

2023 CTDOT Service and Fare Equity Analysis

Connecticut Department of Transportation

Draft – September 18, 2023



Table of Contents

Service and Fare Equity Analysis Executive Summary	i
Equity Analysis Methodology	i
Connecticut Rail System Changes	i
Proposed Rail Service Changes	i
Proposed Rail Fare Changes.....	ii
CTtransit Proposed Bus System Changes	iv
Proposed Hartford Division Service Changes	iv
Proposed CTfastrak Feeder Service Proposed Service Changes.....	v
Proposed New Haven Division Proposed Service Changes	v
Bus Fare Changes	v
Service and Fare Analyses – Findings and Alternatives	vi
Rail System Findings.....	vi
Bus System Findings.....	viii
Introduction	1
Title VI Principles and Definitions	1
Service Equity Analysis Policy	1
Fare Equity Analysis Policy.....	2
Disparate Impact/Disproportionate Burden Policy	3
Major Service Changes.....	3
Fare Changes.....	3
Rail.....	4
Connecticut Rail System Description	4
2023 Rail Service Changes	4
Rail Lines Major Service Change Analysis	5
Rail Service Change Summary.....	5
Rail Service Equity Analysis.....	7
Methodology.....	7
Rail Service Equity Analysis Results	8
Rail Fare Equity Analysis	12

CTDOT Title VI Policy..... 14

Methodology..... 15

Fare Change Analyses 22

Determination of a Discriminatory Impact or Disproportionate Burden 29

Fare Impacts and Alternatives Findings..... 31

Bus..... 32

 Proposed Bus Service Changes 32

 Hartford Division (Local routes and Express services)..... 32

 CTfastrak Feeder Service Proposed Service Changes 39

 New Haven Division Proposed Service Changes..... 47

 Bus Routes Major Service Change Summary 50

 Bus Service Equity Analysis..... 50

 Service Equity Analysis Methodology 50

 Bus Service Equity Analysis Results 52

 Bus Service Change Impacts and Alternatives..... 57

 Bus Fare Equity Analysis 58

 CTDOT Title VI Policy..... 58

 Methodology..... 59

 Fare Change Analyses 62

 Determination of a Disparate Impact or Disproportionate Burden 64

 Fare Impacts and Alternatives 64

Appendix A - 2023 Rail Major Service Change Threshold Analysis Results 65

Appendix B - Rail Service Equity Analysis Schedule Analysis Tables 67

Appendix C - Rail Fare Equity Analysis – Fare Medium Tables 69

Appendix D - Bus Major Service Change Threshold Analysis Results..... 85

Appendix E - Bus Fare Equity Analysis – Fare Medium Tables 89

Table of Figures

Figure 1: Map of Connecticut Rail Passenger Service.....	4
Figure 2: Hartford dash Shuttle	33
Figure 3: 45X – Berlin Turnpike Flyer	34
Figure 4: 47B – Berlin Turnpike.....	35
Figure 5: 69 – Capitol Avenue.....	36
Figure 6: 907 – Newington Express	37
Figure 7: 923 – Bristol Express.....	39
Figure 8: 102 – Hartford/New Britain/Bristol.....	40
Figure 9: 125 – Hartford-Berlin Turnpike.....	42
Figure 10: 140 – CCSU Connector	43
Figure 11: 144 – Wethersfield/Westfarms	45
Figure 12: 153 – Elmwood/Copaco.....	47
Figure 13: 216 – Northford/Wallingford/Meriden	48
Figure 14: 262 – Orange Business District	50

Table of Tables

Table 1: Percent Change in Ridership by Rail Line (2023 Year-to-Date vs. 2019)	ii
Table 2: Metro-North Railroad Average Fare Medium Changes.....	ii
Table 3: Shore Line East Average Fare Medium Changes.....	iii
Table 4: Hartford Line Average Fare Medium Changes.....	iii
Table 5: Percent Change in Ridership by Rail Line (2023 Year-to-Date vs. 2019)	5
Table 6: New Haven Line Service Change Threshold Analysis.....	6
Table 7: New Canaan Line Service Change Threshold Analysis	6
Table 8: Danbury Line Service Change Threshold Analysis.....	6
Table 9: Shore Line East Service Change Threshold Analysis	7
Table 10: Minority Serving Stations on Shore Line East	8
Table 11: Shore Line East Disparate Impact Analysis for Headway Changes	9
Table 12: Shore Line East Disparate Impact Analysis for Stop Changes.....	9
Table 13: Aggregate Rail System Minority Population Comparison.....	10

Table 14: Low-Income Serving Stations on Shore Line East 10

Table 15: Shore Line East Disproportionate Burden Analysis for Headway Changes 11

Table 16: Shore Line East Disproportionate Burden Analysis for Stop Changes 11

Table 17: Aggregate Rail System Low-Income Population Comparison..... 12

Table 18: Summary of Average Fare Media Changes..... 13

Table 19: Metro-North Railroad Fare Medium Purchase by Customer Type..... 22

Table 20: Metro-North Railroad Fare Medium Purchases 23

Table 21: Annual MNR Fare Expenses by Medium by Customer Type (Pre-Increase)..... 23

Table 22: Annual Metro-North Railroad Fare Expenses by Medium by Customer Type 24
(Post-Increase) 24

Table 23: Hartford Line Fare Medium Purchase by Type of Customer 25

Table 24: Estimated 2021 Hartford Line Fare Medium Usage by Type of Customer 25

Table 25: Annual Hartford Line Fare Expenses by Medium by Type of Customer (Pre-Increase) 26

Table 26: Annual Hartford Line Fare Expenses by Medium by Type of Customer (Post-Increase)
..... 26

Table 27: 2019 Shore Line East Ridership Survey Fare Medium Use by Type of Customer..... 27

Table 28: Estimated 2021 Shore Line East Fare Medium Usage by Type of Customer 27

Table 29: Annual Shore Line East Fare Expenses by Medium by Type of Customer (Pre-Increase)
..... 28

Table 30: Annual Shore Line East Fare Expenses by Medium by Type of Customer (Post-
Increase)..... 28

Table 31: Percent Change in Metro-North Railroad Fare Payments 30

Table 32 Percent Change in Hartford Line Fare Payments..... 30

Table 33: Percent Change in Shore Line East Fare Payments..... 30

Table 34: Percent Change in Full Package Payments 31

Table 35: Route 45X Service Summary - Current..... 33

Table 36: Route 47B Service Summary – Current..... 34

Table 37: Route 69 Service Summary – Current..... 36

Table 38: Route 907 Service Summary – Current..... 37

Table 39: Route 923 Weekday Ridership by Trip..... 38

Table 40: Route 102 Service Summary – Current..... 40

Table 41: Route 125 Service Summary – Proposed 41

Table 42: Route 140 Service Summary – Current 43

Table 43: Route 144 Service Summary – Current 44

Table 44: Route 144 Service Summary – Proposed 44

Table 45: Route 153 Service Summary – Current 46

Table 46: Route 153 Service Summary – Proposed 46

Table 47: Route 216 Service Summary – Proposed 48

Table 48: Route 262 Service Summary – Proposed 49

Table 49: Disparate Impact Analysis for Hartford Division Express Routes 53

Table 50: Disparate Impact Analysis for Hartford Division Local Routes 53

Table 51: Disparate Impact Analysis for Hartford Division Route 69 54

Table 52: Disparate Impact Analysis for New Haven Division Proposed Routes..... 54

Table 53: Disproportionate Burden Analysis for Hartford Division Express Routes with Proposed Service Changes 55

Table 54: Disproportionate Burden Analysis for Hartford Division Local Routes with Proposed Service Changes 55

Table 55: Disproportionate Burden Analysis for Hartford Division Route 69 56

Table 56: Disproportionate Burden Analysis for New Haven Division Proposed Routes..... 56

Table 57: Service Change Impacts and Alternatives – Hartford Local and Express Bus System .. 57

Table 58: Total Fare Collections Determination Example, All-Day Fares 62

Table 60: CTtransit Percent Fare Medium Purchases by Customer 63

Table 61: CTtransit Fare Medium Purchases by Customer 63

Table 62: CTtransit Fare Expenses by Medium by Customer type 64

Table 63: Percent Change in CTtransit Fare Payments..... 64

Service and Fare Equity Analysis Executive Summary

In accordance with Title VI of the Civil Rights Act of 1964 and Federal Transit Administration (FTA) Title VI Circular 4702.1B, Connecticut Department of Transportation (CTDOT) conducts a Service and Fare Equity (SAFE) Analysis any time fare changes or major service changes are proposed to ensure that changes do not unfairly impact minority and low-income populations, as defined by the FTA Title VI Circular.

CTDOT analyzed proposed 2023 bus and rail service changes to determine if they met the criteria of a Major Service Change under the CTDOT FTA Title VI Program, these proposed changes include:

- Proposed schedule changes on Shore Line East, Metro-North New Haven Line, New Canaan Line, and Danbury Line
- Proposed schedule changes to *CTtransit* bus service

Additional items analyzed in this Service and Fare Equity Analysis include:

- Proposed increase to rail fares on the Metro-North Railroad New Haven Line and branch lines, the Shore Line East, and the Hartford Line
- Reintroduction of fares on *CTtransit* buses

Proposed Shore Line East service changes and proposed *CTtransit* bus service changes were deemed to exceed the Major Service Change criteria thresholds and were analyzed for impacts in accordance with CTDOT's Title VI policy.

Equity Analysis Methodology

The CTDOT FTA Title VI Program outlines the agency's Major Service Change, Disparate Impact, and Disproportionate Burden policies, as well as the way in which CTDOT conducts SAFE Analyses. Proposed major service changes to rail and bus services and all fare changes were analyzed to determine if there would be disparate impacts to minority populations, or disproportionate burdens to low-income populations.

Connecticut Rail System Changes

Proposed Rail Service Changes

The bipartisan budget adopted earlier this year included a funding reduction for Metro-North Railroad (MNR) and Shore Line East (SLE) passenger rail service, therefore new schedules are proposed for both services to achieve budgetary targets established by the legislature and more closely align with current ridership levels and travel patterns. The following table illustrates how current ridership compares on the MNR New Haven Line and branch lines and the Shore Line East for Year-to-Date (June 2023) compared to pre-Covid (2019) ridership levels.

Table 1: Percent Change in Ridership by Rail Line (2023 Year-to-Date vs. 2019)

Percent Change	Metro-North Railroad				CTrail
	Main Line	New Canaan	Danbury	Waterbury	Shore Line East
2023 YTD vs. 2019	-31.9%	-45.19%	-49.6%	-2.9%	-68.2%

- Monday-Thursday service on the New Haven Line is proposed to be reduced from 239 trains to 237 trains per day.
- Friday Service on the New Haven Line is proposed to be reduced from 241 trains to 233 trains per day.
- Weekday service on the New Canaan Line is proposed to be reduced from 41 trains to 39 trains per day.
- Weekday service on the Danbury Line is proposed to be reduced from 28 trains to 26 trains per day.
- Weekday service on Shore Line East is proposed to be reduced from 23 trains to 16 trains per day.

Proposed Rail Fare Changes

Fares are critical to CTDOT and its service providers’ ability to operate a safe and reliable transportation system, while helping to support rising costs. To address the loss of fare revenue, CTDOT proposes to increase fares for Metro-North Railroad services in Connecticut, Shore Line East, and the Hartford Line.

Each rail line would experience a slightly different percent increase due to the need to raise one-way fares by 25 cent increments. The collective average proposed fare increase for each fare medium throughout the statewide rail network is presented below (Table 2 - Table 4):

Table 2: Metro-North Railroad Average Fare Medium Changes

Metro-North Railroad		
Fare Medium	Current Average Fare	New Average Fare
One Way - Peak	\$7.14	\$7.60
One Way - Off Peak	\$6.73	\$7.15
Half Price One Way - Peak	\$3.61	\$3.75
Monthly School	\$102.30	\$95.83
Weekly	\$47.78	\$49.58
10-trip Peak	\$63.23	\$67.19
10-Trip Off Peak	\$57.25	\$60.80
10-trip Older Adult/Disabled	\$35.17	\$37.54
Promo Monthly	\$137.44	\$142.98
Average Fare Medium Price	\$51.18	\$52.49

Table 3: Shore Line East Average Fare Medium Changes

Shore Line East		
Fare Medium	Current Average Fare	New Average Fare
One Way	\$4.91	\$5.17
Discount One-Way	\$2.39	\$2.44
10-Trip	\$39.29	\$41.36
10-Trip Discount	\$24.20	\$25.85
Monthly	\$103.13	\$108.56
Monthly Bus Plus	\$113.13	\$118.56
School Monthly	\$69.07	\$69.07
Unirail	\$33.89	\$35.26
Average Fare Medium Price	\$48.75	\$50.78

Table 4: Hartford Line Average Fare Medium Changes

Hartford Line		
Fare Medium	Current Average Fare	New Average Fare
Fare Medium	Current Average Fare	New Average Fare
One Way	\$5.88	\$6.13
Discount One Way	\$2.89	\$3.00
Onboard One Way	\$8.88	\$9.13
Weekly	\$38.29	\$39.88
10-Trip	\$47.07	\$49.00
Discount 10-Trip	\$28.93	\$30.63
Monthly	\$123.56	\$128.63
School Monthly	\$88.26	\$88.26
Unirail	\$57.26	\$59.55
Average Fare Medium Price	\$44.56	\$46.02

CTtransit Proposed Bus System Changes

The bipartisan budget adopted earlier this year included an increase in funding for bus service in Connecticut. The focus of the expansion is to provide better access to jobs, training, and education by providing service that operates later and seven days a week. The Service and Fare Equity Analysis includes one proposed new route in the Hartford Division, two proposed new routes in the CTtransit New Haven Division and proposed improvements to service frequencies on two CTfastrak routes.

In addition, changes are proposed to eight routes in the CTtransit Hartford Division to better align with ridership demand and promote efficiency. The types of proposed service changes on these eight routes include decreased service frequency, route restructuring and route elimination with replacement service.

Proposed Hartford Division Service Changes

- **Hartford dash Shuttle.** To better align ridership demand with scheduled service the dash Shuttle is proposed to transition from a Monday through Friday schedule to a Thursday through Sunday schedule, operating 8 AM to 10 PM, with service on Mondays, Tuesdays and Wednesdays for special events.
- **45X – Berlin Turnpike Flyer.** It is proposed to discontinue service on this route with replacement service provided by CTfastrak Route 125.
- **47B – Berlin Turnpike.** It is proposed to discontinue service on this branch. Service along Prospect Street in Wethersfield would be replaced with limited alternate service provided by the 61 – Broad Street route. Service along Berlin Turnpike would be provided by CTfastrak Route 125.
- **69 – Capitol Avenue.** Service on this route is proposed to be rerouted to operate via Fenn Road and CTfastrak Cedar Street Station, terminating at the Newington Veteran’s Hospital at all times. Replacement service to Willard Avenue and Berlin Turnpike would be provided by the proposed CTfastrak Route 125.
- **907 – Newington Express.** Service on Route 907 is proposed to be discontinued. Service between the Newington Park & Ride and downtown Hartford on weekdays would be provided by the proposed CTfastrak Route 125.
- **923 – Bristol Express.** Given the limited ridership return to Route 923 as well as the similar geographic coverage provided by Route 102, service on Route 923 is proposed to be discontinued.

Proposed CTfastrak Feeder Service Proposed Service Changes

- **102 – Hartford/New Britain/Bristol.** In Bristol, service on CTfastrak Route 102 is proposed to be discontinued along the expressway portion of CT 72 between Todd Street and Forestville Avenue.

All trips would be rerouted to operate along Pine Street making local stops in both directions, establishing two-way service to Forestville Commons. The level of service on Route 102 is not proposed to change.

- **125 – Hartford-Berlin Turnpike.** CTfastrak Route 125 is a proposed new bus route that would operate between downtown Hartford and Berlin Turnpike. Buses would depart Main Street in downtown Hartford, service Union Station, then operate via the CTfastrak guideway, making all stops to Newington Junction Station.
- **140 – CCSU Connector.** Due to low utilization and the availability of alternate services linking multiple CTfastrak stations to the CCSU campus – including Routes 128, 144 and 507 – service on Route 140 is proposed to be discontinued. Service to Fenn Road would instead be provided on weekdays and Saturdays by Route 69.
- **144 – Wethersfield/Westfarms.** To provide customers with a more convenient and reliable travel experience, weekday headways on Route 144 are proposed to be narrowed from 60 minutes to 40 minutes during the peak and base periods.
- **153 – Elmwood/Copaco.** To provide customers with a more convenient and reliable travel experience, weekday headways on the route are proposed to be narrowed from 60 minutes to 40 minutes during the peak and base periods.

In addition, Route 153 is proposed to be rerouted via Albany Avenue and Bloomfield Avenue in West Hartford to restore service to the University of Hartford campus.

Proposed New Haven Division Proposed Service Changes

- **216 – Northford/Wallingford/Meriden.** CTtransit Route 216 is a proposed new bus route that would operate between New Haven and Meriden.
- **262 – Orange Business District** CTtransit Route 262 is a proposed new bus route that would operate between New Haven and Milford.

Bus Fare Changes

During the early stages of the COVID-19 pandemic, CTDOT suspended CTtransit fares as it implemented COVID-19 specific safety measures like rear door boardings. CTtransit is the CTDOT-owned bus service operating in several metropolitan areas throughout Connecticut. Fare

suspensions were then extended in 2022 as part of the state’s gas-tax suspension bill. As the pandemic waned and economic conditions and safety measures changed, CTDOT restored fare collection following a 12-month fare-free period. Per federal guidance, a restoration of fares following a fare free period needs to be analyzed. As a result, CTDOT conducted a fare equity analysis on the resumption of fare collection to determine if there was a disparate impact on minority¹ or disproportionate burden on low-income² populations as defined in the CTDOT Title VI Program.

Following the reinstatement of fares for all ticket types, the average fare medium cost for overall customers, minority customers pay 2.4% less than overall customers and low-income customers pay 7.2% less than overall customers.

Service and Fare Analyses – Findings and Alternatives

Rail System Findings

A summary of the rail major service change threshold analysis results and fare changes are presented as follows:

- **New Haven Line – Did not meet the threshold for a Major Service Change**, therefore no equity analysis was required.
- **New Canaan Line – Did not meet the threshold for a Major Service Change**, therefore no equity analysis was required.
- **Danbury Line - Did not meet the threshold for a Major Service Change**, therefore no equity analysis was required.
- **Shore Line East – Met the threshold for a Major Service Change**, therefore an equity analysis was required

Proposed Fare Change Impacts by Individual Rail Line

An evaluation of the individual fare changes on each line was conducted.

Metro-North Railroad Fare Change

The percentage change for each Metro-North Railroad type of customer showed that all customers, once adjusted for the types of fare used, would experience a 5.86% increase in average fare medium price, minority customers would experience a 5.74% increase in average

¹ The United State Department of Transportation defines minorities as a person who identifies as American Indian and Alaska Native, Asian, Black, or African American, Hispanic or Latino Populations, and Native Hawaiian and Other Pacific Islander.

² The definition of “low-income” is a reported household income 150% of the poverty line or lower. The poverty line is a sliding scale that adjusts the poverty line to the number of individuals living in a given household. This analysis utilized the U.S. Federal Poverty Guidelines as identified by Department of Health and Human Services (HHS).

fare medium price and low-income customers would experience a 5.91% increase in average fare medium price. Given that the difference between all customers and minorities is 0.12%, the difference between all customers and low-income customers is -0.05% -- values that are well below the CTDOT-mandated 10% threshold -- there was no finding of a disparate impact or disproportionate burden on the New Haven Line.

Hartford Line Fare Change

The percentage change for each Hartford Line type of customer, once adjusted for the types of fare used, showed that all customers would experience a 4.06% increase in average fare, minority customers would experience a 4.07% increase in average fare medium price and low-income customers would experience a 4.04% increase in average fare medium price. Given that there is a 0.01% difference between all customers and minorities and a -0.02% difference between all customers and low-income customers -- values that are well below the CTDOT-mandated 10% threshold -- there was no finding of a disparate impact or disproportionate burden on the Hartford Line.

Shore Line East Fare Change

The percentage change for each Shore Line East type of customer, once adjusted for the types of fare used, shows that all customers would experience a 4.95% increase in average fare, minority customers would experience a 5.07% increase in average fare medium price and low-income customers would experience a 5.05% increase in average fare medium price. Given that there is a 0.12% difference between all customers and minorities and a 0.11% difference between all customers and low-income customers -- values that are well below the CTDOT-mandated 10% threshold -- there is no finding of a disparate impact or disproportionate burden on Shore Line East.

Proposed Fare Change Impacts for all Individual Rail Lines Combined (Full Package)

Metro-North Railroad, Hartford Line, and Shore Line East data was combined and weighted based on their total estimated annual ridership.

- The percentage change analysis revealed that the change, following the fare increase, for minority and low-income ridership was 5.73% and 5.86% respectively.
- Compared to all customers, the difference for minority customers was approximately 0.12% below the overall average increase.
- Compared to all customers and the difference for low-income customers was a 0.02% above the overall increase.

Because these differences are below the 5% disparate impact or disproportionate burden threshold, the analysis concluded that the proposed fare changes for the full package did not have a disparate impact on minority or disproportionate burden on low-income populations.

Rail System Mitigation Alternatives

There was no finding of disparate impact or disproportionate burden resulting from the proposed Shore Line East service changes, therefore, no mitigations or alternatives must be considered.

Bus System Findings

Proposed Bus Service Change Findings

The proposed route elimination of Route 907 resulted in a disparate impact to minority populations.

The proposed change in service frequency on the Hartford dash Shuttle resulted in a disparate impact to minority populations and a disproportionate burden to low-income populations.

Reintroduction of Bus Fare Findings

The percent difference in average fare price between overall CTtransit customers and minority customers was -3.2%, meaning minority riders pay an average of \$0.56 less per average fare medium than the overall CTtransit customer base. The percent difference in average fare price between all customers and low-income customers was -8.2%, meaning low-income riders pay an average of \$1.45 less per average fare medium than all CTtransit customers.

The percentage difference between overall customers and minority customers fell below the 10% disparate impact threshold. Similarly, the percentage difference between overall customers and low-income customers fell below the 10% disproportionate burden threshold.

Bus System Mitigation Alternatives

Route 907 is a commuter service with AM trips inbound from the Newington Park and Ride to downtown Hartford and PM trips outbound from Hartford back to the Park and Ride. Service between the Newington Park & Ride and downtown Hartford on weekdays is proposed to be provided by CTfastrak Route 125.

To better align ridership demand with scheduled service, the dash Shuttle is proposed to transition from a Monday through Friday schedule to Thursday through Sunday. On Monday, Tuesday and Wednesday, replacement service along the dash route is proposed to be provided by CTfastrak Route 125.

Bus Fare Mitigation Measures

There was no finding of disparate impact or disproportionate burden, therefore, no mitigations or alternatives must be considered.

Introduction

Title VI of the Civil Rights Act of 1964 ensures that “no person in the United States shall, on the basis 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 Connecticut Department of Transportation (CTDOT) has committed to the Federal Transit Administration (FTA) Title VI objectives set forth in FTA Circular 4702.1B ensuring that FTA-assisted benefits and related services are made available and are equitably distributed without regard to race, color, or national origin.

The FTA requires recipients of transit program funds, including CTDOT, to “evaluate significant system-wide service changes and proposed improvements at the planning and programming stages to determine whether those changes have a discriminatory impact.”

The proposed changes include:

- Proposed schedule changes on Shore Line East, Metro-North New Haven Line, New Canaan Line, and Danbury Line
- Proposed schedule changes to CTtransit bus service
- Proposed increase to rail fares on New Haven Line, Shore Line East, and Hartford Line

As part of this Service and Fare Equity Analysis, CTDOT also analyzed the reintroduction of fares on CTtransit buses.

Title VI Principles and Definitions

CTDOT’s FTA Title VI Program for FFY 2021 – FFY 2023 defines its Major Service Change Policy as any service change meeting at least one of the following criteria:

- Route restructuring actions resulting in at least a 20% change in overall route length.
- Service frequency changes that result in a 25% or more change in annual revenue vehicle miles (RVM). Annual RVMs are a compilation of weekday and weekend RVMs.
- A service change adding or reducing service to a fixed guideway station resulting in a greater than 25% change in service at the station.
- Service change actions resulting in at least a one-hour change in service span.

Service Equity Analysis Policy

A Service Equity Analysis will be conducted whenever CTDOT proposes a major service change to the rail or bus system as defined in the policies provided above; providing these changes will remain in effect in excess of twelve (12) months. When a service change is proposed, there shall be a twelve-month look-back, to determine if the aggregate of any changes in the prior twelve (12) months would have triggered one of the major service change criteria. The following service changes are exempted:

- Standard seasonal variations in service: a seasonal route or routing variation is usually a modification to service to provide “added” access that is not broadly needed year-round, or the discontinuation of the same. Any temporary service addition, change, or discontinuation of a route with the intention that it will be in operation for less than twelve months is also exempted. While all changes from regular service to seasonal service and the reverse are exempt, should there be changes within the seasonal service from one year to the next, CTDOT will conduct a Service and Fare Equity analysis should the change exceed fifty percent (50%), regardless of increase or decrease in service;
- Changes on routes serving sporting events, special events, or service contracted through other cities or agencies;
- Any service change that does not meet the definition of a major service change such as minor route alignments, frequency, span, or time point adjustments; route or bus stop changes due to temporary road detours caused by construction, maintenance, closures, emergencies, labor disruptions or strikes, fuel shortages, or safety concerns; etc.

Fare Equity Analysis Policy

A fare equity analysis will be conducted whenever CTDOT proposes a fare change, regardless of the amount of increase or decrease. For proposed fare changes CTDOT will:

1. Determine the number and percent of users of each fare media proposed for increase or decrease;
2. Review fares before the change and after the change;
3. Analyze the fare media generated from ridership surveys indicating whether minority and/or low-income riders are disproportionately more likely to use the mode of service, payment type, or fare media proposed for change; and
4. Compare the impacts for each fare media between minority users and overall users.

A fare change is defined as an increase or decrease in fares: (a) on the entire system, (b) on certain transit modes, or (c) by fare payment type or fare media. The exceptions are as follows:

1. “Spare the air days” or other instances when a local municipality, the State or CTDOT has declared that all customers ride free;
2. Temporary fare reductions that are mitigating measures for other actions (i.e., construction activities that close a segment of the rail system for a period of time); or
3. Promotional fare reductions that last less than six (6) months.
4. FTA Circular 4702.1B states that a recipient can implement a fare increase that would have a disproportionate or adverse effect provided that it demonstrates the action meets a substantial need that is in the public interest, and that alternatives would have more severe adverse effects than the preferred alternative.

Disparate Impact/Disproportionate Burden Policy

The purpose of the SAFE Policy is to establish thresholds which identifies when adverse effects of a major service or fare change result in a disparate impact to minority populations, or a disproportionate burden to low-income populations.

CTDOT applies the Disparate Impact Policy and the Disproportionate Burden Policy uniformly to all major service and fare changes regardless of mode.

Major Service Changes

A major service change to the rail or bus system will be deemed to have a disparate impact on minority populations, or a disproportionate burden on low-income populations, if the percentage of riders or vehicle revenue hours on affected minority-classified or low-income classified routes is at least fifteen (15%) percent higher than the percentage of riders or vehicle revenue hours on non-minority-classified or non-low income classified routes affected by the major service change.

Fare Changes

A fare change will be deemed to have a disparate impact on minority populations or a disproportionate burden on low-income populations if its implementation results in either:

1. When one fare change is proposed, the percentage of impacts of the proposed fare change borne by minority or low-income riders as a result of the proposed fare change is at least ten (10%) percentage points higher than the percentage of impacts of that proposed fare change on the overall rider population; or
2. When more than one fare change is proposed:
 - For each fare change in the package: the percentage of impacts of each individual proposed fare change borne by minority or low-income riders as a result of the proposed fare change is at least ten (10%) percentage points higher than the percentage of impacts of that proposed fare change on the overall rider population; and
 - For the total package of fare changes: the aggregate percentage of impacts for the proposed fare changes borne by minority or low-income riders as a result of the proposed fare changes is at least five (5%) percentage points higher than the aggregate percentage of impacts on the overall rider population.

FTA Circular 4702.1B states that a recipient can implement a fare change that would have a disproportionate or adverse effect provided that it demonstrates the action meets a substantial need that is in the public's interest and that alternatives would have more severe adverse effects than the preferred alternative.

Rail

Connecticut Rail System Description

Passenger rail service in Connecticut is supported by CTDOT and consists of three main lines and three branch lines, illustrated in Figure 1.

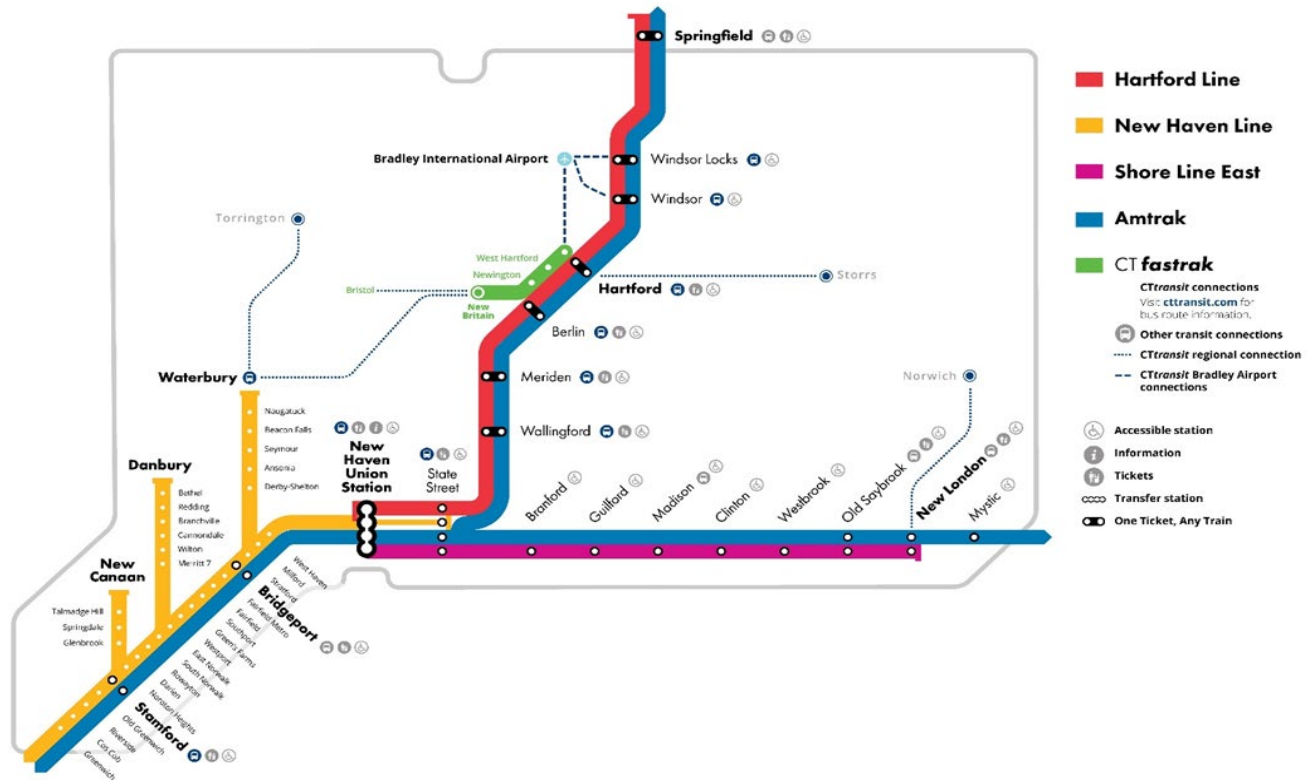


Figure 1: Map of Connecticut Rail Passenger Service

The New Haven Line, operated by Metro-North Railroad (MNR), operates between New Haven and Grand Central Terminal in New York City. This line has three branch lines that extend to New Canaan, Danbury and Waterbury. *Illustrated by Gold lines on Figure 1.*

Shore Line East (SLE), operated by Amtrak, operates along the Northeast Corridor between New London and New Haven, with connections to the New Haven Line. *Illustrated by Purple line on Figure 1.*

Amtrak and TransitAmerica Services Inc. (TASI) operate intercity passenger services between New Haven – Springfield (Hartford Line), and Amtrak over the Northeast Corridor to New York. *Illustrated by Blue lines on Figure 1.*

2023 Rail Service Changes

The bipartisan budget adopted earlier this year included a funding reduction for MNR and SLE passenger rail service, therefore new schedules are proposed for both services to achieve budgetary targets established by the legislature and more closely align with current ridership

levels and travel patterns. CTDOT and MNR looked at every train to identify the trains with the lowest ridership and reviewed the overall service needs. Table 5 below illustrates how current ridership compares on both MNR New Haven Line and branches and SLE for Year-to-Date (June 2023¹) compared to pre-Covid (2019) ridership levels.

Table 5: Percent Change in Ridership by Rail Line (2023 Year-to-Date vs. 2019)

Percent Change	Metro-North Railroad				CTrail
	Main Line	New Canaan	Danbury	Waterbury	Shore Line East
2023 YTD vs. 2019	-31.9%	-45.19%	-49.6%	-2.9%	-68.2%

The proposed changes to rail service are as follows:

- Monday-Thursday service on the New Haven Line is proposed to be reduced from 239 trains to 237 trains per day.
- Friday Service on the New Haven Line is proposed to be reduced from 241 trains to 233 trains per day.
- Weekday service on the New Canaan Line is proposed to be reduced from 41 trains to 39 trains per day.
- Weekday service on the Danbury Line is proposed to be reduced from 28 trains to 26 trains per day.
- Weekday service on SLE is proposed to be reduced on from 23 trains to 16 trains per day.

Rail Lines Major Service Change Analysis

The 2021-2023 CTDOT Title VI Program defines a major service change as any service change meeting at least one of the following criteria:

- *Route restructuring actions resulting in at least a 20% change in overall route length.*
- *Service frequency changes that result in a 25% or more change in annual revenue vehicle miles (RVM). Annual RVMs are a compilation of weekday and weekend RVMs.*
- *A service change adding or reducing service to a fixed guideway station resulting in a greater than 25% change in service at the station.*
- *Service change actions resulting in at least a one-hour change in service span.*

An analysis was performed to identify if those changes qualified as a major service change as defined by the CTDOT major service change policy.

The threshold analysis compares the service characteristics of the current New Haven Line schedule in effect on June 11, 2023, to the proposed New Haven Line schedule for October 29, 2023. **Appendix A** contains the details of these analyses.

Rail Service Change Summary

The **New Haven Line** threshold analysis revealed that associated proposed service changes did not exceed the major service change thresholds, therefore no equity analysis was required.

While there are southbound (to New York) and northbound (to New Haven) proposed service reductions on Monday to Thursday service and Friday service, the overall reductions fall well below the 25% threshold for trips (stops) and headways. Table 6 provides a summary of the threshold analysis for New Haven Line service changes.

Table 6: New Haven Line Service Change Threshold Analysis

Schedule	Trip Comparison	
	Mon-Thurs	Friday only
Existing	239	241
Proposed	237	233
% Change	-0.84%	-3.32%

The **New Canaan Line** threshold analysis revealed that associated service changes did not exceed the thresholds, therefore no equity analysis was required. While there are service reductions proposed for the proposed schedule, the overall reductions fall well below the 25% major service change threshold for trips and headways at 4.88% (see Table 7).

Table 7: New Canaan Line Service Change Threshold Analysis

Schedule	Trip Comparison	
	Mon- Fri	Weekends & Holidays
Existing	41	37
Proposed	39	37
% Change	-4.88%	0.00%

The **Danbury Line** threshold analysis revealed that associated service changes did not exceed the thresholds therefore no equity analysis was required. There is a two-trip peak reduction proposed for the proposed schedule (one in each for the AM and PM peaks). However, the overall schedule changes fall well below the 25% major service change threshold for trips and headways at 7.14% (see Table 8).

Table 8: Danbury Line Service Change Threshold Analysis

Schedule	Trip Comparison	
	Mon- Fri	Weekends & Holidays
Existing	28	12
Proposed	26	12
% Change	-7.14%	0.00%

Shore Line East schedule changes exceeded the threshold for weekday (Monday – Friday) service with a 30.4% overall decrease in service, thus met the criteria for a major service change and required an equity analysis. Weekend and holiday service changes did not meet the criteria for major service changes (see Table 9).

Table 9: Shore Line East Service Change Threshold Analysis

Schedule	Trip Comparison	
	Mon- Fri	Weekends & Holidays
Existing	23	16
Proposed	16	16
% Change	-30.4%	-0%

Rail Service Equity Analysis

Methodology

As part of its Title VI Program, CTDOT recently completed a demographic analysis of rail service territories on the New Haven Line, three branch lines, and Shore Line East and classified minority and low-income stations on each line. According to CTDOT’s Title VI Program, rail service territories are each defined as all census tracts that are within (and touching) 2.5 miles of the commuter rail stations. Census 2013-2017 American Community Survey (ACS) data was utilized in the analysis.

For consistency with CTDOT’s current Title VI program, the minority and low-income station classifications and the 2013-2017 ACS data was utilized in the project team’s rail service equity analysis. CTDOT’s Title VI Disparate and Disproportionate burden threshold of 15% (described above under Title VI Principles and Definitions section) was used to determine whether a disparate impact or disproportionate burden exists for major service changes.

As discussed above, proposed changes on SLE line resulted in a major service change. The project team evaluated proposed schedule changes in terms of station service (i.e., station stop differentials) and degree of service (i.e., station weekday headway differentials (peak and off-peak). 2023 proposed rail schedules were compared to current 2023 schedules to determine average stops and headways per station in the peaks and off-peaks for both directions of rail service. Average stop reduction and average headway increase was then calculated for each station in each of periods. **Appendix B** contains the Service Change Analysis tables.

The project team then compared average stop change and average headway change between minority-serving and non-minority-serving stations to determine if disparate impacts exist in service; and between low-income-serving and non-low-income-serving stations to determine if disproportionate burdens exist. Using the 15% threshold, if the service changes for minority serving stations was more than 15% worse than the changes for non-minority serving stations, that would signify a disparate impact. Similarly, if changes for low-income serving stations are

more than 15% worse than non low-income serving stations, that would signify a disproportionate burden.

The project team also calculated the aggregate minority and low-income populations of the service territories of each rail line that had a major service change and compared to the minority and low-income populations of CTDOT’s total rail system service territories in aggregate. To determine minority and low-income status, two Census ACS tables were utilized.

Table B03002 (Hispanic or Latino Origin by Race) which contains population counts by race broken down by Hispanic or Latino origin. Minority population counts were calculated as total population minus counts for “not Hispanic or Latino” variable (one race: white alone).

Table B06012 (Place of Birth by Poverty Status in the Past 12 Months in the United States) which reports poverty status by place of birth. Low-income population counts are those who live below 150% of the poverty level (which is consistent with CTDOT’s Title VI policy).

The purpose of this aggregate exercise was to confirm that for lines where major service changes occurred, that none of the lines’ minority or low-income populations exceeded the total rail system minority or low-income service territory population by greater than 15%. The results of the Rail Service Equity Analysis are presented below.

Rail Service Equity Analysis Results

As discussed above, proposed service changes on Shore Line East qualified as major service changes, as defined in CTDOT’s Title VI Program. The line was analyzed using the criteria outlined above in the methodology section and the results of this equity analysis are described below.

Evaluation of Disparate Impacts on Minority Populations

Shore Line East

The following stations (Table 10) on Shore Line East were classified in CTDOT’s Title VI Program as Minority Serving.

Table 10: Minority Serving Stations on Shore Line East

SLE Line Stations	Minority Serving?
New London	Y
Old Saybrook	N
Westbrook	N
Clinton	N
Madison	N
Guilford	N
Branford	N
NH-State St.	Y
New Haven	Y

Table 11 below displays the results of the Disparate Impact Analysis for headway changes on Shore Line East. There were no disparate impacts in change in headways as the variance in average headway increase between minority and non-minority serving stations was less than 15% in all instances.

Table 11: Shore Line East Disparate Impact Analysis for Headway Changes

SLE - Headway Analysis Results	Average Headway Change: Minority Serving Stations	Average Headway Change: Non-minority Serving Stations	Variance	Disparate Impact?
Weekday Peak Service to New Haven	-33.98%	-32.86%	-1.12%	N
Weekday Off-Peak Service to New Haven	42.68%	39.80%	2.88%	N
Weekday Peak Service to New London	-100.00%	-100.00%	0.00%	N
Weekday Off-Peak Service to New London	82.68%	89.55%	-6.87%*	N

*A negative number indicates that the average headway change at minority serving stations was less than the average headway change at non-minority serving stations.

Table 12 below displays the results of the Disparate Impact Analysis for station stop changes on Shore Line East. There were no disparate impacts in station stop changes as the variance in average stop reduction between minority and non-minority serving stations was less than 15% in all instances.

Table 12: Shore Line East Disparate Impact Analysis for Stop Changes

SLE - Stop Analysis Results	Average Stop Change: Minority Serving Stations	Average Stop Change: Non-minority Serving Stations	Variance	Disparate Impact?
Weekday Peak Service to New Haven	0.00%	0.00%	0.00%	N
Weekday Off-Peak Service to New Haven	-37.78%	-40.00%	2.22%	N
Weekday Peak Service to New London	-50.00%	-50.00%	0.00%	N
Weekday Off-Peak Service to New London	-19.58%	-17.78%	-1.80%	N

Aggregate Rail System

Table 13 displays the aggregate minority populations of the service territories of each rail line compared to the minority populations of CTDOT’s total rail system (including the Hartford Line)

service territories in aggregate. There are no disparate impacts on the Shore Line East where major service changes occurred as the line’s minority population did not exceed the total rail system minority service territory population by greater than 15%.

Table 13: Aggregate Rail System Minority Population Comparison

	New Canaan Branch	Waterbury Branch	Danbury Branch	Shore Line East	New Haven Line	Hartford Line	Total Rail System*
Total Population Served	210,759	489,384	279,318	393,207	834,375	651,020	1,920,610
Minority Population Served	80,476	235,064	96,724	165,851	403,431	347,292	816,063
% of Line Minority	38.18%	48.03%	34.63%	42.18%	48.35%	53.35%	42.49%
% Variation from Total Rail System	-4.31%	5.54%	-7.86%	-0.31%	5.86%	10.86%	N/A

*Note that some stations are shared with multiple rail lines. The total rail system calculations only include station service area populations once and is not the sum of each line's populations.

Evaluation of Disproportionate Burden Impacts on Low-Income Populations

Shore Line East

The following SLE stations were classified in the CTDOT Title VI Program as Low-Income Serving.

Table 14: Low-Income Serving Stations on Shore Line East

SLE Line Stations	Low-Income Serving?
New London	Y
Old Saybrook	N
Westbrook	N
Clinton	N
Madison	N
Guilford	N
Branford	Y
NH-State St.	Y
New Haven	Y

Table 15 below displays the results of the Disproportionate Burden Analysis for headway changes on Shore Line East. There were no disproportionate burdens in change in headways as the variance in average headway increase between minority and non-minority serving stations was less than 15% in all instances.

Table 15: Shore Line East Disproportionate Burden Analysis for Headway Changes

SLE - Headway Analysis Results	Average Headway Change: Low-Income Serving Stations	Average Headway Change: Non-Low-Income Serving Stations	Variance	Disproportionate Burden?
Weekday Peak Service to New Haven	-34.41%	-32.14%	-2.27%	N
Weekday Off-Peak Service to New Haven	42.32%	39.44%	2.89%	N
Weekday Peak Service to New London	-100.00%	-100.00%	0.00%	N
Weekday Off-Peak Service to New London	74.41%	97.54%	23.13%*	N

*A negative number indicates that the average headway reduction at low-income serving stations was less than the average headway reduction at non-low-income serving stations.

Table 16 below displays the results of the Disproportionate Burden Analysis for station stop changes on Shore Line East. There were no disproportionate burdens in station stop changes as the variance in average stop reduction between low-income and non-low-income serving stations was less than 15% in all instances.

Table 16: Shore Line East Disproportionate Burden Analysis for Stop Changes

SLE - Stop Analysis Results	Average Stop Change: Low-Income Serving Stations	Average Stop Change: Non-Low-Income Serving Stations	Variance*	Disproportionate Burden?
Weekday Peak Service to New Haven	0.00%	0.00%	0.00%	N
Weekday Off-Peak Service to New Haven	-38.33%	-40.00%	1.67%	N
Weekday Peak Service to New London	-50.00%	-50.00%	0.00%	N
Weekday Off-Peak Service to New London	-14.68%	-22.22%	7.54%	N

Aggregate Rail System

Table 17 displays the aggregate low-income populations of the service territories of each rail line compared to the low-income populations of CTDOT’s total rail system (including the Hartford Line) service territories in aggregate. There were no disproportionate burdens on Shore Line East where major services changes occurred as the line’s low-income population does not exceed the total rail system low-income service territory population by greater than 15%.

Table 17: Aggregate Rail System Low-Income Population Comparison

	New Canaan Branch	Waterbury Branch	Danbury Branch	Shore Line East	New Haven Line	Hartford Line	Total Rail System*
Total Population Served	209,609	482,424	274,240	372,510	812,480	620,511	1,864,280
Low-Income Population Served	27,142	118,539	35,174	86,149	168,513	157,463	374,132
% of Line Low-Income	12.95%	24.57%	12.83%	23.13%	20.74%	25.38%	20.07%
% Variation from Total Rail System	-7.12%	4.50%	-7.24%	3.06%	0.67%	5.31%	N/A

*Note that some stations are shared with multiple rail lines. The total rail system calculations only include station service area populations once and is not the sum of each line's populations.

Summary of Impacts from Service Changes

The above analysis determined that there were no findings of disparate impact between minority and non-minority serving stations in the train headways or stop changes from the service changes made to Connecticut’s Shore Line East rail system.

No disproportionate burden was found in average headways or stop variance between low-income and non-low-income serving stations resulting from Shore Line East service changes.

Rail Fare Equity Analysis

Fares are critical to CTDOT and its service providers’ ability to operate a safe and reliable transportation system, while helping to support rising costs. To address the loss of fare revenue, CTDOT proposes to increase fares for Metro-North services in Connecticut, Shore Line East, and the Hartford Line. The proposed rail fare increase would result in the following:

- A 3.3% Statewide average fare medium price increase composed of:³
 - An average 2.55% New Haven Line fare medium price increase
 - An average 4.17% Shore Line East fare medium price increase
 - An average 3.28% Hartford Line fare medium price increase
- A 4.5% Statewide average “real” fare price medium price increase composed of:⁴
 - An average 4.63% New Haven Line fare medium price increase
 - An average 4.97% Shore Line East fare medium price increase
 - An average 3.83% Hartford Line fare medium price increase

³ These numbers are calculated by taking the average fare medium cost before and after the fare increase, and then determining the percent change. Average fare costs are determined by looking at the average fare for all origin and destinations for a given fare media type.

⁴ This represents the average fare medium increase, weighted by the total volume of fare medium sales.

As part of this initiative, CTDOT must conduct a Service and Fare Equity (SAFE) analysis to ensure that this proposed increase will not have a disparate impact or disproportionate burden on minority or low-income populations as defined in the CTDOT Title VI Policy.

Table 18: Summary of Average Fare Media Changes

Rail Line	% Increase	Statewide Average	Weighted % Increase	new	
New Haven Line	2.55%	3.3%	4.63%	4.5%	
Shore Line East	4.17%		4.97%		
Hartford Line	3.28%		3.83%		
New Haven Line					
Fare Medium	Current Avg Fare	New Avg Fare	~ Fare Sales	Weighted Current Avg Fare	Weighted New Avg Fare
One Way - Peak	\$7.14	\$7.60	449,085	\$3,207,211.80	\$3,411,171.01
One Way - Off Peak	\$6.73	\$7.15	621,756	\$4,183,896.39	\$4,444,256.50
Half Price One Way - Peak	\$3.61	\$3.75	116,107	\$419,192.84	\$435,883.15
Monthly School	\$102.30	\$95.83	924	\$94,525.20	\$88,542.30
Weekly	\$47.78	\$49.58	5,218	\$249,298.67	\$258,690.17
10-trip Peak	\$63.23	\$67.19	10,228	\$646,750.53	\$687,257.68
10-Trip Off Peak	\$57.25	\$60.80	6,592	\$377,405.73	\$400,821.07
10-trip Older Adult/Disabled	\$35.17	\$37.54	1,721	\$60,504.25	\$64,590.44
Promo Monthly	\$137.44	\$142.98	151,454	\$20,816,030.05	\$21,654,388.63
Average Fare Medium Price	\$51.18	\$52.49		\$22.05	\$23.07
Average Fare Medium Price Increase	2.55%			4.63%	
Shore Line East					
Fare Medium	Current Avg Fare	New Avg Fare	~ Fare Sales	Weighted Current Avg Fare	Weighted New Avg Fare
One Way	\$4.91	\$5.17	49,282	\$242,009.93	\$254,770.45
Discount One-Way	\$2.39	\$2.44	13,215	\$31,621.16	\$32,211.11
10-Trip	\$39.29	\$41.36	811	\$31,860.71	\$33,540.64
10-Trip Discount	\$24.20	\$25.85	329	\$7,960.63	\$8,504.06
Monthly	\$103.13	\$108.56	624	\$64,350.00	\$67,743.00
Monthly Bus Plus	\$113.13	\$118.56	40	\$4,525.00	\$4,742.50
School Monthly	\$69.07	\$69.07	51	\$3,522.64	\$3,522.64
Unirail	\$33.89	\$35.26	50	\$1,694.64	\$1,762.95
Average Fare Medium Price	\$48.75	\$50.78		\$6.02	\$6.32

CTDOT 2023 Rail and Bus SAFE Analysis

Average Fare Medium Price Increase	4.17%			4.97%	
Hartford Line					
Fare Medium	Current Avg Fare	New Avg Fare	~ Fare Sales	Weighted Current Avg Fare	Weighted New Avg Fare
One Way	\$5.88	\$6.13	102,135	\$600,955.04	\$625,576.88
Discount One Way	\$2.89	\$3.00	32,250	\$93,294.64	\$96,750.00
Onboard One Way	\$8.88	\$9.13	16,999	\$151,017.34	\$155,115.30
Weekly	\$38.29	\$39.88	250	\$9,573.66	\$9,968.75
10-Trip	\$47.07	\$49.00	690	\$32,479.29	\$33,810.00
Discount 10-Trip	\$28.93	\$30.63	164	\$4,744.29	\$5,022.50
Monthly	\$123.56	\$128.63	349	\$43,123.31	\$44,890.13
School Monthly	\$88.26	\$88.26	48	\$4,236.43	\$4,236.43
Unirail	\$57.26	\$59.55	105	\$6,040.73	\$6,282.82
Average Fare Medium Price	\$44.56	\$46.02		\$6.18	\$6.42
Average Fare Medium Price Increase	3.28%			3.83%	

CTDOT Title VI Policy

This analysis aligns with the fare equity analysis process articulated in the CTDOT Title VI Policy:

As stated above, Federal law requires CTDOT to conduct a fare analysis that evaluates all proposed fare changes to determine if there would be any disparate impacts to minority populations or disproportionate burdens to low-income populations.

CTDOT policy defines a disparate impact as:

A facially neutral policy or practice that disparately affects members of a group identified by race, color, or national origin, when the recipient’s policy or practice lacks a substantial legitimate justification and when there exists one or more alternatives that would serve the same legitimate objectives but with less disparate impact on the basis of race, color, or national origin.

CTDOT policy defines a 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.

The Disparate Impact/Disproportionate Burden (DI/DB) policies set by CTDOT have the following thresholds for multiple fare changes:

A fare change will be deemed to have a disparate impact on minority populations or a disproportionate burden on low-income populations if its implementation results in either:

- 1. When one fare change is proposed, the percentage of impacts of the proposed fare change borne by minority or low-income riders as a result of the proposed fare change is at least ten (10%) percentage points higher than the percentage of impacts of that proposed fare change on the overall rider population; or*
- 2. When more than one fare change is proposed:*
 - a. For each fare change in the package: the percentage of impacts of each individual proposed fare change borne by minority or low-income riders as a result of the proposed fare change is at least ten (10%) percentage points higher than the percentage of impacts of that proposed fare change on the overall rider population; and*
 - b. For the total package of fare changes: the aggregate percentage of impacts for the proposed fare changes borne by minority or low-income riders as a result of the proposed fare changes is at least five (5%) percentage points higher than the aggregate percentage of impacts on the overall rider population.*

While this fare equity analysis analyzed a proposed single fare change across all fare media, it does so on three separately operated lines with different regional demographics, operators, fare structures and information informing the analysis. Given that differences exist and that the importance of the analysis in terms of advancing equity, the analysis team classified this as two separate proposed fare changes, meaning the MNR New Haven Line and branch lines, Hartford Line and Shore Line East will be individually evaluated using the 10% disparate impact/disproportionate burden threshold and the collective package will be evaluated using the 5% disparate impact/disproportionate burden threshold.

Methodology

In alignment with the above-mentioned Title VI policy, the fare equity analysis involved two parts:

- Analysis A featured a review of disparate impacts/disproportionate burden, if any, for each line individually; and
- Analysis B featured a review of disparate impacts/disproportionate burden, if any, for the collective package.

This section summarizes the methodology used for each analysis.

Analysis A: Individual Rail Lines

Metro-North Railroad

Understanding the current rates of MNR fare media usage established existing conditions that were compared to changes resulting from the proposed fare increase. This process utilized data from several reports including:

- A *2022 Metro North Railroad Ridership Survey* that provides demographic user information such as race/ethnicity, income, and fare media, among others.
- A *2022 and 2023 MTA Ticket Sale and Revenue Report* that provides monthly statistics on fare media purchased and revenue by fare media for the New Haven Line for two months.

While these different data elements were useful and allowed CTDOT to assess the impact of proposed fare changes, there were several limitations to the overall study approach:

- The 2022 ridership survey asked individuals to identify their income by selecting one of ten household income ranges. The HHS Poverty Guidelines identify poverty level based on total household income and the number of individuals in the household. The poverty guidelines use precise values to define poverty and while the survey question ranges include these values, they do not match exactly as they include incomes both under and over poverty levels. To address this, survey responses that, after accounting for household size, selected a bracket including the 150% poverty level value, were considered to be low-income.
- In many instances, survey data were incomplete. If an entry related to minority or low-income status was listed as incomplete, it was not included in the analysis. One exception to this rule involves low-income individuals. If an individual reported under \$17,399 in household income and did not list any answer to the number of people in their household, they were still considered to be below the poverty level as \$17,399 is below 150% of the poverty level, regardless of the number of members in one's household.
- Respondents who indicated that they purchased "Round trip (peak)", or "Round trip (off-peak)" were reclassified as having purchased two "One way (peak)" or two "One way (off-peak)" tickets, as the 2022/2023 revenue reporting document did not include round trip tickets.
- Similarly, the 2022/2023 revenue reporting document's fare media subdivided "Senior/Disabled" tickets into "One Way" and "Ten Trip"; because the survey only included a "Senior/Disabled (all types)" option, ticket sales/revenue for "Senior/Disabled One Way" and "Senior/Disabled Ten Trip" were combined and summed to reflect all "Senior/Disabled" ticket types. Student passes were also discarded, as they were very context-specific and could not be applied to larger population estimates.
- The 2022 survey also listed other ticket types that were not represented in the 2022/2023 MNR Ticket Sale and Revenue Reporting document, including: "City Ticket," "UniTicket," and "Employee Pass." Together individuals selecting these ticket types accounted for less

than 1.5% of all riders and less than 0.6% of riders answering minority- or income-related questions. They were not included in this analysis.

- Based on these assumptions, the team took the following steps to determine whether minority or low-income MNR customers would experience a disparate impact and/or disproportionate burden if the proposed fare change was implemented:
 1. Using the 2022 ridership survey, the team established the percentage of minorities and low-income individuals using the line. The survey asked individuals to list each race with which they identified. If an individual identified with any minority race, even if also identifying as white, they were considered to be a minority. Blank responses or those selecting “Prefer not to respond” with no other indication of race, were not included in the analysis.
 2. Once the percentage of minority and low-income customers was identified, the team then determined the fare media used by these different types of customers. The ridership survey had asked individuals to report the fare medium used and responses were aggregated into a total and percentage by minority and low-income populations, as well as the overall population.
 3. Having established the survey response rates for these populations, as well as their rates of fare media usage, the team then applied these rates to the 2022/2023 Ticket Sales and Revenue Report. For example, the 2022 survey indicated that 32.4% of monthly tickets were purchased by minority-identifying individuals. Given that the 2022/2023 fare sales show that 13,408 monthly tickets were sold, it was estimated that 32.4% or 4,343 monthly tickets were purchased by minorities. The same approach applied to low-income and the overall population.
 4. The team then estimated the average cost of each fare medium for each population (minority, low-income, and all riders) and compared values. The cost for the proposed increase was calculated by taking the current and proposed fare for a given medium and calculating the percent change based on the new fare.
 5. Finally, the analysis team analyzed the impact of the proposed fare increase on minority, low-income, and all riders. This involved taking the existing costs for all ticket types and adjusting the value to reflect the proposed increase. The percentage paid by minority and low-income populations was compared to all riders. If the percent change was below 10%, the analysis would conclude there is no disparate impact or disproportionate burden.

Hartford Line

Understanding the current rates of Hartford Line fare media usage established existing conditions that were compared to changes resulting from the proposed fare increase. This process utilized data from several CTDOT reports including:

- The *2020 Hartford Line Ridership Survey*⁵ that provides demographic user information such as race/ethnicity, income, and fare media, among others.
- The *2021 CTrail Ridership and Revenue Report* that provides summary statistics on Hartford Line station ridership and fare media purchased, price paid per fare; and
- A list of current Hartford Line fare media and costs.

While these different data elements were useful and allowed CTDOT to assess the impact of proposed fare changes, there were several limitations to the overall study approach:

- The 2020 ridership survey asked individuals to identify their income by selecting one of ten household income ranges. The HHS Poverty Guidelines identify poverty level based on total household income and the number of individuals in the household. The poverty guidelines use precise values to define poverty and while the survey question ranges include these values, they do not match exactly as they include incomes both under and over poverty levels. To address this, survey responses that, after accounting for household size, selected a bracket including the 150% poverty level value, were considered to be low-income.
- In many instances, survey data were incomplete. If an entry related to minority or low-income status was listed as incomplete, it was not included in the analysis. One exception to this rule involves low-income individuals. If an individual reported under \$12,500 in household income and did not list any answer to the number of people in their household, they were still considered to be below the poverty level as \$12,500 is below 150% of the poverty level, regardless of the number of members in one's household.
- The 2020 survey did not list the UniRail pass as an option for the survey, meaning the team couldn't break down UniRail fare medium use by minority or income type. To address this gap in information, the team only examined 2021 fare purchases at origins and destinations along the Hartford Line. Similarly, fare media purchase data indicated some customers purchased a "monthly bus", "daily" or "child" ticket, though these were not options in the survey. These were not included in the analysis as the survey did not list these options. UPASS tickets were also discarded, as they were very context-specific and could not be applied to larger population estimates.
- Some Hartford Line fare customers did not specify whether their one-way ticket was purchased on- or off-board. For the sake of this analysis, the team considered all one-way tickets to be purchased off-board as the change in average fare price was higher.
- Hartford Line fare sales included some people who had a final destination not located on the Hartford Line, this analysis only examined those fare sales consisting of an origin and destination on the Hartford Line.

⁵ CTDOT conducted a 2022 Rider Survey, but it did not include a question regarding household size. Because of these missing datapoints, the team could not reliably identify low-income respondents and opted to use the 2020/2021 dataset, rather than mix data sources.

These assumptions noted, the team took the following steps to determine whether minority or low-income Hartford Line customers would experience a disparate impact and/or disproportionate burden if the proposed fare change was implemented:

1. Using the 2020 ridership survey, the analysis team established the percentage of minority and low-income individuals using the line. The survey asked individuals to list each race with which they identified. If an individual identified with any minority race, even if also identifying as white, they were considered to be a minority. Some listed “mixed” or “miscellaneous” as their race. These individuals were also considered to be minorities. Additionally, some survey respondents listed terms that could not be categorized, such as “human”. These responses, in addition to blank responses, were not included in the analysis.
2. Once the percentage of minority and low-income customers was identified, the team then determined the fare media used by these different types of customers. The ridership survey had asked individuals to report the fare medium used and responses were aggregated into a total and percentage by minority and low-income populations, as well as the overall population.
3. Having established the survey response rates of minority and low-income populations, as well as their rates of fare media usage, the team then applied these rates to the 2021 ridership and revenue report. For example, the 2020 survey indicated that 31.4% of ten-trip tickets were purchased by minority-identifying individuals. Given that the 2021 fare sales show that 690 ten-trip tickets were sold, it was estimated that 31.4% or 216 ten-trip tickets were purchased by minorities. The same approach applied to low-income individuals and the overall population.
4. The analysis team then estimated the average cost of each fare medium for each population (minority, low-income, and all riders) and compared values.
5. Finally, the analysis team analyzed the impact of the fare increase on minority, low-income, and all customers. This involved taking the existing costs for the ten-trip ticket and adjusting the value to reflect the new increase. The percentage paid by minority and low-income customers was compared to all customers. If the percent change was below 10%, the analysis would conclude there is no disparate impact and/or disproportionate burden on minorities or low-income individuals.

Shore Line East

The process for analyzing the impact of the fare increase on Shore Line East media was similar to the Hartford Line. Using information on current rates of Shore Line East fare usage allowed CTDOT to establish existing conditions that were compared to changes resulting from the proposed fare increase. This process was informed by several CTDOT data reports including:

- The *2019 Shore Line East Ridership Survey*⁶ that provides demographic user information such as race, income, and fare media used, among others;
- The *2021 CTrail Ridership and Revenue Report* that provides summary statistics on Shore Line East station ridership and fare media purchased, price paid per trip.
- A 2021 Amtrak invoice accounting for those who used Shore Line East tickets on an Amtrak train⁷; and
- A list of current Shore Line East fare media and costs.

In ways nearly identical to the Hartford Line analysis, there were several limitations to this approach:

- The 2019 ridership survey asked individuals to identify their income by selecting one of ten household income ranges. The HHS Poverty Guidelines identify a poverty level based on total household income and the number of individuals in the household. The poverty guidelines use precise values to define poverty and while the survey question ranges include these values, they do not match exactly as they include incomes both under and over poverty levels. To address this, survey responses that, after accounting for household size, selected a bracket including the 150% poverty level value, were considered to be low-income.
- In many instances, survey data were incomplete. For example, if an entry related to minority or low-income status was listed as incomplete or included answers that did not apply to the question, it was not included in the analysis. One exception to this rule involves low-income individuals. If an individual reported under \$12,500 in income and did not list any answer to the number of people in their household, they were still considered to be below the poverty level as \$12,500 is below 150% of the poverty level, regardless of the number of members in one's household.
- While the Amtrak invoice provided the collective sum of one-way fares purchased in 2021, it only provided revenue information for on-board, one-way tickets. To account for this, the total number of off-board, one-way fares purchased was multiplied by the average cost of a fare in the 2021 CTrail Ridership and Revenue Report. These two were then combined and a weighted average was used to calculate the average one-way fare price.
- While survey respondents indicated that they purchased either a UniRail one-way or monthly ticket, there was no information on other UniRail information. Amtrak data indicated that customers purchased other UniRail passes. Because demographic information was only available for the UniRail monthly pass, this was the only information included in the analysis.

⁶ CTDOT conducted a 2022 Rider Survey, but it did not include a question regarding household size. Because of these missing datapoints, the team could not reliably identify low-income respondents and opted to use the 2019/2021 dataset, rather than mix data sources.

⁷ Amtrak has an agreement with CTDOT to allow crossover customers.

Based on these assumptions the analysis used the following approach to determine whether minority or low-income Shore Line East customers would experience a disparate impact and/or disproportionate burden if the proposed fare change was implemented:

1. Using the 2019 ridership survey, the team established the percentage of minorities and low-income individuals using the line. The survey asked individuals to list each race for which they identified. If an individual identified with any minority race, even if also identifying as white, they were considered to be a minority. Some listed “mixed” or “miscellaneous” as their race. These individuals were also considered to be minorities. Additionally, some survey respondents listed terms that could not be categorized, such as “human”. These responses, in addition to blank responses, were not included in the analysis.
2. Once the percentage of minority and low-income customers was identified, the team then determined the fare media used by these different types of customers. The ridership survey asked individuals to report the fare medium that they used, and responses were aggregated into a total and percentage by minority and low-income populations, as well as the overall population.
3. Having established the survey response rates of minority and low-income populations among total riders, as well as their rates of fare media usage, the analysis team then applied these rates to the 2021 ridership and revenue report. For example, the 2019 survey indicated that 10.9% of ten-trip tickets were purchased by minority-identifying individuals. Given that the 2021 fare sales show that 811 ten-trip tickets were sold, it was estimated that 10.9% or 88 ten-trip tickets were purchased by minorities.
4. The team then estimated the average cost of each fare medium for each population (minority customers, low-income customers, and all customers) and compared values.
5. Finally, the team analyzed the impact of the fare increase on minority customers, low-income customers, and all customers. This involved taking the existing costs for all ticket types and adjusting the value to reflect the new increase.

Analysis B: Full Package

The team used the data created in Analysis A, Individual Rail Lines to build the model for Analysis B Full Package. There are several differences between the Metro-North Railroad, Hartford Line, and Shore Line East, including fare media available, regional demographics, and levels of service. Additionally, the estimates for MNR were informed by a 2022 survey, whereas the estimates for the Hartford Line and Shore Line East were informed by surveys from 2020 and 2019, respectively. Recognizing that different data sources informed the analysis for each element of the full package, weighted averages were calculated for each of the line’s populations in this analysis (all riders, minority riders and low-income riders). For MNR, this included adjusting the ridership estimates to reflect annual, rather than monthly, counts.

Fare Change Analyses

Analysis A: Individual Lines

Metro-North Railroad

To account for rising costs and loss of fare revenue, CTDOT proposes to increase the cost of fare on the New Haven Line by approximately 2.55% for all average fare media.

Understanding that different passes and destinations have different “real” fares the average increase by fare for MNR customers, adjusted for origins and destinations, includes a 6.36% increase for one-way peak fares, 6.22% increase for one-way off-peak fares, a 6.75% increase for half fare tickets, a 4.03% increase for promotional monthly fares, a 6.33% decrease for monthly school fares, a 3.77% increase for weekly fares, a 6.26% increase for 10 trip peak fares, a 6.20% increase for 10 trip off-peak fares, and a 6.75% increase for senior 10 trip fares.⁸

The customer survey indicated that 26% of respondents belonged to minority groups and 7% of respondents earned a low income. Minority and low income customers, proportionally, purchase fares at different rate as compared to the overall customer population. For example, approximately 2.52% of minority customers purchase an older adult/disabled ticket, whereas 8.51% of the general population purchases an older adult/disabled ticket. For this reason, minority and low-income customers would be impacted by fare increases at different levels than all customers.

Based on the sample collected by the customer survey, all customers would experience a 5.86% average fare medium increase, minority customers would experience a 5.74% average fare medium increase and low-income customers would experience a 5.91% average fare medium increase. As compared to all customers, minority customers would experience a 0.12% lower increase, whereas low-income customers would experience 0.05% larger fare increase.

Table 19 shows fare media usage patterns among minority and low-income customers relative to customers as a whole. As stated in the methodology section, this information is based off a 2022 on-board customer survey.

Table 19: Metro-North Railroad Fare Medium Purchase by Customer Type

Fare Medium	All Customers %	Minority %	Non-Minority %	Low-income %	Non- Low Income %
Ten-Trip Ticket (Off-Peak)	4.5%	31.9%	68.1%	9.8%	90.2%
Ten-Trip Ticket (Peak)	7.5%	20.8%	79.2%	1.4%	98.6%
Monthly	14.2%	32.4%	67.6%	2.6%	97.4%
Senior/Disabled (All Types)	8.5%	7.6%	92.4%	4.1%	95.9%
One Way Ticket (Off-Peak)	43.0%	27.7%	72.3%	10.9%	89.1%

⁸ See the methodology section for more information.

One Way Ticket (Peak)	21.5%	27.3%	72.7%	5.2%	94.8%
Weekly Pass	0.9%	46.2%	53.8%	13.3%	86.7%

Source: 2022 Metro North Railroad Ridership Survey

Using 2022/2023 fare sales information, the average monthly total amount of fare paid per boarding was calculated for each fare medium. This involved taking the total sales of each fare medium and applying the usage percentages to the total number of fares sold in month in 2022/2023. The monthly ticket purchases by minorities and low-income customers are shown in Table 20.

Table 20: Metro-North Railroad Fare Medium Purchases

Fare Medium	All Purchases	% All Purchases	Minority Estimate	% Minority	Low-income Estimate	% Low-income
Ten-Trip Ticket (Off-Peak)	6,592	0.5%	2,100	31.9%	648	9.8%
Ten-Trip Ticket (Peak)	10,228	0.8%	2,130	20.8%	269	2.6%
Monthly	13,408	1.1%	4,343	32.4%	552	4.1%
Senior/Disabled (All Types)	117,827	9.6%	8,935	7.6%	12,882	10.9%
One Way Ticket (Off-Peak)	621,756	50.8%	171,931	27.7%	32,215	5.2%
One Way Ticket (Peak)	449,085	36.7%	122,640	27.3%	23,269	5.2%
Weekly Pass	5,218	0.4%	2,408	46.2%	696	13.3%
Total	1,224,113		314,487		70,530	

Source: 2022/2023 MTA Ticket Sales and Revenue Report and 2022 MNR Ridership Survey

The 2022/2023 MTA Ridership and Revenue Report provided the revenue and ticket sales by fare medium during a month in 2022 and 2023. Given that different travel distances cost different fares, an average fare price, by fare medium, was determined. Then it was multiplied by the total number of purchased fares for each customer type. This provided the analysis team with information on total monthly fare expenses by customer type (see Table 21).

Table 21: Annual MNR Fare Expenses by Medium by Customer Type (Pre-Increase)

Fare Medium	Average Fare Per Ticket	Total Fare Paid All Customers	Total Fare Paid Minority	Total Fare Paid Low-income
Ten-trip Ticket (Off-Peak)	\$96.41	\$635,504	\$202,461	\$62,448
Ten-trip Ticket (Peak)	\$112.75	\$1,153,176	\$240,113	\$30,285
Monthly	\$241.62	\$3,239,608	\$1,049,450	\$133,467
Senior/Disabled (All Types)	\$7.17	\$844,721	\$64,055	\$92,352

One Way Ticket (Off-Peak)	\$11.93	\$7,419,646	\$2,051,724	\$384,438
One Way Ticket (Peak)	\$10.60	\$4,760,340	\$1,299,994	\$246,650
Weekly Pass	\$58.96	\$307,614	\$141,975	\$41,015
Total		\$18,360,607	\$5,049,772	\$990,655

Source: 2022/2023 MTA Fare Sales and Revenue Report and 2022 MNR Ridership Study

To determine total monthly expenses after the increase to all fare media was applied, the team adjusted each ticket type’s costs by adding fare media-specific increase of the ticket cost to the original fare. Using the same process for calculating Table 21 the total expenses by fare medium, by customer type, were calculated to show the respective increases (see Table 22).

Table 22: Annual Metro-North Railroad Fare Expenses by Medium by Customer Type (Post-Increase)

Fare Medium	Average Fare Per Ticket	Total Fare Paid All Customers	Total Fare Paid Minority	Total Fare Paid Low-income
Ten-trip Ticket (Off-Peak)	\$102.39	\$674,932	\$215,023	\$66,323
Ten-trip Ticket (Peak)	\$119.81	\$1,225,401	\$255,152	\$32,182
Monthly	\$251.35	\$3,370,082	\$1,091,717	\$138,842
Senior/Disabled (All Types)	\$7.65	\$901,769	\$68,381	\$98,589
One Way Ticket (Off-Peak)	\$12.68	\$7,881,363	\$2,179,400	\$408,361
One Way Ticket (Peak)	\$11.27	\$5,063,069	\$1,382,665	\$262,335
Weekly Pass	\$61.18	\$319,202	\$147,324	\$42,560
Total		\$19,435,819	\$5,339,662	\$1,049,193

Source: 2022/2023 MTA Fare Sales and Revenue Report and 2022 MNR Ridership Study

Hartford Line

CTDOT proposes an average Hartford Line fare medium increase of 3.28%. Accounting for adjustments like origin/designation and fare media types, all customers would pay a 4.06% higher average fare medium, minority customers would pay a 4.07% higher average fare medium and low-income customers would pay a 4.04% higher average fare medium.⁹ Below is a summary of the process used to make these determinations.

Table 23 shows fare media usage patterns among minority and low-income relative to all customers. As stated in the methodology section, this information is based off a past on-board customer survey.

⁹ See the methodology section for more information.

Table 23: Hartford Line Fare Medium Purchase by Type of Customer

Fare Medium	All Customers %	Minority %	Low-income %
Ten-trip Ticket	5.6%	31.4%	0.0%
Monthly	12.8%	31.7%	10.3%
One Way Senior/Disabled Ticket	6.4%	30.0%	29.8%
One Way Ticket	73.0%	46.4%	27.1%
Ten-trip Senior/Disabled Ticket	1.3%	27.3%	0.0%
Weekly Pass	0.9%	22.2%	55.6%

Source: 2019 CTrail Ridership Survey

Using 2021 fare sales information, the annual total amount of fare paid per boarding was calculated for each fare medium. This involved taking the total sales of each fare medium and applying the usage percentages to the total number of fares sold in 2021 (see Table 24).

Table 24: Estimated 2021 Hartford Line Fare Medium Usage by Type of Customer

Fare Medium	All Purchases	% All Purchases	Minority Estimate	% Minority	Low-income Estimate	% Low-income
Ten-trip Ticket	690	0.5%	216	31.4%	0	0.0%
Monthly	349	0.3%	111	31.7%	36	10.3%
One Way Senior/Disabled Ticket	32,250	23.7%	9,675	30.0%	9,618	29.8%
One Way Ticket	102,135	75.2%	47,345	46.4%	27,669	27.1%
Ten-trip Senior/Disabled Ticket	164	0.1%	45	27.3%	0	0.0%
Weekly Pass	250	0.2%	56	22.2%	139	55.6%
Grand Total	135,838	100.0%	57,448		37,462	

Source: 2021 CTrail Ridership and Revenue Report and 2019 Ridership Survey

The 2021 CTrail Ridership and Revenue Report provided the cost of every fare purchase in 2021. Given that different travel distances cost different fares, an average fare price, by fare medium, was determined. Then it was multiplied by the total number of purchased fares for each type of customer. This provided the analysis team with information on total annual fare expenses by type of customer (see Table 25).

Table 25: Annual Hartford Line Fare Expenses by Medium by Type of Customer (Pre-Increase)

Fare Medium	Average Fare Per Trip	Total Fare Paid All Customers	Total Fare Paid Minority	Total Fare Paid Low-income
Ten-trip Ticket	\$58.43	\$40,313	\$12,647.29	\$0.00
Monthly	\$117.97	\$41,171	\$13,054.06	\$4,259.02
One Way Senior/Disabled Ticket	\$3.61	\$116,263	\$34,878.98	\$34,675.00
One Way Ticket	\$6.97	\$712,138	\$330,116.45	\$192,920.33
Ten-trip Senior/Disabled Ticket	\$32.41	\$5,315	\$1,449.55	\$0.00
Weekly Pass	\$36.38	\$9,094	\$2,020.83	\$5,052.08
Total		\$924,293	\$394,167	\$236,906

Source: 2021 CTrail Ridership and Revenue Report and 2019 Ridership Study

To determine total annual expenses after the fare increase was applied, the team added the fare media-specific increases to the original fare to calculate the new the media fare cost. Using the same process for calculating Table 25, the total expenses by fare medium, by type of customer, were calculated to show the respective increases (see Table 26).

Table 26: Annual Hartford Line Fare Expenses by Medium by Type of Customer (Post-Increase)

Fare Medium	Average Fare Per Trip	Total Fare Paid All Customers	Total Fare Paid Minority	Total Fare Paid Low-income
Ten-trip Ticket	\$60.82	\$41,966	\$13,166	\$0.00
Monthly	\$122.80	\$42,858	\$13,589	\$4,434
One Way Senior/Disabled Ticket	\$3.74	\$120,565	\$36,169	\$35,958
One Way Ticket	\$7.26	\$741,336	\$343,651	\$200,830
Ten-trip Senior/Disabled Ticket	\$34.31	\$5,626	\$1,534	\$0.00
Weekly Pass	\$37.88	\$9,469	\$2,104	\$5,261
Total		\$961,821	\$410,215	\$246,482

Source: 2021 CTrail Ridership and Revenue Report and 2019 Ridership Study

Shore Line East

CTDOT proposes an average Shore Line East fare medium increase of 4.21%. The proposed increase in total average fare medium cost paid by all customers, adjusted for origin/designation

and select fare media types, is 5.55%.¹⁰ For minority customers, the average fare medium would increase by 5.46% and for low-income customers it would increase by 5.47%. Below is a summary of the process used to make these determinations.

Table 27 shows fare usage patterns among minority and low-income customers relative to all customers. As stated in the methodology section, this information is based on a 2019 on-board customer survey.

Table 27: 2019 Shore Line East Ridership Survey Fare Medium Use by Type of Customer

Fare Medium	All Customers %	Minority %	Low-income %
Monthly pass (does not include New Haven Commuter Connection bus service)	26.6%	13.1%	3.5%
Monthly Plus (includes New Haven Commuter Connection bus service)	5.5%	7.1%	4.3%
10-trip ticket	9.2%	10.9%	13.2%
One way	39.4%	21.7%	23.1%
Senior/disabled 10-trip ticket	2.6%	14.3%	7.7%
Senior/disabled One way	10.0%	12.2%	13.2%
UniRail monthly	6.6%	8.8%	3.8%

Source: 2019 SLE On-board Customer Survey

Using 2021 fare sales, the annual number of fares paid by type of customer was calculated for each fare medium. This involved taking the total sales of each fare medium and using percentages from Table 27 to estimate the number of tickets purchased by minorities and low-income individuals, as shown in Table 28.

Table 28: Estimated 2021 Shore Line East Fare Medium Usage by Type of Customer

Fare Medium	All Purchases	Minority Estimate	Low-income Estimate
Monthly pass (does not include New Haven Commuter Connection bus service)	624	82	22
Monthly Plus (includes New Haven Commuter Connection bus service)	40	3	2
Ten-trip Ticket	811	88	107
One Way Ticket	49,282	10,703	11,395
Senior/disabled Ten-trip Ticket	329	47	25
Senior/disabled One Way Ticket	13,215	1,618	1,739

¹⁰ See the methodology section for more detail

UniRail Monthly Pass	50	4	2
Total	64,351	12,545	13,291

Source: 2021 CTrail Ridership, Amtrak Invoice and Revenue Report and 2020 Ridership Survey

The 2021 CTrail Ridership and Revenue Report provided the cost of every fare purchase in 2021. Given that different trip distances cost different fares, an average fare price, per-fare medium was determined. Then, it was multiplied by the total number of fares purchased for each type of customer. This provided the analysis team with information on total annual fare expenses by type of customer.

Table 29: Annual Shore Line East Fare Expenses by Medium by Type of Customer (Pre-Increase)

Fare Medium	Average Fare	Total Fare Paid All Customers	Total Fare Paid Minority	Total Fare Paid Low-income
Monthly pass (Not including New Haven Commuter Connection bus service)	\$109.01	\$68,023.45	\$8,937.39	\$2,386.79
Monthly Plus (includes New Haven Commuter Connection bus service)	\$164.95	\$6,598.08	\$471.29	\$286.87
Ten-trip Ticket	\$48.28	\$39,156.09	\$4,256.10	\$5,152.12
One Way Ticket	\$8.93	\$440,118.34	\$95,581.26	\$101,761.47
Senior/disabled Ten-trip Ticket	\$13.67	\$4,498.00	\$642.57	\$346.00
Senior/disabled One Way Ticket	\$4.41	\$58,243.74	\$7,131.89	\$7,663.65
UniRail Monthly Pass	\$152.40	\$7,620.16	\$672.37	\$293.08
Total		\$624,257.87	\$117,692.86	\$117,889.98

Source: 2021 CTrail Ridership, Amtrak Invoice and Revenue Report and 2020 Ridership Survey

To determine total annual expenses after the proposed fare increase was applied, the team adjusted all fare media costs by adding each of the fare media specific increases to the original cost to calculate each fare type (see Table 30).

Table 30: Annual Shore Line East Fare Expenses by Medium by Type of Customer (Post-Increase)

Fare Medium	Average Fare Per Trip	Total Fare Paid All	Total Fare Paid Minority	Total Fare Paid Low-income
Monthly pass (does not include New Haven Commuter Connection bus service)	\$114.76	\$71,608	\$9,408	\$2,513
Monthly Plus (includes New Haven Commuter Connection bus service)	\$172.89	\$6,915	\$494	\$301

Ten-trip Ticket	\$50.83	\$41,220	\$4,480	\$5,424
One Way Ticket	\$9.40	\$463,313	\$100,618	\$107,124
Senior/disabled Ten-trip Ticket	\$14.61	\$4,805	\$686	\$370
Senior/disabled One Way Ticket	\$4.49	\$59,330	\$7,265	\$7,807
UniRail Monthly Pass	\$158.55	\$7,927	\$699	\$305
Total		\$655,133	\$123,655	\$123,845

Source: 2021 CTrail Ridership, Amtrak Invoice and Revenue Report & 2020 Ridership Survey

Analysis B: Full Package

Once individual average fares were determined for each line, the three lines were combined to make the full package. This involved taking the average fare for each line and multiplying it by the total number of fares sold on that line. These were then added together and divided by the sum of the fares for each line. This process was repeated for both minority and low-income populations. The average fare for all customers increased by \$0.87. Collective minority customer and low-income customer fares increased by \$0.91 and \$0.80 respectively.

Determination of a Discriminatory Impact or Disproportionate Burden

In alignment with CTDOT Title VI policy, the analysis team conducted two analyses to determine if there was a disparate impact or disproportionate burden:

- Analysis A examined the differences in percentage change between all customers and minority/low-income customers for the Metro-North Railroad, Hartford Line, and Shore Line East individually; and
- Analysis B examined the differences in percentage change between all customers and minority/low-income customers for the Metro-North Railroad, Hartford Line, and Shore Line East as a single, collective package.

Analysis A: Individual Lines

Metro-North Railroad

The percentage change for each MNR type of customer showed that all customers would experience a 5.86% increase in average fare medium price, minority customers would experience a 5.74% increase in average fare medium price and low-income customers would experience a 5.91% increase in average fare medium price. Given that the difference between all customers and minority customers is -0.12%, the difference between all customers and low-income customers is 0.0% (see Table 31) -- values that are well below the CTDOT-mandated 10% threshold -- there was no finding of a disparate impact or disproportionate burden on MNR customers.

Table 31: Percent Change in Metro-North Railroad Fare Payments

	All	Minority	Low-income
Average Fare Medium Price Pre-Increase	\$15.00	\$16.06	\$14.05
Average Fare Medium Price Post-Increase	\$15.88	\$16.98	\$14.88
Percent Change	5.86%	5.74%	5.91%

Source: 2022 MNR Fare Sales and Revenue Report and 2022 Ridership Study

Hartford Line

The percentage change for each Hartford Line type of customer showed that all customers would experience a 4.06% increase in average fare, minority customers would experience a 4.07% increase in average fare and low-income customers would experience a 4.04% increase in average fare. Given that there is a 0.01% difference between all customers and minority customers and a 0.02% difference between all customers and low-income customers (Table 32) -- values that are well below the CTDOT-mandated 10% threshold -- there was no finding of a disparate impact or disproportionate burden on Hartford Line customers.

Table 32 Percent Change in Hartford Line Fare Payments

	All	Minority	Low-income
Average Fare Medium Price Pre-Increase	\$6.80	\$6.86	\$6.32
Average Fare Medium Price Post-Increase	\$7.08	\$7.14	\$6.58
Percent Change	4.06%	4.07%	4.04%

Source: 2021 CTrail Ridership and Revenue Report and 2020 Ridership Study

Shore Line East

The percentage change for each Shore Line East type of customer shows that all customers would experience a 4.95% increase in average fare, minority customers would experience a 5.07% increase in average fare and low-income customers would experience a 5.05% increase in average fare. Given that there is a 0.12% difference between all customers and minority customers and a 0.11% difference between all customers and low-income customers -- values that are well below the CTDOT-mandated 10% threshold -- there was no finding of a disparate impact or disproportionate burden on Shore Line East customers (see Table 33).

Table 33: Percent Change in Shore Line East Fare Payments

	All	Minority	Low-income
Average Fare Medium Price Pre-Increase	\$9.70	\$9.38	\$8.87
Average Fare Medium Price Post-Increase	\$10.18	\$9.86	\$9.32
Percent Change	4.95%	5.07%	5.05%

Source: 2021 CTrail Revenue Report, Amtrak Invoice and 2019 Ridership Survey

Analysis B: Full Package

As stated in the methodology, Metro-North Railroad, Hartford Line, and Shore Line East data were combined and weighted based on their total estimated annual ridership. The percentage change analysis revealed that the change, following the proposed fare increase, for minority and low-income customers was 5.73% and 5.85% respectively (see Table 34). Compared to all customers, the difference for minority customers was approximately 0.12% below the overall average increase. Compared to all customers and the difference for low-income customers was 0.02% above the overall increase. Because these differences are below the 5% disparate impact or disproportionate burden threshold, the analysis concluded that the proposed fare changes for the full package do not have a disparate impact on minority or disproportionate burden on low-income customers.

Table 34: Percent Change in Full Package Payments

	All	Minority	Low-income
Average Fare Pre-Increase	\$14.90	\$15.90	\$13.65
Average Fare Post-Increase	\$15.77	\$16.81	\$14.45
Percent Change	5.85%	5.73%	5.86%

Source: 2021 CTrail Revenue Report, Amtrak Invoice, 2022/2023 MTA Fare Sales and Revenue Report, and 2019, 2020, and 2022 Ridership Survey

Fare Impacts and Alternatives Findings

There was no finding of disparate impact or disproportionate burden for both individual lines (satisfying the first component of CTDOT policy) and the total package (satisfying the second component of CTDOT policy). Therefore, no mitigations or alternatives must be considered.

Bus

Proposed Bus Service Changes

The bipartisan budget adopted earlier this year included an increase in funding increase for bus service in Connecticut. The focus of the expansion is on better access to jobs, training, and education by providing service that operates later and seven days a week. The Service and Fare Equity Analysis includes one proposed new route in the *CTtransit Hartford* Division, two proposed new routes in the *CTtransit New Haven* Division and proposed improvements to service frequencies on two *CTfastrak* routes.

In addition, changes are proposed to eight routes in the *CTtransit Hartford* Division to better align with ridership demand and promote efficiency. The types of proposed service changes on these eight routes include decreased service frequency, route restructuring, and route elimination with replacement service.

The following bus routes have proposed changes. A description of these route's current service plans and proposed route changes are described.

Hartford Division (Local routes and Express services)

Hartford dash Shuttle

Current Service Plan

Currently the Hartford dash Shuttle operates Monday through Friday from 7 AM to 7 PM. The weekday ridership demand is less than 50 customers per day. The shuttle is also operated on weekends when events occur in downtown Hartford. During those service days the ridership varies on the route from a few hundred daily riders to over 2,000 customers per day.

Proposed Route Changes

To better align ridership demand with scheduled service the dash Shuttle is proposed to transition from a Monday through Friday schedule to a Thursday through Sunday schedule, operating 8 AM to 10 PM. Service would operate on Monday, Tuesday, and Wednesdays for special events, as needed. Operating the proposed schedule would align the service to the ridership demand and make more efficient use of the available resources. The dash Shuttle is displayed below in Figure 2.

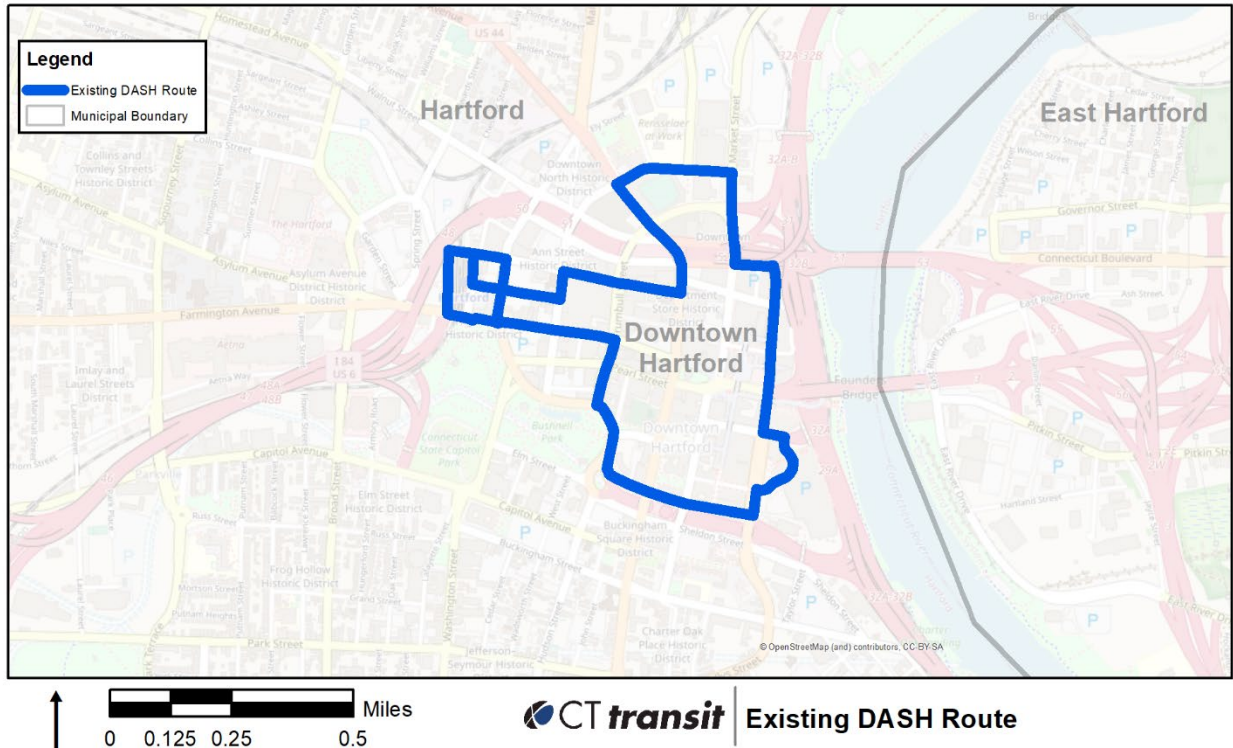


Figure 2: Hartford dash Shuttle

45X – Berlin Turnpike Flyer

Current Service Plan

Route 45X is a limited-stop local service that operates between downtown Hartford and the Berlin Turnpike seven days a week. All trips serve CTDOT Headquarters and Price Chopper, with some trips extended to Stew Leonard’s and Eversource. Some weekday trips originate or terminate at Hartford Union Station and are timed to meet Hartford Line trains.

On weekdays, service operates in the outbound (to Berlin Turnpike) direction only during the AM peak and in the inbound (to Downtown Hartford) direction only during the PM peak. At night and on Sundays, service on Route 45X operates in both directions.

Table 35: Route 45X Service Summary - Current

	Service Span	Headway			
		AM	Base	PM	Off-Peak
Weekday	6:15 AM – 8:01 AM 4:26 PM – 10:35 PM	20	--	15	130
Saturday	7:15 PM – 10:35 PM	--	--	--	130
Sunday	8:00 AM – 7:25 PM	70	140	70	--

Proposed Route Changes

Service on Route 45X is proposed to be discontinued and replacement service provided by CTfastrak Route 125. Route 45X is displayed below in Figure 3.

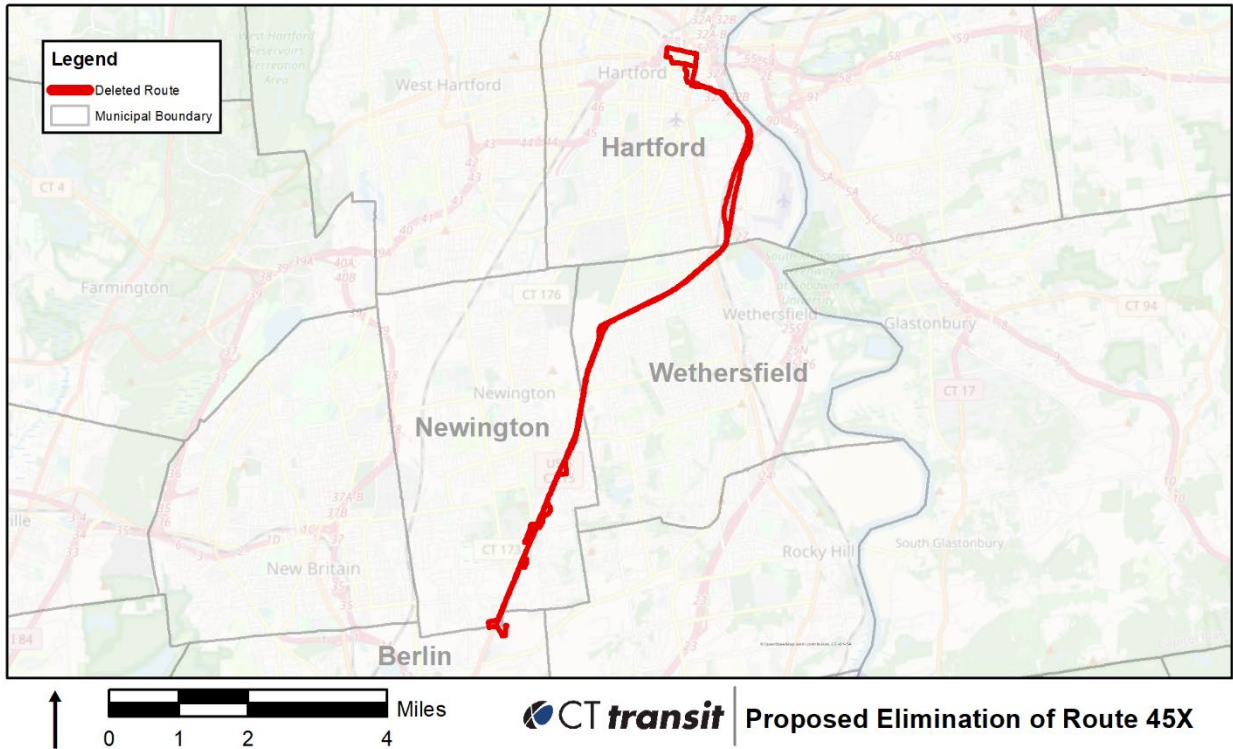


Figure 3: 45X – Berlin Turnpike Flyer

47B – Berlin Turnpike

Current Service Plan

Route 47B is a branch of the Route 47 – Franklin Avenue local route. It operates hourly service between downtown Hartford and Berlin Turnpike via Franklin Avenue in Hartford and Wolcott Hill Road in Wethersfield. Route 47B operates on weekdays and Saturdays only, serving CTDOT Headquarters and Price Chopper.

Table 36: Route 47B Service Summary – Current

	Service Span	Headway			
		AM	Base	PM	Off-Peak
Weekday	7:45AM – 4:54PM	60	60	60	--
Saturday	7:45AM – 6:58PM	60	60	60	--
Sunday	N/A	--	--	--	--

Proposed Route Changes

The 47B branch of Route 47 is proposed to be discontinued. Service levels along Franklin Avenue in Hartford and along Wolcott Hill Road in Wethersfield north of Jordan Lane would remain unchanged.

As a result of the proposed changes, weekday headways during the midday would be widened from 30 to 60 minutes and Saturday service would be discontinued along Wolcott Hill Road between Jordan Lane and Prospect Street in Wethersfield for Route 47.

Service along Prospect Street in Wethersfield would be discontinued on weekdays and Saturdays, with limited alternate service provided by the 61 – Broad Street route.

Replacement service along Berlin Turnpike would be provided by CTfastrak Route 125.

Route 47B is displayed below in Figure 4.

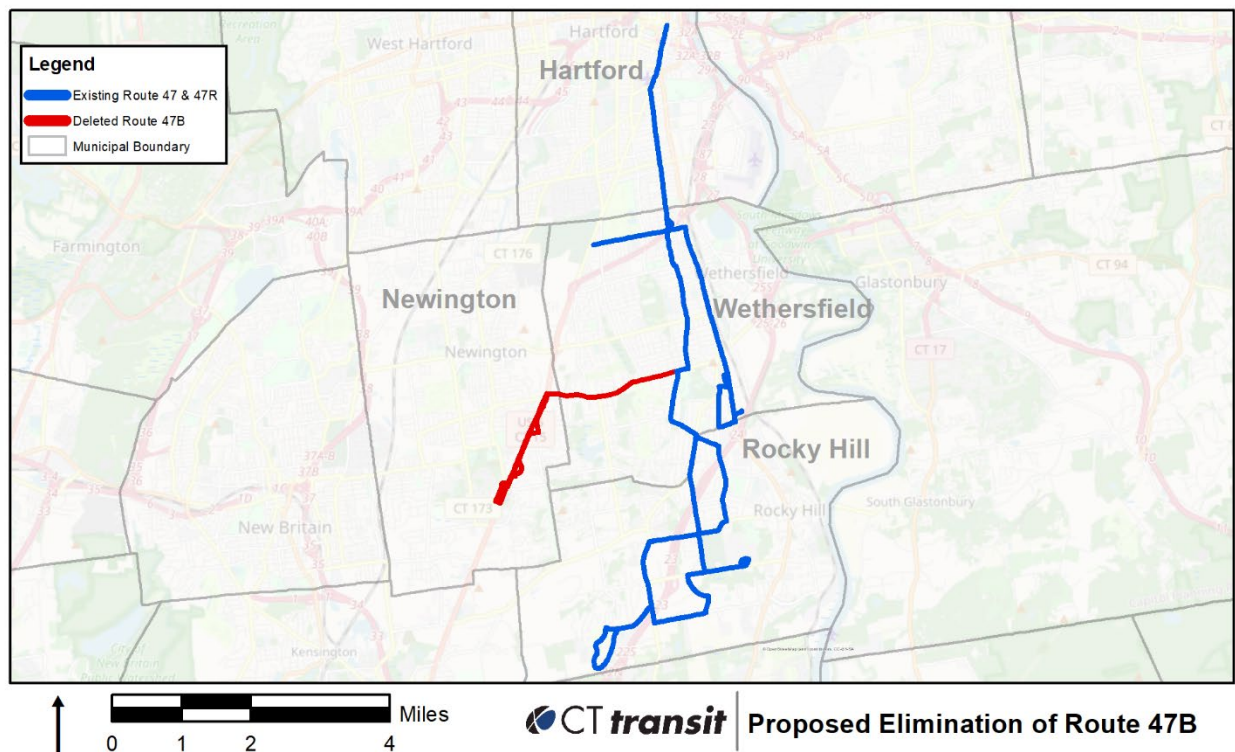


Figure 4: 47B – Berlin Turnpike

69 – Capitol Avenue

Current Service Plan

Route 69 local service operates between Downtown Hartford and Berlin Turnpike via Capitol Avenue in Hartford, Boulevard; Quaker Lane South; and Newington Road in West Hartford, and Willard Avenue in Newington. Service operates six days a week, Monday through Saturday. All trips serve CTfastrak Newington Junction Station, Newington Veterans Hospital, Turnpike Plaza (Price Chopper) and CTDOT Headquarters. Part-time service to Fenn Road and CTfastrak Cedar Street Station is provided on weekdays.

Table 37: Route 69 Service Summary – Current

	Service Span	Headway			
		AM	Base	PM	Off-Peak
Weekday	5:05AM – 10:38PM	30	30	30	65
Saturday	6:05AM – 10:38PM	30	30	30	65
Sunday	N/A	--	--	--	--

Proposed Route Changes

Service on Route 69 would be rerouted to operate via Fenn Road and CTfastrak Cedar Street Station at all times. All trips on Route 69 would terminate at the Newington Veteran’s Hospital. Replacement service to Willard Avenue and Berlin Turnpike would be provided by the proposed CTfastrak Route 125. Route 69 is displayed below in Figure 5.

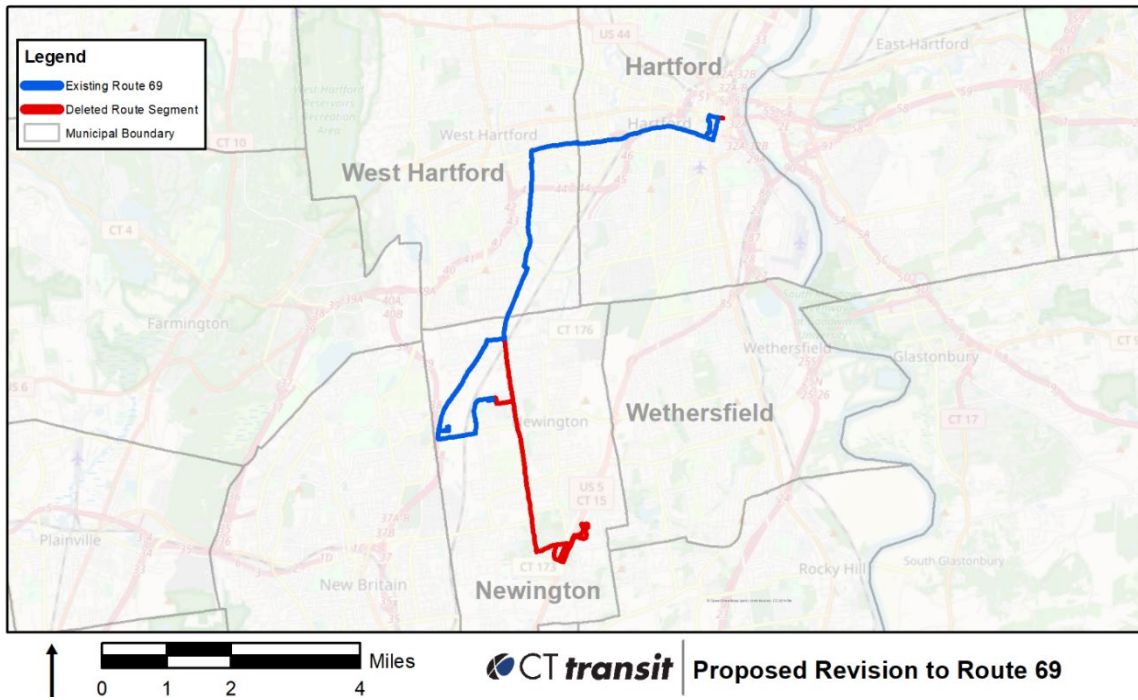


Figure 5: 69 – Capitol Avenue

907 – Newington Express

Current Service Plan

Route 907 is an express service that operates between downtown Hartford and the Newington Park & Ride on weekdays only. Service operates inbound only from Newington to Hartford during the AM peak in the outbound only during the PM peak.

Table 38: Route 907 Service Summary – Current

	Service Span	Headway			
		AM	Base	PM	Off-Peak
Weekday	6:39AM – 8:24AM & 4:02PM – 5:42PM	40	--	40	--
Saturday	N/A	--	--	--	--
Sunday	N/A	--	--	--	--

Proposed Route Changes

Service on Route 907 is proposed to be discontinued. Service between the Newington Park & Ride and downtown Hartford on weekdays would be provided by the proposed CTfastrak Route 125. Route 907 is displayed below in Figure 6.

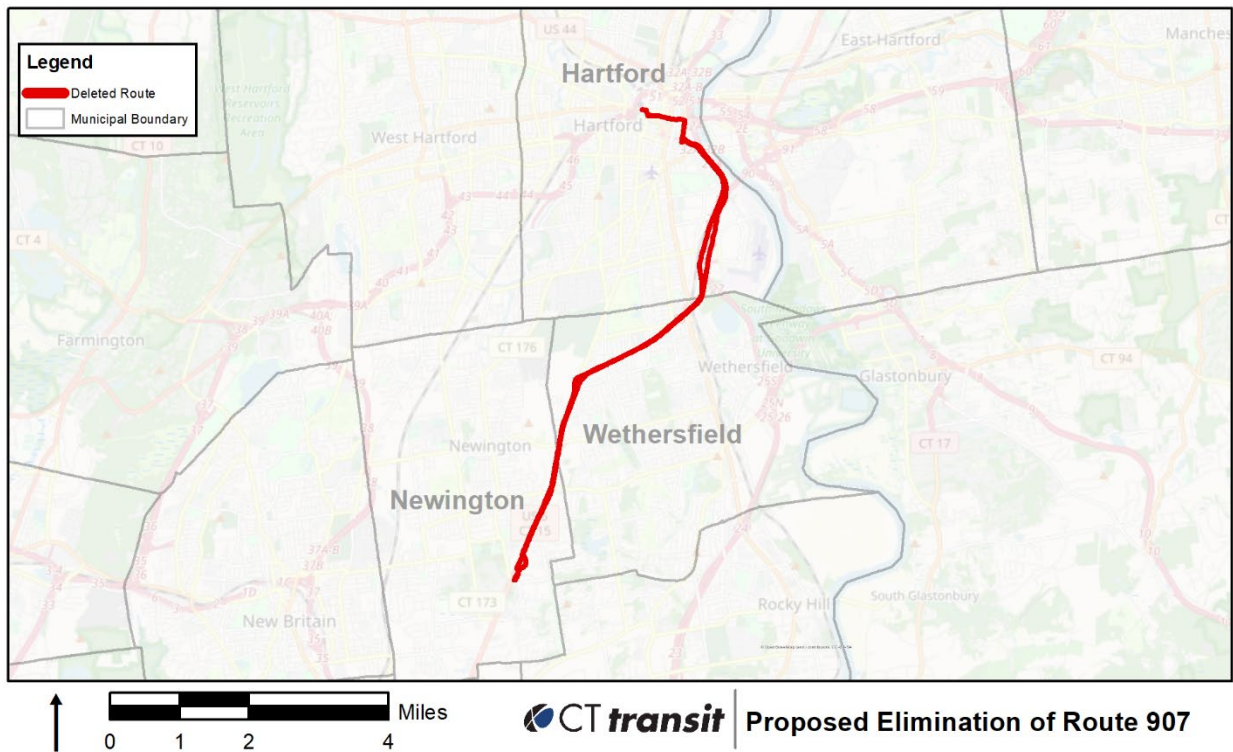


Figure 6: 907 – Newington Express

923 – Bristol Express

Current Service Plan

Route 923 operates between Downtown Hartford, CTfastrak New Britain Station and Bristol, CT. This service operates five morning trips towards Hartford and five evening trips from Hartford. The ridership on this route is carrying 55% of the estimated volume from the Express Bus Service for a Dynamic Future completed in 2021. In reviewing the ridership by trip, the ridership has not responded to the new schedule (see Table 39). There was an expectation that there would be greater amount of ridership by leveraging the service in the PM rather than the AM. This is largely due to a schedule redesign in 2021. The former schedule had seven trips in the AM starting at 6:40 AM and ending at 8:50 AM. The earlier start time and earlier ending time along with fewer trip was expected to carry fewer customers. The PM schedule also had a reduction from seven trips to five trips. Unlike the AM service period, the start and end times of the PM trips largely remained the same. It was expected the ridership from the two eliminated trips in the former schedule would be absorbed into the reduced schedule. Also of note was some elimination of reverse commute trips and midday service which was not provided in the 2021 service redesign.

The 923 also operates along a similar corridor to CTfastrak Route 102. Route 102 provides service to the same points in Bristol as well as CTfastrak New Britain station. The travel time on the 102 is scheduled to take approximately 1 hour to 1 hour and 10 minutes between Hartford, CTfastrak New Britain and Bristol, CT. Route 923 is scheduled to take 49 minutes outbound and 46 minutes inbound. While there is some travel time savings on Route 923, the increased frequency of Route 102 may better serve some of the ridership who would otherwise use Route 923.

Table 39: Route 923 Weekday Ridership by Trip

Eastbound to Hartford		
Trip Time	Actual Ridership	Estimated Ridership
5:54AM	5	10
6:24AM	11	6
6:54AM	3	10
7:24AM	6	9
7:54AM	7	6
Westbound from Hartford		
Trip Time	Actual Ridership	Estimated Ridership
3:45PM	5	16
4:15PM	7	21
4:45PM	3	26
5:15PM	14	11
5:45PM	3	2

Proposed Route Change

Given the limited ridership return to Route 923 as well as the similar geographic coverage provided by Route 102, Route 923 is proposed to be eliminated. Route 923 is displayed below in Figure 7.

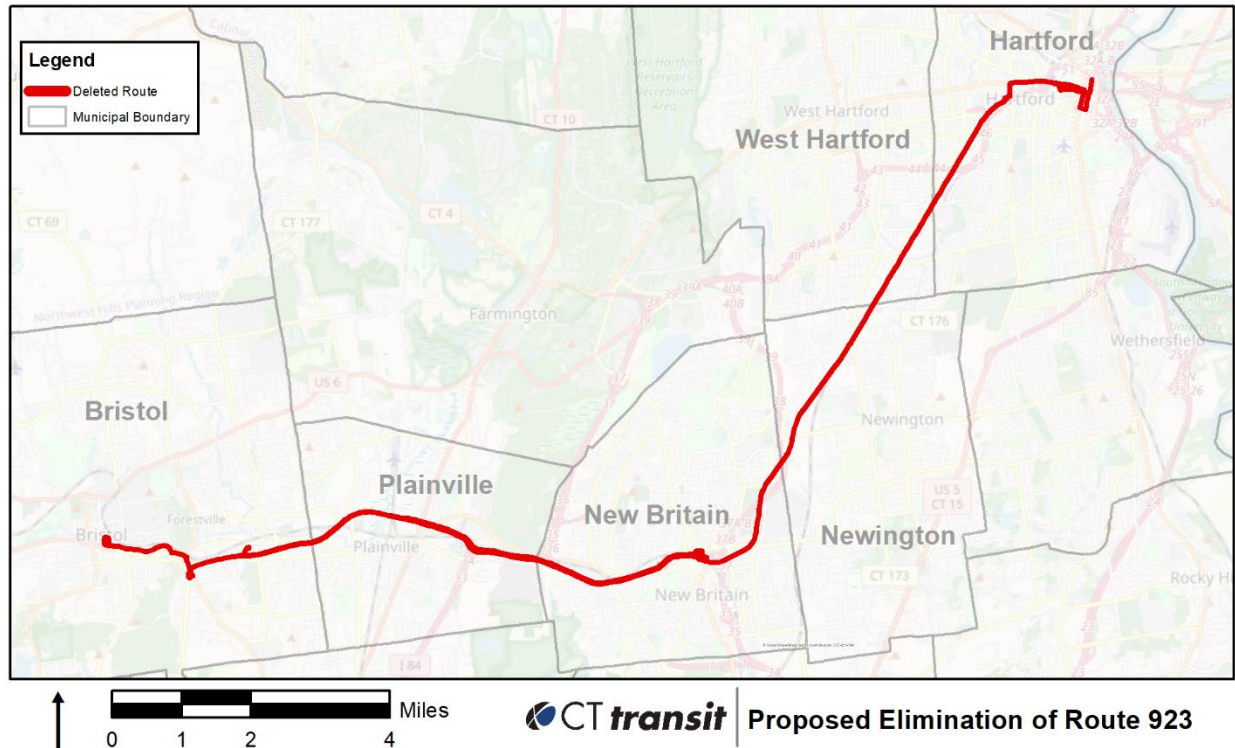


Figure 7: 923 – Bristol Express

CTfastrak Feeder Service Proposed Service Changes

102 – Hartford/New Britain/Bristol

Current Service Plan

CTfastrak Route 102 operates local service between downtown Hartford and downtown New Britain via the CTfastrak guideway, then continues to downtown Bristol via CT 72 making stops at the Todd Street and Lake Avenue Park & Rides. Service on Route 102 operates seven days week.

Table 40: Route 102 Service Summary – Current

	Service Span	Headway			
		AM	Base	PM	Off-Peak
Weekday	4:31AM – 1:25AM	30	60	30	60
Saturday	5:06AM – 1:25AM	60	60	60	60
Sunday	7:09AM – 9:25PM	60	60	60	--

Proposed Route Changes

In Bristol, service on CTfastrak Route 102 is proposed to be discontinued along the expressway portion of CT 72 between Todd Street and Forestville Avenue.

All trips would be rerouted to operate along Pine Street making local stops in both directions, establishing two-way service to Forestville Commons. The level of service on Route 102 would remain unchanged. Route 102 is displayed below in Figure 8.

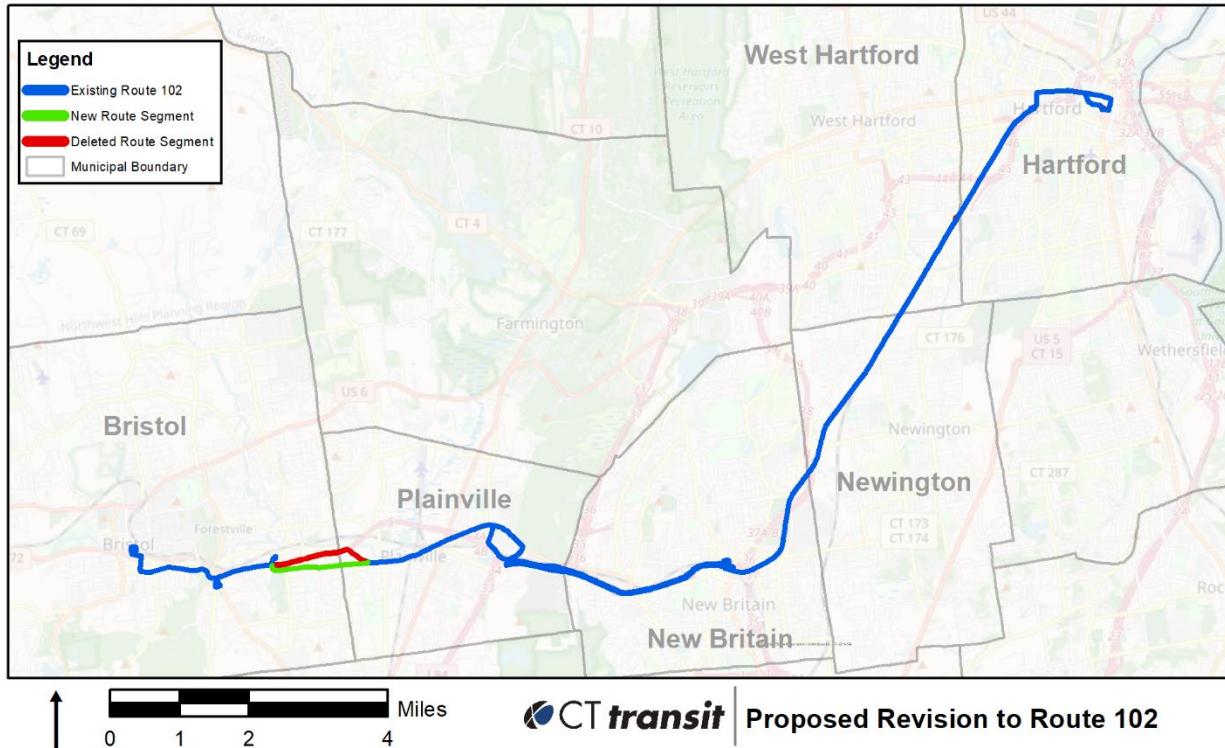


Figure 8: 102 – Hartford/New Britain/Bristol

125 – Hartford-Berlin Turnpike

Current Service Plan

Not applicable.

Proposed Route Changes

CTfastrak Route 125 is a proposed new bus route that would operate between downtown Hartford and Berlin Turnpike. Buses would depart Main Street in downtown Hartford, service Union Station, then operate via the CTfastrak guideway, making all stops to Newington Junction Station.

From this point, buses would make local stops along Willard Avenue, Robbins Avenue and East Robbins Avenue in Newington to the Berlin Turnpike. Buses would make multiple stops in the Berlin Turnpike corridor, including:

- Kitts Lane (Boston Market, Stop & Shop)
- CTDOT Headquarters
- Newington Park & Ride (part-time service only)
- Turnpike Plaza (Price Chopper)
- Willard Avenue (Southfield Apartments, Salem Village)
- Target
- Newington Plaza (Walmart, Staples)
- Pane Road (Best Buy, Olympia Diner)
- Newington Fair (Sam’s Club, Stew Leonard’s, Burlington)
- Eversource (part-time service only)

Service on CTfastrak Route 125 would operate seven days a week, with buses every 30 minutes during the AM & PM peak, every 40 minutes during midday and on Saturdays, and every hour after 10:00PM and on Sundays.

Table 41: Route 125 Service Summary – Proposed

	Service Span	Headway			
		AM	Base	PM	Off-Peak
Weekday	4:45AM – 1:12AM	30	40	30	60
Saturday	4:55AM – 1:12AM	40	40	40	60
Sunday	5:40AM – 9:37PM	60	60	60	--

Route 125 is displayed below in Figure 9.

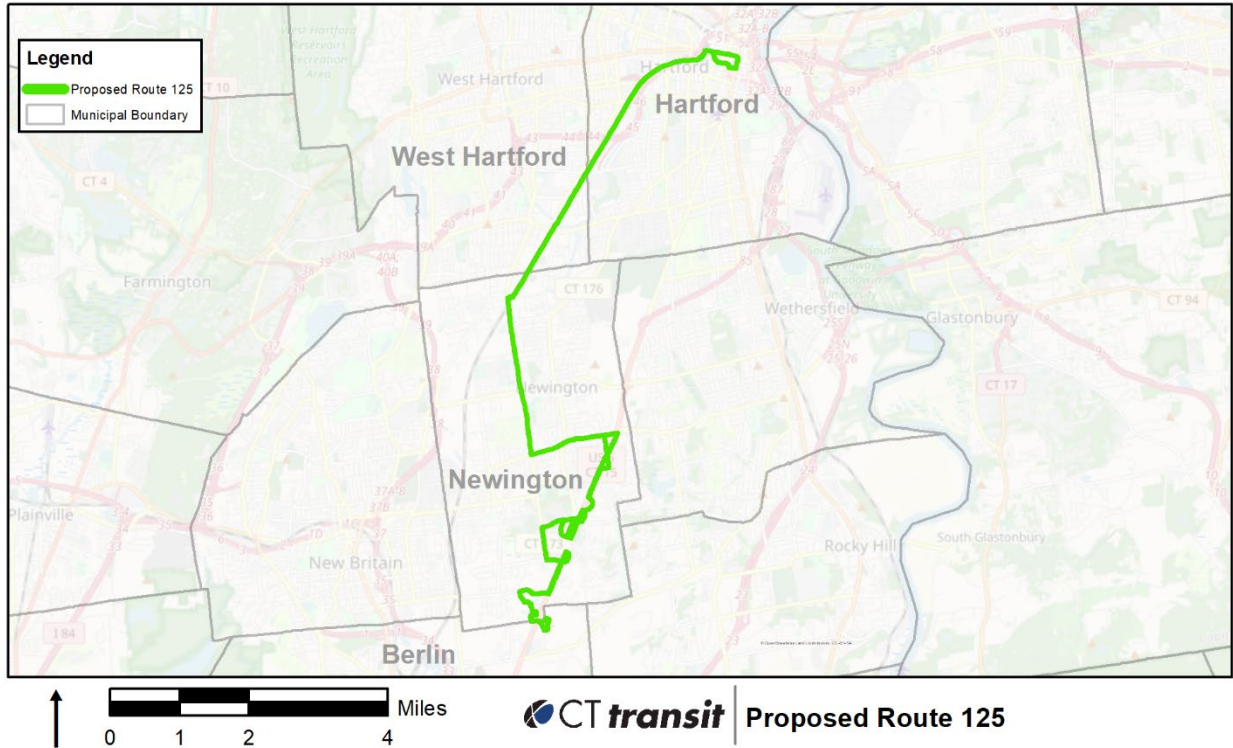


Figure 9: 125 – Hartford-Berlin Turnpike

140 – CCSU Connector

Current Service Plan

CTfastrak Route 140 is a local feeder service that operates in a loop between the CTfastrak guideway and the Central Connecticut State University (CCSU) campus seven days a week, providing students and faculty alike an opportunity to connect with mainline CTfastrak routes at Cedar Street and East Street Stations. Route 140 also provides part-time service (i.e., every other trip) to Fenn Road and Newington Junction Station.

Service on Route 140 had been suspended during the Covid-19 pandemic and during a significant portion of calendar year 2022 due to an operator shortage and the availability of other services to accommodate Route 140 customers.

Route 140 currently serves 32 customers each weekday on average, 19 customers per day on Saturdays and 12 customers per day on Sundays.

Table 42: Route 140 Service Summary – Current

	Service Span	Headway			
		AM	Base	PM	Off-Peak
Weekday	6:18AM – 12:10AM	20	20	20	30
Saturday	6:18AM – 12:10AM	20	20	20	30
Sunday	6:58AM – 8:46PM	20	20	20	--

Proposed Route Changes

Due to low utilization (1.57 customers per hour) and the availability of alternate services linking multiple CTfastrak stations to the CCSU campus – including Routes 128, 144 and 507 – service on Route 140 is proposed to be discontinued. Service to Fenn Road would instead be provided on weekdays and Saturdays by Route 69. The proposal to increase weekday frequency on CTfastrak Route 144 which operates between Cedar Street Station, East Street Station and the CCSU campus is described in the next section.

Route 140 is displayed below in Figure 10.

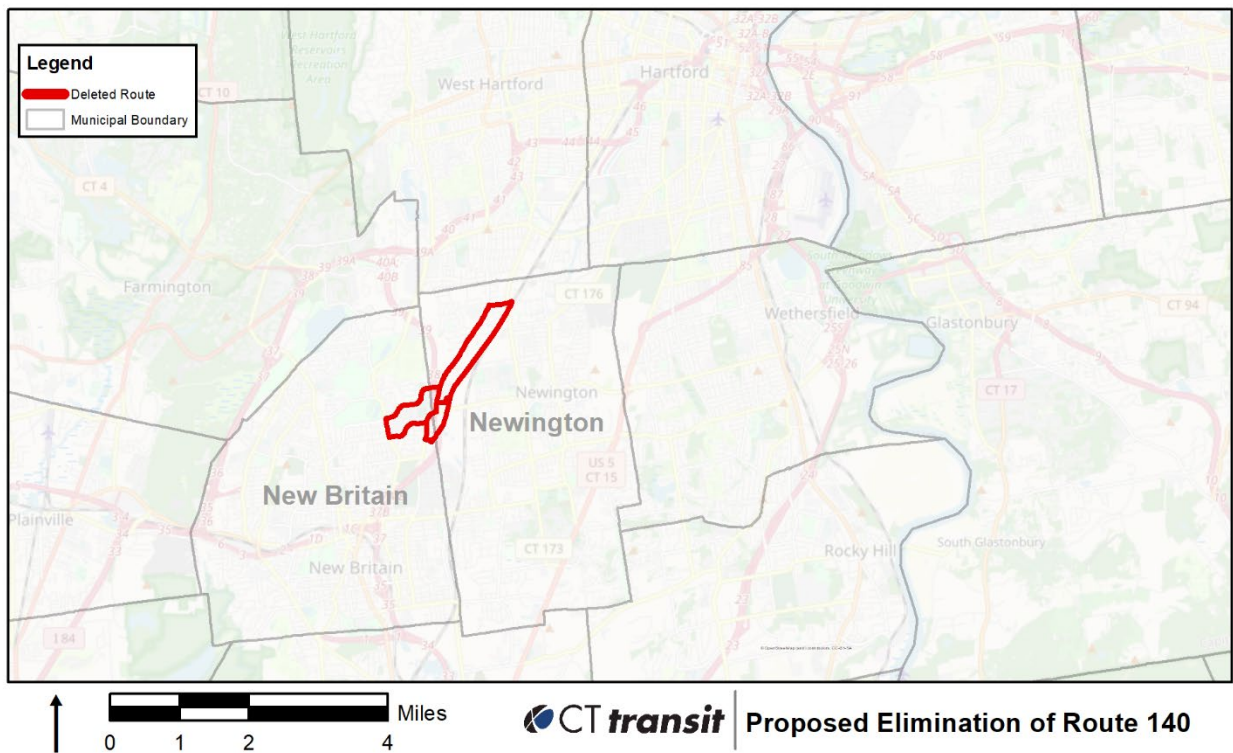


Figure 10: 140 – CCSU Connector

144 – Wethersfield/Westfarms

Current Service Plan

CTfastrak Route 144 is a local feeder service that provides a crosstown link between Jordan Lane in Wethersfield and Westfarms Mall. Route 144 connects with mainline CTfastrak routes at Cedar Street and East Street Stations and also serves Newington Center, the CCSU campus and Brittany Farms. Route 144 operates hourly service, seven days a week.

Ridership on Route 144 currently averages 189 customers per day on weekdays, 163 per day on Saturdays and 149 customers per day on Sundays.

Table 43: Route 144 Service Summary – Current

	Service Span	Headway			
		AM	Base	PM	Off-Peak
Weekday	5:07AM – 11:50PM	60	60	60	60
Saturday	6:08AM – 11:50PM	60	60	60	60
Sunday	7:08AM – 8:51PM	60	60	60	--

Proposed Route Changes

To provide customers with a more convenient and reliable travel experience, weekday headways on Route 144 is proposed to be narrowed from 60 minutes to 40 minutes during the peak and base periods. These investments are projected to result in a 30% ridership increase over the next year.

Table 44: Route 144 Service Summary – Proposed

	Service Span	Headway			
		AM	Base	PM	Off-Peak
Weekday	5:07AM – 11:50PM	40	40	40	60
Saturday	6:08AM – 11:50PM	60	60	60	60
Sunday	7:08AM – 8:51PM	60	60	60	--

Route 144 is displayed below in Figure 11.

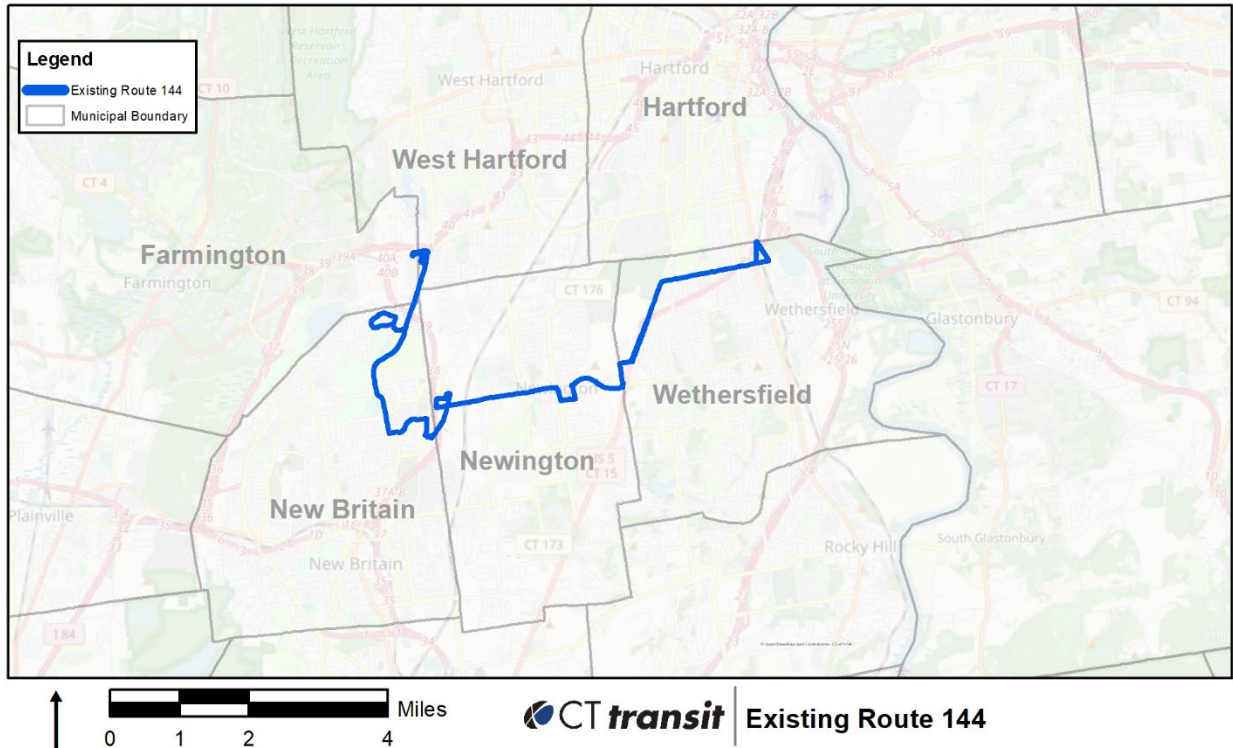


Figure 11: 144 – Wethersfield/Westfarmers

153 – Elmwood/Copaco

Current Service Plan

CTfastrak Route 153 is a local feeder service that provides a crosstown link between CTfastrak Flatbush Avenue Station and Copaco Center. It also serves Charter Oak Marketplace, West Hartford Center and Bishops Corner. In March 2023, Route 153 was rerouted to serve UCONN Health and Kane Street Station and extended to Elmwood Station. Service operates hourly, seven days a week.

Ridership on Route 153 currently averages 220 customers per day on weekdays, 172 per day on Saturdays and 133 customers per day on Sundays.

Table 45: Route 153 Service Summary – Current

	Service Span	Headway			
		AM	Base	PM	Off-Peak
Weekday	5:40AM – 12:35AM	60	60	60	60
Saturday	6:40AM – 12:35AM	60	60	60	60
Sunday	7:40AM – 9:35PM	60	60	60	--

Proposed Route Changes

To provide customers with a more convenient and reliable travel experience, weekday headways on Route 153 is proposed to be narrowed from 60 minutes to 40 minutes during the peak and base periods.

In addition, Route 153 would be rerouted via Albany Avenue and Bloomfield Avenue in West Hartford to restore service to the University of Hartford campus. Service to the University of Hartford was discontinued in March 2020 during the Covid-19 pandemic but could not be restored due to a roadway configuration change on campus. As a result of this route change, Saturday and Sunday service on Hall Boulevard would be discontinued and local bus service on Simsbury Road would be discontinued entirely.

These investments are projected to result in a 50% ridership increase over the next year.

Table 46: Route 153 Service Summary – Proposed

	Service Span	Headway			
		AM	Base	PM	Off-Peak
Weekday	5:10AM – 12:30AM	40	40	40	60
Saturday	5:40AM – 12:30AM	60	60	60	60
Sunday	7:40AM – 9:30PM	60	60	60	--

Route 153 is displayed below in Figure 12.

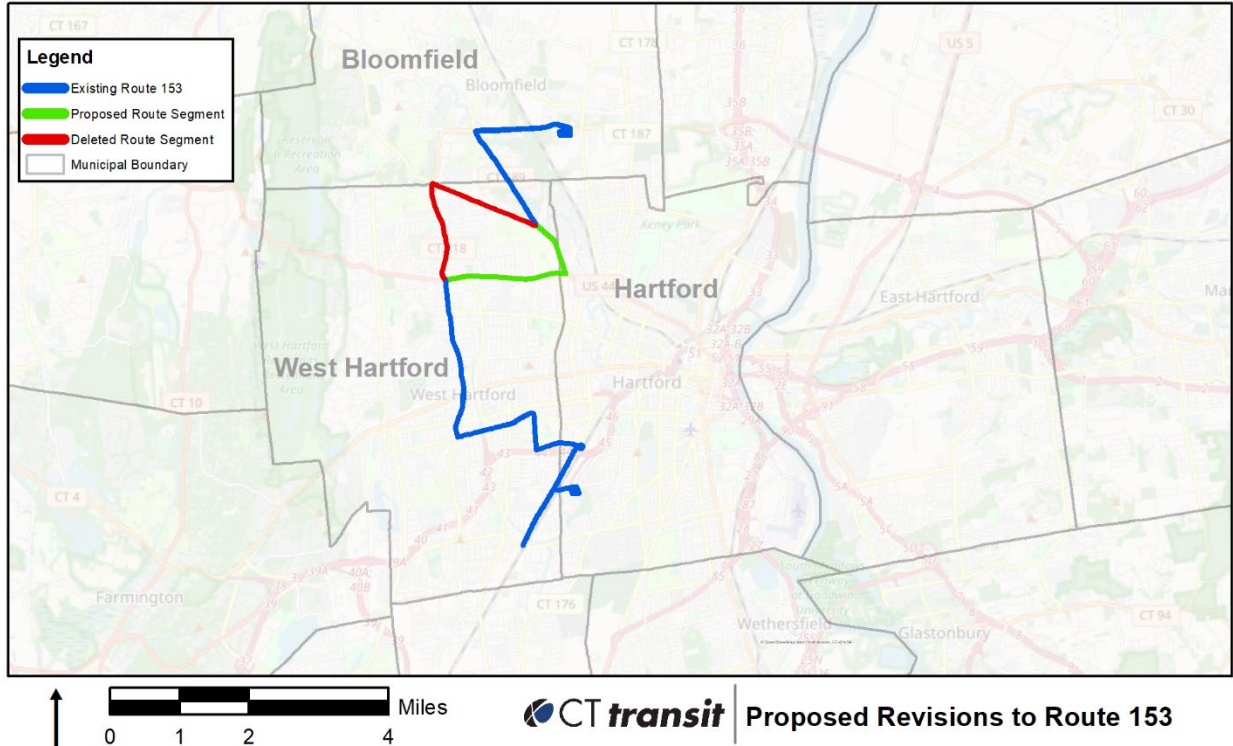


Figure 12: 153 – Elmwood/Copaco

New Haven Division Proposed Service Changes

216 – Northford/Wallingford/Meriden

Current Service Plan

Not applicable.

Proposed Route Changes

Route 216 is a proposed new bus route that would operate between New Haven and Meriden.

Amazon opened its second distribution center in Connecticut at 29 Research Parkway, Wallingford, CT in 2016 (BDL5). The Wallingford sorting center employs approximately 300 part-time staffers that would benefit from a public transportation option. Honeywell Life Safety is a manufacturing and distribution center located along CT-22, Clintonville Road in Northford, CT. Honeywell Life Safety experiences the same lack of public transportation options as Amazon BDL5 and has trouble with recruitment of new employees due to a shortfall of transit service coverage.

The following service plan is proposed to provide direct public transportation to manufacturing and distribution center employment opportunities in the Northford/Wallingford/Meriden corridors. Customers would have access to these employment facilities from the New Haven, Middlesex, and Hartford counties. Transit connections and multimodal networks would be available at the Meriden train station and the City of New Haven’s downtown transit hub.

All trips on Route 216 would operate bi-directionally on all service days express via interstate I-91 to state highway CT-5 North Haven bypassing Amazon North Haven (BDL3). Route 216 would then operate via interstate I-91 to the Amazon BDL5 sorting center on Research Pkwy, Wallingford. Route 216 will continue along Research Pkwy, Maple Avenue, East Main Street to the Meriden Train Station.

Honeywell Life Safety would be provided service as a weekday deviation during AM & PM peak service to accommodate employee work shifts. Route 216 weekday service would operate bi-directionally express via interstate I-91 to state highway CT-22 to the Honeywell Life Safety business park. Route 216 would return to state highway CT-5 and operate the listed regular routing.

Table 47: Route 216 Service Summary – Proposed

	Service Span	Headway			
		AM	Base	PM	Off-Peak
Weekday	4:00am – 1:00am	60	60	60	60
Saturday	4:00am – 1:00am	60	60	60	60
Sunday	4:00am – 1:00am	60	60	60	60

Route 216 is displayed below in Figure 13.

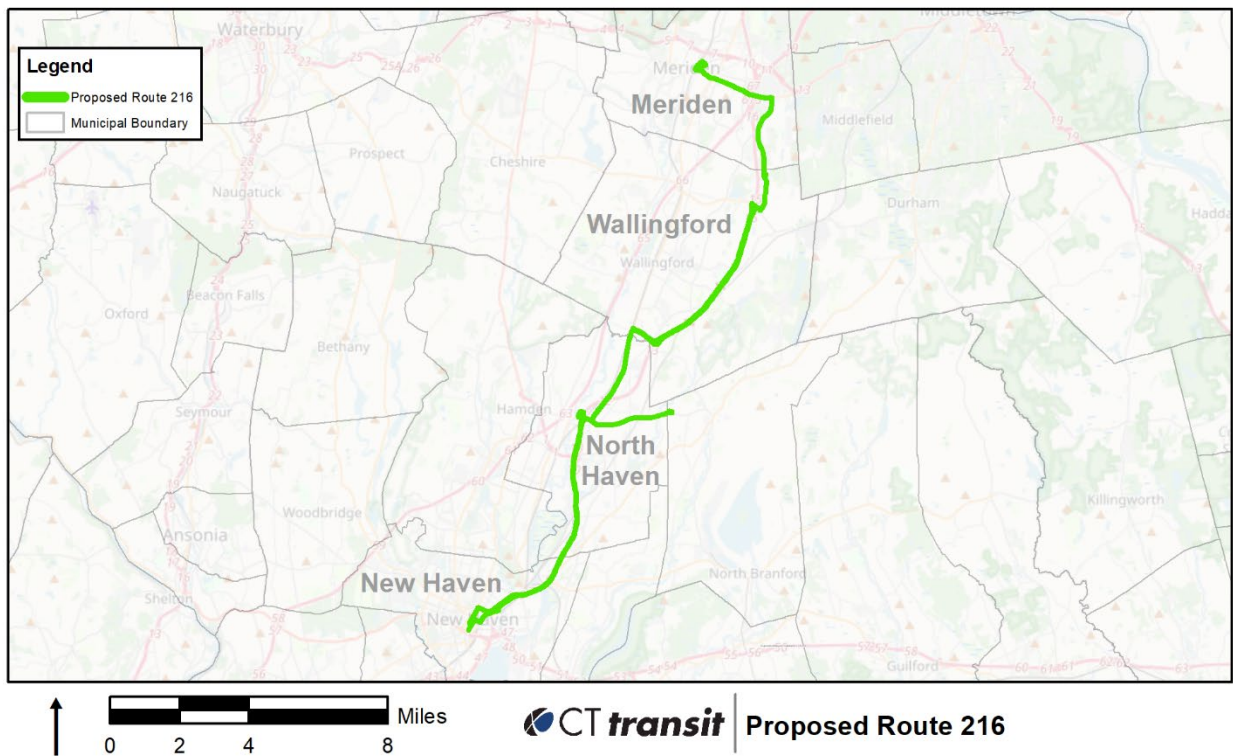


Figure 13: 216 – Northford/Wallingford/Meriden

262 – Orange Business District

Current Service Plan

Not applicable.

Proposed Route Changes

Route 262 is a proposed new bus route that would operate between New Haven and Milford.

The industrial, manufacturing, and distribution centers located on Marsh Hill Road between Indian River Road and the Orange town line are not currently directly served by CTtransit. Service coverage of this area is accessible by Route 261 – Boston Post Road although the walking distance to transit service from major traffic generators is above standard. The one (1) mile stretch on Marsh Hill Road is also home to healthcare facilities, an educational institution, and dining destinations.

The following service plan is to provide direct public transportation to the Marsh Hill Road business district corridor and to complement multimodal connections with other transit providers in the region.

All trips on Route 262 would operate via interstate I-95 in both directions between downtown New Haven and the transit hub located in Milford, CT at the Connecticut Post Mall. Route 262 would service the Veterans Administration Connecticut Health Care clinic on Edison Road, businesses, and an educational academy on Marsh Hill Road, and operate to Connair Road to UPS before returning to interstate I-95.

Service on Route 262 would operate at a consistent 60-minute headway during all service periods, including nights and weekends.

Table 48: Route 262 Service Summary – Proposed

	Service Span	Headway			
		AM	Base	PM	Off-Peak
Weekday	6:00 AM – 12:40 AM	60	60	60	60
Saturday	6:00 AM – 12:00 AM	60	60	60	60
Sunday	6:30 AM – 7:30 PM	60	60	60	--

Route 262 is displayed below in Figure 14.

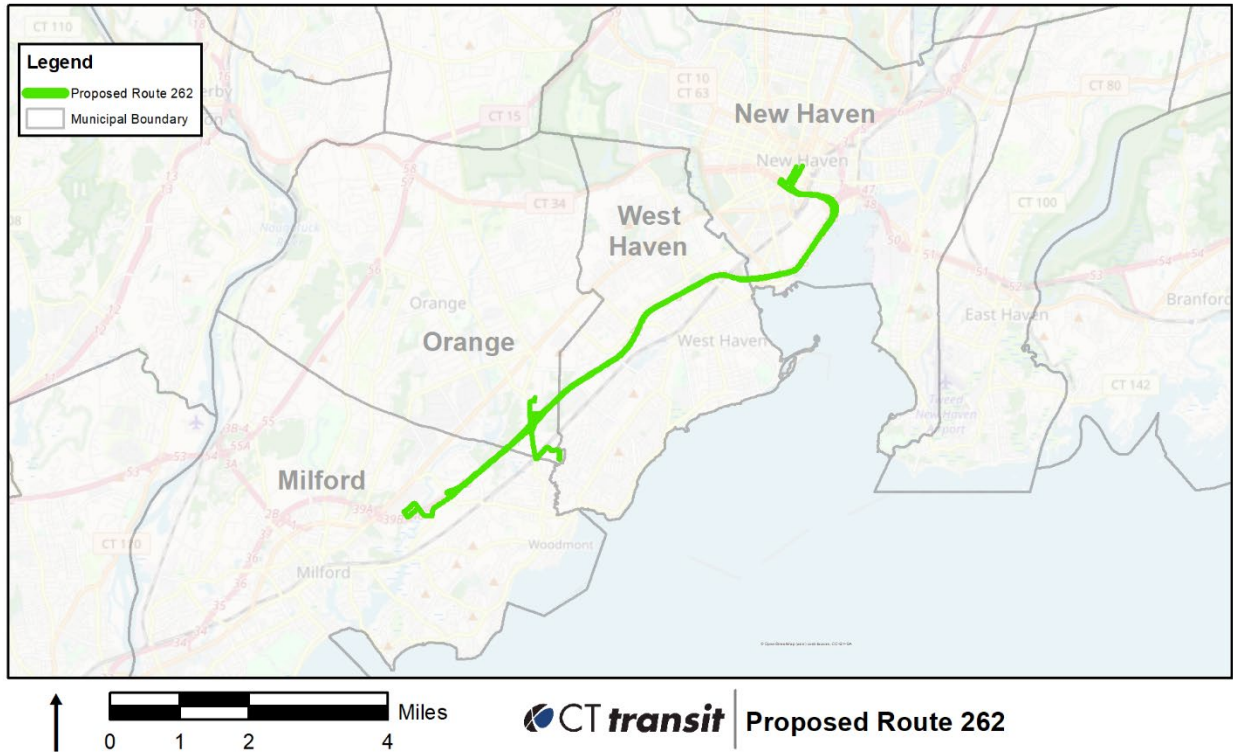


Figure 14: 262 – Orange Business District

Bus Routes Major Service Change Summary

Thirteen bus routes including Express, shuttle and local routes from the Hartford Division, the New Haven Division, and CTfastrak are proposed to have service changes. These changes include route modifications, route eliminations, new routes, headway changes, and span of service changes. Of these routes, the proposed changes to 11 routes exceed the thresholds for a Major Service Change. The proposed changes to Routes 47B and 102 do not exceed the Major Service Change threshold.

The results of the Major Service Change threshold analysis are presented in **Appendix C**.

Bus Service Equity Analysis

Service Equity Analysis Methodology

CTDOT has identified and adopted policies to define what constitutes a major service change and has developed thresholds to be used to determine if a major service change creates a disparate impact on minority customers and/or a disproportionate burden on low-income customers. These are described in the Title VI Principles and Definitions section and were utilized in this analysis.

According to CTDOT’s Title VI Program, bus system service areas are each defined as all census tracts within (and touching) 0.25 miles of local weekday transit service, within 0.5 miles of local weekend transit service and within 2.5 miles of park and ride stops.

For consistency with CTDOT's current Title VI program, the Census 2013-2017 American Community Survey (ACS) data was utilized in the bus service equity analysis. CTDOT's Disparate Impact/Disproportionate Burden Policy threshold of 15% was used to determine whether a disparate impact or disproportionate burden exists for major service changes.

Hartford Division (Express service and Local routes)

The equity analysis for the Hartford Division express bus and local routes with proposed major service changes were analyzed for the following:

1. Service Changes

- a) **Increased Service Frequency.** Headway reductions are proposed for Routes 144 and 153 to increase service frequency. The project team calculated the percent of low-income and minority populations within the service area of each route. The percent of low-income and minority populations in the service area of each route was then compared to the average low-income and minority populations of the local Hartford bus network service area. The project team calculated whether each route experiencing the service increase was less minority/low-income serving compared to the local Hartford system as a whole using a 15% threshold. If this threshold was crossed, then there was a disparate impact/disproportionate burden.
- b) **Decreased Service Frequency.** A reduction in service days and service hours is proposed for the Hartford dash shuttle. The percent of low-income and minority populations in the service area of the route was compared to the average low-income and minority populations of the local Hartford bus network service area. The project team calculated whether the route experiencing the service decrease was 15% or more minority/low-income serving compared to the local Hartford system average. If this threshold was crossed, then there was a disparate impact/disproportionate burden.

2. Route Changes

- a) **Adding New Local Route.** There is one new proposed local route (Route 125). The project team performed an analysis to determine if the proposed local route is 15% less minority/low-income serving than the local Hartford bus system average and thus created a disparate impact/disproportionate burden.
- b) **Route Elimination.** Two local routes (Route 45x and Route 140) and two express routes (Route 907 and Route 923) are proposed for elimination. The project team performed analysis to determine if each route proposed for elimination is 15% more minority/low-income serving than the local Hartford bus system average or the express bus system average, respectively, and thus created a disparate impact/disproportionate burden.
- c) **Route Restructuring.** There is one local route with proposed restructuring (Route 69) that met the threshold for a major service change. While it is indicated in above sections that Route 153 is proposed for restructuring, the route

restructuring did not meet the major service change criteria of an action resulting in at least a 20% change in overall route length. Therefore, for only Route 69 the project team calculated the minority/non-minority and low-income/non-low-income populations in the service area of the modified route as well as the demographics of the full route, pre-modification. The team then calculated the percent difference for the minority and low-income populations (between full route and modified route) and compared it to the calculated percent difference for the non-minority and non-low-income populations (full route and modified route) using the 15% threshold. If the minority/low-income percent change was 15% greater than the non-minority/non-low-income percent change, then the route modification was considered to have a disparate impact/disproportionate burden.

New Haven Division (local service)

There were two New Haven Division routes that met the major service change threshold and were analyzed as follows:

1. Route Change

- a) **Adding New Local Route.** Route 216 and Route 262 are new proposed local routes and considered a positive service change. Analysis was performed to determine if each new route is 15% less minority/low-income serving than the local New Haven bus system average and thus creating a disparate impact/disproportionate burden by providing non-minority and non-low-income populations a greater benefit of the new service.

Once the service equity analysis was complete for the Hartford Division and New Haven Division routes that met the major service change criteria, if the analysis found that a disparate impact or disproportionate burden exists, the project team examined whether alternatives exist to maintain the effect of the major service change, while taking steps to avoid, minimize, or mitigate disparate or disproportionate burdens where practicable.

Bus Service Equity Analysis Results

The express and local routes with proposed service changes that qualify as major service changes according to CTDOT's Major Service Change Policy were analyzed using the criteria outlined above in the methodology section. The results of this equity analysis are described below.

Evaluation of Disparate Impacts to Minority Populations

This section presents the results of the evaluation of impacts to minority populations.

Hartford Division

There are two Hartford Division express routes (Route 907 and Route 923) proposed for elimination. The minority population in the service area of these routes was calculated and compared to the average minority population in the service area of the entire Hartford Express

bus system. Table 49 below displays the results of the Disparate Impact Analysis for the routes. There is a disparate impact on Route 907.

Table 49: Disparate Impact Analysis for Hartford Division Express Routes

		907	923	Total Hartford Express Bus System
Proposed Change:		Route Elimination	Route Elimination	
Total Population Served		283,135	420,707	1,783,750
Minority Population	Number Persons	169,870	213,690	646,011
	% of Route	60.00%	50.79%	36.22%
% Variation from Total Express Bus System		23.78%	14.58%	N/A
Disparate Impact?		Y	N	

There are two Hartford Division local routes proposed for elimination (Route 45X and Route 140) and one local route where a reduction in service frequency is proposed (Hartford dash shuttle). There is one new local route proposed (Route 125). Headway reductions are proposed for two local routes (Route 144 and Route 153).

Table 50 below displays the results of the Disparate Impact Analysis for these routes. A disparate impact was created with the proposed changes in the Hartford dash Shuttle’s frequency.

Table 50: Disparate Impact Analysis for Hartford Division Local Routes

		45X	dash	140	125	144	153	Total Hartford Local Bus System
Proposed Change:		Route Elimination	Change in span of service (reduction in days/hours of service)	Route Elimination	New Route	Headway Reduction	Headway Reduction	
Total Population Served		36,294	16,724	29,825	97,660	61,098	73,780	692,273
Minority Population	Number Persons	6,852	13,505	10,434	44,820	17,728	31,287	300,421
	% of Route	56.62%	80.75%	34.98%	45.89%	29.02%	42.41%	43.40%
% Variation from Total Local Bus System		-6.08%	37.36%	-8.41%	2.50%*	-14.38%*	-0.99%*	N/A
Disparate Impact?		N	Y	N	N	N	N	

*For these routes, a negative number indicates that the route is less minority-serving than the Local Bus system as a whole and a positive number indicates the route is more minority-serving.

There is one Hartford Division local route with proposed restructuring and truncation (Route 69) that met the threshold for a major service change. There was no disparate impact created by the proposed route changes on Route 69 (see Table 51).

Table 51: Disparate Impact Analysis for Hartford Division Route 69

Measures	Route 69
Existing route: minority	48,356
Existing route: non-minority	49,504
Proposed modified route: minority	44,172
Proposed modified route: non-minority	35,314
Percent difference minority (existing route to proposed route)	-8.65%
Percent difference non-minority (existing route to proposed route)	-28.66%
Variance (minority to non-minority) *	-20.01%
Disparate Impact?	N

*A negative number represents that the proposed route change results in less of a negative impact on minority populations compared to non-minority populations.

New Haven Division

There are two proposed New Haven Division routes which classify as a major service change. Table 52 shows that there are no disparate impacts created by the proposed routes.

Table 52: Disparate Impact Analysis for New Haven Division Proposed Routes

		216	262	Total New Haven Local Bus System
Proposed Change:		New Route	New Route	
Total Population Served		136,739	69,622	632,645
Minority Population	Number of Persons	50,185	29,433	240,688
	% of Route	36.70%	42.28%	38.04%
% Variation from Total New Haven Bus System*		-1.34%	4.23%	N/A
Disparate Impact?		N	N	

*A negative number indicates that the route is less minority-serving than the Local Bus system as a whole and a positive number indicates the route is more minority-serving.

Evaluation of Disproportionate Burden to Low-Income Populations

This section presents the results of the evaluation of impacts to low-income populations.

Hartford Division

Table 53 below displays the results of the Disproportionate Burden Analysis for the two Hartford Division Express routes proposed for elimination. No disproportionate burdens were created by the elimination of these two routes.

Table 53: Disproportionate Burden Analysis for Hartford Division Express Routes with Proposed Service Changes

		907	923	Total Hartford Express Bus System
Proposed Change:		Route Elimination	Route Elimination	
Total Population Served		273,387	407,061	1,714,137
Low-income Population	Number Persons	78,666	108,882	324,736
	% of Route	28.77%	26.75%	18.94%
% Variation from Total Express Bus System		9.83%	7.80%	N/A
Disproportionate Burden?		N	N	

Table 54 below displays the results of the Disproportionate Burden Analysis for the six Hartford Division local routes with proposed service changes that met the definition of a major service change. The proposed change in service frequency on the Hartford dash Shuttle resulted in a disproportionate burden.

Table 54: Disproportionate Burden Analysis for Hartford Division Local Routes with Proposed Service Changes

		45X	dash	140	125	144	153	Total Hartford Local Bus System
Proposed Change:		Route Elimination	Change in service span (reduction in days /hours of service)	Route Elimination	New Route	Headway Reduction	Headway Reduction	
Total Population Served		35,877	15,290	27,636	96,583	58,620	71,959	672,784
Low-Income Population	Number Persons	6,513	6,470	4,895	22,943	7,314	12,656	138,859
	% Route	18.15%	42.32%	17.71%	23.75%	12.48%	17.59%	20.36%

% Variation from Total Express Bus System	-2.35%	21.81%	-2.80%	3.25%*	-8.03%*	-2.92%*	N/A
Disproportionate Burden?	N	Y	N	N	N	N	

*For these routes with service changes, a negative number indicates that the route is less low-income-serving than the Local Bus system as a whole and a positive number indicates the route is more low-income-serving.

There is one Hartford Division local route with proposed restructuring and truncation (Route 69) that met the threshold for a major service change. There was no disproportionate burden created by the proposed route changes on Route 69.

Table 55: Disproportionate Burden Analysis for Hartford Division Route 69

Hartford Route with Proposed Route Restructuring	69
Existing route: low-income	24,406
Existing route: non-low-income	70,274
Proposed modified route: low-income	22,797
Proposed modified route: non-low-income	53,726
Percent difference low-income (existing route to proposed route)	-6.59%
Percent difference non-low-income (existing route to proposed route)	-23.55%
Variance (low-income to non-low-income) *	-16.96%
Disproportionate Burden?	N

*A negative number represents that the proposed route change results in less of a negative impact on low-income populations compared to non-low-income populations.

New Haven Division

As discussed above, there are two proposed New Haven Division routes which classify as a major service change. Table 56 below demonstrates that there were no disproportionate burdens created by the proposed routes.

Table 56: Disproportionate Burden Analysis for New Haven Division Proposed Routes

	216	262	Total New Haven Local Bus System
Proposed Change:	New Route	New Route	
Total Population Served	131,034	62,088	610,537
Number Persons	24,809	15,243	120,263

Low-Income Population	% of Route	18.93%	24.55%	19.70%
% Variation from Total New Haven Bus System*		-0.76%	4.85%	N/A
Disproportionate Burden?		N	N	

*A negative number indicates that the route is less low-income-serving than the Local Bus system as a whole and a positive number indicates the route is more low-income-serving.

Bus Service Change Impacts and Alternatives

The routes in Table 57 have been identified as having proposed service changes that trigger either a Disparate Impact and/or Disproportionate Burden. Mitigation or justifications for the proposed service changes are included.

Table 57: Service Change Impacts and Alternatives – Hartford Local and Express Bus System

Route	Disparate Impact (Minority Populations)	Disproportionate Burden (Low-Income Populations)	Route Change Causing Impact	Mitigation or Justification
907 – Newington Express	Y	N	<ul style="list-style-type: none"> Route elimination 	<p>Route 907 is a commuter service with AM trips inbound from the Newington Park & Ride to downtown Hartford and PM trips outbound from Hartford back to the Park & Ride.</p> <p>Service between the Newington Park & Ride and downtown Hartford on weekdays would be provided by CTfastrak Route 125.</p>
Hartford dash Shuttle	Y	Y	<ul style="list-style-type: none"> Reduction in span of service 	<p>To better align ridership demand with scheduled service, the dash Shuttle is proposed to transition from a Monday through Friday schedule to Thursday through Sunday.</p> <p>On Monday, Tuesday and Wednesday, replacement service along the dash route would be provided by CTfastrak Route 125.</p>

Bus Fare Equity Analysis

During the early stages of the COVID-19 pandemic, CTDOT suspended CTtransit fares as it implemented COVID-19 specific safety measures like rear door boardings. CTtransit is the CTDOT-owned bus service operating in several metropolitan areas throughout Connecticut. Fare suspensions were then extended in 2022 as part of the state’s gas-tax suspension bill. As the pandemic waned and economic conditions and safety measures changed, CTDOT restored fare collection following a 12-month fare-free period. Per federal guidance, a restoration of fares following a fare free period needs to be analyzed. As a result, CTDOT is conducted a fare equity analysis on the resumption of fare collection to determine if there was a disparate impact on minority¹¹ or disproportionate burden on low-income¹² populations as defined in the CTDOT Title VI Program.

CTDOT Title VI Policy

This analysis aligns with the fare equity analysis process articulated in the CTDOT Title VI program.

CTDOT policy defines a disparate impact as:

A facially neutral policy or practice that disparately affects members of a group identified by race, color, or national origin, when the recipient’s policy or practice lacks a substantial legitimate justification and when there exists one or more alternatives that would serve the same legitimate objectives but with less disparate impact on the basis of race, color, or national origin.

CTDOT policy defines a 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.

CTDOT Title VI policy identifies two separate approaches to a fare analysis, depending on the number of fare changes involved. This analysis looks at fare re-institution across all ticket types for the entire CTtransit system, with systemwide demographics, fare structures and information informing the analysis. Fare-free transit at the system-scale is a relatively new concept that has not previously been evaluated under CTDOT’s Title VI framework. The analysis team classifies the fare-free concept as separate fare changes for each transit fare media, meaning that the analysis aligns with the following section of the Disparate Impact/Disproportionate Burden (DI/DB) policy:

¹¹ The United State Department of Transportation defines minorities as a person who identifies as American Indian and Alaska Native, Asian, Black, or African American, Hispanic or Latino Populations, and Native Hawaiian and Other Pacific Islander.

¹² The definition of “low-income” is a reported household income 150% of the poverty line or lower. The poverty line is a sliding scale that adjusts the poverty line to the number of individuals living in a given household. This analysis utilized the U.S. Federal Poverty Guidelines as identified by Department of Health and Human Services (HHS).

A fare change will be deemed to have a disparate impact on minority populations or a disproportionate burden on low-income populations if its implementation results in either:

- 1. When one fare change is proposed, the percentage of impacts of the proposed fare change borne by minority or low-income riders as a result of the proposed fare change is at least ten (10%) percentage points higher than the percentage of impacts of that proposed fare change on the overall rider population; or*
- 2. When more than one fare change is proposed:*
 - a. For each fare change in the package: the percentage of impacts of each individual proposed fare change borne by minority or low-income riders as a result of the proposed fare change is at least ten (10%) percentage points higher than the percentage of impacts of that proposed fare change on the overall rider population; and*
 - b. For the total package of fare changes: the aggregate percentage of impacts for the proposed fare changes borne by minority or low-income riders as a result of the proposed fare changes is at least five (5%) percentage points higher than the aggregate percentage of impacts on the overall rider population.*

The fare equity analysis analyzed a single transit system (CTtransit) and involves a change to all fare media, as fares were previously not being collected across the system. Consequently, the conditions in Disparate Impact/Disproportionate Burden (DI/DB) policies section 2.a are the only ones that apply and CTDOT evaluated fare changes for each individual fare medium at the 10% threshold.¹³

Methodology

This analysis aligns with the fare equity analysis process articulated in the CTDOT Title VI Program. Though CTDOT plans to apply the general principles of the policy to this fare equity analysis, the transition from fare-free back to fare collection follows a subtly different methodology compared to previous analyses.

Traditionally, a fare equity analysis involves the following process:

1. Utilize on-board customer surveys to establish a current ridership profile for overall, minority and low-income customers.
2. Determine the average fare paid by each customer prior to and following the fare change.

¹³ If this involved multiple systems, such as CTtransit and another system like Southeast Area Transit Authority, CTDOT would also conduct 2.b.

3. Compare minority and low-income customers to the general population using the percent change formula.

The fare-free to fare collection change cannot utilize this methodology as the above-mentioned step 3 would involve division by zero, a mathematical impossibility. Consequently, the analysis team is using a different process utilizing the following steps:

1. Utilize on-board customer surveys to establish a current ridership profile for overall, minority and low-income customers.
2. Determine the average fare paid by each customer following the re-institution of fares in 2023.
3. Compare the 2023 average cost of an overall customer's average fare medium to the average cost of a minority and low-income customer's fare medium to determine if either customer type is paying greater than 10% more than all customers' average cost.

In conducting this analysis, the team used the following data sources:

- A 2023 *CTtransit Ridership Survey* that provides demographic customer information such as race/ethnicity, income, and fare media, among others.
- 2019 and 2023 *CTtransit* fare sales information that includes monthly statistics on fare media purchased and revenue by fare media for the *CTtransit* system.

The team had to make the following assumptions about the data sources above when conducting the analysis:

- While the *CTtransit* system operates in several Connecticut municipalities, the fares are uniform throughout the service area. Because *CTtransit* fares are uniform, regardless of location, the analysis team developed survey populations that represented the full system, not individual municipalities.
- In terms of low-income populations, the format of the survey questions did not align with the United States Department of Health and Human Services (HHS) poverty guidelines. The team adjusted responses to align with HHS guidelines by using the midpoint of the income range the survey respondent selected as a proxy for their income.
 - Because the survey data did not include the number of persons in each respondent's household, the Connecticut state average was assumed for each respondent.¹⁴
- Fares available for purchase did not completely align with the fare purchase options in the survey. Where possible and logical, the analysis team consolidated actual fares sales data into the categories featured in the on-board survey.

¹⁴ As of the 2017-2021 American Community Survey, the US Census estimates 2.50 persons per household for the state of Connecticut. <https://www.census.gov/quickfacts/fact/table/CT,US/PST045222>

- Token Transit sales, at the time the on-board survey was administered, only applied to a two-hour pass, and these were allocated to the other specific two-hour pass purchase¹⁵.
- The GO CT card uses a fare capping mechanism making it vague as to which corresponding ticket it could be assigned to. For this reason, GO CT card customers were not included in this study.
- Additionally, the survey combined 3, 5, and 7-day passes. Fare sales data for these passes was also combined.
- There were several fare types that could not fit into these buckets and, subsequently, are not included in this analysis:
 - Senior Tickets
 - Youth Tickets
 - Youth 10-Ride Tickets
 - Youth Cash
 - UniTicket
- Fare data utilized in this analysis consisted of fares collected from three regions of the CTtransit system: Stamford, Hartford, and New Haven.
- Fare sales data included the total volume of fares purchased, but not the actual amount of fare generated. Total fare collections were estimated by multiplying the total volume of fares by the respective fare price. The cost for local fare is lower than for express bus fare and the cost for youth, seniors, or people with disabilities is less than full-price fare. For this reason, the average fare for most ticket types is a different value than the base cost.
 - For example, 175,778 all-day bus fares were purchased (Table 58) Accounting for local fare, express fare, and discount fare, the total sales were calculated to be \$518,287. Dividing the total fare (\$518,287) by the count of tickets purchased (175,778), resulted in a \$2.95 average fare, a price below standard \$3.50 fare. Complete fare sales data for all ticket types can be found in “Total Fare Collections Determination” in Appendix E.

¹⁵ CTDOT began offering 31-day passes via Token Transit on September 1, 2023.

Table 58: Total Fare Collections Determination Example, All-Day Fares

Fare Medium	Count of Tickets Purchased	Value of Ticket Type	Total Sales
All Day Pass Local	119,811	\$3.50	\$419,338.50
Day Pass Local	160	\$3.50	\$560.00
All Day Pass Express 2	169	\$6.40	\$1,081.60
All Day Pass Express 3	161	\$8.20	\$1,320.20
All Day Pass Express 4	200	\$10.00	\$2,000.00
All Day Pass Express 5	4	\$12.00	\$48.00
All Day Pass I-Bus Express	153	\$6.40	\$979.20
All Day Pass SR/DIS Local	51,220	\$1.70	\$87,074.00
All Day Pass SR/DIS Express 2	74	\$3.20	\$236.80
All Day Pass SR/DIS Express 3	19	\$4.10	\$77.90
All Day Pass SR/DIS Express 4	58	\$5.00	\$290.00
All Day Pass Youth Local	3,742	\$1.40	\$5,238.80
All Day Pass SR/DIS Express 5	7	\$6.00	\$42.00
Total	175,778		\$518,287.00
Average	\$2.95		

Fare Change Analyses

As stated in the methodology, the CTtransit analysis involved estimating the total number of annual tickets purchased by each customer type and then determining the average fare price (of all fare media) per customer type. In light of fare reinstatement, minority customers pay 2.4% less than overall customers and low-income customers pay 7.2% less than overall customers (Table 59).

Table 59: Fare Analysis Results

Customer Type	Cost Difference (All)	% Difference (All)
Minority Riders	(\$0.36)	-2.4%
Low income Riders	(\$1.06)	-7.2%

Table 60 shows fare media usage patterns among minority and low-income customers relative to customers as a whole. As stated in the methodology section, this information is based off a 2023 customer survey.

Table 60: CTtransit Percent Fare Medium Purchases by Customer

Fare Medium	Overall Customers %	Minority %	Low-Income %
2-Hour Pass	41.8%	80.2%	75.0%
All-Day	17.1%	78.1%	74.2%
31-Day	16.7%	77.1%	65.3%
3-,5-,7-Day	2.2%	92.0%	65.7%
10-Ride	8.8%	54.5%	32.1%
U-Pass	13.5%	89.0%	68.9%

Source: 2023 CTtransit Ridership Survey

Using 2023 fare sales information, the average monthly total amount of fare paid per boarding was calculated for each fare medium. This involved taking the total volume of each fare medium purchased and applying the usage percentages to the total number of fares purchased. The monthly ticket purchases by minority customers and low-income customers are shown in Table 61.

Table 61: CTtransit Fare Medium Purchases by Customer

Fare Medium	Overall Purchases	% Overall Purchases	Minority Estimate	% Minority	Low-income Estimate	% Low-Income
2-Hour Pass	485,054	43.7%	389,054	80.2%	363,895	75.0%
All-Day	175,778	15.8%	137,214	78.1%	130,484	74.2%
31-Day	257,869	23.2%	198,774	77.1%	168,292	65.3%
3-,5-,7-Day	31,887	2.9%	29,336	92.0%	20,962	65.7%
10-Ride	90,472	8.2%	49,267	54.5%	29,054	32.1%
U-Pass	68,247	6.2%	60,762	89.0%	47,028	68.9%
Grand Total	1,109,307		864,407		759,715	

Source: 2023 CTtransit Sales Report and Survey

Volumes of fare purchases were then multiplied by the price of each respective fare. Given that different travel distances and discounts impact the cost of fares, an average fare price by fare medium was determined.¹⁶ Then it was multiplied by the total number of purchased fares for each customer type. This provided the analysis team with information on total monthly fare expenses by customer type (Table 62).

¹⁶ For example, Express buses have multiple zones.

Table 62: CTtransit Fare Expenses by Medium by Customer type

Fare	Average Fare Per Ticket
2-Hour Pass	\$1.75
All-Day	\$2.95
31-Day	\$51.19
3-,5-,7-Day	\$15.55
10-Ride	\$13.66
U-Pass	\$0.00
Total	

Source: 2023 CTtransit Sales Report and Survey

After determining the total fares by customer type, the analysis team calculated the average fare per customer type through dividing the total fares paid by the total cost paid for each customer type.

Determination of a Disparate Impact or Disproportionate Burden

The percent difference in average fare price between overall CTtransit customers and minority customers was -2.4%, meaning minority customers pay an average of \$0.36 less per average fare medium than the overall CTtransit customer base. The percent difference in average fare price between all customers and low-income customers was -7.2%, meaning low-income customers pay an average of \$1.06 less per average fare medium than all CTtransit customers.

The percentage difference between overall customers and minority customers fell below the 10% disparate impact threshold. Similarly, the percentage difference between overall customers and low-income customers fell below the 10% disproportionate burden threshold.

Table 63: Percent Change in CTtransit Fare Payments

Customer type	Cost Difference (All)	% Difference (All)	Result
Minority Customers	(\$0.36)	-2.4%	No Impact Found
Low Income Customers	(\$1.06)	-7.2%	No Impact Found

Source: 2023 CTtransit Sales Report and Survey

There was no disparate impact or disproportionate burden to minority or low-income riders as a result of reinstating fares. For this reason, there is no need to recommend alternative measures or mitigation strategies.

Fare Impacts and Alternatives

There was no finding of disparate impact or disproportionate burden, therefore, no mitigations or alternatives must be considered.

Appendix A - 2023 Rail Major Service Change Threshold Analysis Results

Table A1: New Haven Line Service Change Threshold Analysis

Schedule	Trip Comparison	
	Mon-Thurs	
Existing	239	
Proposed	237	
% Change	-0.84%	

Table A2: New Canaan Branch Service Change Threshold Analysis

Schedule	Trip Comparison	
	Mon- Fri	Weekends & Holidays
Existing	41	37
Proposed	39	37
% Change	-4.88%	0.00%

Table A3: Danbury Line Service Change Threshold Analysis

Schedule	Trip Comparison	
	Mon- Fri	Weekends & Holidays
Existing	28	12
Proposed	26	12
% Change	-7.14%	0.00%

Table A4: Shore Line East Service Change Threshold Analysis

Schedule	Trip Comparison	
	Mon- Fri	Weekends & Holidays
Existing	23	16
Proposed	16	16
% Change	-30.4%	-0%

Appendix B - Rail Service Equity Analysis Schedule Analysis Tables

Table B1: Shore Line East Service Change 2023

Shore Line East Service Change 2023												
To New Haven (Westbound)	SLE Existing Schedule				SLE Proposed Schedule				% Change			
Monday- Friday	Off-Peak	Avg	Peak	Avg	Off Peak	Avg.	Peak	Avg	Off Peak	Avg. Off	Peak	Avg,
Stations	Trips M-F	Headway	Trips M-F	Headway	Trips M-F	Headway	Trips M-F	Headway	Trips M-F	Peak	Trips M-F	Peak
New London	10	94.10	2	35	6	126.67	2	24	40%	34.61%	0%	-31.43%
Old Saybrook	10	94.00	2	35	6	126.17	2	24	40%	34.22%	0%	-31.43%
Westbrook	10	94.00	2	35	6	132.67	2	24	40%	41.13%	0%	-31.43%
Clinton	10	94.00	2	35	6	132.67	2	24	40%	41.13%	0%	-31.43%
Madison	2	32.00	2	35	5	120.00	2	24	-150%	275.00%	0%	-31.43%
Guilford	10	93.80	2	35	6	132.50	2	23	40%	41.26%	0%	-34.29%
Branford	10	93.80	2	35	6	132.50	2	22.5	40%	41.26%	0%	-35.71%
New Haven State Street	9	87.33	2	34.5	6	132.50	2	22.5	33%	51.72%	0%	-34.78%
New Haven	10	93.50	2	35	6	132.50	2	22.5	40%	41.71%	0%	-35.71%
To New London (Eastbound)	SLE Existing Schedule				SLE Proposed Schedule				% Change			
Monday- Friday	Off Peak	Avg.	Peak	Avg.	Off Peak	Avg.	Peak	Avg.	Off Peak	Headway	Peak Trips	Avg. Peak
Stations	Trips M-F	Headway	Trips	Headway	Trips M-F	Headway	Trips M-F	Headway	Trips M-F	Headway	M-F	Headway
New Haven	9	68.11	2	92.5	7	130.71	1	0	22%	91.91%	50%	-100.00%
New Haven State Street	7	87.57	2	92.5	6	144.17	1	0	14%	64.63%	50%	-100.00%
Branford	7	87.29	2	93	7	130.57	1	0	0%	49.59%	50%	-100.00%
Guilford	9	67.89	2	93	7	130.57	1	0	22%	92.33%	50%	-100.00%
Madison	5	83.00	2	93	5	182.80	1	0	0%	120.24%	50%	-100.00%
Clinton	9	68.11	2	92.5	7	130.57	1	0	22%	91.70%	50%	-100.00%
Westbrook	9	68.11	2	92.5	7	130.57	1	0	22%	91.70%	50%	-100.00%
Old Saybrook	9	68.11	2	91.5	7	130.57	1	0	22%	91.70%	50%	-100.00%
New London	9	68.33	2	80	7	130.86	1	0	22%	91.50%	50%	-100.00%

Appendix C - Rail Fare Equity Analysis – Fare Medium Tables

New Haven Line

Table C1: 2022 Ridership Survey Metro-North Railroad Fare Medium Use (Full Table)

	All - Total	All %	All - Minority	All – Low Income	Minority Customers	Minority %	Low Income Customers	Low Income %
Ten-trip Ticket (Off-Peak)	280	4.5%	226	173	72	31.9%	17	9.8%
Ten-trip Ticket (Peak)	467	7.5%	365	278	76	20.8%	4	1.4%
Monthly	886	14.2 %	639	495	207	32.4%	13	2.6%
Senior/Disabled (All Types)	531	8.5%	422	267	32	7.6%	11	4.1%
One Way Ticket (Off-Peak)	2682	43.0 %	2,130	1,683	589	27.7%	184	10.9%
One Way Ticket (Peak)	1339	21.5 %	1,007	772	275	27.3%	40	5.2%
Weekly Pass	57	0.9%	39	30	18	46.2%	4	13.3%
Total	6,242		4,828	3,698	1,269		273	

Table C2: Estimated 2022 Metro-North Railroad Fare Medium Usage by Type of Customer (Full Table)

Fare Medium	All Purchases	% All Purchases	Minority Estimate	% Minority	Low Income Estimate	% Low Income
Ten-trip Ticket (Off-Peak)	6,592	0.5%	2,100	31.9%	648	9.8%
Ten-trip Ticket (Peak)	10,228	0.8%	2,130	20.8%	269	2.6%
Monthly	13,408	1.1%	4,343	32.4%	552	4.1%
Senior/Disabled (All Types)	117,827	9.6%	8,935	7.6%	12,882	10.9%
One Way Ticket (Off-Peak)	621,756	50.8%	171,931	27.7%	32,215	5.2%
One Way Ticket (Peak)	449,085	36.7%	122,640	27.3%	23,269	5.2%
Weekly Pass	5,218	0.4%	2,408	46.2%	696	13.3%
Grand Total	1,224,113		314,487		70,530	

Table C3: Monthly Metro-North Railroad Fare Expenses by Medium by Type of Customer (Pre- Increase) (Full Table)

Fare Medium	Avg Fare Per Ticket	Total Fare Paid - All Customers	Total Fare Paid - Minority	Total Fare Paid - Low Income
Ten-trip Ticket (Off-Peak)	\$96.41	\$635,504	\$202,461	\$62,448
Ten-trip Ticket (Peak)	\$112.75	\$1,153,176	\$240,113	\$30,285
Monthly	\$241.62	\$3,239,608	\$1,049,450	\$133,467
Senior/Disabled (All Types)	\$7.17	\$844,721	\$64,055	\$92,352
One Way Ticket (Off-Peak)	\$11.93	\$7,419,646	\$2,051,724	\$384,438
One Way Ticket (Peak)	\$10.60	\$4,760,340	\$1,299,994	\$246,650
Weekly Pass	\$58.96	\$307,614	\$141,975	\$41,015
Grand Total		\$18,360,607.00	\$5,049,772	\$990,655

Table C4: Average Metro-North Railroad Fare by Type of Customer (Pre-Increase) (Full Table)

	All	Minority	Low income
Total Fares Paid	\$18,360,607.00	\$5,049,772	\$990,655.34
Total Count of Fares Paid	1,224,113	314,487	70,530
Average Fare Paid	\$15.00	\$16.06	\$14.05

Table C5: Current Metro-North Railroad Fare Expenses

	Total Fare Purchases	Total Price	Average
Ten-trip Ticket (Off-Peak)	6,592	\$635,504	\$96.41
Ten-trip Ticket (Peak)	10,228	\$1,153,176	\$112.75
Monthly	13,408	\$3,239,608	\$241.62
Senior/Disabled (All Types)	117,827	\$844,721	\$7.17
One Way Ticket (Off-Peak)	621,756	\$7,419,646	\$11.93
One Way Ticket (Peak)	449,085	\$4,760,340	\$10.60
Weekly Pass	5,218	\$307,614	\$58.96

Table C6: Metro-North Railroad Adjusted Fares for Increase

Fare Medium	Total Fares Purchased	Total Price Paid	Original Price	New Fares
Ten-trip Ticket (Off-Peak)	6,592	\$635,504	\$635,504	\$674,932
Ten-trip Ticket (Peak)	10,228	\$1,153,176	\$1,153,176	\$1,225,401
Monthly	13,408	\$3,239,608	\$3,239,608	\$3,370,082
Senior/Disabled (All Types)	117,827	\$844,721	\$844,721	\$901,769
One Way Ticket (Off-Peak)	621,756	\$7,419,646	\$7,419,646	\$7,881,363
One Way Ticket (Peak)	449,085	\$4,760,340	\$4,760,340	\$5,063,069
Weekly Pass	5,218	\$307,614	\$307,614	\$319,202
Total	1,224,113	\$18,360,607	\$18,360,607	\$19,435,819

Table C7: Monthly Metro-North Railroad Fare Expenses by Medium by Type of Customer (Post-Increase) (Full Table)

Far Medium	Avg Fare Per Ticket	Total Fare Paid - All Customers	Total Fare Paid - Minority	Total Fare Paid - Low Income
Ten-trip Ticket (Off-Peak)	\$102.39	\$674,932	\$215,023	\$66,323
Ten-trip Ticket (Peak)	\$119.81	\$1,225,401	\$255,152	\$32,182
Monthly	\$251.35	\$3,370,082	\$1,091,717	\$138,842
Senior/Disabled (All Types)	\$7.65	\$901,769	\$68,381	\$98,589
One Way Ticket (Off-Peak)	\$12.68	\$7,881,363	\$2,179,400	\$408,361
One Way Ticket (Peak)	\$11.27	\$5,063,069	\$1,382,665	\$262,335
Weekly Pass	\$61.18	\$319,202	\$147,324	\$42,560
Grand Total		\$19,435,819	\$5,339,662	\$1,049,193

Table C8: Average Metro-North Railroad Fare by Type of Customer (Post- Increase) (Full Table)

	All		Minority	Low income
Total Fares Paid	\$19,435,819	\$5,339,662		\$1,049,192.78
Total Count of Fares Paid	1,224,113	314,487		70,530
Average Fare Paid	\$15.88	\$16.98		\$14.88

Table C9: Metro-North Railroad Percent Change (Full Table)

	All		Minority	Low income
Average Fare Pre- Increase	\$15.00	\$16.06		\$14.05
Average Fare Post-Increase	\$15.88	\$16.98		\$14.88
Percent Change	5.86%	5.74%		5.91%

Hartford Line

Table C10: 2019 Ridership Survey Hartford Line Fare Medium Use (Full Table)

Fare Medium	All Customers Total	All Customers %	All Customers (Minority)	All Customers (Low-Income)	Minority Count	Minority %	Low-income Count	Low-income %
Ten-trip Ticket	61	5.60%	51	47	16	31.4%	0	0.0%
Monthly	139	12.75%	123	116	39	31.7%	12	10.3%
One Way Senior/Disabled Ticket	70	6.42%	60	57	18	30.0%	17	29.8%
One Way Ticket	796	73.03%	686	598	318	46.4%	162	27.1%
Ten-trip Senior/Disabled Ticket	14	1.28%	11	7	3	27.3%	0	0.0%
Weekly Pass	10	0.92%	9	9	2	22.2%	5	55.6%
Total	1,090		940	834	396		196	

Table C11: Estimated 2021 Hartford Line Fare Medium Usage by Type of Customer (Full Table)

Fare Medium	All Purchases	% All Purchases	Minority Estimate	% Minority	Low-income Estimate	% Low-income
Ten-trip Ticket	690	0.5%	216	31.4%	0	0.0%
Monthly	349	0.3%	111	31.7%	36	10.3%
One Way Senior/Disabled Ticket	32,250	23.7%	9,675	30.0%	9,618	29.8%
One Way Ticket	102,135	75.2%	47,345	46.4%	27,669	27.1%
Ten-trip Senior/Disabled Ticket	164	0.1%	45	27.3%	0	0.0%
Weekly Pass	250	0.2%	56	22.2%	139	55.6%
Grand Total	135,838		57,448		37,462	

Table C12: Annual Hartford Line Fare Expenses by Medium by Type of Customer (Pre-Increase) (Full Table)

Fare Medium	Average Fare Per Ticket	Total Fare Paid All Customers	Total Fare Paid Minority	Total Fare Paid Low-income
Ten-trip Ticket	\$58.43	\$40,313	\$12,647.29	\$0.00
Monthly	\$117.97	\$41,171	\$13,054.06	\$4,259.02
One Way Senior/Disabled Ticket	\$3.61	\$116,263	\$34,878.98	\$34,675.00
One Way Ticket	\$6.97	\$712,138	\$330,116.45	\$192,920.33
Ten-trip Senior/Disabled Ticket	\$32.41	\$5,315	\$1,449.55	\$0.00
Weekly Pass	\$36.38	\$9,094	\$2,020.83	\$5,052.08
Grand Total		\$924,293.75	\$394,167.16	\$236,906.43

Table C13: Average Hartford Line Fare by Type of Customer (Pre-Increase) (Full Table)

	All	Minority	Low-income
Total Fares Paid	\$924,293.75	\$394,167	\$236,906.43
Total Count of Fares Paid	135,838	57,448	37,462
Average Fare Paid	\$6.80	\$6.86	\$6.32

Table C14: Current Hartford Line Fare Expenses

	Total Fare Purchases	Total Price	Average
Ten-trip	690	\$40,313	\$58.43
Monthly	349	\$41,171	\$117.97
One Way SR/Disabled	32,250	\$116,263.25	\$3.61
One Way	102,135	\$712,138	\$6.97
Ten Trip Senior/Disabled	164	\$5,315	\$32.41
Weekly	250	\$9,093.75	\$36.38

Table C15: Hartford Line Adjusted Fares for Increase

	Total Fares Purchased	Total Price Paid	Original Price	New Fares
Ten-trip Ticket	690	\$40,313	\$40,313	\$41,966
Monthly	349	\$41,171	\$41,171	\$42,858
One Way Senior/Disabled Ticket	32,250	\$116,263	\$116,263.25	\$120,565
One Way Ticket	102,135	\$712,138	\$712,138.00	\$741,336
Ten-trip Senior/Disabled Ticket	164	\$5,315	\$5,315	\$5,626
Weekly Pass	250	\$9,093.75	\$9,093.75	\$9,469
Total	135,838	\$924,294	\$924,294	\$961,821

Table C16: Annual Hartford Line Fare Expenses by Medium by Type of Customer (Post-Increase) (Full Table)

Far Medium	Avg Fare Per Ticket	Total Fare Paid - All Customers	Total Fare Paid - Minority	Total Fare Paid - Low Income
Ten-trip Ticket	\$60.82	\$41,966	\$13,166	\$0
Monthly	\$122.80	\$42,858	\$13,589	\$4,434
One Way Senior/Disabled Ticket	\$3.74	\$120,565	\$36,169	\$35,958
One Way Ticket	\$7.26	\$741,336	\$343,651	\$200,830
Ten-trip Senior/Disabled Ticket	\$34.31	\$5,626	\$1,534	\$0
Weekly Pass	\$37.88	\$9,469	\$2,104	\$5,261
Grand Total		\$961,821.01	\$410,215	\$246,482

Table C17: Average Hartford Line Fare by Type of Customer (Post-Increase) (Full Table)

	All	Minority	Low income
Total Fares Paid	\$961,821	\$410,215	\$246,482
Total Count of Fares Paid	135,838	57,448	37,462
Average Fare Paid	\$7.08	\$7.14	\$6.58

Table C18: Hartford Line Percent Change (Full Table)

	All	Minority	Low income
Average Fare Pre-Increase	\$6.80	\$6.86	\$6.32
Average Fare Post-Increase	\$7.08	\$7.14	\$6.58
Percent Change	4.06%	4.07%	4.04%

Shore Line East

Table C19: 2019 Ridership Survey Shore Line East Fare Medium Use (Full Table)

Fare Medium	All Customers Count	All %	All Customers Minority	All Customers Low-Income	Minority Count	Minority %	Low-income Count	Low-income %
Monthly pass (does not include New Haven Commuter Connection bus service)	154	26.6%	137	114	18	13.1%	4	3.5%
Monthly Plus (includes New Haven Commuter Connection bus service)	32	5.5%	28	23	2	7.1%	1	4.3%
10-trip ticket	53	9.2%	46	38	5	10.9%	5	13.2%
One way	228	39.4%	198	173	43	21.7%	40	23.1%
Senior/disabled 10-trip ticket	15	2.6%	14	13	2	14.3%	1	7.7%
Senior/disabled One way	58	10.0%	49	38	6	12.2%	5	13.2%
UniRail monthly	38	6.6%	34	26	3	8.8%	1	3.8%
Total	578		506	425	79		57	

Table C20: Estimated 2021 Shore Line East Fare Medium Usage by Type of Customer (Full Table)

Fare Medium	All Purchases	% All Purchases	Minority Estimate	% Minority	Low-income Estimate	% Low-income
Monthly pass (does not include New Haven Commuter Connection bus service)	624	1.0%	82	13.1%	22	3.5%
Monthly Plus (includes New Haven Commuter Connection bus service)	40	0.1%	3	7.1%	2	4.3%
10-trip ticket	811	1.3%	88	10.9%	107	13.2%
One way	49,282	76.6%	10,703	21.7%	11,395	23.1%
Senior/disabled 10-trip ticket	329	0.5%	47	14.3%	25	7.7%
Senior/disabled One way	13,215	20.5%	1,618	12.2%	1,739	13.2%
UniRail - Monthly	50	0.1%	4	8.8%	2	3.8%
Total	64,351	100%	12,545		13,291	

Table C21: Annual Shore Line East Fare Expenses by Medium by Type of Customer (Pre-Increase) (Full Table)

Fare Medium	Average Fare Per Trip	Total Fare Paid - All Customers	Total Fare Paid - Minority	Total Fare Paid - Low-income
Monthly pass (does not include New Haven Commuter Connection bus service)	\$109.01	\$68,023.45	\$8,937.39	\$2,386.79
Monthly Plus (includes New Haven Commuter Connection bus service)	\$164.95	\$6,598.08	\$471.29	\$286.87
10-trip ticket	\$48.28	\$39,156.09	\$4,256.10	\$5,152.12
One way	\$8.93	\$440,118.34	\$95,581.26	\$101,761.47
Senior/disabled 10-trip ticket	\$13.67	\$4,498.00	\$642.57	\$346.00
Senior/disabled One way	\$4.41	\$58,243.74	\$7,131.89	\$7,663.65
UniRail - Monthly	\$152.40	\$7,620.16	\$672.37	\$293.08
Total		\$624,257.87	\$117,692.86	\$117,889.98

Table C22: Average Shore Line East Fare by Type of Customer (Pre-Increase) (Full Table)

	All	Minority	Low-income
Total Fares Paid	\$624,257	\$117,693	\$117,889
Total Count of Fares Paid	64,351	12,545	13,291
Average Fare Paid	\$9.70	\$9.38	\$8.87

Table C23: Current Shore Line East Fare Expenses

Fare Medium	Total Fare Purchases	Total Price	Avg Per-Trip Fare
Monthly pass (does not include New Haven Commuter Connection bus service)	624	\$68,023.45	\$109.01
Monthly Plus (includes New Haven Commuter Connection bus service)	40	\$6,598.08	\$164.95
10-trip ticket	811	\$39,156.09	\$48.28
One way	49,282	\$440,118.34	\$8.93
Senior/disabled 10-trip ticket	329	\$4,498.00	\$13.67
Senior/disabled One way	13,215	\$58,243.74	\$4.41
UniRail - Monthly	50	\$7,620.16	\$152.40
Grand Total	64,351	\$624,257.87	\$9.70

Table C24: Shore Line East Adjusted Fares for Increase

Fare Medium	Total Fares Purchased	Total Price Paid	Original Price	New Fares
Monthly pass (does not include New Haven Commuter Connection bus service)	624	\$68,023.45	\$68,023.45	\$71,610.14
Monthly Plus (includes New Haven Commuter Connection bus service)	40	\$6,598.08	\$6,598.08	\$6,915.23
10-trip ticket	811	\$39,156.09	\$39,156.09	\$41,220.69
One way	49,282	\$440,118.34	\$440,118.34	\$463,324.58
Senior/disabled 10-trip ticket	329	\$4,498.00	\$4,498.00	\$4,805.06
Senior/disabled One way	13,215	\$58,243.74	\$58,243.74	\$59,330.37
UniRail - Monthly	50	\$7,620.16	\$7,620.16	\$7,927.30
Grand Total	64,351	\$624,257.87	\$624,257.87	\$655,133.37

Table C25: Annual Shore Line East Fare Expenses by Medium by Type of Customer (Post-Increase) (Full Table)

Fare Medium	Avg Fare Per Ticket	Total Fare Paid - All Customers	Total Fare Paid - Minority	Total Fare Paid - Low Income
Monthly pass (does not include New Haven Commuter Connection bus service)	\$114.76	\$71,608	\$9,408	\$2,513
Monthly Plus (includes New Haven Commuter Connection bus service)	\$172.89	\$6,915	\$494	\$301
10-trip ticket	\$50.83	\$41,220	\$4,480	\$5,424
One way	\$9.40	\$463,313	\$100,618	\$107,124
Senior/disabled 10-trip ticket	\$14.61	\$4,805	\$686	\$370
Senior/disabled One way	\$4.49	\$59,330	\$7,265	\$7,807
UniRail - Monthly	\$158.55	\$7,927	\$699	\$305
Grand Total		\$655,133	\$123,655	\$123,845

Table C26: Average Shore Line East Fare by Type of Customer (Post-Increase) (Full Table)

	All	Minority	Low income
Total Fares Paid	\$655,133.37	\$123,654.93	\$123,845.29
Total Count of Fares Paid	64,351	12,545	13,291
Average Fare Paid	\$10.18	\$9.86	\$9.32

Table C27: Shore Line East Percent Change by Type of Customer (Full Table)

	All	Minority	Low income
Average Fare Pre-Increase	\$9.70	\$9.38	\$8.87
Average Fare Post-Increase	\$10.18	\$9.86	\$9.32
Percent Change	4.95%	5.07%	5.05%

Full Package

Table C28: Percent Change in Full Package Payments (Full Table)

	All	Minority	Low-income
Average Fare Pre-Increase	\$14.90	\$15.90	\$13.65
Average Fare Post-Increase	\$15.77	\$16.81	\$14.45
Percent Change	5.85%	5.73%	5.86%

Appendix D - Bus Major Service Change Threshold Analysis Results

The threshold analysis results for any proposed change that exceeded the major service change threshold are presented in this appendix.

Hartford dash Shuttle

Threshold Analysis Results

The proposed route change would result in a Major Service Change under the under the Span of Service criterion (a change in the service span of at least one-hour).

Route 45X

Threshold Analysis Results

The proposed route change would result in a Major Service Change under the under the Route Restructuring criterion (at least a 20% change in route length), change in Annual Revenue Vehicle Miles criterion (25% or more change) and Span of Service criterion (a change in the service span of at least one-hour).

Route 47B

Threshold Analysis Results

No major service change thresholds were exceeded.

Route 69

Threshold Analysis Results

The proposed route change would result in a Major Service Change under the Route Restructuring criterion (at least a 20% change in route length) and the change in Annual Revenue Vehicle Miles criterion (25% or more change).

Route 102

Threshold Analysis Results

No major service change thresholds were exceeded.

Route 125

Threshold Analysis Results

The proposed route change would result in a Major Service Change under the Route Restructuring criterion (at least a 20% change in route length), change in Annual Revenue Vehicle Miles criterion (25% or more change) and Span of Service criterion (a change in the service span of at least one-hour).

Route 140

Threshold Analysis Results

The proposed route change would result in a Major Service Change under the Route Restructuring criterion (at least a 20% change in route length), change in Annual Revenue Vehicle Miles criterion (25% or more change) and Span of Service criterion (a change in the service span of at least one-hour).

Route 144

Threshold Analysis Results

The proposed route change would result in a Major Service Change under the change in Annual Revenue Vehicle Miles criterion (25% or more change).

Route 153

Threshold Analysis Results

The proposed route change would result in a Major Service Change under the change in Annual Revenue Vehicle Miles criterion (25% or more change).

Route 216

Threshold Analysis Results

The proposed route change would result in a Major Service Change under the under the Route Restructuring criterion (at least a 20% change in route length), change in Annual Revenue Vehicle Miles criterion (25% or more change) and Span of Service criterion (a change in the service span of at least one-hour).

Route 262

Threshold Analysis Results

The proposed route change would result in a Major Service Change under the Route Restructuring criterion (at least a 20% change in route length), change in Annual Revenue Vehicle Miles criterion (25% or more change) and Span of Service criterion (a change in the service span of at least one-hour).

Route 907

Threshold Analysis Results

The proposed route change would result in a Major Service Change under the Route Restructuring criterion (at least a 20% change in route length), change in Annual Revenue Vehicle Miles criterion (25% or more change) and the Span of Service criterion (a change in the service span of at least one-hour).

Route 923

Threshold Analysis Results

The proposed route change would result in a Major Service Change under the Route Restructuring criterion (at least a 20% change in route length), change in Annual Revenue Vehicle Miles criterion (25% or more change) and the Span of Service criterion (a change in the service span of at least one-hour).

The following table summarizes the results of the Major Service Change Threshold Analysis.

Table D1: Major Service Change Threshold Analysis Results

Route	Major Service Change Criteria				Type of Change
	Route restructuring actions resulting in at least a 20% change in overall route length	Service frequency changes that result in a 25% or more change in annual revenue vehicle miles (RVM). Annual RVMs are a compilation of weekday and weekend RVMs	A service change adding or reducing service to a fixed guideway station resulting in a greater than 25% change in service at the station	Service change actions resulting in at least a one-hour change in service span	
45X	YES	YES	NO	YES	Route elimination
47B	NO	NO	NO	NO	Route restructuring
69	YES	YES	NO	NO	Route restructuring
102	NO	NO	NO	NO	Route restructuring
125	YES	YES	NO	YES	New route
140	YES	YES	NO	YES	Route elimination
144	NO	YES	NO	NO	Headway reduction
153	NO	YES	NO	NO	Route restructuring/ Headway reduction
216	YES	YES	NO	YES	New route
262	YES	YES	NO	YES	New route
907	YES	YES	NO	YES	Route elimination
923	YES	YES	NO	YES	Route elimination
dash	NO	NO	NO	YES	Change in Span of service

Appendix E - Bus Fare Equity Analysis – Fare Medium Tables

Appendix E Total Fare Collections

Table E1: 2023 2-Hour Fare Sales and Average Fare (Full Table)

Fare Medium	Count of Tickets Purchased	Value of Ticket Type	Total Sales
2 Hours Local	374,061	\$1.75	\$654,606.75
2 Hours Express 2	3,585	\$3.20	\$11,472.00
2 Hours I-Bus Express	431	\$3.20	\$1,379.20
2 Hours Express 3	977	\$4.10	\$4,005.70
2 Hours Express 4	763	\$5.00	\$3,815.00
2 Hours Express 5	198	\$6.00	\$1,188.00
2 Hours Youth Local	5,470	\$2.80	\$15,316.00
2 Hours SR/DIS Local	20,425	\$0.85	\$17,361.25
2 Hours SR/DIS Express 2	325	\$1.60	\$520.00
2 Hours SR/DIS Express 3	68	\$2.05	\$139.40
2 Hours SR/DIS Express 4	30	\$5.00	\$150.00
2 Hours SR/DIS Express 5	34	\$3.00	\$102.00
Digital Fare-2H	78,687	\$1.75	\$137,702.25
Total:	\$485,054.00		\$847,757.55
Average Fare Cost:	\$1.75		

Table E2: 2023 All-Day Fare Sales and Average Fare (Full Table)

Fare Medium	Count of Tickets Purchased	Value of Ticket Type	Total Sales
All Day Pass Local	119,811	\$3.50	\$419,338.50
Day Pass Local	160	\$3.50	\$560.00
All Day Pass Express 2	169	\$6.40	\$1,081.60
All Day Pass Express 3	161	\$8.20	\$1,320.20
All Day Pass Express 4	200	\$10.00	\$2,000.00
All Day Pass Express 5	4	\$12.00	\$48.00
All Day Pass I-Bus Express	153	\$6.40	\$979.20
All Day Pass SR/DIS Local	51,220	\$1.70	\$87,074.00
All Day Pass SR/DIS Express 2	74	\$3.20	\$236.80
All Day Pass SR/DIS Express 3	19	\$4.10	\$77.90
All Day Pass SR/DIS Express 4	58	\$5.00	\$290.00
All Day Pass Youth Local	3,742	\$1.40	\$5,238.80
All Day Pass SR/DIS Express 5	7	\$6.00	\$42.00
Total	175,778		\$518,287.00
Average	\$2.95		

Table E3: 2023 31-Day Fare Sales and Average Fare (Full Table)

Fare Medium	Count of Tickets Purchased	Value of Ticket Type	Total Sales
31 Day Local	155,141	\$63.00	\$9,773,883.00
31 Day Express 2	975	\$108.80	\$106,080.00
31 Day Express 3	621	\$139.40	\$86,567.40
31 Day Express 4	136	\$170.00	\$23,120.00
31 Day Express 5	117	\$204.00	\$23,868.00
***31 Day I-Bus Express	1,284	\$108.80	\$139,699.20
31 Day SR/DIS Local	99,594	\$30.60	\$3,047,576.40
Monthly Z4 - Express	1	\$170.00	\$170.00
Total	257,869		\$13,200,964.00
Average	\$51.19		

Table E4: 2023 3, 5, and 7-Day Fare Sales and Average Fare (Full Table)

Fare Medium	Count of Tickets Purchased	Value of Ticket Type	Total Sales
7 Day Local	13,828	\$19.25	\$266,189.00
3 Day Local	4,436	\$8.75	\$38,815.00
5 Day Local	13,623	\$14.00	\$190,722.00
Total	31,887		\$495,726.00
Average	\$15.55		

Table E5: 2023 10-Ride Fare Sales and Average Fare (Full Table)

Fare Medium	Count of Tickets Purchased	Value of Ticket Type	Total Sales
10 Ride Express 2	2,116	\$28.80	\$60,940.80
10 Ride Express 3	643	\$18.45	\$11,863.35
10 Ride Local	45,023	\$15.75	\$709,112.25
10 Ride Express 4	419	\$45.00	\$18,855.00
10 Ride Express 5	15	\$54.00	\$810.00
10 Ride I-Bus Express	1,677	\$28.80	\$48,297.60
10 Ride SR/DIS Local	25,866	\$7.65	\$197,874.90
10 Ride Youth Local	13,992	\$12.60	\$176,299.20
10 Ride SR/DIS Express 2	502	\$14.40	\$7,228.80
10 Ride SR/DIS Express 3	106	\$18.45	\$1,955.70
10 Ride SR/DIS Express 4	113	\$22.50	\$2,542.50
10 Ride SR/DIS Express 5	-	\$27.00	\$-
Total	90,472		\$1,235,780.10
Average	\$13.66		

Table E6: 2023 10-Ride Fare Sales and Average Fare (Full Table)

Fare Medium	Count of Tickets Purchased	Value of Ticket Type	Total Sales
Semester Pass Naugatuck Valley	68	\$-	\$-
Semester Pass University of New Haven	19,665	\$-	\$-
Semester Pass UPass CT	48,514	\$-	\$-
Total	68,247		\$-
Average	\$-	\$-	

Appendix E Fare Analysis Tables

Table E7: 2023 Ridership Survey CTtransit Fare Medium Use with Go CT Card and Token Transit Redistribution (Full Table)

Fare Medium	Overall - Total	% Distribution Token Transit	All Riders Adjusted	All Customers – Minority Responses	% Distribution Token Transit	All Customers – Minority Adjusted	All Customers – Low Income Responses	% Distribution Token Transit	All Customers - Low Income Adjusted
2-Hour Pass	418	100.0%	480	339	100.0%	385	311	100.0%	360
All-Day	196	0.0%	196	153	0.0%	153	145	0.0%	145
31-Day	192		192	148		148	125		125
3-,5-,7-Day	25		25	23		23	16		16
10-Ride	101		101	55		55	32		32
Student/U-Pass	155		155	138		138	107		107
Token Transit	62			46			49		
Total	1149	614	1149	902	492	902	787	457	787

Table E8: 2023 Ridership Survey CTtransit Fare Medium Usage by Customer Type (Full Table)

Fare Medium	Overall - Total	% Overall Riders	Minority Count	% Minority	Low Income Count	% Low-Income
2-Hour Pass	480	41.8%	385	80.2%	360	75.0%
All-Day	196	17.1%	153	78.1%	145	74.2%
31-Day	192	16.7%	148	77.1%	125	65.3%
3-,5-,7-Day	25	2.2%	23	92.0%	16	65.7%
10-Ride	101	8.8%	55	54.5%	32	32.1%
U-Pass	155	13.5%	138	89.0%	107	68.9%
Grand Total	1,149		902		787	

Table E9: Annual Fare Media Purchases by Customer Type (Full Table)

Fare Medium	Overall Purchases	% Overall Purchases	Minority Estimate	% Minority	Low Income Estimate	% Low Income
2-Hour Pass	485,054	43.7%	389,054	80.2%	363,895	75.0%
All-Day	175,778	15.8%	137,214	78.1%	130,484	74.2%
31-Day	257,869	23.2%	198,774	77.1%	168,292	65.3%
3-,5-,7-Day	31,887	2.9%	29,336	92.0%	20,962	65.7%
10-Ride	90,472	8.2%	49,267	54.5%	29,054	32.1%
U-Pass	68,247	6.2%	60,762	89.0%	47,028	68.9%
Grand Total	1,109,307		864,407		759,715	

Table E10: Annual CTtransit Fare Expenses by Medium (Full Table)

Fare Medium	Overall Purchases	Value	Average Fare
2-Hour Pass	485,054	\$847,758	\$1.75
All-Day	175,778	\$518,287	\$2.95
31-Day	257,869	\$13,200,964	\$51.19
3-,5-,7-Day	31,887	\$495,726	\$15.55
10-Ride	90,472	\$1,235,780	\$13.66
U-Pass	68,247	\$0	\$0.00

Table E11: Total Fares Paid by Customer Type (Full Table)

Fare Medium	Average Fare	Total Fare Paid - Overall Customers	Total Fare Paid – Minority Customers	Total Fare Paid - Low Income Customers
2-Hour Pass	\$1.75	\$847,758	\$679,972	\$636,001
All-Day	\$2.95	\$518,287	\$404,581	\$384,737
31-Day	\$51.19	\$13,200,964	\$10,175,743	\$8,615,283
3-,5-,7-Day	\$15.55	\$495,726	\$456,068	\$325,884
10-Ride	\$13.66	\$1,235,780	\$672,950	\$396,853
U-Pass	\$0.00	\$0	\$0	\$0
Grand Total		\$16,298,514.65	\$12,389,313.94	\$10,358,758.29

Table E12: Average Fare Paid by Customer Type (Full Table)

	Overall	Minority	Low Income
Total Fares Paid	\$16,298,514.65	\$12,389,314	\$10,358,758
Total Count of Fares Paid	1,109,307	864,407	759,715
Average Fare Paid	\$14.69	\$14.33	\$13.64

Table E13: Fare Difference Paid by Customer Type (Full Table)

Customer type	Cost Difference (Overall)	% Difference (Overall)	Result
Minority Customers	(\$0.36)	-2.4%	No Impact Found
Low Income Customers	(\$1.06)	-7.2%	No Impact Found