p.m.**

DOCUMENTS RELIED ON IN THE MEETING

FMCB Public Meeting Agenda Items

CA Report

Commuter Rail Schedules Initiative Public Comment Summary

FY17 Preliminary Itemized Budget

Late-Night Discontinuance SEA to Board

Late-Night Service Equity Analysis

Potential MBTA Fare Changes in SFY 2017 Final Option: Impact Analysis

Appendix 7-J

CTPS Service Equity Analysis for the Fitchburg Line Improvement Project and Wachusett Extension Project



TECHNICAL MEMORANDUM

DATE: September 23, 2016

TO: Brian Shortsleeve, Chief Administrator & Acting General Manager,
Massachusetts Bay Transportation Authority
John Lozada, Manager of Federal Programs, MassDOT Office of
Diversity and Civil Rights

FROM: Annette Demchur, Manager
CTPS Transit Analysis and Planning Group
Nicholas Hart, Principal Transportation Planner
CTPS Transit Analysis and Planning Group

RE: Service Equity Analysis of MBTA Fitchburg Line Improvements and
Service Extension to Wachusett Station

1 INTRODUCTION

The Massachusetts Bay Transportation Authority (MBTA) has completed upgrades to its Fitchburg Commuter Rail Line and completed construction of a new Wachusett Station that extends the Fitchburg Line by four miles. The Federal Transit Administration (FTA) regulations pertaining to Title VI of the Civil Rights Act of 1964, found in FTA Circular 4702.1B, require the MBTA to conduct a service equity analysis to evaluate whether a capital project funded by a federal Small Start's grant or a major service change will have a discriminatory impact based on race, color, or national origin, and whether low-income populations will bear a disproportionate burden or non-low-income populations will receive disproportionate benefits because of the project or service change. Because the Fitchburg Line improvements were completed with a Small Starts grant from the FTA, and extending commuter rail service to Wachusett Station qualifies as a major service change as defined in the MBTA's Service Delivery Policy, a service equity analysis is required for each. Consistent with FTA Circular 4702.1B, the MBTA's Disparate Impact and Disproportionate Burden Policy defines procedures for conducting service equity analyses. This memorandum presents the results of equity analyses for both the Fitchburg Line improvements and service extension to Wachusett Station.

1.1 Fitchburg Line Improvement Project

The primary goal of the Fitchburg Line Improvement Project was to increase benefits to users of the transportation system by offering reduced travel times

and improved service reliability throughout the corridor. In order to accomplish this goal, substantial upgrades were necessary to overcome the significant geographical and infrastructure issues that have long plagued service on the Fitchburg Line. Specifically, the project was deemed necessary to remedy the following issues:

- The Fitchburg Line has the oldest infrastructure in the MBTA commuter rail system.
- The Fitchburg Line is the longest commuter rail line in terms of both distance and travel time.
- The Fitchburg Line has one of the worst on-time performance records in the MBTA.
- The Fitchburg Line serves the Montachusett region, which has limited commuter options.
- The Montachusett region has had significant population growth in the past decade.

The Fitchburg Line Improvement Project was funded by three sources: Small Starts, American Recovery and Reinvestment Act (ARRA), and ARRA Transportation Investment Generating Economic Recovery funds. The portion of the project funded by Small Starts contains the following elements:

- Replacement and realignment of the track structure
- Replacement or repair of eight bridge structures
- Upgrades to signal and communication systems
- Resolution of freight rail and passenger rail conflicts
- Upgrades to South Acton Station

Upon completion of the project, it was estimated that service reliability along the corridor would increase on-time performance from 83 percent to over 95 percent, and maximum train speeds would increase from 60 miles per hour (mph) to 80 mph. Construction was substantially completed at the end of 2015, and new train schedules reflecting the faster and more reliable service were implemented on May 23, 2016. Although the improvements do not qualify as a major service change under the MBTA's Service Delivery Policy, FTA regulations pertaining to Title VI of the Civil Rights Act of 1964, found in FTA Circular 4702.1B, require the MBTA to conduct a service equity analysis for Small Start capital projects, whether or not the changes to existing service rise to the level of a major service change.

1.2 Wachusett Extension Project

The Wachusett Extension Project consists of a new Wachusett Station at the end of the Fitchburg Line, upgrades to the existing rail line to accommodate the extension of commuter rail service four miles west from Fitchburg Station to Wachusett Station, and a new layover facility located in Westminster. Wachusett Station has a fully-accessible high-level platform, which allows direct platform-to-coach boarding, and a new 360-space parking lot, which will be operated by the Montachusett Regional Transit Authority (MART). The goals of the Wachusett Extension Project were as follows:

- Improve mass transit options to the communities west of Fitchburg
- Improve the region's economy by reducing the commute time from the Montachusett Region to the Boston area job market
- Increase the supply of commuter rail parking for riders in the western part of the region
- Improve the operation and capacity of the Fitchburg Line train layover facility

The MBTA's Service Delivery Policy defines major service changes at the individual route level as ones that will have a significant effect on riders, resource requirements, route structure, or service delivery, and specifically lists route extensions of greater than one mile as a major service change. Since the new Wachusett Station extends commuter rail service on the Fitchburg Line four miles west of its pre-existing terminus it is considered a major service change under the MBTA's Service Delivery Policy.

The new Fitchburg Line layover facility in Westminster replaces the existing layover facility in Lunenburg. The facility is located approximately 1.5 miles west of Wachusett Station in the Westminster Business Park. It contains six train storage tracks, an employee parking area, a maintenance building, and an electrical substation. The siting of the Westminster layover facility was determined through an alternatives analysis conducted through the National Environmental Policy Act (NEPA) process, which resulted in a Finding of No Significant Impact (FONSI). Therefore, the MBTA is not required to conduct an additional Title VI equity analysis, as per the guidelines in FTA Circular 4702.1B. A copy of the FONSI for the Wachusett Extension Project is provided in Appendix A.

2 ASSESSMENT OF DISPARATE BENEFITS AND DISPROPORTIONATE BENEFITS – FITCHBURG LINE IMPROVEMENTS

2.1 Analysis Framework

To compare the impacts of the Fitchburg Line improvements on minority and nonminority riders, and low-income and non-low-income riders, Central Transportation Planning Staff (CTPS) conducted an analysis of travel-time savings before and after project implementation. This analysis is consistent with the required methodology described in FTA Circular 4702.1B, which states that the service equity analysis shall include a comparative analysis of service levels pre- and post- the Small Starts capital project, depicted in a tabular format.

Average weekday station-to-station travel-time savings for the inbound direction of the Fitchburg Line were estimated by comparing scheduled service that went into effect on December 14, 2015 (pre-implementation) to that of May 23, 2016 (post-implementation). An estimation of these travel-time savings is provided in Appendix B. Some of the origin and destination pairs in the analysis did not benefit from the project in terms of average travel-time savings; CTPS performed an analysis to determine if each population (minority, nonminority, low-income, and non-low-income) along the line received a travel-time benefit as a whole.

For the analysis, CTPS used FTA's Title VI guidelines for defining a minority person as one who identifies as any of the following:

- American Indian and Alaska Native, which refers to people having origins in any of the original peoples of North and South America (including Central America), and who maintain tribal affiliation or community attachment.
- Asian, which refers to people having origins in any of the original peoples of the Far East, Southeast Asia, or the Indian subcontinent, including, for example, Cambodia, China, India, Japan, Korea, Malaysia, Pakistan, the Philippine Islands, Thailand, and Vietnam.
- Black or African American, which refers to people having origins in any of the Black racial groups of Africa.
- Hispanic or Latino, which includes persons of Cuban, Mexican, Puerto Rican, South or Central American, or other Spanish culture or origin, regardless of race.
- Native Hawaiian or Other Pacific Islander, which refers to people having origins in any of the original peoples of Hawaii, Guam, Samoa, or other Pacific Islands.

FTA's Title VI guidelines define a "low-income" person as "a person whose median household income is at or below the US Department of Health and Human Services' poverty guidelines." As of 2013, the national low-income level for a one-person household was \$11,490 annually, with an additional \$4,020 per household member. Because median incomes in the 175-municipality MBTA service area are higher than national levels, the MBTA uses a more inclusive definition of low-income. The MBTA's Title VI Program defines a low-income rider as one whose household income is less than 60 percent of the median household income of the MBTA service area. The median household income for the years 2010 through 2014 for the 175-municipality MBTA service area was \$73,587. Therefore, a low-income rider is defined as one whose household income is less than 60 percent of that level, i.e., less than \$44,152.

The percentage of minority and low-income passengers boarding at each station¹ was multiplied by the number of passengers traveling between station origin and destination pairs² to produce an estimated minority/nonminority and low-income/non-low-income flow rate from station to station. The estimated percentage of minority and low-income boardings at each station along the Fitchburg Line is provided in tabular format in Appendix C. The estimated flow rates from station to station for all passengers, minority passengers, nonminority passengers, low-income passengers, and non-low-income passengers is provided in tabular format in Appendix D.

The minority/nonminority and low-income/non-low-income flow rates from station to station were multiplied by the estimated time savings from station to station to determine the total amount of time savings for each population. The total estimated time savings from station to station for each population is provided in tabular format in Appendix E. The total amount of time savings for each population was divided by the size of the population to determine the travel-time savings per person for each population. The results are summarized in Table 1.

¹ Estimated from the 2008-09 MBTA systemwide passenger survey results

² Estimated from 2012 CTPS commuter rail passenger counts

TABLE 1
Summary of Travel-Time Savings – Fitchburg Line Improvement Project

Population	Total Change in Travel Time (minutes)	Total Passengers	Change in Travel Time per Passenger (minutes)
Minority	-1,397	515	-2.71
Nonminority	-9,384	3,440	-2.73
Low-Income	-642	228	-2.82
Non-Low-Income	-10,139	3,727	-2.72

Source: CTPS.

Travel times for minority riders of the Fitchburg Line are estimated to be reduced by an average of 2.71 minutes, and for nonminority riders by an average of 2.73 minutes. Travel times for low-income riders of the Fitchburg Line are estimated to be reduced by an average of 2.82 minutes, and for non-low-income riders by an average of 2.72 minutes. Since the Fitchburg Line improvements are not provided at the expense of reductions in service on other MBTA routes or services, and each population receives the benefit of travel-time savings, the Title VI equity analysis of the project is restricted to an assessment of disparate benefits for nonminority populations and disproportionate benefits for non-low-income populations, as described below.

2.2 Assessment of Disparate Benefits and Disproportionate Benefits

The suggested methodology in FTA Circular 4702.1B and the MBTA's subsequently implemented Disparate Impact and Disproportionate Burden Policy requires an assessment of disparate benefits and disproportionate benefits to reflect a comparison of the demographic makeup of riders, who will receive the benefit of the new service to the demographic makeup of riders who use the system as a whole.

The MBTA uses the following thresholds defined in its Disparate Impact and Disproportionate Burden Policy for assessing disparate benefits and disproportionate benefits:

- Disparate benefit – The existing minority customers or minority service area populations receive less than 80 percent of the benefits that the existing nonminority customers or nonminority service area populations receive.
- Disproportionate benefit – The existing low-income customers or low-income service area populations receive less than 80 percent of the benefits that the existing non-low-income customers or non-low-income service area populations receive.

CTPS used the 2008-09 MBTA systemwide passenger survey to obtain data on minority and low-income inbound boardings on the Fitchburg Line (see Appendix C). Those data were used to estimate that 13.0 percent of Fitchburg Line passengers are minorities and 5.8 percent are people with low-incomes.

The ratio of the percentage of minority passengers on the Fitchburg Line (13.0 percent) to the percentage of minority commuter rail riders systemwide (14.4 percent) is 0.90. Based on this comparison, minority commuter rail riders are receiving more than 80 percent of the benefits that nonminority commuter rail riders are receiving, thus no disparate benefit is found.

The ratio of the percentage of low-income passengers on the Fitchburg Line (5.8) to the percentage of low-income commuter rail riders systemwide (7.2 percent) is 0.81. Based on this comparison, low-income commuter rail riders are receiving more than 80 percent of the benefits that non-low-income commuter rail riders are receiving, thus no disproportionate benefit is found.

3 ASSESSMENT OF DISPARATE BENEFITS AND DISPROPORTIONATE BENEFITS – SERVICE EXTENSION TO WACHUSETT STATION

3.1 Analysis Framework

Since extending service to Wachusett Station will not be provided at the expense of reductions in service on other MBTA routes or services, and all populations surrounding the station receive the benefit of increased transit access, the Title VI equity analysis of the project is restricted to an assessment of disparate benefits for nonminority populations and disproportionate benefits for non-low-income populations.

To conduct the analysis, CTPS used 2010 US Census Bureau and 2014 American Community Survey data to determine the locations of minority and low-income populations at the census tract level, respectively. These are the most recent data sets with statistically significant minority and household income data for the MBTA service area and the census tract level is the smallest statistically significant unit of measurement for both minority and low-income populations.

The FTA's Title VI guidelines define a minority population as "any readily identifiable group of minority persons who live in geographic proximity and, if circumstances warrant, geographically dispersed/transient populations who will be similarly affected by a proposed DOT program, policy, or activity." In the 175 municipalities of the MBTA service area, 26.19 percent of the residents were members of minority groups in 2010. The MBTA defines a minority tract as one in

which the percentage of minorities exceeds the 26.19 percent average for its service area.

The FTA's Title VI guidelines define "low-income" as "a person whose median household income is at or below the US Department of Health and Human Services' poverty guidelines." As of 2013, the base level for a one-person household was \$11,490 annually, with a \$4,020 increase per household member. Because median incomes in the MBTA service area are high compared to national levels, the MBTA uses a more inclusive definition for "low-income." The MBTA's Title VI Program defines a low-income area as a unit of census geography in which the median household income is less than 60 percent of the median household income of the MBTA service area. The median household income for the years 2010 through 2014 for the MBTA service area was \$73,587. Consistent with the MBTA's Title VI Program, a low-income tract is defined as one in which the median household income in 2014 was less than 60 percent of that level, i.e., less than \$44,152. Since the US Census household income data are reported by ranges that do not provide a break at \$44,152, CTPS performed an additional procedure to apportion a certain percentage of households that fall within the \$40,000–\$49,999 household income bracket as low-income. Since \$44,152 falls approximately 42 percent of the way between \$40,000 and \$49,999, approximately 42 percent of households that fell within this income bracket in each census tract were apportioned as low-income households.

CTPS created a demographic profile of the market access area surrounding Wachusett Station (including minority status, low-income status, and population density of each census tract) by selecting roadways within five miles of the station using geographic information system (GIS) software. Roadways within five miles of the station represent the market access area of a terminal station outside of the core 65 MBTA municipalities. The market access area is defined for each type of commuter rail station in Table 2 and Table 3. Since the five-mile market access area for Wachusett Station overlaps with the five-mile market access area for Fitchburg Station, the overlapping area was divided halfway, and each station was assigned the nearest half. The area of each tract within the Wachusett Station market access area was calculated, and then multiplied by the population density to obtain the population in the market access area. Finally, minority and low-income populations in the market access area were summed to obtain a total for each category. The market access area for Wachusett Station is displayed in Figure 1.

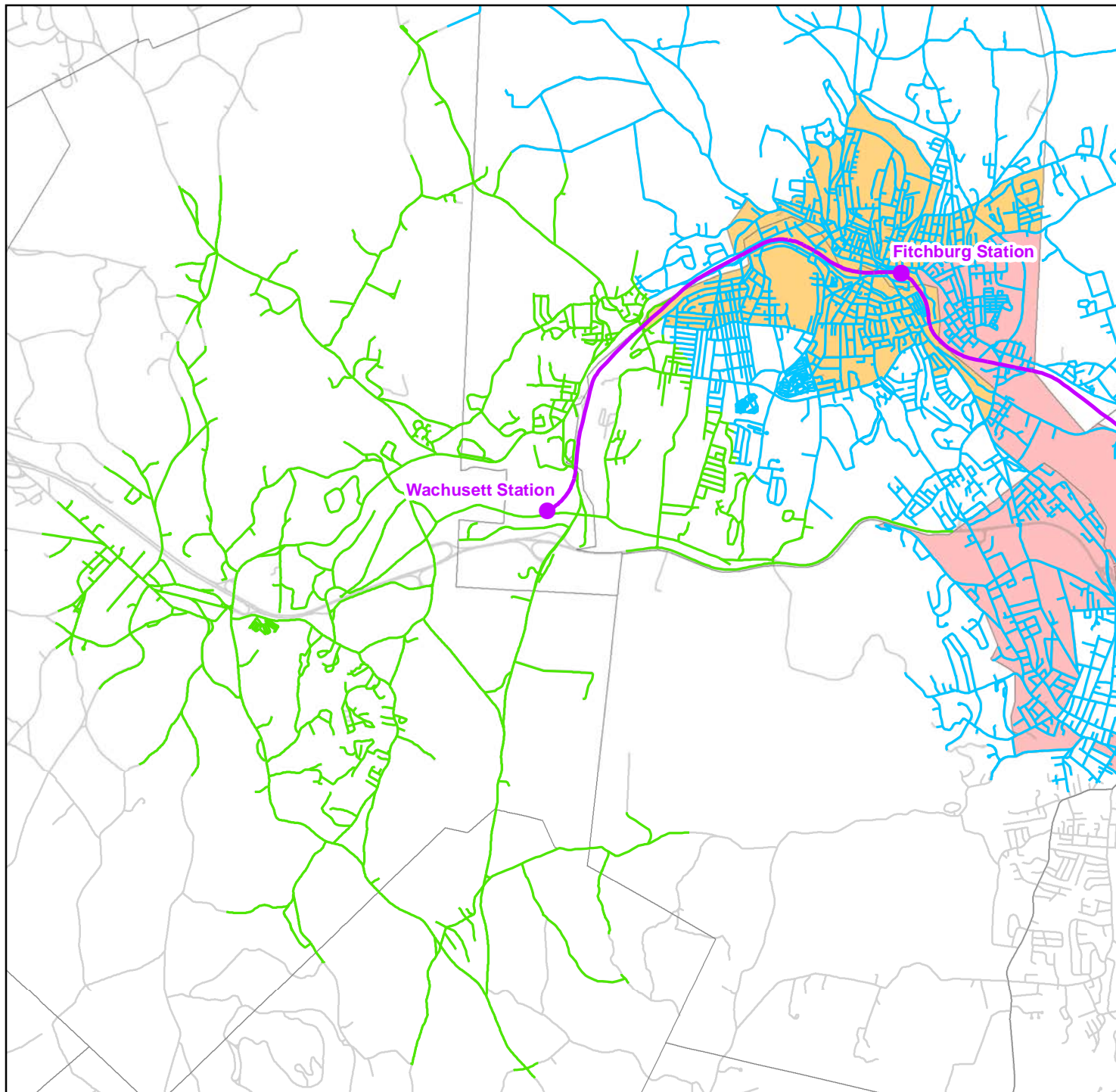


FIGURE 1
Market Access for
Wachusett Station

- Wachusett market access
- Other station market access
- MBTA Commuter Rail Station
- MBTA Commuter Rail
- Other roads

Minority and/or Low-Income Status

- Minority tract
- Minority and low-income tract
- Not minority or low-income



0 0.5 1 2 Miles

TABLE 2
Market Access Definitions of MBTA Commuter Rail Stations Outside
of the Core 65 MBTA Municipalities

Station Type	Market Access
Terminal stations with low service frequency and minimal parking	3 miles
All other terminal stations	5 miles
Stations with significant ridership from municipalities beyond three miles*	5 miles
All other stations	3 miles

*Straight-line distance from the boarding station to the nearest point on the town border
Source: CTPS.

TABLE 3
Market Access Definitions of MBTA Commuter Rail Stations Inside
of the Core 65 MBTA Municipalities

Station Type	Market Access
Stations that significantly serve other municipalities	3 miles
Fairmount Line—South Station and Readville Station	1 mile
Fairmount Line— all other stations	0.5 miles
All other stations	1 mile

Source: CTPS.

3.2 Assessment of Disparate Benefits and Disproportionate Benefits

As with the Fitchburg Line improvements, CTPS conducted an assessment of disparate benefits and disproportionate benefits for the extended service to Wachusett Station using the suggested methodology in FTA Circular 4702.1B and the MBTA's Disparate Impact and Disproportionate Burden Policy. The MBTA's policy requires an assessment of disparate benefits and disproportionate benefits to reflect a comparison of the demographic makeup of the population receiving the benefit of the new service to the demographic makeup of the population using the system as a whole.

As noted previously, the MBTA uses the following thresholds defined in its Disparate Impact and Disproportionate Burden Policy for assessing disparate benefits and disproportionate benefits:

- Disparate benefit – The existing minority customers or minority service area populations receive less than 80 percent of the benefits that the existing nonminority customers or nonminority service area populations receive.
- Disproportionate benefit – The existing low-income customers or low-income service area populations receive less than 80 percent of the

benefits that the existing non-low-income customers or non-low-income service area populations receive.

The demographic profile of the market access area surrounding Wachusett Station is 15.28 percent minority. The ratio of the percentage of minorities in the market access area surrounding Wachusett Station (15.28 percent) to the percentage of minorities in the MBTA systemwide service area (26.19 percent) is 0.58. Based on this comparison, minority populations are receiving less than 80 percent of the benefits that nonminority populations are receiving, thus a disparate benefit is found.

The demographic profile of the market access area surrounding Wachusett Station is 30.19 percent low-income. The ratio of the percentage of low-income households in the market access area surrounding Wachusett Station (30.19 percent) to the percentage of low-income households in the MBTA systemwide service area (31.85 percent) is 0.95. Based on this comparison, low-income populations are receiving more than 80 percent of the benefits that non-low-income populations are receiving, thus no disproportionate benefit is found.

cc: John Ray, MBTA
Paul Hadley, MBTA
Miles Walters, MBTA
John Englander, MassDOT/MBTA

**Appendix A:
Finding of No Significant Impact
for the Siting of the
Westminster Layover Facility**



U.S. Department
of Transportation
**Federal Transit
Administration**

REGION I
Connecticut, Maine,
Massachusetts,
New Hampshire,
Rhode Island, Vermont

Volpe Center
55 Broadway Suite 920
Cambridge, MA 02142-1093
617-494-2055
617-494-2865 (fax)

October 1, 2010

Mr. Mohammed H. Khan
Administrator
Montachusett Regional Transit Authority
R1427 Water Street
Fitchburg, MA 01420

Mr. Richard Davey
General Manager & Rail and Transit Administrator
Massachusetts Bay Transportation Authority
10 Park Plaza
Boston, MA 02116

**Re: Fitchburg Commuter Rail Extension Project
Wachusett Station and Westminster Layover Facility
Environmental Assessment - Finding of No Significant Impact**

Dear Messrs. Khan and Davey:

Based upon our review of the environmental documentation, the Federal Transit Administration (FTA) has issued a Finding of No Significant Impact (FONSI) for the Fitchburg Commuter Rail Extension Project (attached). The purpose of this commuter rail extension is to provide a transit option for motorists traveling to Boston along Route 2. The project will extend commuter rail service 4.5 miles west from the existing terminus in downtown Fitchburg to a new terminus in West Fitchburg, MA (Wachusett). The project includes the following components:

- o 4.5 miles of track and signal upgrade
- o Up to 285 space station parking facility
- o High level boarding platform
- o Up to 6 track layover facility

Please be advised that in accordance with 23 CFR 771.121, please transmit a notice of availability of this FONSI to all affected Federal, state and local governmental entities. In addition, under Section 106 of the National Historic Preservation Act, the FTA has determined "No Historic Properties Effected".

The FTA looks forward to continuing to work with the Montachusett Regional Transit Authority and the Massachusetts Bay Transportation Authority on this important transit improvement.

Sincerely,

Mary Beth Mello
Regional Administrator

Attachment

**FEDERAL TRANSIT ADMINISTRATION
REGION I**

Finding of No Significant Impact

Project: Fitchburg Commuter Rail Extension Project/Wachusett Station and Westminster Layover Facility

Applicant: Montachusett Regional Transit Authority (MART) and Massachusetts Bay Transportation Authority (MBTA)

Project Location: West Fitchburg, MA/ Westminster, MA

Purpose and Need

The purpose of the Fitchburg Commuter Rail Extension project is to provide a transit option for motorists traveling to Boston via Route 2. By extending commuter rail service 4.5 miles from downtown Fitchburg to a new rail station in West Fitchburg at the intersection of Routes 2 and 31, the ease of access is expected to attract commuters from the North Central Region of Massachusetts.

The need for the project stems from the several inter-related transportation deficiencies; 1) lack of transit options west of Fitchburg; existing demand for transit service and additional parking along the existing Fitchburg Commuter Rail line; 3) the MBTA's current reliance on a poorly located, undersized, and outdated layover facility; and 4) the need for improved access to jobs in both the Boston area and Montachusett region.

The project will extend commuter rail service 4.5 miles west from the existing terminus in downtown Fitchburg to a new terminus in West Fitchburg, MA (Wachusett). The proposed commuter rail station will be located largely within the limits of Pan Am Southern's existing right of way in the City of Fitchburg immediately adjacent to the existing main line and will consist of a full-length high level platform equipped with passenger shelters benched lighting and bicycle storage facilities. The station will be fully accessible per the standards of the Americans with Disabilities Act. Parking for up to 286 cars on adjacent industrially-zoned parcels with access to the parking lot via Authority Drive, which is located less than one-half mile of Route 2. To reduce cut through traffic on Fifth Massachusetts Turnpike, establishment of a cul-de-sac is proposed to be located prior to the parking lot with breakaway bollards for emergency vehicle access. A new layover facility will be located at the Westminster Business Park, approximately 1.5 miles west of Wachusett Station. The layover facility will allow for the overnight night storage of up to six trains.

Alternatives Considered

The environmental assessment (EA) evaluates three alternatives to improve mobility along the corridor; 1) No Build Alternative, 2) Bus Service and 3) Commuter Rail. The commuter rail alternative as described above was selected as the preferred alternative. The EA also evaluated alternative sites for the station and layover facility.

Agency Coordination and Public Opportunity to Comment

The MART involved a number of agencies, local officials and the public in the planning and conceptual design of the Fitchburg Commuter Rail Extension project. The EA was made available for a 30 day comment period. A public meeting was held on July 13, 2010. Meeting minutes and response to comments are included within the EA. During the comment period the Massachusetts Historical Commission (MHC) requested additional information to support FTA's proposed Section 106 determination of "No Historic Properties Effectuated." Specifically, MHC, in its role as the State Historic Preservation Officer (SHPO), requested additional information on the sensitivity of historical and archaeological resources within the station and layover facility sites. The supplemental information had been prepared and transmitted to MHC. On September 23, 2010, MHC concurred on FTA's determination of effect.

Based on the public comments, including the supplemental Section 206 information, the MBTA and MART determined that no substantive changes were warranted.

Determinations and Findings

National Environmental Policy Act (NEPA) Finding

FTA served as the lead agency under NEPA for the project. The MART and the MBTA prepared an EA in compliance with NEPA, 42 U.S.C. 4321 et seq. and with FTA's regulations, 23 CFR Part 771. The EA analyzes and describes the project's potential significant impacts.

After reviewing the EA, its supporting documents and public comments, the FTA finds under 23 CFR 771.121 that the proposed project will have no significant impacts on the environment. The record provides sufficient evidence and analysis for determining that an Environmental Impact Statement (EIS) is not required.

Section 106 Compliance

In accordance with Section 106 of the Historic preservation Act of 1966 as amended (36 CFR 800); FTA has issued a determination of "No Historic Properties Effectuated". On September 23, 2010, MHC, in its role as SHPO, concurred on FTA's determination.

Section 4(f) Findings

In accordance with 23 CFR 771.135, the FTA has determined that Section 4(f) requirements do not apply since no land from a significant publicly owned public park, recreation area, or wildlife and waterfowl refuge, or any significant historic site will be used as a result of this project. FTA has made this determination since the current contemplated project has no anticipated 4(f) use.

Approved: Mary Beth Mello Date: 10/11/10
Mary Beth Mello
Regional Administrator
FTA, Region I

Concur: Wendy A. Lee Date: 10/11/10
Wendy A. Lee
Regional Counsel



Deval L. Patrick, Governor
Timothy P. Murray, Lt. Governor
Jeffrey B. Mullan, MassDOT Secretary & CEO
Richard A. Davey, General Manager
and Rail & Transit Administrator



September 27, 2010

Mary Beth Mello
Regional Administrator
Federal Transit Administration
55 Broadway, Suite 920
Cambridge, MA 02142

Dear Regional Administrator Mello:

As you are aware, on June 22, 2010, the Montachusett Area Regional Transit Authority (MART), in cooperation with the MBTA, released for public review the Draft Environmental Assessment (EA) for the Wachusett Extension project. The project involves the extension of commuter rail service from the current terminus in Fitchburg to a new terminus in Westminster, MA. A new layover facility adjacent to the end of the line is also part of the project. The MART held a robust public review of the document. Copies of the EA were distributed to the regulatory agencies as well as other municipal agencies and other interested parties. Copies were made available at local libraries in Fitchburg, Westminster and Gardner and a copy of the EA was posted on MART's website.

A public meeting was held on July 13, 2010, at MART's Headquarters in Fitchburg. MART placed an advertisement in the local paper notifying the public of the document's availability and of the public meeting. The meeting included the presentation and an opportunity for questions and answers, as well as comments from the public. A copy of the meeting minutes, including the presentation slides and the sign in sheet have been added to the EA as an Appendix. MART accepted comments on the EA for 30 days; 9 comment letters were received. MART and the MBTA prepared a Response to Comments Memorandum. Copies of the Response to Comments memorandum as well as the comment letters are included in the Appendix to the EA.

During the comment period, the Massachusetts Historical Commission, in its role as State Historic Preservation Officer (SHPO), requested additional information to support the FTA's proposed determination of effect. In summary, the SHPO requested that the Wachusett Station and layover facility sites be subjected to a sensitivity assessment for historical and archeological resources by a qualified cultural resource professional. A copy of MHC's letter is included in the EA. This information was submitted to the FTA on September 16, 2010; on September 17, 2010, the FTA provided this information to SHPO and also reiterated its proposed Section 106 Determination of Effect ("No historic Properties Effected"). On September 23, 2010, SHPO concurred with this Determination of Effect. The supplemental information, the FTA's Draft Finding of Effect and SHPO's concurrence documents have all been included in the EA as attachments in the Appendices.

Based upon the public review, including the supplemental Section 106 information, the MBTA and MART do not believe any substantive changes are needed in the EA. In summary, the EA documents that the project will not result in impacts to the human and natural environment. Given that this project does not have the potential to affect the quality of the human and natural

Massachusetts Bay Transportation Authority
Ten Park Plaza, Boston, MA 02116
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environment, the MBTA is requesting that the Federal Transit Administration issue a Finding of No Significant Impact (FONSI) for the Wachusett Extension.

We appreciate your assistance on this project. If you have any questions on the document, please feel free to contact me.

Sincerely,

A handwritten signature in black ink, appearing to read "A. D. Brennan", with a long horizontal flourish extending to the right.

Andrew D. Brennan
Director of Environmental Affairs

Enclosure

Appendix B:

Estimated Travel-Time Savings from the Fitchburg Line Improvement Project

TABLE B-1
Estimated Travel-Time Savings on Fitchburg Line From Station to Station – Inbound Direction

Station	Fitchburg	North Leominster	Shirley	Ayer	Littleton/Route 495	South Acton	West Concord	Concord	Lincoln	Silver Hill	Hastings	Kendal Green	Brandeis/Roberts	Waltham	Waverley	Belmont	Porter Square	North Station
Fitchburg	-1.5	-0.8	-1.1	-2.0	-2.7	-4.6	-6.5	-5.0	-4.0	-3.0	-4.7	-6.9	-6.3	-6.8	-6.5	-8.3	-6.4	
North Leominster		0.7	0.5	-0.5	-1.2	-3.1	-4.9	-3.5	-3.0	-2.0	-3.8	-5.2	-4.7	-5.8	-5.5	-6.7	-4.8	
Shirley			-0.2	-1.2	-1.8	-3.7	-5.6	-4.1	-3.0	-2.0	-4.2	-5.8	-5.3	-6.2	-5.9	-7.4	-5.5	
Ayer				-0.9	-1.6	-3.7	-5.5	-4.0	-2.0	-1.0	-3.8	-5.8	-5.3	-6.0	-5.7	-7.2	-5.3	
Littleton/Route 495					-0.7	-2.7	-4.5	-3.1	-1.0	0.0	-3.0	-4.8	-4.4	-5.0	-4.7	-6.1	-4.4	
South Acton						-1.9	-3.6	-2.2	0.0	1.0	-0.2	-3.0	-2.7	-1.7	-1.3	-4.9	-4.1	
West Concord							-1.7	-0.3	1.0	2.0	1.2	-1.0	-0.8	-0.2	0.2	-1.2	-0.8	
Concord								1.4	2.0	3.0	2.6	0.7	0.9	1.2	1.6	0.5	0.9	
Lincoln									0.0	1.0	1.0	-0.8	-0.5	-0.3	0.1	-0.8	-0.5	
Silver Hill										1.0	2.0	1.0	1.0	1.0	2.0	1.0	0.0	
Hastings											1.0	0.0	0.0	0.0	1.0	0.0	-1.0	
Kendal Green												-0.8	-1.0	-1.0	-0.6	-1.2	-2.2	
Brandeis/Roberts													0.0	-0.1	0.3	-1.4	-0.9	
Waltham														0.0	0.4	-0.9	-0.7	
Waverley															0.4	0.1	-0.9	
Belmont																-0.3	-1.3	
Porter Square																	-1.0	
North Station																		

Source: CTPS.

Appendix C: Summary of Minority and Low-Income Boardings by Station

TABLE C-1
Summary of Minority and Low-Income Riders by Station for Inbound
Boardings before 3:30 PM

Station	Percentage Minority Boardings	Confidence Interval at 95 Percent Level - Percentage Minority Boardings	Percentage Low-Income Boardings	Confidence Interval at 95 Percent Level - Percentage Low-Income Boardings
Fitchburg	15.2	8.7	14.5	8.7
North Leominster	10.8	9.1	10.5	9.1
Shirley	3.0	4.8	9.3	8.1
Ayer	8.4	4.9	1.5	2.5
Littleton/Route 495	7.6	6.0	2.2	3.1
South Acton	18.1	4.1	1.8	1.5
West Concord	15.4	5.5	2.8	2.6
Concord	9.4	4.9	9.0	4.9
Lincoln	7.1	6.0	3.3	4.0
Silver Hill	0.0	19.5	0.0	19.5
Hastings	0.0	5.3	0.0	5.3
Kendal Green	19.4	18.0	0.0	4.6
Brandeis/Roberts	21.4	14.3	14.7	12.4
Waltham	13.4	8.8	0.0	2.6
Waverley	0.0	7.0	14.3	24.5
Belmont	0.0	7.6	20.8	31.0
Porter Square	11.8	14.7	0.0	4.5

Source: 2008-09 MBTA Systemwide Passenger Survey.

**Appendix D:
Estimated Weekday
Total Station-to-Station Trips
by Population**

TABLE D-1
Estimated Weekday Total Station-to-Station Trips – All Passengers

Station	Fitchburg	North Leominster	Shirley	Ayer	Littleton/Route 495	South Acton	West Concord	Concord	Lincoln	Silver Hill	Hastings	Kendal Green	Brandeis/Roberts	Waltham	Waverley	Belmont	Porter Square	North Station
Fitchburg		0	7	14	1	2	2	4	1	0	0	0	4	4	2	3	110	133
North Leominster			5	10	0	1	1	3	1	0	0	0	3	3	1	2	82	99
Shirley				8	0	1	1	2	1	0	0	0	2	2	1	1	61	74
Ayer					0	2	2	3	1	0	0	0	4	4	2	2	104	125
Littleton/Route 495						2	1	3	1	0	0	0	3	3	2	2	85	103
South Acton							4	9	3	1	0	2	12	13	5	7	283	342
West Concord								4	1	0	0	1	5	7	2	3	136	164
Concord									0	0	0	1	6	6	3	4	156	189
Lincoln										0	0	1	3	3	1	2	73	88
Silver Hill											0	0	0	0	0	0	3	4
Hastings												0	0	0	0	0	12	15
Kendal Green													1	2	1	1	38	45
Brandeis/Roberts														7	3	4	182	218
Waltham															4	4	163	198
Waverley																1	30	36
Belmont																	25	31
Porter Square																		281
North Station																		

Source: Winter/Spring 2012 CTPS Commuter Rail Passenger Counts.

TABLE D-2
Estimated Weekday Total Station-to-Station Trips – Minority Passengers

Station	Fitchburg	North Leominster	Shirley	Ayer	Littleton/Route 495	South Acton	West Concord	Concord	Lincoln	Silver Hill	Hastings	Kendal Green	Brandeis/Roberts	Waltham	Waverley	Belmont	Porter Square	North Station
Fitchburg	0	1	2	0	0	0	0	1	0	0	0	0	1	1	0	0	17	20
North Leominster		1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	9	11
Shirley			0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
Ayer				0	0	0	0	0	0	0	0	0	0	0	0	0	9	10
Littleton/Route 495					0	0	0	0	0	0	0	0	0	0	0	0	6	8
South Acton						1	2	1	0	0	0	0	2	2	1	1	51	62
West Concord							1	0	0	0	0	0	1	1	0	0	21	25
Concord								0	0	0	0	0	1	1	0	0	15	18
Lincoln									0	0	0	0	0	0	0	0	5	6
Silver Hill										0	0	0	0	0	0	0	0	0
Hastings											0	0	0	0	0	0	0	0
Kendal Green												0	0	0	0	0	7	9
Brandeis/Roberts													1	1	1	1	39	47
Waltham														1	1	1	22	27
Waverley															0	0	0	0
Belmont																0	0	0
Porter Square																	0	0
North Station																		33

Source: Winter/Spring 2012 CTPS Commuter Rail Passenger Counts.

TABLE D-3
Estimated Weekday Total Station-to-Station Trips – Nonminority Passengers

Station	Fitchburg	North Leominster	Shirley	Ayer	Littleton/Route 495	South Acton	West Concord	Concord	Lincoln	Silver Hill	Hastings	Kendal Green	Brandeis/Roberts	Waltham	Waverley	Belmont	Porter Square	North Station
Fitchburg		0	6	12	1	2	2	3	1	0	0	0	3	3	2	3	93	113
North Leominster			4	9	0	1	1	3	1	0	0	0	3	3	1	2	73	88
Shirley				8	0	1	1	2	1	0	0	0	2	2	1	1	59	72
Ayer					0	2	2	3	1	0	0	0	4	4	2	2	95	115
Littleton/Route 495						2	1	3	1	0	0	0	3	3	2	2	79	95
South Acton							3	7	2	1	0	2	10	11	4	6	232	280
West Concord								3	1	0	0	1	4	6	2	3	115	139
Concord									0	0	0	1	5	5	3	4	141	171
Lincoln										0	0	1	3	3	1	2	68	82
Silver Hill											0	0	0	0	0	0	3	4
Hastings												0	0	0	0	0	12	15
Kendal Green													1	2	1	1	31	36
Brandeis/Roberts														6	2	3	143	171
Waltham															3	3	141	171
Waverley																1	30	36
Belmont																	25	31
Porter Square																		248
North Station																		

Source: Winter/Spring 2012 CTPS Commuter Rail Passenger Counts.

TABLE D-4
Estimated Weekday Total Station-to-Station Trips – Low-Income Passengers

Station	Fitchburg	North Leominster	Shirley	Ayer	Littleton/Route 495	South Acton	West Concord	Concord	Lincoln	Silver Hill	Hastings	Kendal Green	Brandeis/Roberts	Waltham	Waverley	Belmont	Porter Square	North Station
Fitchburg	0	1	2	0	0	0	0	1	0	0	0	0	1	1	0	0	16	19
North Leominster		1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	9	10
Shirley			1	0	0	0	0	0	0	0	0	0	0	0	0	0	6	7
Ayer				0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
Littleton/Route 495					0	0	0	0	0	0	0	0	0	0	0	0	2	2
South Acton						0	0	0	0	0	0	0	0	0	0	0	5	6
West Concord							0	0	0	0	0	0	0	0	0	0	4	5
Concord								0	0	0	0	0	1	1	0	0	14	17
Lincoln									0	0	0	0	0	0	0	0	2	3
Silver Hill										0	0	0	0	0	0	0	0	0
Hastings											0	0	0	0	0	0	0	0
Kendal Green												0	0	0	0	0	0	0
Brandeis/Roberts													0	0	0	0	0	0
Waltham														1	0	1	27	32
Waverley															0	0	0	0
Belmont																0	4	5
Porter Square																	5	6
North Station																		0

Source: Winter/Spring 2012 CTPS Commuter Rail Passenger Counts.

TABLE D-5
Estimated Weekday Total Station-to-Station Trips – Non-Low-Income Passengers

Station	Fitchburg	North Leominster	Shirley	Ayer	Littleton/Route 495	South Acton	West Concord	Concord	Lincoln	Silver Hill	Hastings	Kendal Green	Brandeis/Roberts	Waltham	Waverley	Belmont	Porter Square	North Station
Fitchburg		0	6	12	1	2	2	3	1	0	0	0	3	3	2	3	94	114
North Leominster			4	9	0	1	1	3	1	0	0	0	3	3	1	2	73	89
Shirley				7	0	1	1	2	1	0	0	0	2	2	1	1	55	67
Ayer					0	2	2	3	1	0	0	0	4	4	2	2	102	123
Littleton/Route 495						2	1	3	1	0	0	0	3	3	2	2	83	101
South Acton							4	9	3	1	0	2	12	13	5	7	278	336
West Concord								4	1	0	0	1	5	7	2	3	132	159
Concord									0	0	0	1	5	5	3	4	142	172
Lincoln										0	0	1	3	3	1	2	71	85
Silver Hill											0	0	0	0	0	0	3	4
Hastings												0	0	0	0	0	12	15
Kendal Green													1	2	1	1	38	45
Brandeis/Roberts														6	3	3	155	186
Waltham															4	4	163	198
Waverley																1	26	31
Belmont																	20	25
Porter Square																		281
North Station																		

Source: Winter/Spring 2012 CTPS Commuter Rail Passenger Counts.

Appendix E:
Estimated Weekday Total Time Savings
from Station-to-Station by Population

TABLE E-1
Estimated Total Change in Travel Time – Minority Passengers

Station	Fitchburg	North Leominster	Shirley	Ayer	Littleton/Route 495	South Acton	West Concord	Concord	Lincoln	Silver Hill	Hastings	Kendal Green	Brandeis/Roberts	Waltham	Waverley	Belmont	Porter Square	North Station
Fitchburg	0	-1	-2	0	-1	-1	-4	-1	0	0	0	-4	-4	-2	-3	-139	-129	
North Leominster		0	0	0	0	0	-2	0	0	0	0	-2	-2	-1	-1	-59	-52	
Shirley			0	0	0	0	0	0	0	0	0	0	0	0	0	-14	-12	
Ayer				0	0	-1	-1	0	0	0	0	-2	-2	-1	-1	-63	-56	
Littleton/Route 495					0	0	-1	0	0	0	0	-1	-1	-1	-1	-40	-34	
South Acton						-1	-6	-1	0	0	0	-6	-6	-2	-2	-249	-257	
West Concord							-1	0	0	0	0	-1	-1	0	0	-25	-19	
Concord								0	0	0	0	0	0	0	1	8	17	
Lincoln									0	0	0	0	0	0	0	-4	-3	
Silver Hill										0	0	0	0	0	0	0	0	
Hastings											0	0	0	0	0	0	0	
Kendal Green												0	0	0	0	-9	-19	
Brandeis/Roberts													0	0	0	-56	-43	
Waltham														0	0	-21	-17	
Waverley															0	0	0	
Belmont																0	0	
Porter Square																	-33	
North Station																		

Source: CTPS.

TABLE E-2
Estimated Total Change in Travel Time – Nonminority Passengers

Station	Fitchburg	North Leominster	Shirley	Ayer	Littleton/Route 495	South Acton	West Concord	Concord	Lincoln	Silver Hill	Hastings	Kendal Green	Brandeis/Roberts	Waltham	Waverley	Belmont	Porter Square	North Station
Fitchburg	0	-5	-13	-2	-5	-8	-22	-4	0	0	0	-23	-21	-12	-17	-776	-719	
North Leominster		3	4	0	-1	-3	-13	-3	0	0	0	-14	-13	-5	-10	-491	-427	
Shirley			-2	0	-2	-4	-11	-4	0	0	0	-11	-10	-6	-6	-438	-397	
Ayer				0	-3	-7	-15	-4	0	0	0	-21	-20	-11	-10	-687	-607	
Littleton/Route 495					-1	-3	-13	-3	0	0	0	-13	-12	-9	-9	-480	-416	
South Acton						-6	-27	-5	0	0	0	-29	-29	-7	-7	-1125	-1162	
West Concord							-6	0	0	0	1	-4	-5	0	1	-134	-106	
Concord								0	0	0	2	4	5	3	6	76	161	
Lincoln									0	0	1	-2	-2	0	0	-51	-38	
Silver Hill										0	0	0	0	0	0	3	0	
Hastings											0	0	0	0	0	0	-15	
Kendal Green												-1	-2	-1	0	-37	-80	
Brandeis/Roberts													0	0	1	-205	-158	
Waltham														0	1	-133	-112	
Waverley															0	3	-32	
Belmont																-7	-40	
Porter Square																	-248	
North Station																		

Source: CTPS.

TABLE E-3
Estimated Total Change in Travel Time – Low-Income Passengers

Station	Fitchburg	North Leominster	Shirley	Ayer	Littleton/Route 495	South Acton	West Concord	Concord	Lincoln	Silver Hill	Hastings	Kendal Green	Brandeis/Roberts	Waltham	Waverley	Belmont	Porter Square	North Station
Fitchburg	0	-1	-2	0	-1	-1	-4	-1	0	0	0	-4	-4	-2	-3	-132	-123	
North Leominster		0	0	0	0	0	-2	0	0	0	0	-2	-1	-1	-1	-58	-50	
Shirley			0	0	0	0	-1	0	0	0	0	-1	-1	-1	-1	-42	-38	
Ayer				0	0	0	0	0	0	0	0	0	0	0	0	-11	-10	
Littleton/Route 495					0	0	0	0	0	0	0	0	0	0	0	-11	-10	
South Acton						0	-1	0	0	0	0	-1	-1	0	0	-25	-25	
West Concord							0	0	0	0	0	0	0	0	0	-4	-4	
Concord								0	0	0	0	0	0	0	1	8	16	
Lincoln									0	0	0	0	0	0	0	-2	-1	
Silver Hill										0	0	0	0	0	0	0	0	
Hastings											0	0	0	0	0	0	0	
Kendal Green												0	0	0	0	0	0	
Brandeis/Roberts													0	0	0	-38	-30	
Waltham														0	0	0	0	
Waverley															0	0	-5	
Belmont																0	-8	
Porter Square																	0	
North Station																		

Source: CTPS.

TABLE E-4
Estimated Total Change in Travel Time – Non-Low-Income Passengers

Station	Fitchburg	North Leominster	Shirley	Ayer	Littleton/Route 495	South Acton	West Concord	Concord	Lincoln	Silver Hill	Hastings	Kendal Green	Brandeis/Roberts	Waltham	Waverley	Belmont	Porter Square	North Station
Fitchburg	0	-5	-13	-2	-5	-8	-22	-4	0	0	0	-23	-22	-12	-17	-782	-725	
North Leominster		3	4	0	-1	-3	-13	-3	0	0	0	-14	-13	-5	-10	-493	-428	
Shirley			-2	0	-2	-3	-10	-4	0	0	0	-10	-10	-6	-5	-410	-371	
Ayer				0	-3	-7	-16	-4	0	0	0	-23	-21	-12	-11	-739	-653	
Littleton/Route 495					-1	-3	-13	-3	0	0	0	-14	-13	-10	-9	-508	-441	
South Acton						-8	-32	-7	0	0	0	-35	-35	-8	-9	-1349	-1394	
West Concord							-7	0	0	0	1	-5	-5	0	1	-154	-122	
Concord								0	0	0	2	4	5	3	6	76	162	
Lincoln									0	0	1	-2	-2	0	0	-53	-40	
Silver Hill										0	0	0	0	0	0	3	0	
Hastings											0	0	0	0	0	0	-15	
Kendal Green												-1	-2	-1	-1	-46	-99	
Brandeis/Roberts													0	0	1	-223	-171	
Waltham														0	2	-154	-129	
Waverley															0	3	-28	
Belmont																-6	-32	
Porter Square																	-281	
North Station																		

Source: CTPS.

Appendix 7-K

FMCB Approval of Service Equity Analysis for the
Fitchburg Line Improvement Project and
Wachusett Extension Project



Charles D. Baker, Governor
Karyn E. Polito, Lieutenant Governor
Stephanie Pollack, MassDOT Secretary & CEO
Frank DePaola, General Manager
Brian Shortsleeve, Chief Administrator



WHEREAS, the Fiscal and Management Control Board (the "FMCB") voted on July 11, 2016 to execute an Amendment to a certain Interdepartmental Service Agreement (ISA) with the Massachusetts Department of Transportation (MassDOT) for the Wachusett Extension Project; and that the MBTA has conducted a Fitchburg Commuter Line Improvement project under an FTA Tiger grant;

WHEREAS, the Federal Transit Administration requires that equity analyses be conducted on major service changes as defined by the MBTA and on Small Starts and other New Fixed Guideway Systems grants;

WHEREAS, the MBTA staff has conducted an equity analysis as to the Fitchburg project and determined that said project poses neither a disparate impact or disproportionate burden to minorities or low-income individuals;

WHEREAS, the MBTA staff has conducted an equity analysis as to the Wachusett project and determined that said project may pose a disparate impact but does not pose a disproportionate burden to minorities or low-income individuals;

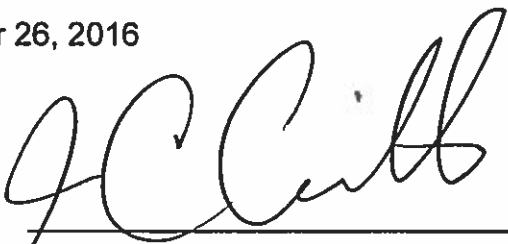
WHEREAS, the MBTA's equity analysis provided a showing of a substantial legitimate justification the Wachusett service change and there are no alternatives that would have a less disparate impact on minority riders;

NOW, THEREFORE, BE IT VOTED by the members of the FMCB, as follows:

The FMCB hereby accepts the Title VI Equity Analysis determinations and directs the Authority, through the General Manager to take all steps necessary to provide notice of such acceptance to all interested parties, including the Federal Transit Authority.

A true copy,

Attest: September 26, 2016



Joseph Aiello, Chair
Fiscal and Management Control Board