



TECHNICAL MEMORANDUM

DATE: May 12, 2021
TO: Kat Benesh, Massachusetts Bay Transportation Authority
FROM: Steven Andrews, Central Transportation Planning Staff
Blake Acton, Central Transportation Planning Staff
RE: Green Line Extension: Title VI Service and Fare Equity Analysis

The Massachusetts Bay Transportation Authority (MBTA) is currently in the final stages of building the Green Line Extension (GLX) through Somerville.

As a recipient of federal funds through the Federal Transit Administration (FTA), the MBTA is required to comply with Title VI of the Civil Rights Act of 1964 (Title 49, part 21, Code of Federal Regulations). The FTA provides guidance to its subrecipients for carrying out Title VI obligations in Circular 4702.1B. This circular includes a requirement for large transit providers to conduct a Title VI service and fare equity analysis to evaluate, prior to implementing any new fixed guideway capital project, whether the planned change would have a discriminatory impact on the basis of race, color, or national origin. Changes to parallel or connecting service will be examined as well.

Because the MBTA is not altering local bus service at this time, CTPS is not considering the addition of the Green Line as a de facto fare increase for local riders.

Although low-income populations are not a protected class under Title VI, the FTA also requires transit providers to determine whether low-income populations would bear a disproportionate burden from a proposed major service change.

Summary of Service Equity Analysis Results

The results of the service equity analysis indicate that implementation of the combined changes associated with GLX result in disparate benefits to nonminority populations and disproportionate benefits to non-low-income populations.

Civil Rights, nondiscrimination, and accessibility information is on the last page.

The remainder of this memorandum documents the detailed results, assumptions, and methodology used to support these conclusions.

1 **PLANNED SERVICE LEVEL CHANGES AND THE PUBLIC PROCESS**

While GLX is primarily the addition of two Green Line branches with six stations in Somerville, it features additional small changes to the existing terminals for the B and C branches.

B: Change the terminus from Park Street to Government Center

C: Change the terminus from North Station to Government Center

D: Change the terminus from Government Center to Union Square Station (new)

E: Change the terminus from Lechmere to Medford/Tufts (new)

Figure 1 presents a map of the new stations and surrounding MBTA services. Appendix A presents the alignment changes of each route.

While the idea of extending the Green Line through Somerville has existed for decades, GLX finally moved towards construction in December 2017 by awarding the design-build contract to *GLX Constructors*. This began a new public process, which can be found at: <https://www.mass.gov/lists/glx-public-meetings-documents>.

Figure 1
The Green Line Extension and Nearby Transit Services



Source: MBTA

2 TITLE VI SERVICE EQUITY ANALYSIS: FRAMEWORK

2.1 The MBTA’s Disparate Impact/Disproportionate Burden Policy

The FTA’s Title VI Circular 4702.1B, issued in October 2012, under the authority of Title VI of the Civil Rights Act of 1964, 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.

The MBTA's Disparate Impact/Disproportionate Burden (DI/DB) Policy describes the general procedure for conducting service and fare equity analyses.¹ This service equity analysis was performed in accordance with the MBTA's DI/DB Policy.

2.2 The Need to Conduct a Service and Fare Equity Analysis

According to the FTA's Title VI Circular 4702.1B, the MBTA must conduct a service and fare equity analysis six months prior to the beginning of revenue service for new fixed guideway capital projects. The analysis is required even if the change does not rise to the MBTA's definition of a "major service change," which is the typical trigger for equity analyses.

2.3 Prior Environmental Justice Work

In 2014, the MBTA delivered a Triennial Title VI report to the FTA. In the report, the MBTA included in its appendices an April 2011 memo regarding service and fare equity analysis for the Green Line Extension project that discussed an analysis from the Central Transportation Staff's (CTPS) October 2010 "Green Line Extension Environmental Justice Analysis" (henceforth, 2010 GLX EJ analysis).²

The major conclusion of the service and fare equity analysis is repeated here:

The [Environmental Assessment]'s Environmental Justice analysis determined that the Green Line Extension scenario improves accessibility, mobility, congestion, and environmental conditions relative to the No-Build scenario for both environmental justice populations and non-environmental justice populations. This is not surprising given that the project does not reduce nor eliminate service, but rather extends the Green Line rapid transit service to areas that currently are only served by buses. This provides more options to all classes of populations in the study area. Furthermore, environmental justice TAZs³ slightly outperform the non-environmental justice population zones in garnering mobility, congestion, and environmental benefits, while non-environmental justice population zones best environmental justice population

¹ <http://www.mbta.com/policies/fairness>

² Massachusetts Bay Transportation Authority. MBTA Title VI Report. Appendix I, Service and Fare Equity Analysis for the Green Line Extension Project. 2014.
https://cdn.mbta.com/sites/default/files/2017-11/2014-APPENDICES-FINAL_0.pdf

³ Transportation Analysis Zone (TAZ) is an aggregation of census geography based on population and estimated trip volumes

zones in accessibility improvements. Thus, compliance is met with the non-process-related elements of the Federal Transit Administration (FTA) Title VI Regulations, defined at 49 CFR Section 21.7.

In the 2010 GLX EJ analysis, the definition of an Environmental Justice (EJ) TAZ was based on the demographics of the entire MPO population. At that time, 21.4 percent of the MPO population were classified as minorities. TAZs with greater than a 21.4 percent minority population were considered “minority TAZs.” While the definition of who is classified as a minority rider remains the same, the current analysis uses the population living near transit services to develop its demographic profile. The 2010 analysis views the GLX corridor relative to the entire region, while the current analysis views the corridor relative to populations living near MBTA services.

Additional methodological differences between the 2010 and present analysis include:

- The low-income designation was based on 80 percent of the area median income instead of 60 percent.
- An entire TAZ was classified as EJ if it met the criteria as either minority and/or low-income. The current analysis evaluates each population separately and allocates minority and low-income proportionally.
- Utilized 2000 Census demographic data while the current analysis relies on demographic data from the 2015-19 ACS
- The 2010 GLX EJ analysis measured many metrics contained within three major categories: accessibility to needed services and jobs, mobility and congestion, and environmental impacts instead of measuring the effects of the changes on revenue-vehicle hours (RVH) and route length.

Overall, the 2010 GLX Environmental Justice analysis found the Green Line Extension did not impose a disproportionate burden on environmental justice populations or a disproportionate benefit to non-environmental justice populations. While at first glance this conclusion may appear to conflict with the present analysis, these studies have significant differences in methodology and objectives which preclude a straightforward comparison. The 2010 analysis measured impacts of GLX on accessibility, congestion, and the environment while the present analysis measures the impact of GLX on service hours and route length. Essentially, both studies use different methods to answer different questions. As a result, the present analysis does not necessary conflict with the conclusion of the 2010 GLX EJ analysis.

3 TITLE VI SERVICE EQUITY ANALYSIS

3.1 Datasets and Definitions

Evaluation of Adverse Impacts

The MBTA defines adverse effects as changes to the amount of service scheduled, by route and by mode, as measured by changes to weekly RVH and access to the service, by route, as measured by changes to route length.

In accordance with the MBTA's DI/DB Policy, the MBTA analyzes the changes to RVH and route length as both relative and absolute changes.⁴ CTPS then measures the relative share of the benefit or burden, which compares the protected population group's share of the net benefit or burden relative to its existing share of the metric.

The MBTA's threshold for determining when adverse effects of major service changes 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 nonminority populations or low-income to non-low-income populations is more than 1.20 (or 20 percent), then the proposed change would be determined to pose a potential disparate impact or disproportionate burden.

Demographic Datasets

CTPS selected the US Census Bureau's American Community Survey (ACS) dataset instead of the 2015–17 MBTA Systemwide Passenger Survey because the MBTA is proposing both changes in RVH and route alignments. The passenger survey does not contain demographic data for the potential riders of the new light rail service.

Employing census data instead of passenger survey data has important ramifications in interpreting results. This analysis measures the impact on transit service availability to nearby residents while an analysis using survey data measures the impact on existing transit riders. As a result, this analysis examines whether areas with a proportion of minority or low-income residents greater than the systemwide average are receiving more burden or less benefit from the proposed transit service changes than areas with a lower proportion of minority or low-income residents.

The 2015–19 ACS's five-year estimates provided demographic information about the people living near transit services. The 2010 US Census Summary File 1 (Table P001001: total population) provided the total population for each census

⁴ Massachusetts Bay Transportation Authority, *MBTA Disparate Impact/Disproportionate Burden (DI/DB) Policy*, January 30, 2017.

tract. The 2010 US Census Summary File 1 (Table H003002: total occupied housing units) provided the total number of households for each census tract. CTPS opted to use the demographics of census tracts rather than block groups or other smaller geometries because the census tract estimates are more precise.

Definitions of Minority and Low-Income Populations

CTPS used the 2015–19 ACS Tables B03002003–B03002009 and B03002012 (Hispanic or Latino origin by race) and the associated Table B03002001 (total population) to assign minority status to residents living in census tracts. Residents who were classified as “white alone, not Hispanic or Latino” were classified as nonminority residents; all others were classified as minority residents. Within the MBTA service area, 30.6 percent of the population is classified as minority residents.

CTPS used the 2015–19 ACS Tables B19001002–B19001017 (household income in the past 12 months) and the associated Table B19001001 (total households) to assign low-income status to households in census tracts. Households were classified as low-income if they earned less than 60 percent of the median household income for the MBTA service area (a threshold of \$53,382).⁵ Within the MBTA service area, 31.9 percent of the population is classified as living in low-income households.

Using ACS Data to Assign Demographics to Routes

CTPS used the following methodology to estimate the demographics attributable to a given route alignment:

Determine the geographic area that has access to transit services.

- 1) Create an access buffer around all stops used by common variations of a route.⁶

⁵ The median household income was derived from 2015–19 ACS household income distribution data by (1) finding the number of households in each census-based income category for the entire MBTA service area, (2) finding which income category for the service area contained at least 50 percent of households, and (3) calculating how far into that category the median is, assuming that incomes are evenly distributed along each category. Following this approach, CTPS found the median household income in the MBTA service area to be \$88,970. The low-income threshold is 60 percent of the median household income, which is \$53,382.

⁶ For buses, a quarter-mile buffer is used. For rapid transit, a half-mile buffer is used. For outer terminal commuter rail stations (including Providence and excluding Wickford Junction) and Hingham and Hull ferry terminals, a five-mile buffer is used. For Fairmount Line Zone 1A stations, excluding South Station, a half-mile buffer is used. For Zone 1A, Zone 1, and Zone 2

- 2) Dissolve the buffer such that overlapping areas are not double counted.

Calculate proportions of each census tract in the buffer.

- 3) For each census tract that is included in the buffer, calculate the length of roads within the buffer.⁷
- 4) For each census tract that is included in the buffer, calculate the total length of roads in the census tract.
- 5) Calculate the percentage of total road length within the buffer in each census tract.

Calculate demographics within the buffer for each route.

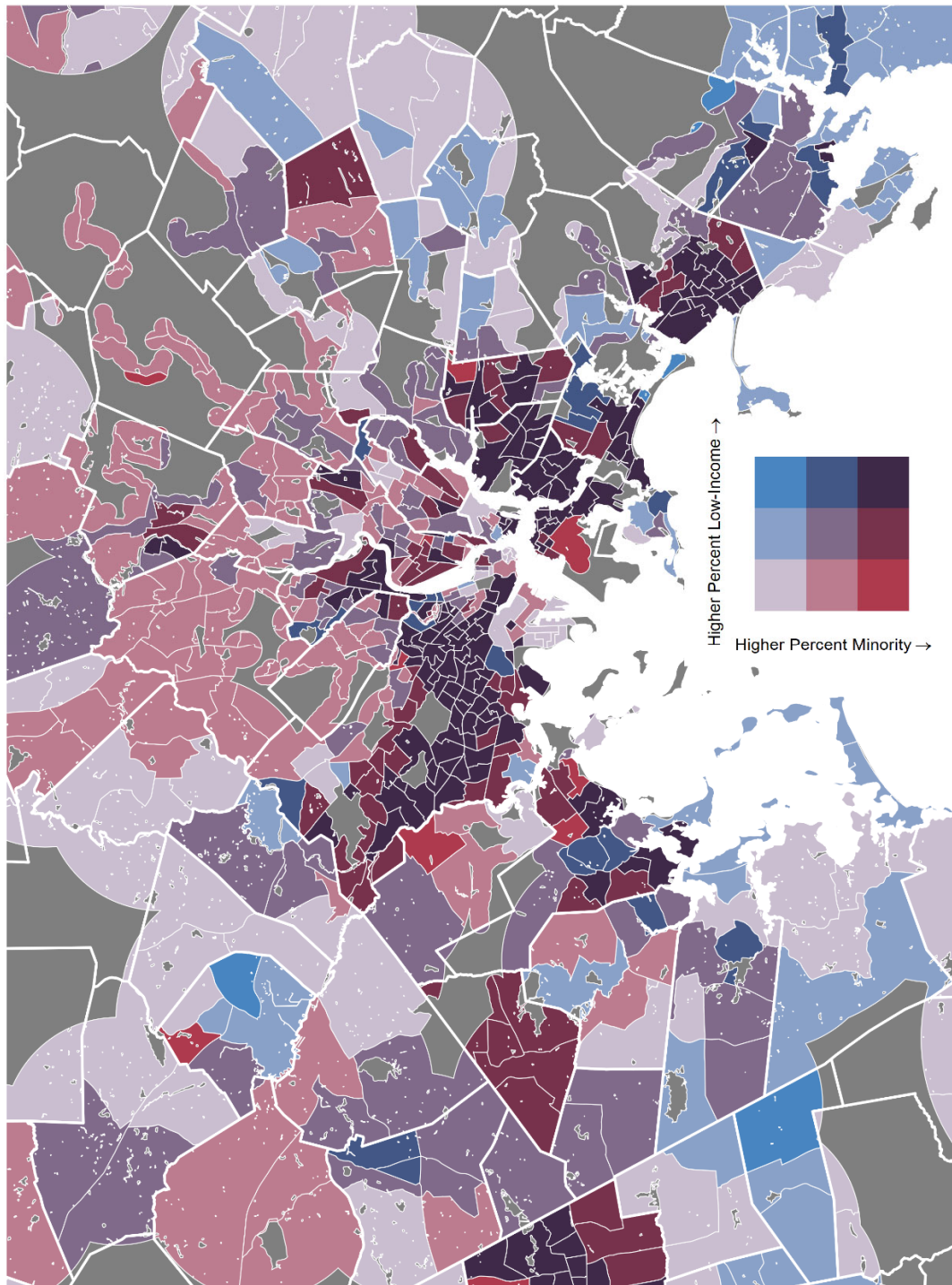
- 6) For each census tract, multiply the percentage of road length within the buffer by the number of people (or households) in each population group (minority, nonminority, low-income, and non-low-income) in the tract.
- 7) Sum the number of people (or households) in each population group within the buffer for all census tracts near the route.
- 8) Calculate the percentage of people (or households) in each population group for the route.

The total number of residents in each population group in a census tract was obtained by multiplying the total number of people (or households) in each tract from the 2010 US Census by the demographic percentages derived from the 2015–19 ACS. Figures 2 and 3 present the resulting demographic data used in the service equity analysis.

through Zone 10 stations with greater walk access shares than the entire commuter rail system as detailed in the 2015–17 MBTA Systemwide Passenger Survey, a one-mile buffer is used. For all other commuter rail stations, a three-mile buffer is used.

⁷ Staff uses roadway length as a proxy for population density within a census tract.

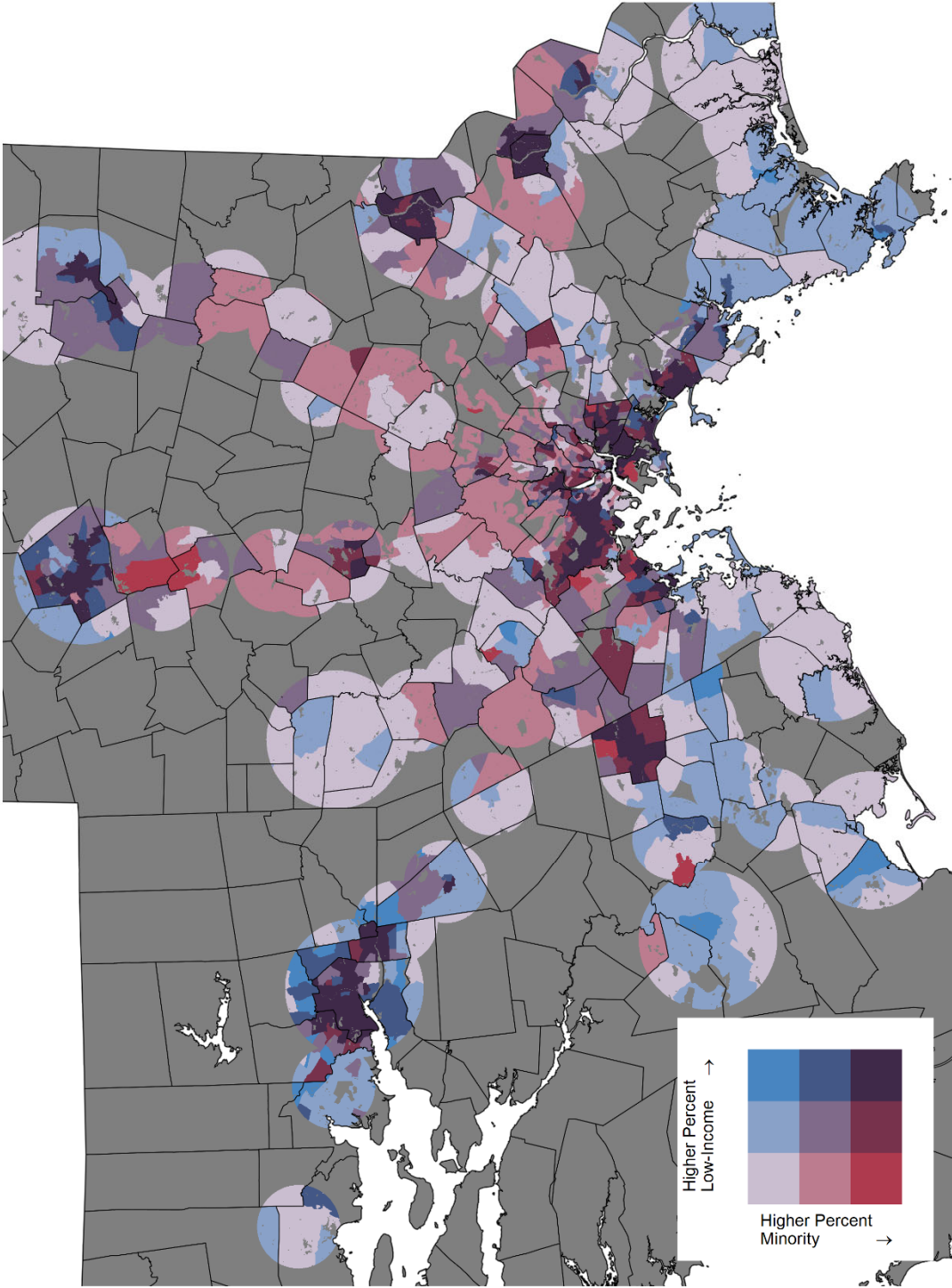
Figure 2
Demographic Profile of People Living Near
Transit in the Bus and Rapid Transit Service Area



Note: The scale was generated by dividing the minority and low-income percentages of census tracts served by any transit into thirds. If a census tract was in the top third for both minority percentage and low-income percentage, that tract is displayed as “purple.” If a census tract was in the top third for minority percentage and the bottom third for low-income percentage, that tract is shaded “red.”

Sources: Spring 2021 MBTA GTFS, 2010 US Census, and 2015–19 ACS.

Figure 3
Demographic Profile of People Living Near
Transit in the Entire MBTA Service Area



Sources: Spring 2021 MBTA GTFS, 2010 US Census, and 2015–19 ACS.

3.2 Change in Weekly Revenue-Vehicle Hours

CTPS estimated the impact of GLX on service equity by comparing the RVH by rider classification between an adjusted winter 2020 baseline and a post-GLX schedule derived from the baseline. The pre-GLX dataset is a winter 2020 schedule with adjusted run-times to account for temporary COVID-19 related service changes. The post-GLX schedule is derived by applying the adjusted winter 2020 service levels to the extended post-GLX network. By employing these datasets, this analysis isolates the impact of GLX on service equity and controls for the on-going and rapidly changing service schedules related to GLX construction and COVID-19.⁸ GLX is a physical extension of the Green Line, so overall service hours will increase as the MBTA adds resources to serve a longer system. Weekly RVH changes and demographics by route are presented in Table 1, which shows a 1,038 weekly RVH increase across all Green Line branches. Maps detailing route changes and residential demographics near each affected route are in Appendix A.

Table 1
Weekly Revenue-Vehicle Hour Changes and Existing Demographics of Affected Routes

Branch	Before	After	Change	Pct. Minority	Pct. Low-Income
Green-B	1,741	1,824	83	37.4%	37.7%
Green-C	1,461	1,297	-164	32.9%	33.9%
Green-D	1,784	2,438	654	33.6%	33.3%
Green-E	1,573	2,038	466	39.1%	37.7%
Total	6,558	7,597	1,038		

Source: MBTA revenue-vehicle hour spreadsheets as processed by CTPS and 2010 US Census and 2015–19 ACS.

Table 2 reports the weekly RVH changes allocated to protected and nonprotected groups. RVH are allocated to population groups through *proportionate allocation* which allocates a metric (revenue-vehicle hours or route-miles) by the percentage of each demographic within the service area of the route. For example, Route 1 operates 1,190 RVH each week, and 47 percent of residents within a quarter mile are classified as minority. For this route, 559.3 RVH ($1,190 \times 0.47$) are assigned minority and the remaining 630.7 RVH are

⁸ CTPS also conducted an additional service equity analysis comparing pre-GLX summer 2021 and post-GLX fall 2021 Green Line schedules with adjustments to account for GLX related construction. The results of this analysis are similar to the one presented here with the same conclusions.

assigned nonminority. The same methodology is applied to low-income and non-low-income groups.

The results in Table 2 show that existing systemwide RVH is nearly equivalent between minority (48 percent) and nonminority (52 percent) residents, with the nonminority population receiving a slightly higher share of service hours. This difference is more pronounced between low-income and non-low-income populations with the non-low-income group receiving 61 percent of RVH and low-income receiving 39 percent of RVH. Nonminority and non-low-income groups receive the majority of the additional service hours—69 percent and 74 percent, respectively. Absolute service hour changes are similar for both protected groups, but the minority share of existing hours is greater than the low-income share.

Table 2
Systemwide Net Change in Weekly Revenue-Vehicle Hours by Population Group: Proportionate Allocation

Population Group	Existing Hours	Share of Existing Hours	Net Change	Share of Net Change	Percent Change
Minority	29,241	48.2%	320	30.8%	1.1%
Nonminority	31,444	51.8%	719	69.2%	2.3%
Low-Income	23,665	39.0%	276	26.5%	1.2%
Non-Low-Income	37,020	61.0%	763	73.5%	2.1%

Sources: MBTA revenue-vehicle hour spreadsheets as processed by CTPS and 2010 US Census and 2015–19 ACS.

Weekly Revenue-Vehicle Hours: Disparate Impact/Disproportionate Burden Analysis

Table 3 summarizes the results of the service equity analysis relating to RVH changes according to the proportionate allocation methodology. A change ratio of 100 percent indicates equal impact between protected and nonprotected groups. In this analysis, an impact ratio of less than 100 percent means that the protected group is receiving a lower relative benefit and, likewise, a ratio greater than 100 percent means that the protected group is receiving a larger relative benefit. Any ratios less than 80 percent indicate a potential disparate benefit or disproportionate benefit. This threshold is derived from the MBTA DI/DB policy, which describes a benefit less than 0.80 or 80 percent as indicating a disparate benefit or disproportionate benefit. To account for statistical error within the datasets used in the analysis, the policy does not consider a ratio greater than 80 percent as a disparate benefit or disproportionate benefit.

The final service equity analysis results indicate a disparate benefit to nonminority populations and a disproportionate benefit to non-low-income populations. This conclusion is determined by all three analysis methods as presented in Table 3. *Absolute Change* (first row of Table 3) is a ratio of additional service hours by population group. *Relative Change* (second row of Table 3) and *Share of Net Change by Share of Existing Hours* (third row of Table 3) are relative metrics that account for change relative to pre-existing service. All six ratios are below the 80 percent DI/DB threshold, which indicates a disparate benefit to nonminority populations and a disproportionate benefit to non-low-income populations.

Table 3
Summary of DI/DB Results Relating to Revenue-Vehicle Hour Changes:
Proportionate Allocation

Analysis Method	Impacts on Minority Populations	Impacts on Low-Income Populations
Absolute Change (Protected / Nonprotected)	Disparate Benefit Ratio: 320 / 719 < 80%	Disproportionate Benefit Ratio: 276 / 763 < 80%
Relative Change (Protected / Nonprotected)	Disparate Benefit Ratio: 1.1% / 2.3% < 80%	Disproportionate Benefit Ratio: 1.2% / 2.1% < 80%
Protected Share of Change / Protected Share of Existing Hours	Disparate Benefit Ratio: 30.8% / 48.2% < 80%	Disproportionate Benefit Ratio: 26.5% / 39.0% < 80%

Note: Values correspond to Table 2.
 DI/DB = disparate impact/disproportionate burden.
 Source: CTPS.

3.3 Change in Route Length
Base Route Length

When calculating each route’s length, CTPS used the shapes contained in the spring 2021 General Transit Feed Specification (GTFS) schedule. CTPS grouped all of the variations of a route travelling in the same direction (inbound or outbound) and calculated the length of the route including each distinct portion of the alignment only once. This step was repeated for the opposite direction and the lengths were summed to determine the total route length. CTPS attempted to eliminate school trips and other exceptionally unusual variations.⁹

⁹ Defined as variations used by 10 or fewer trips or that made up 10 percent or less of the total trips. Using this definition, a variation with four out of eight total trips would be kept because those trips make up more than 10 percent of the route’s total trips.

Changes to Route Length

The MBTA provided a GTFS file for its current spring 2021 schedule. After creating new and modified route alignments and stop locations reflective of the changes associated with the GLX opening, CTPS calculated the route lengths for the MBTA’s existing and proposed services and compared the proposed route lengths to the spring 2021 route lengths.

In previous service equity analyses, the Green Line has been treated as a single service—the length of the subway section of the Green Line was only counted once. Here, because of the various changes to each branch, each branch was considered its own route.

Table 4 presents the route length changes by population group. Maps displaying the route alignments and demographics of the populations living near each route affected by GLX changes are found in Appendix B.

**Table 4
Net Change in Weekly Route Length for Each Population Group:
Proportionate Allocation**

Population Group	Existing Miles	Share of Existing Miles	Net Change	Share of Net Change	Percent Change
Minority	7,768	42%	26	33%	0.34%
Nonminority	10,545	58%	53	67%	0.51%
Low-Income	6,716	37%	23	29%	0.34%
Non-Low-Income	11,597	63%	57	71%	0.49%

Sources: MBTA Spring 21 GTFS files and descriptions of proposed changes as processed by CTPS and 2010 US Census and 2015–19 ACS.

Weekly Route Length: Disparate Impact/Disproportionate Burden Analysis

Table 5 summarizes the results of the service equity analysis relating to route length changes according to the proportionate allocation methodology. As shown in Table 5, the results indicate a disparate benefit to minority populations and a disproportionate benefit to non-low-income populations.

Table 5
Summary of DI/DB Results Relating to Route Length Changes:
Proportionate Allocation

Analysis Method	Impacts on Minority Populations	Impacts on Low-Income Populations
Absolute Change (Protected / Nonprotected)	Disparate Benefit Ratio: 26 / 53 < 80%	Disproportionate Benefit Ratio: 23 / 57 < 80%
Relative Change (Protected / Nonprotected)	Disparate Benefit Ratio: 0.34% / 0.51% < 80%	Disproportionate Benefit Ratio: 0.34% / 0.49% < 80%
Protected Share of Change / Protected Share of Existing Hours	Disparate Benefit Ratio: 33% / 42% < 80%	Disproportionate Benefit Ratio: 29% / 37% < 80%

Note: Values correspond to Table 4.
DI/DB = disparate impact/disproportionate burden.
Source: CTPS.

- Appendix A: Route Structure Changes
- Appendix B: Route-by-Route Revenue-Vehicle Hour and Route Length Changes

The Boston Region Metropolitan Planning Organization (MPO) 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, denied the benefits of, or be otherwise subjected to discrimination under any program or activity that receives federal assistance. Related federal nondiscrimination laws administered by the Federal Highway Administration, Federal Transit Administration, or both, prohibit discrimination on the basis of age, sex, and disability. The Boston Region MPO considers these protected populations in its Title VI Programs, consistent with federal interpretation and administration. In addition, the Boston Region MPO provides meaningful access to its programs, services, and activities to individuals with limited English proficiency, in compliance with U.S. Department of Transportation policy and guidance on federal Executive Order 13166.

The Boston Region MPO also complies with the Massachusetts Public Accommodation Law, M.G.L. c 272 sections 92a, 98, 98a, which prohibits 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 Boston Region MPO complies with the Governor's Executive Order 526, section 4, which requires that 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.

A complaint form and additional information can be obtained by contacting the MPO or at http://www.bostonmpo.org/mpo_non_discrimination. To request this information in a different language or in an accessible format, please contact

Title VI Specialist
Boston Region MPO
10 Park Plaza, Suite 2150
Boston, MA 02116
civilrights@ctps.org

By Telephone:

857.702.3702 (voice)

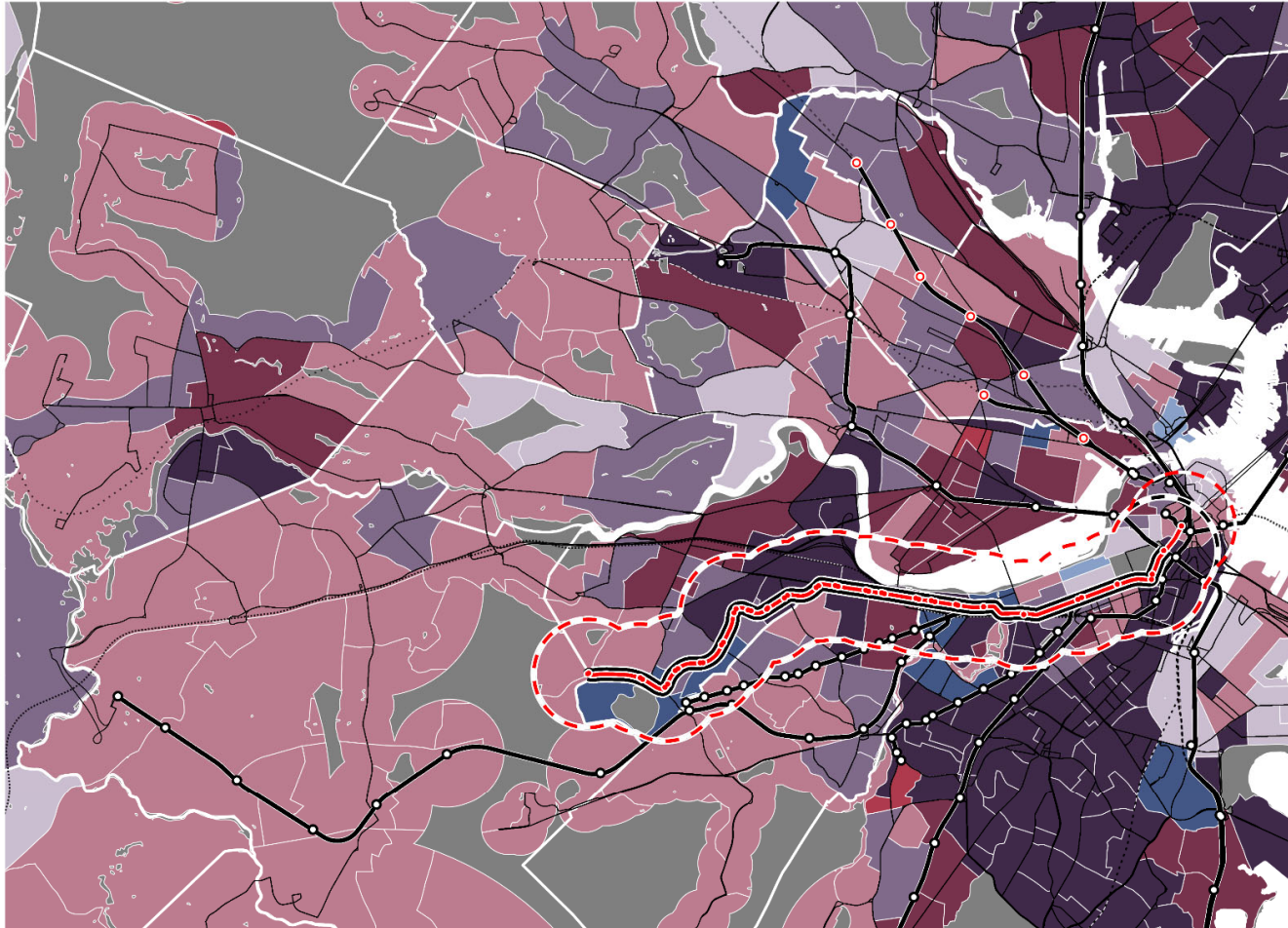
For people with hearing or speaking difficulties, connect through the state MassRelay service:

- **Relay Using TTY or Hearing Carry-over:** 800.439.2370
- **Relay Using Voice Carry-over:** 866.887.6619
- **Relay Using Text to Speech:** 866.645.9870

For more information, including numbers for Spanish speakers, visit <https://www.mass.gov/massrelay>

Appendix A: Route Structure Changes

Figure A1 Demographic Profile of People Living Near the Green Line (B Branch)



Scenarios

- Base Service
- -• Proposed Service

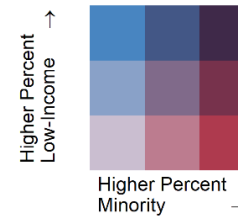
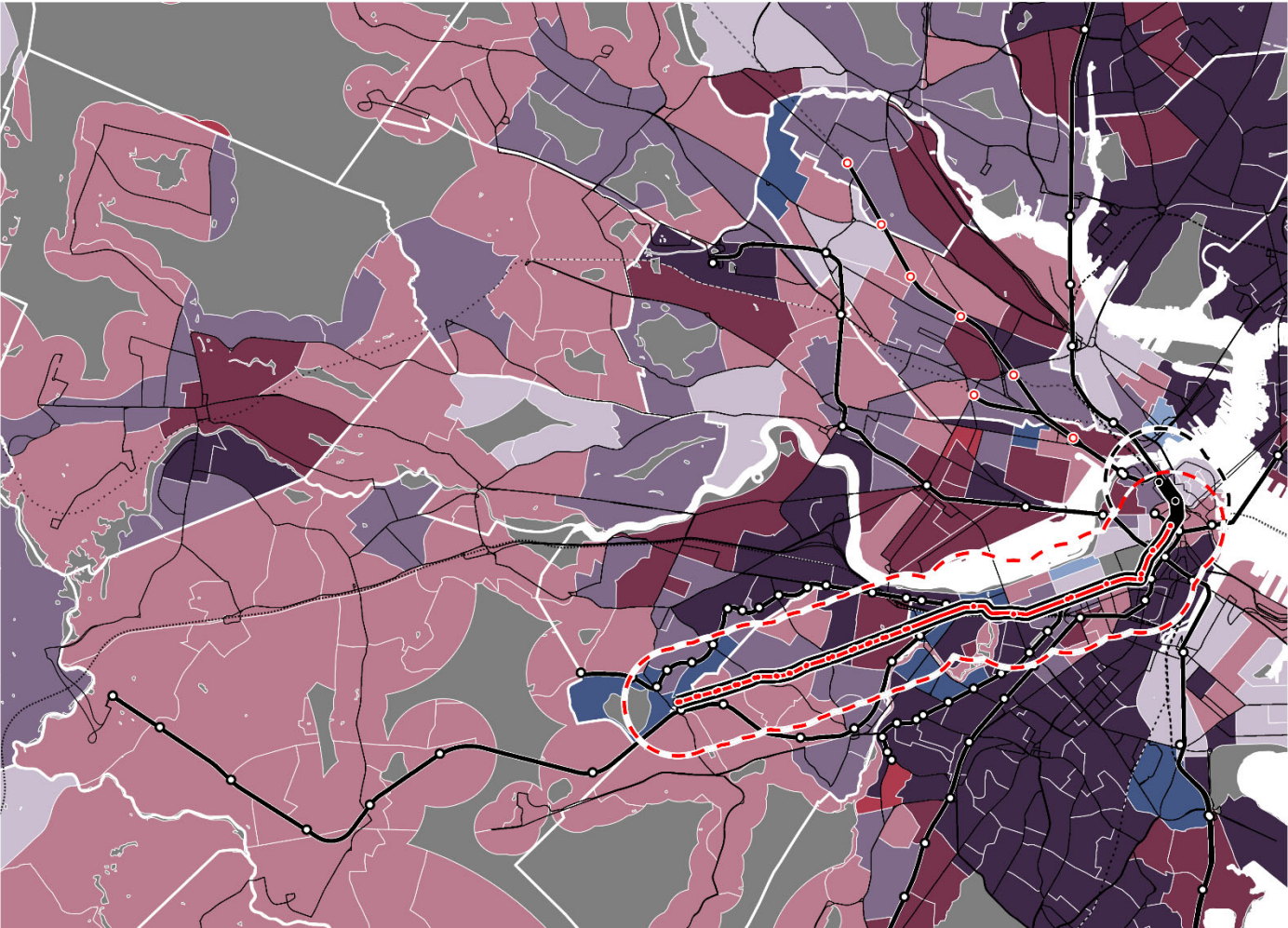


Figure A2
Demographic Profile of People Living Near
the Green Line (C Branch)



Scenarios

- Base Service
- Proposed Service

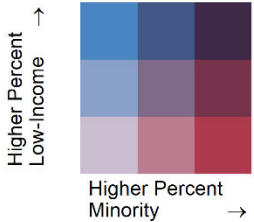
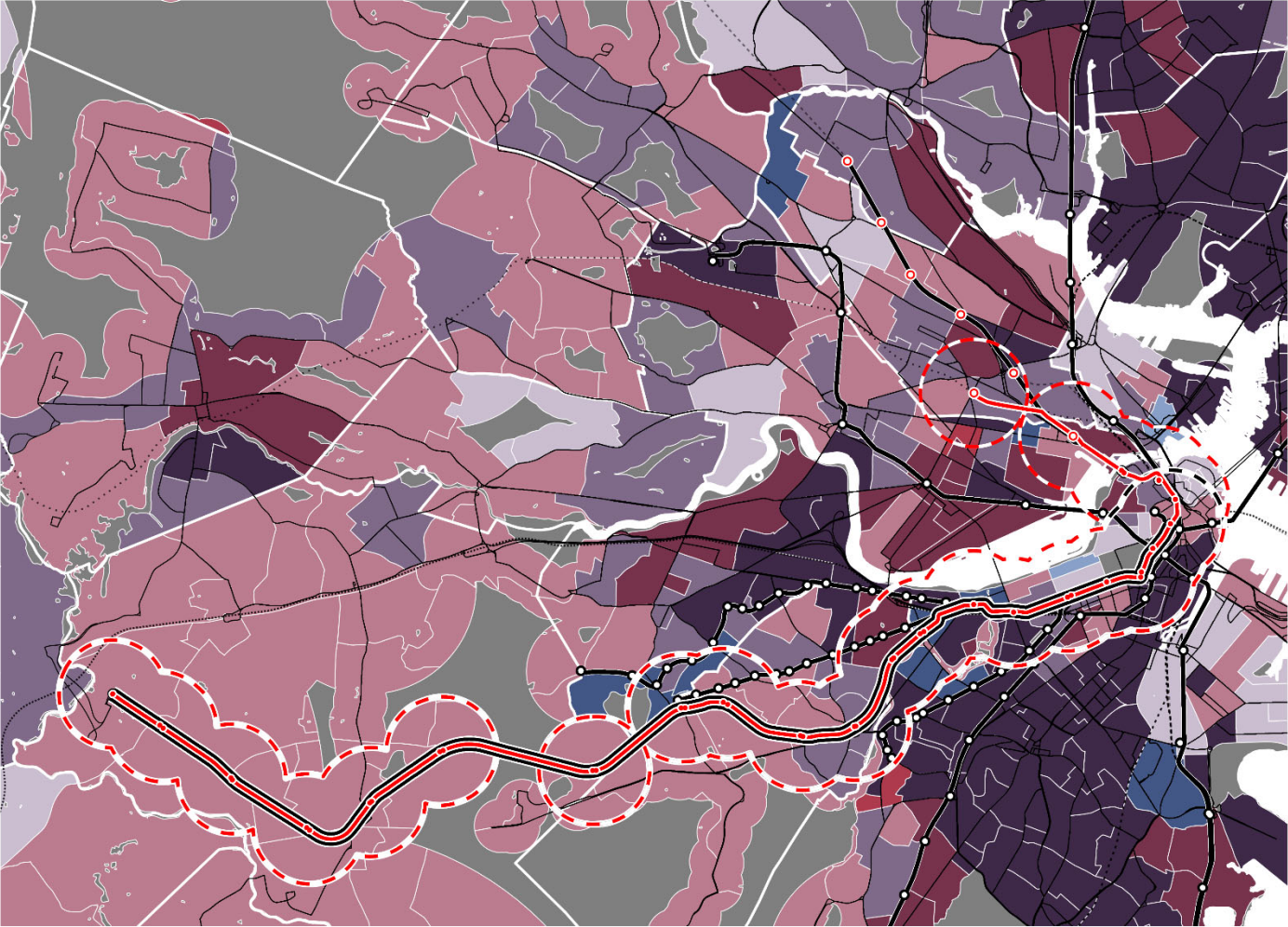


Figure A3
Demographic Profile of People Living Near
the Green Line (D Branch)



Scenarios

- Base Service
- Proposed Service

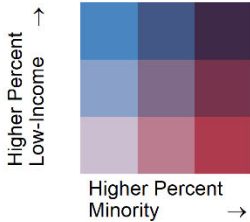
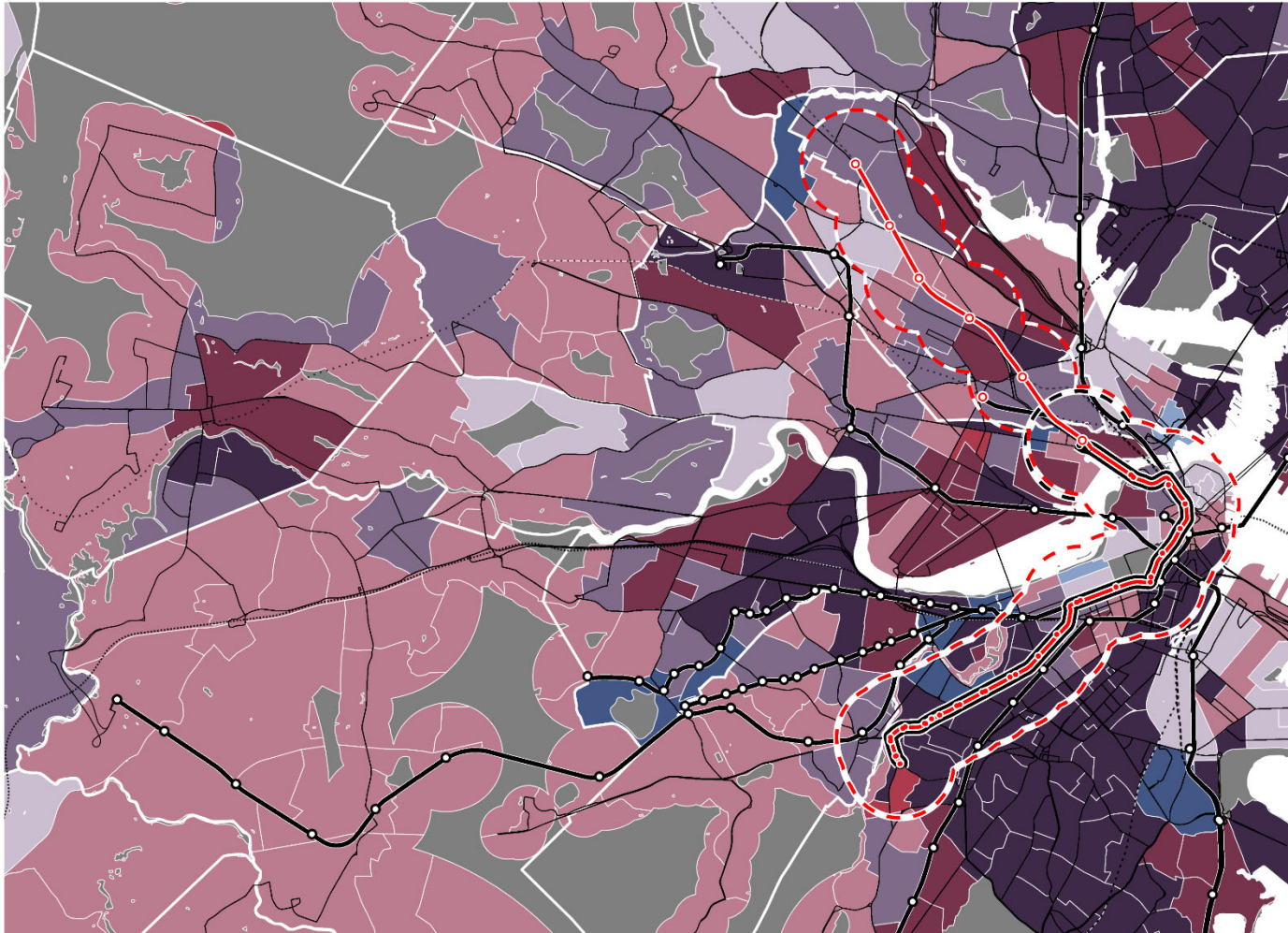
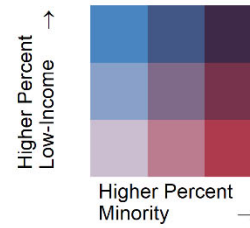


Figure A4
Demographic Profile of People Living Near
the Green Line (E Branch)



Scenarios

- Base Service
- - Proposed Service



Appendix B: Route-by-Route Revenue-Vehicle Hour and Route Length Changes

Table B1
Change in Weekly Revenue-Vehicle Hours by Route and Day of the Week

Route	DOW	Existing Weekly RVH	Change in Weekly RVH	Existing Minority Percentage	Existing Low-Income Percentage	Proposed Minority Percentage	Proposed Low-Income Percentage	Minority RVH Change	Nonminority RVH Change	Low-Income RVH Change	Non-Low-Income RVH Change
Green-B	WD	1,326.7	70.3	37.4%	37.7%	36.3%	36.6%	11.2	59.1	11.0	59.4
Green-B	SA	216.6	7.4	37.4%	37.7%	36.3%	36.6%	0.4	7.1	0.3	7.1
Green-B	SU	197.9	4.9	37.4%	37.7%	36.3%	36.6%	-0.4	5.2	-0.4	5.3
Green-C	WD	1,096.5	-119.8	32.9%	33.9%	33.6%	34.5%	-32.4	-87.4	-34.8	-85.0
Green-C	SA	200.5	-25.4	32.9%	33.9%	33.6%	34.5%	-7.1	-18.3	-7.6	-17.9
Green-C	SU	163.8	-18.9	32.9%	33.9%	33.6%	34.5%	-5.2	-13.7	-5.5	-13.4
Green-D	WD	1,411.2	518.2	33.6%	33.3%	33.5%	32.4%	171.7	346.4	154.9	363.3
Green-D	SA	207.3	77.8	33.6%	33.3%	33.5%	32.4%	25.8	52.0	23.3	54.5
Green-D	SU	165.4	58.1	33.6%	33.3%	33.5%	32.4%	19.3	38.9	17.3	40.8
Green-E	WD	1,258.7	363.8	39.1%	37.7%	36.9%	34.8%	105.8	258.1	90.6	273.3
Green-E	SA	183.6	50.4	39.1%	37.7%	36.9%	34.8%	14.4	35.9	12.3	38.1
Green-E	SU	130.3	51.6	39.1%	37.7%	36.9%	34.8%	16.1	35.5	14.2	37.4

DOW = day of the week. RVH = revenue-vehicle hour. SA = Saturday. SU = Sunday. WD = weekday.

Sources: MBTA revenue-hour spreadsheets, Spring 2021 MBTA GTFS, 2010 US Census, and 2015-19 ACS.

Table B2
Change in Weekly Route Length by Route and Day of the Week

Route	DOW	Existing Weekly Route Length	Change in Weekly Length	Existing Minority Percentage	Existing Low-Income Percentage	Proposed Minority Percentage	Proposed Low-Income Percentage	Minority Length Change	Nonminority Length Change	Low-Income Length Change	Non-Low-Income Length Change
Green-B	WD	61.8	2.6	37.4%	37.7%	36.3%	36.6%	0.3	2.3	0.3	2.3
Green-B	SA	12.3	0.5	37.4%	37.7%	36.3%	36.6%	0.1	0.5	0.1	0.5
Green-B	SU	12.3	0.5	37.4%	37.7%	36.3%	36.6%	0.1	0.5	0.1	0.5
Green-C	WD	56.2	-5.0	32.9%	33.9%	33.6%	34.5%	-1.3	-3.7	-1.4	-3.6
Green-C	SA	11.2	-1.0	32.9%	33.9%	33.6%	34.5%	-0.3	-0.7	-0.3	-0.7
Green-C	SU	11.2	-1.0	32.9%	33.9%	33.6%	34.5%	-0.3	-0.7	-0.3	-0.7
Green-D	WD	119.1	25.5	33.6%	33.3%	33.5%	32.4%	8.4	17.1	7.2	18.3
Green-D	SA	23.8	5.1	33.6%	33.3%	33.5%	32.4%	1.7	3.4	1.4	3.7
Green-D	SU	23.8	5.1	33.6%	33.3%	33.5%	32.4%	1.7	3.4	1.4	3.7
Green-E	WD	53.1	33.7	39.1%	37.7%	36.9%	34.8%	11.2	22.4	10.2	23.5
Green-E	SA	10.6	6.7	39.1%	37.7%	36.9%	34.8%	2.2	4.5	2.0	4.7
Green-E	SU	10.6	6.7	39.1%	37.7%	36.9%	34.8%	2.2	4.5	2.0	4.7

DOW = day of the week. SA = Saturday. SU = Sunday. WD = weekday.

Sources: Spring 2021 MBTA GTFS, 2010 US Census, and 2015-19 ACS.