

**2021 CTDOT Service and Fare Equity Analysis**  
*Bureau of Public Transportation*

**Connecticut Department of Transportation**

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## 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 also analyzes temporary service changes under COVID emergency conditions that are expected to have a duration of over twelve months, and temporary fare changes expected to have a duration over six months. CTDOT has committed to assessing the results of those service and fare changes that were enacted in Spring 2020 in response to reduced demand for transit service during the pandemic.

CTDOT is also analyzing proposed service changes to *CTtransit* bus service, minor fare changes on two *CTtransit* Express bus routes, and a proposal to eliminate the Metro-North Railroad (Metro-North) Mail and Ride Program.

### 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. Rail major service and fare changes, and proposed bus major service and fare changes were analyzed to determine if there are disparate impacts to minority populations, or disproportionate burdens to low income populations.

#### *Connecticut Rail System Changes*

Due to COVID-19 service changes to trains on the New Haven Line, New Canaan Branch, Danbury Branch, Waterbury Branch, Shore Line East, and Hartford Line were previously implemented on an emergency basis. Metro-North implemented a modified weekend service schedule operating seven days a week in response to the pandemic. Weekend service does not have peak service periods therefore peak fares were no longer offered. The Mail & Ride Program, which provides a 2% discount for people who purchase monthly Metro-North passes and monthly MTA passes by mail, is proposed for elimination in order to promote the use of mobile no-touch fare media.

#### *Proposed Hartford Express Bus System Changes*

The purpose of the proposed Hartford Express Bus system changes is to offer a slate of sensible, efficient measures that would allow the express bus network to adapt to lower ridership demand as a result of the COVID pandemic, while maintaining critical links between communities and providing a framework to rebuild ridership post-pandemic. In addition, fare changes are proposed to two Hartford Express Bus routes: Route 912 and Route 950.

- On Route 912, it is proposed to rescind a fare policy exception on reverse commute trips (a policy left over from a former Jobs Access Program). Reverse-commute trips on Route



912 will no longer charge a local fare (\$1.75), but instead will charge a distance-based express fare.

- On Route 950, during the midday CTrail Hartford Line tickets (except the 10-trip pass) would be cross-honored.

#### *Proposed New Haven Bus System Changes*

The proposed changes to the New Haven Bus system include an increase in span of service on a number of routes designed to meet the transportation needs of workers who work beyond the normal 8 AM-5 PM schedule. In addition, this proposed change will also improve access to transit for individuals to connect across the Greater New Haven Region, spread load capacities and establish a supportive transit system for existing high ridership lines.

### Service and Fare Analyses – Findings and Alternatives

#### *Rail System Findings*

Analyses of the rail major service changes or fare changes are presented as follows:

1. New Haven Line main line – A disproportionate burden was identified as a result of a reduction in off-peak weekday eastbound service on the New Haven Line main line due to a reduction in State Street Station Stops operated by Metro-North. However, since the Hartford Line and Shore Line East provide connecting service between New Haven Union Station and State Street Station, the burden is offset by the additional service options provided by the connecting operators.
2. Danbury Branch – No disparate impacts or disproportionate burdens were identified.
3. Shore Line East - A disproportionate burden was identified as a result of reduced weekend westbound service headways to New Haven. This is largely due to infrastructure limitations at Clinton and Madison stations.
4. Fare Changes – No disparate impacts or disproportionate burdens were identified.

#### *Rail System Mitigation Alternatives*

For both the New Haven main line and the Shore Line East, the project team identified three alternatives for mitigation:

- A) Monitor Ridership – Adjust service according to observable ridership changes.
- B) Remediation – Adjust to remove the quantified burden. In both cases, this would be accomplished by:
  - a. New Haven Line main line - adding a single State Street Station stop on the eastbound off-peak.
  - b. Shore Line East – extending train 3610/3637 to New London weekends.
- C) Restore former service levels – a gradual restoration plan may accomplish this staging in pace with service demand.

*Bus System Findings*

1. Proposed service changes to 13 Hartford routes and one New Haven bus route result in disparate impacts.
2. The proposed service changes on one route, Asylum Hill Shuttle, resulted in a disproportionate burden.
3. For the proposed fare changes on Routes 912 and 950, there is no finding of disparate impact or disproportionate burden.

*Bus System Mitigation Alternatives*

For bus routes where either route modifications or eliminations are proposed, replacement service provided by existing bus routes is proposed.

For bus routes where headways are widened or span of service is decreased, the rationale for these proposed changes is because current ridership levels do not warrant the level of service provided today.

## 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.” Those include temporary, major changes in effect for 12 months or more and those that will become permanent. Therefore, CTDOT is conducting this Title VI Service And Fare Equity Analysis (SAFE) for the impacts of the Connecticut rail temporary service and fare adjustments in response to the public health emergency and pandemic of 2020. The analysis will compare major changes between Pre-COVID and COVID in Service and Fare Equity for Connecticut public transit users.

In addition to changes to rail service, CTDOT is evaluating the impacts of proposed service and fare changes to the Hartford Express Bus network that would allow it to adapt to lower ridership demand as a result of the COVID pandemic, while maintaining critical links between communities and providing a framework to rebuild ridership post-pandemic.

Finally, CTDOT is evaluating proposed increases to the span of service on a number of routes in the New Haven Local Bus network. The purpose of these span of service changes is to better meet the transportation needs of customers who work beyond the normal 8 AM-5 PM schedule and to provide improved access to transit across the Greater New Haven region, spread load capacities and establish a supportive transit system for existing high ridership lines.

## 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 particular 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 passengers 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

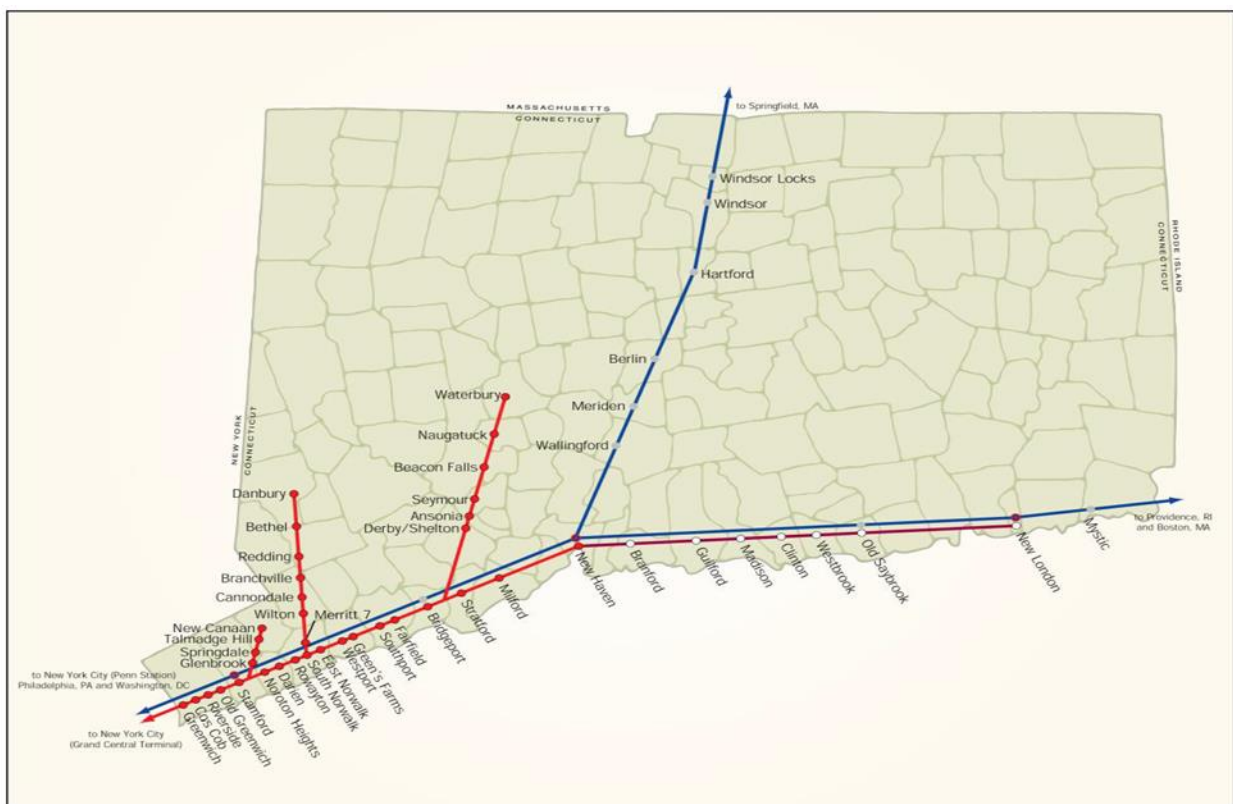
## Connecticut Rail System Description

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

The New Haven Line, operated by Metro-North Railroad (Metro-North), 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 Red lines on Figure 1 below.*

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

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 below.*



**Figure 1 – Map of Connecticut Rail Passenger Service**

The commuter rail lines that will be the focus of this SAFE are:

- New Haven Line Main Line (New Haven-Greenwich)

- New Canaan Branch (New Canaan-Stamford)
- Danbury Branch (Danbury-South Norwalk)
- Waterbury Branch (Waterbury-Bridgeport)
- Shore Line East (New London-New Haven)

*Note: intercity services are omitted from this Service And Fare Equity Analysis (SAFE).*

### Background of COVID-Related Rail Changes

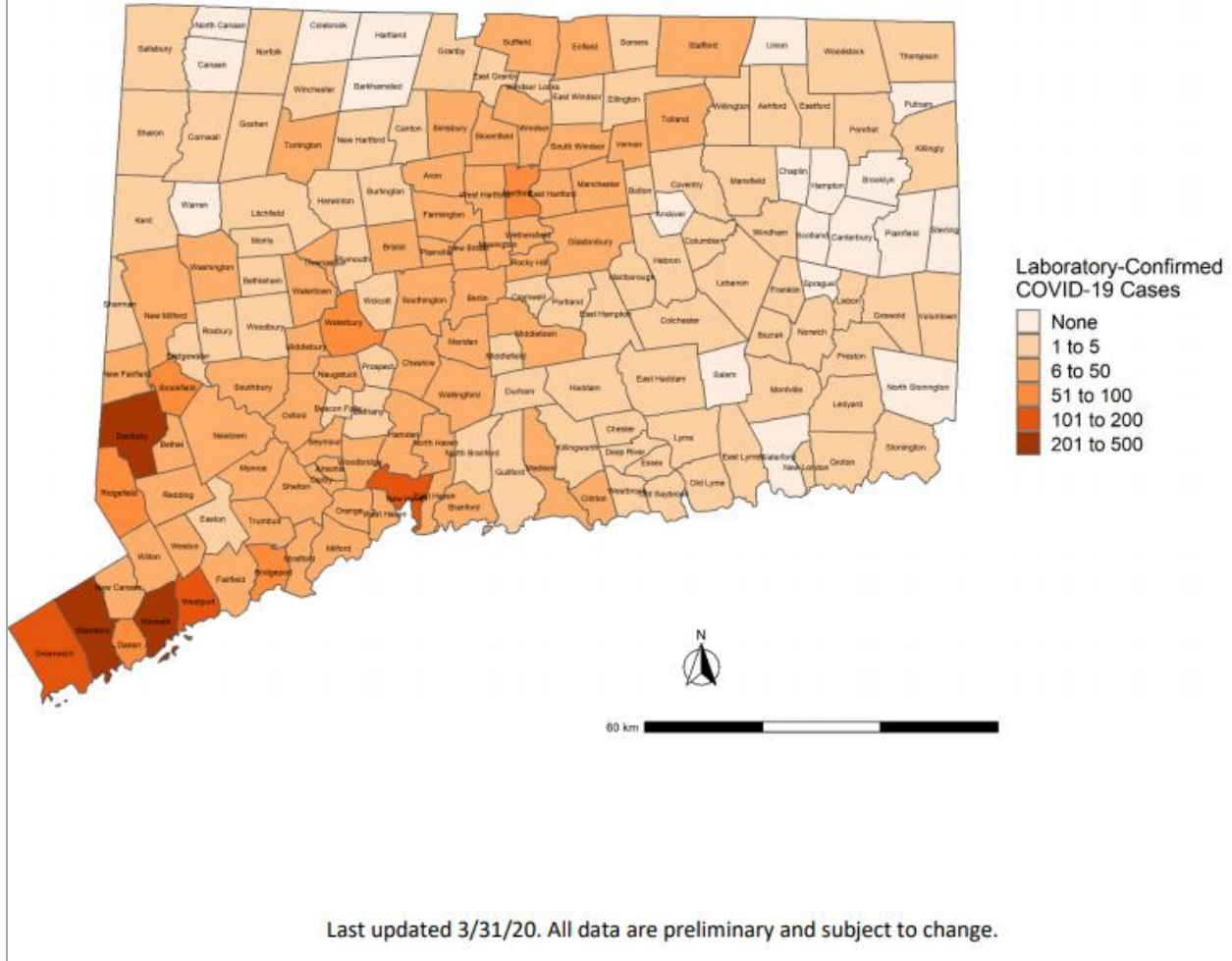
The Secretary of Health and Human Services (HHS) declared a public health emergency on January 31, 2020, under section 319 of the Public Health Service Act (42 U.S.C. 247d), in response to the COVID-19 virus and on March 1, 2020 the President of the United States declared a national health emergency. The Federal Government, along with State and local governments, started preventive and proactive measures to slow the spread of the virus. Beginning in early February the U.S. Centers for Disease Control and Prevention (CDC) recommended social distancing, self-quarantine, and working from home to stop the spread of the virus. These and other recommended guidelines, such as school and business closings were enacted by states and municipalities who issued calls to stay at home.

On March 10, 2020, Governor Ned Lamont declared a public health emergency and civil preparedness emergency throughout the State, pursuant to Sections 19a-131a and 28-9 of the Connecticut General Statutes. The public was again urged by federal and state officials to quarantine, shelter-in-place, and work from home to the extent possible to avoid further spread of the virus, overload of hospitals, care facilities and their employees.



# Connecticut Towns with Confirmed Cases of COVID-19

Map does not include 77 cases pending address validation.



**Figure 2 – COVID-19 Cases in Connecticut**  
Source: Connecticut Department of Health

## Transit Agency Response to National Public Health Emergency

By March 17<sup>th</sup>, Connecticut moved with MTA which implemented the Essential Service Plan (ESP), developed “in close consultation with groups representing the heroic workers on the front lines of the pandemic, including hospitals, utility workers”. This ESP reduced service plan was viewed by the agencies as an essential, extraordinary measure to protect essential workers on the front lines by allowing for more flexibility in scheduling. The ESP operated by Metro-North and in connection with CTrail lines scheduled trains to operate on hourly intervals on the New Haven and interconnected lines. By month end, transit agencies in Massachusetts,

Connecticut, New York, New Jersey, Pennsylvania, Maryland, and Washington, D.C. drastically cut transit service in response to the national public health emergency.

#### Ancillary Impact of the Pandemic on Rail Transit

By the end of April 2020, Metro-North ridership dropped 95%, while Shore Line East ridership dropped 92%; similar to declines across the nation and globally. The significant decline in ridership highlighted the vulnerability of public transit to disruptions caused by widespread public health emergencies. To assure the ability to transport essential workers, CTDOT initiated steps to continue providing service while ensuring safety. These included enhanced cleaning and disinfecting of railcars, buses, and stations; establishing social distancing guidelines and other public safety regimens for riders, and enhanced personal protective gear, and other employee protective measures. In telling the public “to stay home if you can”, transit agencies had to balance their essential service while undergoing severe revenue losses, and still survive to serve the public.

## COVID Rail Service Changes

### 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 results 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.*

*The COVID threshold analysis compares the September 2019 service characteristics to the 2020 COVID service characteristics, both in threshold analysis, and in the breakdown of service levels for those major service and fare changes.*

An analysis was performed to determine whether service changes in response to the pandemic on the New Haven Line mainline, the New Canaan Branch, the Danbury Branch, the Waterbury Branch, or Shore Line East qualified as a major service change as defined by the CTDOT major service change policy. **Appendix A** contains the details of these analyses.

- **New Haven Line (NHL) Main Line – Major Service Change**

The New Haven Line Main Line service was re-slotted to a weekend standardized frequency, which represented service reductions to station service, train and vehicle-mile frequency compared to Pre-COVID that exceed the 25% threshold, to be considered a major service change in all days of the week.

- **NHL New Canaan Branch – No Major Service Change**

- **NHL Danbury Branch – Major Service Change**

The Danbury Branch service was re-slotted to interconnect with New Haven Line Main Line service, which represented weekday service reductions to station service, train and vehicle-mile frequency compared to Pre-COVID that exceed the 25% threshold, to be considered a major service change.

The Danbury Branch also received a 1-hour westbound service span increase, and a 1-hour eastbound service span decrease weekdays.

- **NHL Waterbury Branch – No Major Service Change**

- **CTrail Shore Line East – Major Service Change**

The Shore Line East service was re-slotted to interconnect with New Haven Line Main Line and Amtrak services, which represented weekday and weekend service reductions to station service, train and vehicle-mile frequency compared to Pre-COVID that exceed the 25% threshold, to be considered a major service change. There was also a five-hour reduction in the westbound weekend service span.

Rail Major Service Change Summary

The table below shows a summary of the rail threshold analysis for service changes. While rail service demand fell by over 90%, any line that received major service adjustments of over 20% were in all cases less than 60%. In fact, on the Danbury Branch and Shore Line East the weekend service was held to no change, to continue to provide the same level of service through the pandemic.

**Table 1 – Rail Threshold Major Service Changes Summary**

<b>Rail Threshold Major Service Changes</b>			
	<b>NHL, Main Line</b>	<b>Danbury Branch</b>	<b>Shore Line East</b>
<b>M-F</b>	<b>49.2%</b>	<b>42.9%</b>	<b>55.6%</b>
<b>Sat</b>	<b>41.1%</b>	na	na
<b>Sun</b>	<b>34.6%</b>	na	na

This SAFE service equity analysis which follows will evaluate the impact of these major service changes, on minority and low-income riders.

## COVID Rail Service Equity Analysis

### Methodology

As part of its Title VI program update, 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 program 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 in the Rail Major Service Change Summary section above, three rail lines met the threshold for a major service change: Danbury Branch, Shore Line East, and New Haven Line. The project team evaluated schedule changes in terms of station service (i.e. station stop differentials) and degree of service (i.e. station headway differentials for both weekday (peak and off-peak) and weekend service). Pre-COVID 2019 rail schedules were compared to current 2021 schedules to determine average stops and headways per station in the weekday peak, weekday off-peak, and weekend. Average stop reduction and average headway increase was then calculated for each station in each of these three periods. **Appendix B** contains the COVID Service Change Analysis tables for the three lines.

The project team then compared average stop reduction and average headway increase between minority-serving and non-minority-serving stations on each rail line where a major service change was identified 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 identified that had a major service change and compared to the minority and low-income populations of CTDOT's total rail system (including the Hartford Line) 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.

#### *COVID Rail Service Equity Analysis Results*

As discussed above, there are three rail lines with COVID service changes that qualify as major service changes, as defined in to CTDOT’s Title VI Program: New Haven Line – Main Line, NHL Danbury Branch Line, and Shore Line East. Each 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*

##### *New Haven Line Main Line*

The following stations on the NHL – Main Line were classified by CTDOT in its Title VI Program as Minority Serving.

**Table 2 – Minority Serving Stations on the NHL – Main Line**

NHL Main Line Stations	Minority Serving?
NH-State St.	Y
New Haven	Y
West Haven	Y
Milford	N
Stratford	Y
Bridgeport	Y
Fairfield Metro	Y
Fairfield	N
Southport	N
Green's Farms	N
Westport	N
East Norwalk	Y
South Norwalk	Y
Rowayton	Y
Darien	Y
Noroton Heights	Y
Stamford	Y
Old Greenwich	Y
Riverside	Y
Cos Cob	N
Greenwich	N

Table 3 below displays the results of the Disparate Impact Analysis for COVID-related headway changes on the NHL Main Line. There are no disparate impacts in change in headways as the variance in average headways increase between minority and non-minority serving stations was less than 15% in all instances.

**Table 3 – NHL Main Line – Disparate Impact Analysis for Headway Changes**

NHL Main Line Headway Analysis Results	Average Headway Increase: Minority Serving Stations	Average Headway Increase: Non minority Serving Stations	Variance*	Disparate Impact?
Weekday Peak Service to New York	46.27%	56.20%	-9.92%	N
Weekday Off-Peak Service to New York	20.23%	35.09%	-14.86%	N
Weekend Service to New York	44.93%	45.21%	-0.28%	N
Weekday Peak Service to New Haven	44.02%	36.30%	7.71%	N
Weekday Off-Peak Service to New Haven	35.95%	43.60%	-7.65%	N
Weekend Service to New Haven	46.93%	47.48%	-0.55%	N

\*A negative number represents that there is less of a negative impact on minority serving stations compared to non-minority serving stations.

Table 4 below displays the results of the Disparate Impact Analysis for COVID-related station stop changes on the NHL Main Line. There are 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 4 – NHL Main Line – Disparate Impact Analysis for Stop Changes**

NHL Main Line Stop Analysis Results	Average Stop Reduction: Minority Serving Stations	Average Stop Reduction: Non minority Serving Stations	Variance*	Disparate Impact?
Weekday Peak Service to New York	46.50%	42.54%	3.95%	N
Weekday Off-Peak Service to New York	26.63%	23.40%	3.23%	N
Weekend Service to New York	26.86%	26.98%	-0.12%	N
Weekday Peak Service to New Haven	41.49%	32.60%	8.88%	N
Weekday Off-Peak Service to New Haven	35.48%	28.94%	6.54%	N
Weekend Service to New Haven	27.60%	27.82%	-0.21%	N

\*A negative number represents that there is less of a negative impact on minority serving stations compared to non-minority serving stations.

[NHL Danbury Branch](#)

The following stations on the Danbury Branch were classified in the CTDOT Title VI Program as Minority Serving.



**Table 5 – Minority Serving Stations on the Danbury Branch**

Danbury Line Stations	Minority Serving?
Danbury	Y
Bethel	Y
Redding	N
Branchville	N
Cannondale	N
Wilton	N
Merritt 7	Y
South Norwalk	Y

Table 6 below displays the results of the Disparate Impact Analysis for COVID-related headway changes on the Danbury Branch. There are no disparate impacts in change in headways as the variance in average headway increases between minority and non-minority serving stations was less than 15% in all instances.

**Table 6 – Danbury Branch – Disparate Impact Analysis for Headway Changes**

Danbury Headway Analysis Results	Average Headway Increase: Minority Serving Stations	Average Headway Increase: Non minority Serving Stations	Variance*	Disparate Impact?
Weekday Peak Service to South Norwalk	104.23%	104.93%	-0.70%	N
Weekday Off-Peak Service to South Norwalk	89.96%	89.90%	0.06%	N
Weekend Service to South Norwalk	0.00%	0.00%	0.00%	N
Weekday Peak Service to Danbury	291.67%	292.08%	-0.41%	N
Weekday Off-Peak Service to Danbury	42.37%	42.03%	0.34%	N
Weekend Service to Danbury	0.00%	0.00%	0.00%	N

\*A negative number represents that there is less of a negative impact on minority serving stations compared to non-minority serving stations.

Table 7 below displays the results of the Disparate Impact Analysis for COVID-related station stop changes on the Danbury Branch. There are no disparate impacts in station stop changes as variance in average stop reduction between minority and non-minority serving stations was less than 15% in all instances since all stations received uniform changes in the degree of service.

**Table 7 – Danbury Branch – Disparate Impact Analysis for Stop Changes**

Danbury Stop Analysis Results	Average Stop Reduction: Minority Serving Stations	Average Stop Reduction: Non minority Serving Stations	Variance	Disparate Impact?
Weekday Peak Service to South Norwalk	40.00%	40.00%	0.00%	N
Weekday Off-Peak Service to South Norwalk	44.44%	44.44%	0.00%	N
Weekend Service to South Norwalk	0.00%	0.00%	0.00%	N
Weekday Peak Service to Danbury	60.00%	60.00%	0.00%	N
Weekday Off-Peak Service to Danbury	33.33%	33.33%	0.00%	N
Weekend Service to Danbury	0.00%	0.00%	0.00%	N

*CTrail* Shore Line East

The following stations on the SLE were classified in CTDOT’s Title VI Program as Minority Serving.

**Table 8 – Minority Serving Stations on the SLE**

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 9 below displays the results of the Disparate Impact Analysis for COVID-related headway changes on Shore Line East. There are 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 9 - SLE – Disparate Impact Analysis for Headway Changes**

SLE Headway Analysis Results	Average Headway Increase: Minority Serving Stations	Average Headway Increase: Non minority Serving Stations	Variance*	Disparate Impact?
Weekday Peak Service to New Haven	N/A**	N/A**	N/A**	N/A**
Weekday Off-Peak Service to New Haven	73.19%	119.45%	-46.26%	N
Weekend Service to New Haven	33.46%	19.87%	13.59%	N
Weekday Peak Service to New London	N/A**	N/A**	N/A**	N/A**
Weekday Off-Peak Service to New London	36.84%	40.53%	-3.69%	N
Weekend Service to New London	38.06%	42.41%	-4.34%	N

\*A negative number represents that there is less of a negative impact on minority serving stations compared to non-minority serving stations.

\*\*Service was reduced to one peak, weekday stop for all SLE stations, so a headway change calculation is not applicable since current headways are zero. Table 10 below however determines the effects of the reduction in stops at the stations.

Table 10 below displays the results of the Disparate Impact Analysis for COVID-related station stop changes on the SLE. There are 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 10 – SLE – Disparate Impact Analysis for Stop Changes**

SLE Stop Analysis Results	Average Stop Reduction: Minority Serving Stations	Average Stop Reduction: Non minority Serving Stations	Variance*	Disparate Impact?
Weekday Peak Service to New Haven	50.00%	75.00%	-25.00%	N
Weekday Off-Peak Service to New Haven	40.17%	41.03%	-0.85%	N
Weekend Service to New Haven	22.41%	11.85%	10.56%	N
Weekday Peak Service to New London	-100.00%	-100.00%	0.00%	N
Weekday Off-Peak Service to New London	36.84%	40.53%	-3.69%	N
Weekend Service to New London	27.42%	35.30%	-7.88%	N

\*A negative number represents that there is less of a negative impact on minority serving stations compared to non-minority serving stations.

Aggregate Rail System

Table 11 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 three lines where major service changes occurred (NHL Main Line, Danbury Branch, and Shore Line East) as none of those lines’ minority populations exceeded the total rail system minority service territory population by greater than 15%.

**Table 11 – Aggregate Rail System Minority Population Comparison**

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

New Haven Line Main Line

The following stations on the NHL – Main Line were classified in the CTDOT Title VI Program as Low-Income Serving.

**Table 12 – Low-Income Serving Stations on the NHL – Main Line**

NHL Main Line Stations	Low Income Serving?
NH-State St.	Y
New Haven	Y
West Haven	Y
Milford	N
Stratford	Y
Bridgeport	Y
Fairfield Metro	Y
Fairfield	N
Southport	N
Green's Farms	N
Westport	N
East Norwalk	N
South Norwalk	N
Rowayton	Y
Darien	N
Noroton Heights	N
Stamford	N
Old Greenwich	N
Riverside	N
Cos Cob	N
Greenwich	N

Table 13 below displays the results of the Disproportionate Burden Analysis for COVID-related headway changes on the NHL Main Line. No disproportionate burdens exist as the variance in average headway increase between low-income and non-low-income serving stations is not more than 15% in any instance.

**Table 13 – NHL Main Line – Disproportionate Burden Analysis for Headway Changes**

NHL Main Line Headway Analysis Results	Average Headway Increase: Low Income Serving Stations	Average Headway Increase: Non Low Income Serving Stations	Variance*	Disproportionate Burden?
Weekday Peak Service to New York	37.46%	56.17%	-18.71%	N
Weekday Off-Peak Service to New York	10.71%	32.43%	-21.72%	N
Weekend Service to New York	45.42%	44.82%	0.60%	N
Weekday Peak Service to New Haven	28.99%	47.68%	-18.69%	N
Weekday Off-Peak Service to New Haven	28.70%	43.40%	-14.70%	N
Weekend Service to New Haven	46.07%	47.63%	-1.57%	N

\*A negative number represents that there is less of a negative impact on low-income serving stations compared to non-low-income serving stations.

Table 14 below displays the results of the Disproportionate Burden Analysis for COVID-related station stop changes on the NHL Main Line. A disproportionate burden exists with the station stop differentials in weekday off-peak service to New Haven as the variance in average stop reduction between low-income and non-low-income serving stations was more than 15%. This is largely due to the removal of service at the low-income serving New Haven State Street station which previously had eight weekday trains stopping at the station but currently has none.

**Table 14 – NHL Main Line – Disproportionate Burden Analysis for Stop Changes**

NHL Main Line Stop Analysis Results	Average Stop Reduction: Low Income Serving Stations	Average Stop Reduction: Non Low Income Serving Stations	Variance*	Disproportionate Burden?
Weekday Peak Service to New York	52.19%	41.67%	10.52%	N
Weekday Off-Peak Service to New York	32.96%	21.86%	11.10%	N
Weekend Service to New York	26.90%	26.90%	0.00%	N
Weekday Peak Service to New Haven	44.19%	35.69%	8.49%	N
Weekday Off-Peak Service to New Haven	43.84%	28.03%	15.81%	Y
Weekend Service to New Haven	27.18%	27.92%	-0.74%	N

\*A negative number represents that there is less of a negative impact on low-income serving stations compared to non-low-income serving stations.

NHL Danbury Branch

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

**Table 15 – Low-Income Serving Stations on the Danbury Branch**

Danbury Line Stations	Low Income Serving?
Danbury	Y
Bethel	Y
Redding	N
Branchville	N
Cannondale	N
Wilton	N
Merritt 7	N
South Norwalk	N

Table 16 below displays the results of the Disproportionate Burden Analysis for COVID-related headway changes on the Danbury Branch. There are no disproportionate burdens in change in headways as the variance in average headway increase between low-income and non-low-income serving stations was less than 15% in all instances.

**Table 16 – Danbury Branch – Disproportionate Burden Analysis for Headway Changes**

Danbury Headway Analysis Results	Average Headway Increase: Low Income Serving Stations	Average Headway Increase: Non Low Income Serving Stations	Variance*	Disproportionate Burden?
Weekday Peak Service to South Norwalk	104.93%	104.46%	0.47%	N
Weekday Off-Peak Service to South Norwalk	89.84%	89.96%	-0.12%	N
Weekend Service to South Norwalk	0.00%	0.00%	0.00%	N
Weekday Peak Service to Danbury	300.16%	289.11%	11.05%	N
Weekday Off-Peak Service to Danbury	43.53%	41.75%	1.78%	N
Weekend Service to Danbury	0.00%	0.00%	0.00%	N

\*A negative number represents that there is less of a negative impact on low-income serving stations compared to non-low-income serving stations.

Table 17 below displays the results of the Disproportionate Burden Analysis for COVID-related station stop changes on the Danbury Branch. There are 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 since all station received uniform changes in the degree of service.

**Table 17 – Danbury Branch – Disproportionate Burden Analysis for Stop Changes**

Danbury Stop Analysis Results	Average Stop Reduction: Low Income Serving Stations	Average Stop Reduction: Non Low Income Serving Stations	Variance	Disproportionate Burden?
Weekday Peak Service to South Norwalk	40.00%	40.00%	0.00%	N
Weekday Off-Peak Service to South Norwalk	44.44%	44.44%	0.00%	N
Weekend Service to South Norwalk	0.00%	0.00%	0.00%	N
Weekday Peak Service to Danbury	60.00%	60.00%	0.00%	N
Weekday Off-Peak Service to Danbury	33.33%	33.33%	0.00%	N
Weekend Service to Danbury	0.00%	0.00%	0.00%	N

**CTrail Shore Line East**

The following stations on the Shore Line East were classified in the CTDOT Title VI Program as Low-Income Serving.

**Table 18 – Low-Income Serving Stations on the SLE**

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 19 below displays the results of the Disproportionate Burden Analysis for COVID-related headway changes on Shore Line East. A disproportionate burden exists with the change in headways during weekend service to New Haven as the variance in average headway increase between low income and non-low income serving stations was more than 15%. This is in part because two non-low-income serving stations (Clinton and Madison) did not experience any COVID-related headway changes while all other stations did.

**Table 19 – SLE – Disproportionate Burden Analysis for Headway Changes**

SLE Headway Analysis Results	Average Headway Increase: Low Income Serving Stations	Average Headway Increase: Non Low Income Serving Stations	Variance*	Disproportionate Burden?
Weekday Peak Service to New Haven	N/A	N/A	N/A	N/A**
Weekday Off-Peak Service to New Haven	80.55%	122.82%	-42.28%	N
Weekend Service to New Haven	33.47%	17.14%	16.33%	Y
Weekday Peak Service to New London	N/A	N/A	N/A	N/A**
Weekday Off-Peak Service to New London	46.73%	33.36%	13.37%	N
Weekend Service to New London	38.53%	42.91%	-4.38%	N

\*A negative number represents that there is less of a negative impact on low-income serving stations compared to non-low-income serving stations.

\*\*Service was reduced to one peak, weekday stop for all SLE stations, so a headway change calculation is not applicable since current headways are zero. The table below however determines the effects of the reduction in stops at the stations.

Table 20 below displays the results of the Disproportionate Burden Analysis for COVID-related station stop changes on the SLE. There are 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 20 – SLE – Disproportionate Burden Analysis for Stop Changes**

SLE Stop Analysis Results	Average Stop Reduction: Low Income Serving Stations	Average Stop Reduction: Non Low Income Serving Stations	Variance*	Disproportionate Burden?
Weekday Peak Service to New Haven	56.25%	75.00%	-18.75%	N

Weekday Off-Peak Service to New Haven	41.67%	40.00%	1.67%	N
Weekend Service to New Haven	19.58%	12.00%	7.58%	N
Weekday Peak Service to New London	79.17%	84.29%	-5.12%	N
Weekday Off-Peak Service to New London	16.48%	51.67%	-35.19%	N
Weekend Service to New London	28.07%	36.36%	-8.30%	N

\*A negative number represents that there is less of a negative impact on low-income serving stations compared to non-low-income serving stations.

### Aggregate Rail System

Table 21 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 are no disproportionate burdens on the three lines where major services changes occurred (NHL Main Line, Danbury Branch, and Shore Line East) as none of those lines’ low-income populations exceeded the total rail system low-income service territory population by greater than 15%.

**Table 21 – 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*
<b>Total Population Served</b>	<b>209,609</b>	<b>482,424</b>	<b>274,240</b>	<b>372,510</b>	<b>812,480</b>	<b>620,511</b>	<b>1,864,280</b>
<b>Low-Income Population Served</b>	27,142	118,539	35,174	86,149	168,513	157,463	374,132
<b>% of Line Low-Income</b>	12.95%	24.57%	12.83%	23.13%	20.74%	25.38%	20.07%
<b>% Variation from Total Rail System</b>	-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.

### COVID Rail Schedule Impacts and Alternatives

#### Summary of Impacts from COVID Service Changes

The above analysis determined that there were no findings of disparate impact for COVID related service changes made to Connecticut rail public transportation. On the other hand, there were disproportionate burdens to low-income populations found for the NHL Main Line and the Shore Line East based on the established thresholds of CTDOT’s Title VI SAFE Policies. These are summarized in the table below.

**Table 22 – Disparate Impacts and Disproportionate Burden Evaluation Summary**

Line	Service	Disparate Impact	Disproportionate Burden	Causes
NHL - Main Line	Weekday Off-Peak Service to New Haven	N	Y - stops	State Street Service
SLE	Weekend Service to New Haven	N	Y - headways	Clinton, Madison Platforms

The following section examines the causes of the disproportionate burdens, and whether alternatives exist to avoid, minimize, or mitigate these disproportionate burdens.

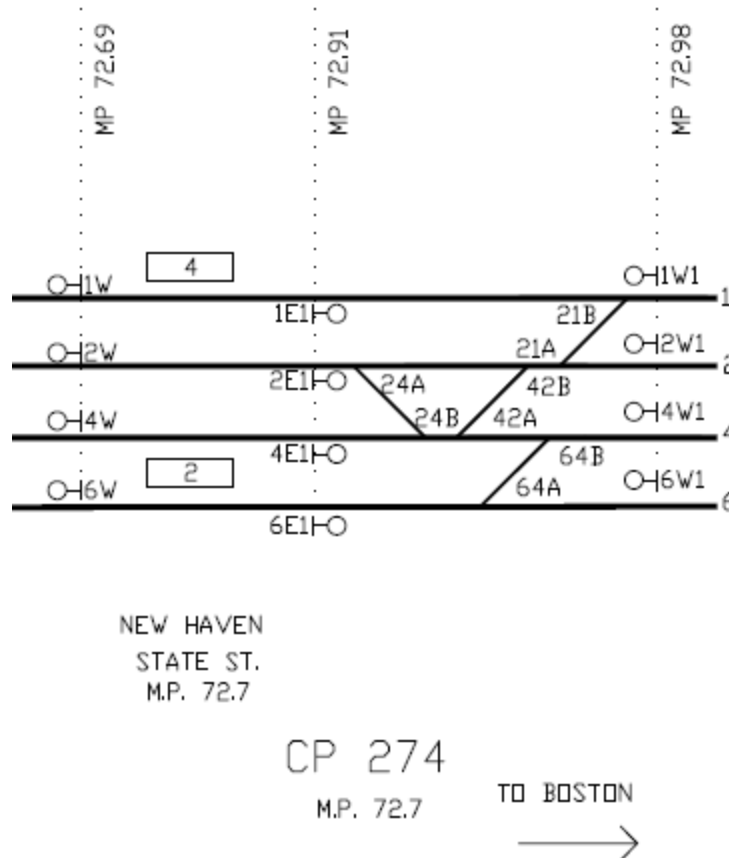
*Causes and Alternatives to COVID-Induced Service Changes*

We observe that there were two service categories that exceeded the 15% disproportionate burden: 1.) Weekday Off-peak eastbound service to New Haven on the New Haven main line, and 2.) Weekend westbound service to New Haven on Shore Line East.

*Weekday Off-peak Eastbound Service to New Haven - Stops*

*Causes*

The weekday off-peak eastbound service to New Haven prior to the pandemic featured eight NHL trains that also stopped at State Street Station. The entire State Street Station service was carefully coordinated between CTDOT, *CTrail* Hartford Line and Shore Line East, Metro-North, New Haven Line, and Amtrak, Intercity Regional and Shuttle services. Since train scheduling is done jointly mostly in the Spring and Fall, it is standard practice to coordinate services that use joint facilities or stations. However, when deviating from the collaborative pattern, joint facilities sequencing becomes very complicated. This is the case for State Street Station going into the different approaches taken by Metro-North, Amtrak, and CTDOT through the COVID pandemic. Referring to the diagram in Figure 3, to serve State Street all four services westbound would be independently scheduling on track 1, and mixed operations eastbound for Metro-North, Shore Line East and the Hartford Line on tracks 4 and 6.



**Figure 3 – State Street Service Diagram**

In view of these and other foreseen future complications, all State Street stops were removed from the New Haven Line schedule, causing the disproportionate burden to the New Haven low-income population.

*Alternatives*

The considerations leading to the eight stops removal at State Street have three alternatives:

- 1) Monitor Ridership, respond to perceived service need;
- 2) Remediate, introduce a measured alternative remediating service;
- 3) Restore the service to pre-COVID levels.

*Monitor Ridership*

Monitoring ridership and fulfilling customer transportation needs is fundamental to the CTDOT mission.

The loss of State Street Station stops from the New Haven Line weekday off-peak is the driving factor that influences the stop reduction average for low-income stations to exceed the threshold. However, New Haven Union Station is less than one mile away. The close proximity of the two rail stations means

the 2.5-mile service areas overlap. Nearly all the populations served by New Haven State Street have NHL rail service from New Haven Union Station. Out of 42 census tracts within the 2.5-mile station service area of New Haven State Street Station 5 of the census tracts are not within the 2.5-mile New Haven Union Station service area. The 5 census tracts have a total population of 22,581 people and a low-income population as defined under the Departments Title VI policy of 3,466. The 5 census tracts unique to State Street Station have a low-income population percentage of 15.3%.

Currently the Hartford Line and the Shore Line East rail services provide 18 State Street Station stops that connect to New Haven Line trains eastbound and 18 westbound for a total of 36 trains per weekday during COVID. This is a high level of State Street Station rail service frequency, and a lookback to pre-COVID revealed a higher level of redundancy in stops at State Street Station. The project team also performed an analysis of the timing of the COVID-schedule State Street stops by the Hartford Line and Shore Line East and found those State Street Station stops to be well served and in similar time slots. These connecting train services were not included in the New Haven Line Rail Service Analysis but would completely mitigate the disproportionate burden if included in the analysis.

#### Remediate

The project team recommends that due to the service area overlap and stop redundancy, it is important to not view the New Haven Line State Street Station service independently from service provided by others. However, by adding one or more weekday off-peak eastbound New Haven Line stops at State Street Station would remediate the low-income disproportionate burden.

#### Restore

A third alternative is to restore all New Haven Line State Street Station stops. This may represent a CTDOT goal for the return to normalcy or pre-COVID service.

## Weekend Westbound SLE Service to New Haven - Headways

### Causes

The weekend westbound service to New Haven prior to the pandemic featured eight New London trains with a 141-minute average headway. The disproportionate burden occurred when two trains – Shore Line East #3653 and #3673 - were removed from New London, impacting the low-income New London service. This is mostly because two stations of non-low-income status – Clinton and Madison – received no service reduction. This was driven by the fact that Clinton and Madison already had inferior service due to the fact that there was only one southside platform at each station.

### Alternatives

The considerations leading to the New London headway disproportionate burdens have three alternatives:

- 1) Monitor Ridership, respond to perceived service need;
- 2) Remediate, introduce a measured alternative remediating service;
- 3) Restore the service to pre-COVID levels.

### Monitor Ridership

Monitoring ridership and fulfilling customer transportation needs is fundamental to the CTDOT mission, and simple polling may discover low income transportation needs.

While the change in weekend headways at New London do represent an impact, much of this impact is due to Shore Line East operating solely a weekend schedule to connect with New Haven Line service. Overall train service at New London was reduced to a lesser degree than at every other Shore Line East station excepting Madison and Clinton stations which have infrastructure limits to their service. Before the pandemic New London had 92 Shore Line East train stops a week, which was reduced to 84 stops after the pandemic. This is a reduction of 8.7 %. Old Saybrook, Westbrook, Guilford, Branford, State Street, and New Haven had 222 train stops every week pre-pandemic, reduced to 112 train stops every week after the pandemic. This is a 49.5% reduction in train stops every week at these stations. It is worth noting that the New London station extension of Shore Line East adds some technical complications being a further 17.8 miles beyond Old Saybrook.

### Remediate

The COVID Shore Line East schedule can be viewed as a simple pared-back line schedule, and the impact can easily be remediated by extending an Old Saybrook originating train to originate from New London, which would in effect add one additional train to the New London weekend train schedule. Extending trains #3610 and #3637 to New London would achieve this service goal for CTDOT and provide more evenly-spaced service on weekends to the eastern population of the line, positioned in the mid-day in the Shore Line East weekend schedule.

## Restore

The third alternative is to restore all New London stops and service. This may represent a CTDOT goal for the return to normalcy or pre-COVID service. CTDOT will typically implement demand-driven service changes when new travel patterns emerge.

### Rail COVID Schedule Impacts and Alternatives Summary

- The pandemic demanded a variety of approaches from transit providers, that were driven by demand, financial, and system security considerations;
- Pandemic changes were intended to be temporary with the goal of gradually returning pre-COVID service levels;
- The New Haven Line State Street Station eastbound off-peak stops reduction is a disproportionate burden to low-income population due the infrastructure limitations of a single platform at Clinton and Madison stations which did not allow for every train to stop at these stations prior to the pandemic. This meant that the service reduction was at these two stations disproportionate to the rest of Shore Line East service because the service was at a lower level to begin with, and the suggested New London weekend train extension for headways would remove disproportionate burdens.

## COVID Rail Fare Equity Analysis

CTDOT operates the sections of Metro-North serving Connecticut stations. Three fare changes were considered in this analysis:

- **Elimination of peak one-way fare** – This fare change was enacted in April 2020 as a result of the COVID-19 pandemic. This is considered a fare decrease, as it is assumed that riders will use less expensive off-peak fares.
- **Elimination of peak 10-trip fare** – This fare change was enacted in April 2020 as a result of the COVID-19 pandemic. This is considered a fare decrease, as it is assumed that riders will use less expensive off-peak fares.
- **Elimination of the Mail & Ride fare** – This fare change is being considered for future implementation. This is considered a fare increase, as it is assumed that riders will switch to the regular monthly pass (a 2% fare increase).

This section contains the analysis of fare impacts on minority and low-income riders and outlines findings relative to the disparate impact (race/ethnicity) and disproportionate burden (low-income) policies set forth by the CTDOT Title VI Program.

### Methodology

CTDOT has enacted a temporary fare change of eliminating the use of Peak Fares on the New Haven Line, including its branches. It is also proposing to eliminate the Mail & Ride fare medium.

The CTDOT Title VI program lays out the following process for undertaking a Title VI fare equity analysis:

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;
4. Compare the impacts for each particular fare media between minority users and overall users;
5. Compare the impacts for each particular fare media between low-income users and overall users; and
6. Identify alternatives and mitigation strategies when the impacts exceed the thresholds established with the disparate impact and disproportionate burden policies.

### *Analysis of Current and Simulated Fare Usage*

Based on this description, the project team used the following methodology:



- 1) **Establish fare media usage rates:** Based on on-board rider survey data from 2019, the project team established usage rates across minority and low-income riders for all fare media available.
  - a) **Defining “Low-Income”:** The definition of “low-income” is a reported household income 150% of the poverty line or lower. Unfortunately, the on-board survey had income brackets that did not match up to the low-income thresholds based on this definition. The project team ran the analysis using the low-end of the bracket to assess income.
- 2) **Calculate Fare Usage by Protected Class:** Based on fare media sales information, the project team assigned quantities of fares and the monetary value of those fares to minority and low-income passengers in order to calculate the average fare paid by passenger type in 2019. The following assumptions were identified as necessary in order to make that calculation:
  - a) **Assumption 1:** Due to low usage rates, monthly student passes were combined with regular monthly passes for this analysis.
  - b) **Assumption 2:** The project team used an average cost for single ride, 10-trip, and monthly passes. In reality, the cost differs based on boarding and alighting station. However, there was insufficient survey information to assess the proportion of minority and low-income riders between each origin/destination pair, and so an average had to be used.
- 3) **Simulate Post-Fare-Change Usage:** Once the “existing conditions” average fare paid by passenger type was determined, the project team shifted peak fare payments to off-peak fare payments (simulating the elimination of peak fares) and Mail & Ride payments to regular monthly passes (simulating the elimination of Mail & Ride passes). The average fare by minority and low-income riders was re-assessed.

#### *Determination of Impacts*

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

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.

Therefore, the analysis to determine adverse impacts included the following:

- 1) **DI/DB Analysis for each Fare Medium:** The project team compared the proportion of minority and low-income riders using each fare medium to overall ridership usage rates of each fare medium separately (Peak Fare and Mail & Ride).

- a) **Mail & Ride/Peak Fare Reinstatement:** For the fare increases, if minority/low-income passengers used an impacted fare medium more often at a differential of 10 percentage points or more than the overall ridership, then it was considered a disparate impact or disproportionate burden.
  - b) **Peak Fare Elimination:** For the fare reduction (elimination of peak fares), if minority/low-income passengers used it less often at a differential of 10 percentage points or more then it was considered a disparate impact or disproportionate burden.
- 2) **DI/DB Analysis for Fare Change Package:** The project team also compared the average fare paid overall between minority/low-income vs. overall riders.
- a) **Mail & Ride/Peak Fare Reinstatement:** For the fare increases, if fares increase 5% or greater for minority/low-income riders more than fares for overall riders, it was considered a disparate impact or disproportionate burden.
  - b) **Peak Fare Elimination:** For the fare decrease (elimination of peak fares), if the fares decrease 5% or greater for overall riders more than for minority/low-income riders, it was considered a disparate impact or disproportionate burden.

### Fare Changes Analysis

Fare changes undertaken or proposed as a result of the COVID-19 pandemic have no finding of disparate impact or disproportionate burden. This is primarily the result of two factors:

- The fare *increase* applies to Mail & Ride monthly passes, which are used at a lower rate by minority and low-income riders;
- The fare *decreases* apply to peak fares, which are used at a higher rate by minority and low-income passengers.

Table 23 shows fare usage patterns among minority and low-income riders relative to riders as a whole, with the fare media that were eliminated highlighted in yellow. This information is based off of a 2019 on-board customer survey.

**Table 23 – CY 2019 Fare Medium Use Proportion by User Type**

Fare Medium	Minority	Low Income	All Riders
Monthly Pass	42.4%	35.1%	38.5%
Weekly Pass	4.1%	6.4%	3.1%
Reduced 10-Trip	0.4%	1.9%	0.9%
Reduced One-Way	1.8%	8.3%	3.7%
10 Trip Peak	2.4%	0.0%	4.5%
10 Trip Off-Peak	1.9%	0.8%	3.0%
One Way Peak Average	15.8%	22.3%	15.0%
One Way Off-Peak Average	22.6%	23.8%	18.7%
Mail & Ride	8.7%	1.4%	12.6%
<b>Total</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>

Post-fare-change estimates of fare usage patterns broken down by minority, low-income, and all riders is shown in Table 24. Zero percent is assumed for 10-trip, one-way peak fares, and Mail & Ride fares as these fares were eliminated, or are proposed for elimination, due to the service impacts of the COVID-19 pandemic. The following assumptions were made:

- Peak fares use was shifted to off-peak fares.
- Mail & Ride monthly pass usage was shifted to regular monthly passes.

**Table 24 – Post-Fare-Change Estimated Fare Medium Use by User Type**

% of Fare Media Use by Class of Rider	Minority	Low Income	All Riders
Monthly Pass	51.1%	36.5%	51.1%
Weekly Pass	4.1%	6.4%	3.1%
Reduced 10-Trip	0.4%	1.9%	0.9%
Reduced One-Way	1.8%	8.3%	3.7%
10 Trip Peak	0.0%	0.0%	0.0%
10 Trip Off-Peak	4.3%	0.8%	7.5%
One Way Peak Average	0.0%	0.0%	0.0%
One Way Off-Peak Average	38.4%	46.1%	33.7%
Mail & Ride	0.0%	0.0%	0.0%
<b>Total</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>

Using Metro-North 2019 fare sales and usage information, the average fare paid per boarding was calculated for each fare medium. As shown in Table 25, the highest average fare paid per boarding was for the one-way peak fares and the lowest is for those using the monthly pass.

**Table 25 – Average Fare per Boarding by Fare Medium**

Fare Medium	Average Fare Paid per Trip*
Monthly Pass	\$6.35
Weekly Pass	\$12.95
Senior/Disabled 10-Trip	\$8.95
Senior/Disabled One-Way	\$8.95
10 Trip Peak	\$9.91
10 Trip Off-Peak	\$6.44
One Way Peak Average	\$21.10
One Way Off-Peak Average	\$16.68
Mail & Ride Monthly	\$6.22

\*The project team used an average cost for single ride, 10-trip, and monthly passes.

Using the fare usage rates shown in Table 23 and Table 24, average fare paid per trip is broken down in Table 26. Calculation tables for this analysis can be found in **Appendix C**.

**Table 26 – Fare Change Impacts Summary Table**

	Minority	Low Income	All Riders
Average Estimated Fare Paid per Trip Pre-COVID Changes	\$11.41	\$12.78	\$10.97
Average Estimated Fare Paid per Trip Post-COVID Changes	\$10.64	\$11.80	\$10.16

#### Rail Fare Equity Analysis Results

The fare equity analysis of the changes implemented in April 2020 as a result of the COVID pandemic, and the proposed elimination of the Mail and Ride Monthly pass, have no findings of disparate impact to minority riders or disproportionate burden to low-income riders. This is explored in greater detail in the following sections.

#### *Evaluation of Disparate Impact on Minority Riders*

Based on the analysis of average estimated fares paid by minority riders in the pre-COVID period compared to the COVID period, there is no evidence of disparate impact to minority riders resulting from the fare changes.

Table 27 shows that minority riders experienced an average fare decrease of 6.7% while all riders experienced an average fare decrease of 7.3%. While more benefit accrued to ridership overall than minority riders (a net difference of 0.6%), it does not exceed the five percentage point threshold laid out in the CTDOT Title VI SAFE Policy.

**Table 27 – Disparate Impact Analysis as a Package**

	Existing Average Fare	Proposed Average Fare	% Change
Minority	\$11.41	\$10.64	-6.7%*
All Riders	\$10.97	\$10.16	-7.3%*
Difference			0.6%

\*A negative number represents a larger benefit to minority riders compared to riders as a whole.

The difference in impact for the individual fare changes pre- and post-COVID does not exceed the 10 percentage point threshold for minority riders. Table 28 shows the proportion of minority riders and riders as a whole using each fare medium. The findings are the following:

- **Peak 10-Ride Tickets:** The benefits of the fare cost decrease are smaller for minority riders than riders as a whole. However, the difference (2.1%) does not exceed the 10 percentage point threshold laid out in the CTDOT Title VI SAFE policy.
- **Peak One-Way Tickets:** The benefits of the fare cost decrease are slightly larger for minority riders than for riders as a whole.
- **Mail & Ride Passes:** The disbenefits of the fare increase are greater for overall riders than for minority riders.

**Table 28 – Disparate Impact Single-Fare Analysis**

	Peak 10 Ride	Peak One Ride	Mail & Ride
Minority	2.4%	15.8%	8.7%
Overall Ridership	4.5%	15.0%	12.6%
<b>Difference</b>	<b>2.1%</b>	<b>-0.8%*</b>	<b>-3.8%*</b>

\*A negative number represents a larger benefit to minority riders compared to riders as a whole.

*Evaluation of Disproportionate Burden on Low-Income Riders*

Based on the analysis of average estimated fares paid by low-income riders in the pre-COVID period compared to the COVID period, there is no finding of disproportionate burden to low-income riders resulting from the fare changes.

Table 29 shows that low-income riders experienced an average fare decrease of 7.7% while all riders experienced an average fare decrease of 7.3%. Because there is more benefit accrued to low-income riders from the fare changes, there is no finding of disproportionate burden.

**Table 29 – Disproportionate Burden Analysis as a Package**

	Existing Avg. Fare	Proposed Avg. Fare	% Change
Low-Income	\$12.78	\$11.80	<b>-7.7%*</b>
All Riders	\$10.97	\$10.16	<b>-7.3%*</b>
Difference			<b>-0.4%*</b>

\*A negative number represents a larger benefit to low-income riders compared to riders as a whole.

The difference in impact for the individual fare changes pre- and post-COVID does not exceed 10 percentage points for low-income riders. Table 30 shows the proportion of low-income riders and riders as a whole using each fare medium. The findings are the following:

- **Peak 10-Ride Tickets:** The benefits of the fare cost decrease are lower for low-income riders than riders as a whole. However, the difference does not exceed the 10 percentage point threshold laid out in the CTDOT Title VI SAFE policy.

- **Peak One-Way Tickets:** The benefits of the fare cost decrease are larger for low-income riders than for riders as a whole.
- **Mail & Ride Passes:** The disbenefits of the fare increase are larger for overall riders than for low-income riders.

**Table 30 – Low-Income Single Fare Analysis**

	Peak 10 Ride	Peak One Ride	Mail & Ride
Low Income	0.0%	22.3%	1.4%
Overall Ridership	4.5%	15.0%	12.6%
<b>Difference</b>	<b>4.5%</b>	<b>-7.3%</b>	<b>-11.2%</b>

\*A negative number represents a larger benefit to low-income riders compared to riders as a whole.

COVID Rail Fare Impacts and Alternatives

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

# Bus

## Bus System Description

### Hartford Express Bus System

The CTtransit Hartford Express Bus system is comprised of 24 express routes and two shuttle bus services. Most express routes operate on weekdays during peak hours primarily between suburban Park & Ride lots and downtown Hartford. The Express bus system is displayed in Figure 4.

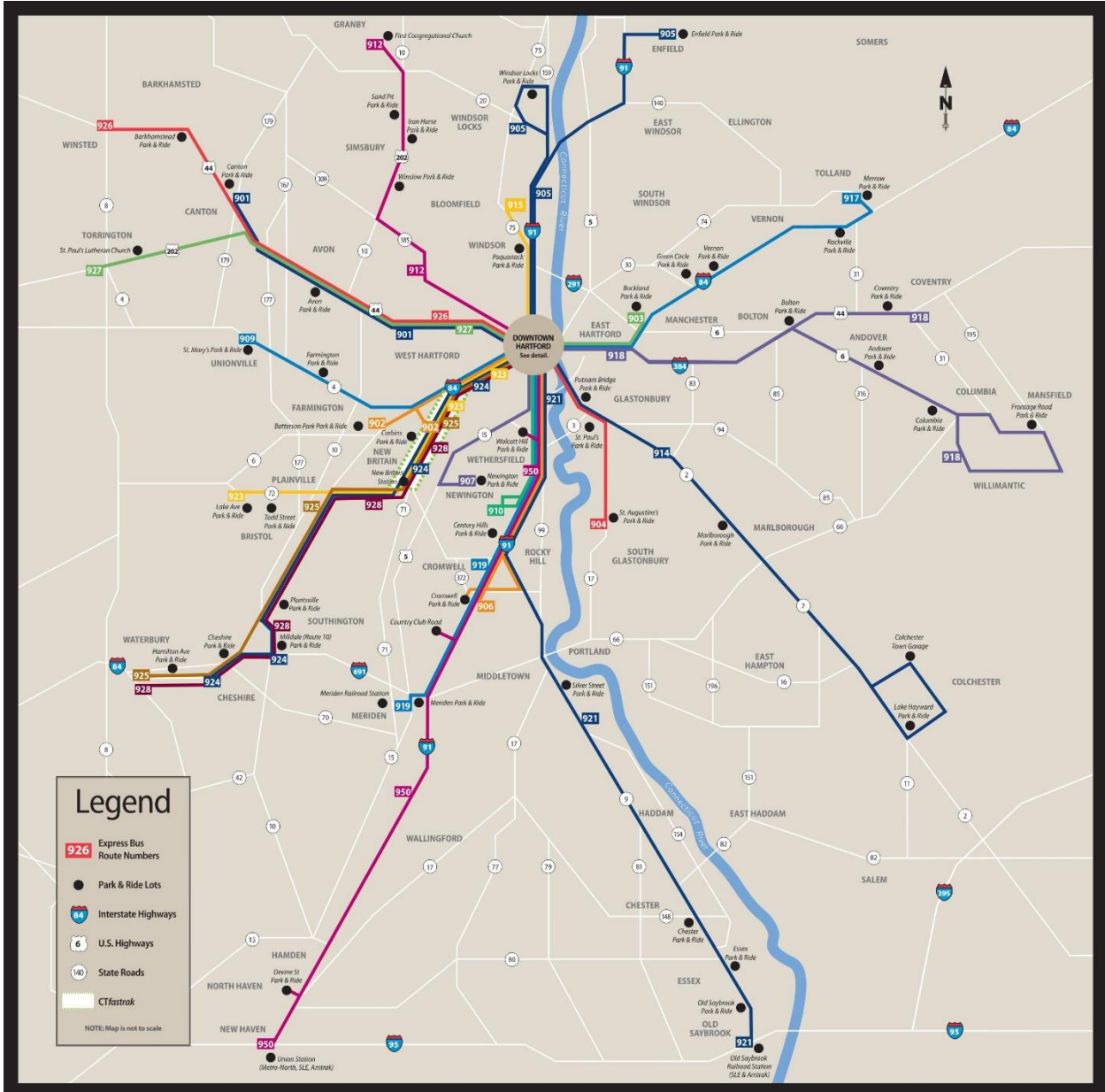


Figure 4 - Greater Hartford Commuter Express Bus System

New Haven Local Bus System

The CTtransit New Haven local bus system has 26 bus routes and serves the city of New Haven and surrounding communities. Connections are available to the Greater Bridgeport Transportation Authority at Derby-Shelton Station, Milford Transit District and the Coastal Link at the Connecticut Post Mall, 9 Town Transit at the Madison Scranton Gazebo and CTtransit Waterbury Division in Wallingford and Meriden. Service is provided seven days a week. The New Haven local bus system is displayed in Figure 5.

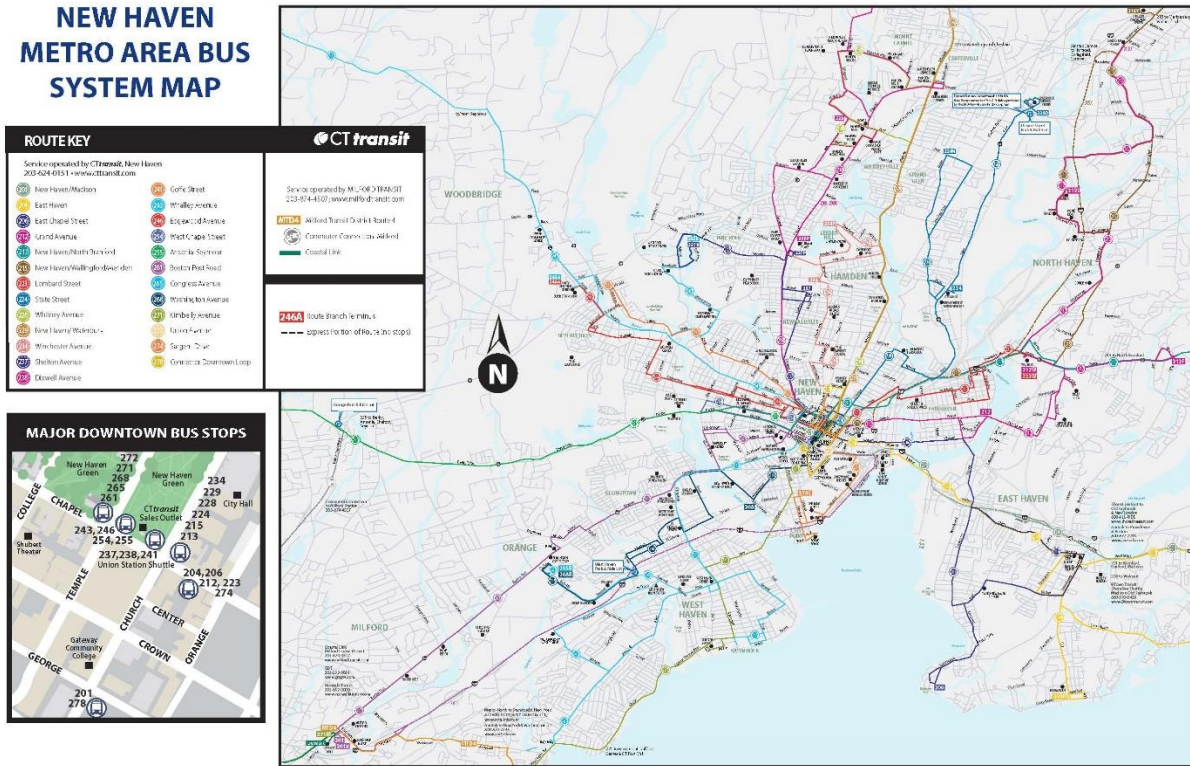


Figure 5 - New Haven Local Bus System



## Proposed Bus Service Changes

### Hartford Express Bus System Changes

In Fall 2019, the CTtransit Planning & Scheduling Department began conducting an analysis of the Hartford area express bus route network under the *Express Bus Service for a Dynamic Future* study. The goal was to identify opportunities to streamline service, attract new riders, reduce duplication of service, improve regional connectivity, and to serve the expanding reverse-commuter market.

To slow the spread of the virus, state and local governments implemented travel restrictions across the region. In mid-March 2020, the Governor directed any employees – including a majority of state workers – who could work remotely to do so. This directive remains in place over one year later. Use of public transportation was restricted to essential purposes only. The express bus service network experienced a 95% drop in ridership. In response, most express bus routes transitioned to hourly service schedules and some routes were combined to reduce the number of vehicles in service while continuing to serve the essential workers who rely on the bus system.

Express ridership began to rebound to a small degree in early Summer 2020 as travel restrictions were eased. Service on many express bus routes returned to normal levels, while high-frequency routes (peak headways of 10 minutes or less) continued to operate on reduced schedules. However, with many of the office workers who constitute the bulk of the express service ridership base now working remotely or on furlough, ridership remains 80% below normal levels. Many major employers have already indicated their intention to adopt a teleworking model for some of their employees after the pandemic passes, significantly shifting the paradigm for the Hartford area express bus route network and raising serious concerns about its future.

The service changes proposed under this study are analyzed in this document.

### Asylum Hill Shuttle

#### Pre-Pandemic and Current Service Plan

Prior to the pandemic, service on Asylum Hill Shuttle operated approximately every 3-5 minutes. As of late June 2020, this route is a stand-alone service, operating at a 15-20-minute headway with two midday trips.

#### Proposed Route Changes

The Asylum Hill Shuttle will operate one-way in the morning from Central Row to Sigourney Street Station (route truncation). The route would be reversed in the afternoon.

The route will continue to operate as stand-alone service operating at a 15-minute headway during the AM and PM peak only. Midday service would be discontinued, and customers accommodated by local service on Routes 62, 64 and 66.

The proposed route changes are displayed in Figure 6.



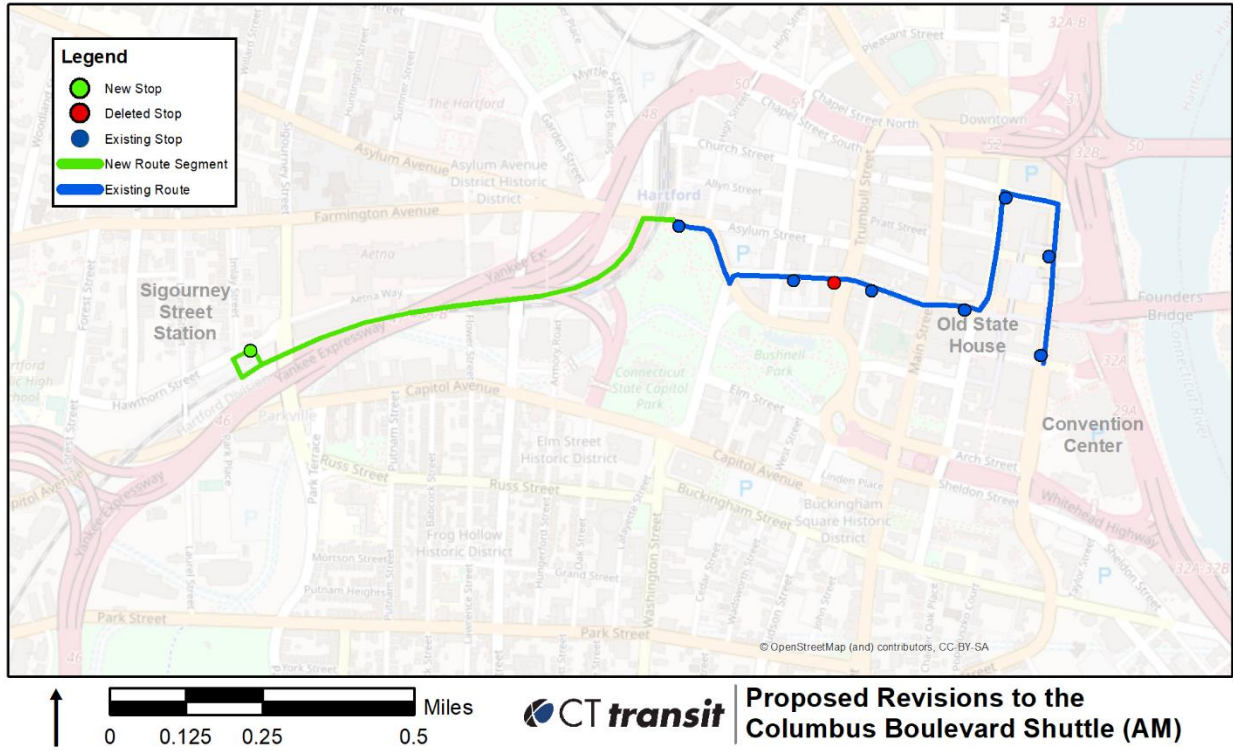


Figure 7 - Columbus Boulevard Shuttle – AM Service Pattern

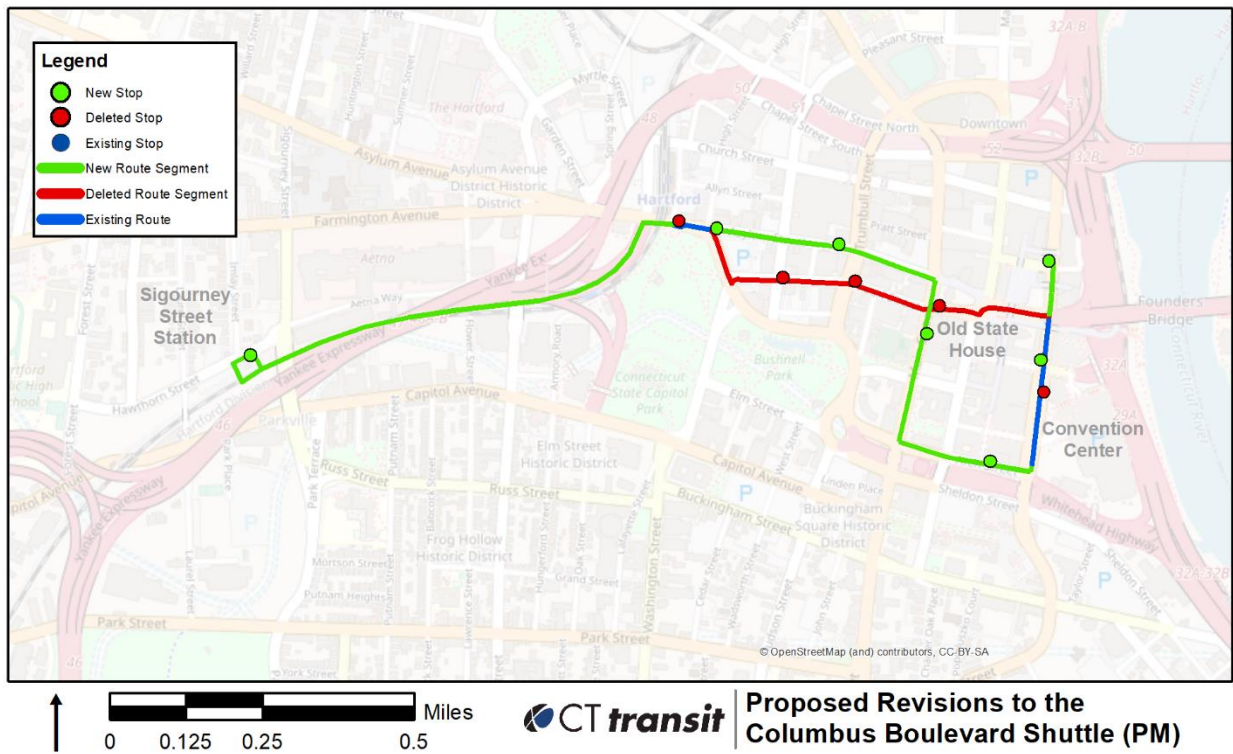


Figure 8 - Columbus Boulevard Shuttle – PM Service Pattern



### 901 Avon-Canton Express

#### Pre-Pandemic and Current Service Plan

The route serves the Avon and Canton Park & Rides, as well as making local stops along the US 44 corridor. Peak direction service operates approximately every 20-30 minutes, supplemented by several reverse-commute trips. A single midday round-trip also operates.

#### Proposed Route Changes

The route will be modified to no longer serve Collinsville. Peak direction service will continue to operate every 30 minutes and reverse-peak and midday service will maintained. Some trips on Route 901 will be replaced by trips on Routes 926 & 927.

The proposed route changes are displayed in Figure 10.

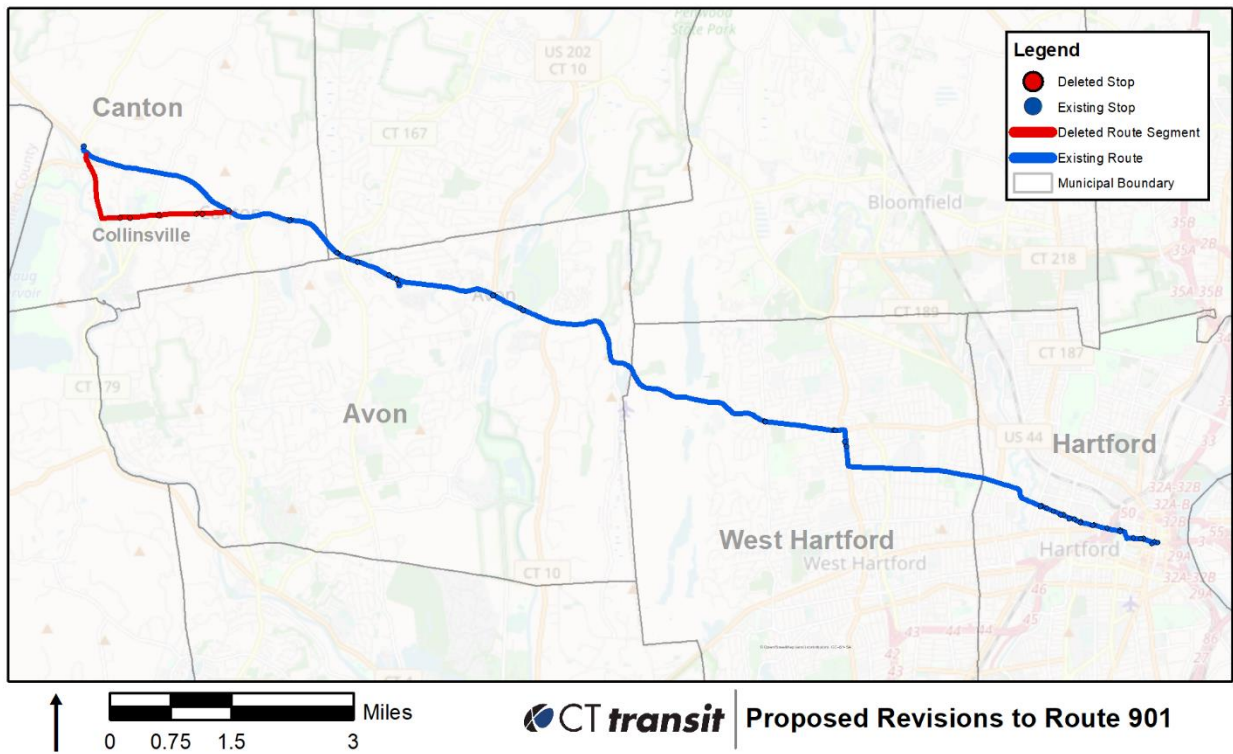


Figure 10 – 901 Avon-Canton Express

### 902 Corbin-Farm Springs Express

#### Pre-Pandemic and Current Service Plan

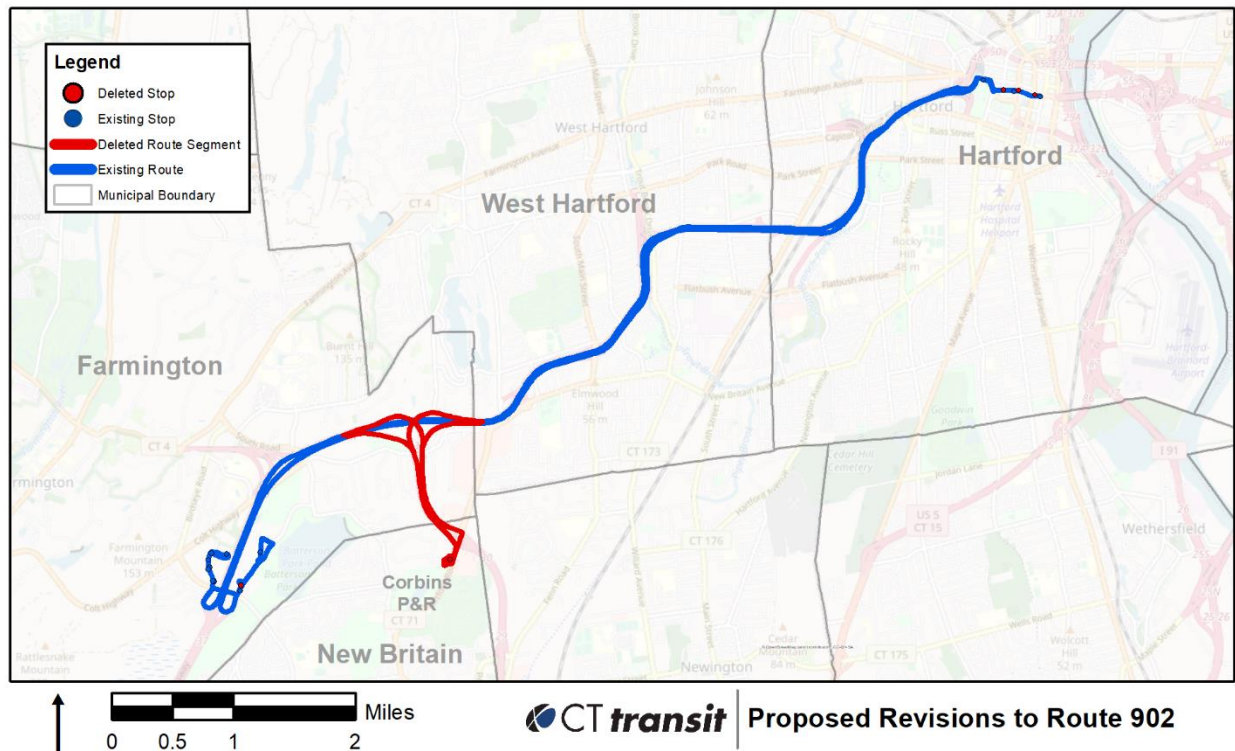
The route serves the Corbins Park & Ride in New Britain. Service operates approximately 20-30 minutes in the peak direction. Reverse-commute service on Route 902 consists of one AM trip and two PM trips that also serve the Farm Springs industrial park and the Batterson Park & Ride.

**Proposed Route Changes**

Due to very low ridership and the availability of alternative service on CTfastrak Routes 121 & 128, Route 902 service to the Corbins Park & Ride is recommended for elimination.

Reverse peak-commute service to Farm Springs will be maintained (one AM trip and one PM trip).

The proposed route changes are displayed in Figure 11.



**Figure 11 - 902 Corbin-Farm Springs Express**

**903 Manchester-Buckland Express**

**Pre-Pandemic and Current Service Plan**

Route 903 provides non-stop service in the peak direction only between Hartford and the Buckland Park & Ride in Manchester. In Fall of 2019, service on Route 903 operated at a 10-minute peak headway; midday & off-peak service was provided by Route 913. Currently, service on Route 903 operates at a 20-minute peak headway with midday & off-peak service provided by Route 913.

**Proposed Route Changes**

It is recommended that two service patterns be operated on Route 903: a service between Hartford and Buckland P&R and a service between Hartford-Buckland-Vernon replacing Route 917.

The Hartford - Buckland P&R service would operate on a 15-min peak headway and midday and off-peak service provided by Route 913.

The Hartford-Buckland-Vernon service would operate on a 30-minute peak headway and two midday trips provided by the 903/913.

The proposed route changes are displayed in Figure 12.

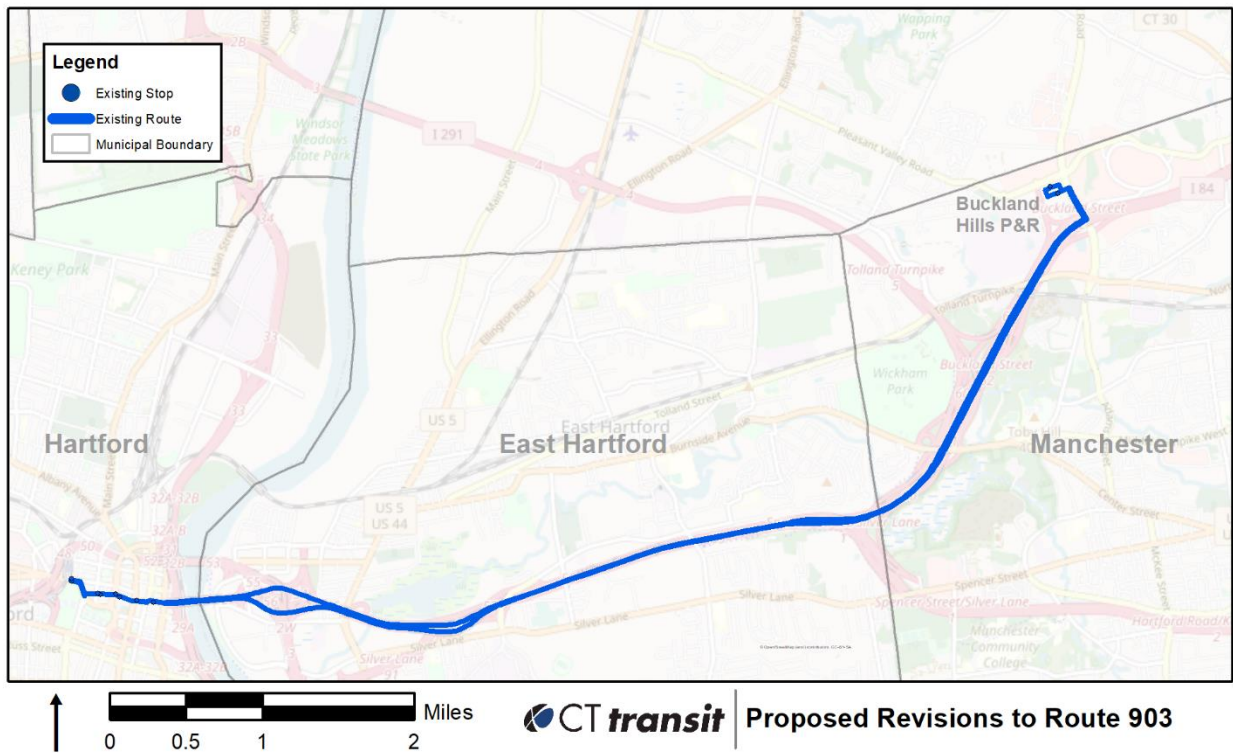


Figure 12 - 903 Manchester-Buckland Express

### 904 Glastonbury Express

#### Pre-Pandemic and Current Service Plan

Route 904 serves the Putnam Bridge Park & Ride and also makes local stops along Main Street in Glastonbury. Prior to the pandemic, service on Route 904 operated every 20-30 minutes in the peak direction and every 30-45 minutes in the reverse direction. Midday and early evening service were provided in the outbound direction only on the combined Route 904/914. Service continues to operate at pre-pandemic headways on Route 904.

## Proposed Route Changes

Ridership on Route 904 no longer warrants the frequency of service currently provided. It is therefore recommended that service is standardized at a 30-minute headway in the peak direction. Reverse peak and midday service would be maintained. Some early morning, midday and evening trips would operate in conjunction with Route 914.

## 905 Enfield-Somers/Windsor Locks Express

### Pre-Pandemic and Current Service Plan

The 905 serves Windsor Locks P&R (905 W) or Enfield Square P&R (905 E), some trips serve both facilities. In Fall of 2019, headways were every 10 minutes in peak direction and every 20-30 minutes in reverse direction. As of Fall 2020, service to Windsor Locks and Enfield operates every 20 minutes in peak direction and every 40 minutes in reverse direction.

The 905 W service between Kennedy Road and Windsor Locks P&R operates at a 40-minute headway. The 905 E service between Enfield Sq. P&R and Mass Mutual has been reduced to two round trips each peak.

In Fall 2019, there was one round trip between Hartford and the Enfield Correctional Institutions on Saturday and Sunday. In Fall 2020, service to the correctional institutions was suspended due to a no visitors policy that remains in effect due to the pandemic.

All service on Route 905 now operates in combination with Route 915 at a 40-minute headway in the peak direction only. A midday round-trip on the combined Route 905/915 continues to operate. Weekend service on Route 905 currently operates to Enfield Square only.

### Proposed Route Changes

Reverse-commute and midday service to East Windsor, within Windsor Locks, and to Kennedy Road would be replaced with local service. On weekends, the single round-trip to the Enfield and Somers correctional institutions is proposed to be eliminated and replaced with three round trips to Enfield Square (one AM, one midday, and one PM).

Peak direction service: Widen peak headway from every 10 minutes to every 20 minutes. Four peak trips each weekday (two AM trips and two PM trips) would continue to originate at Mass Mutual.

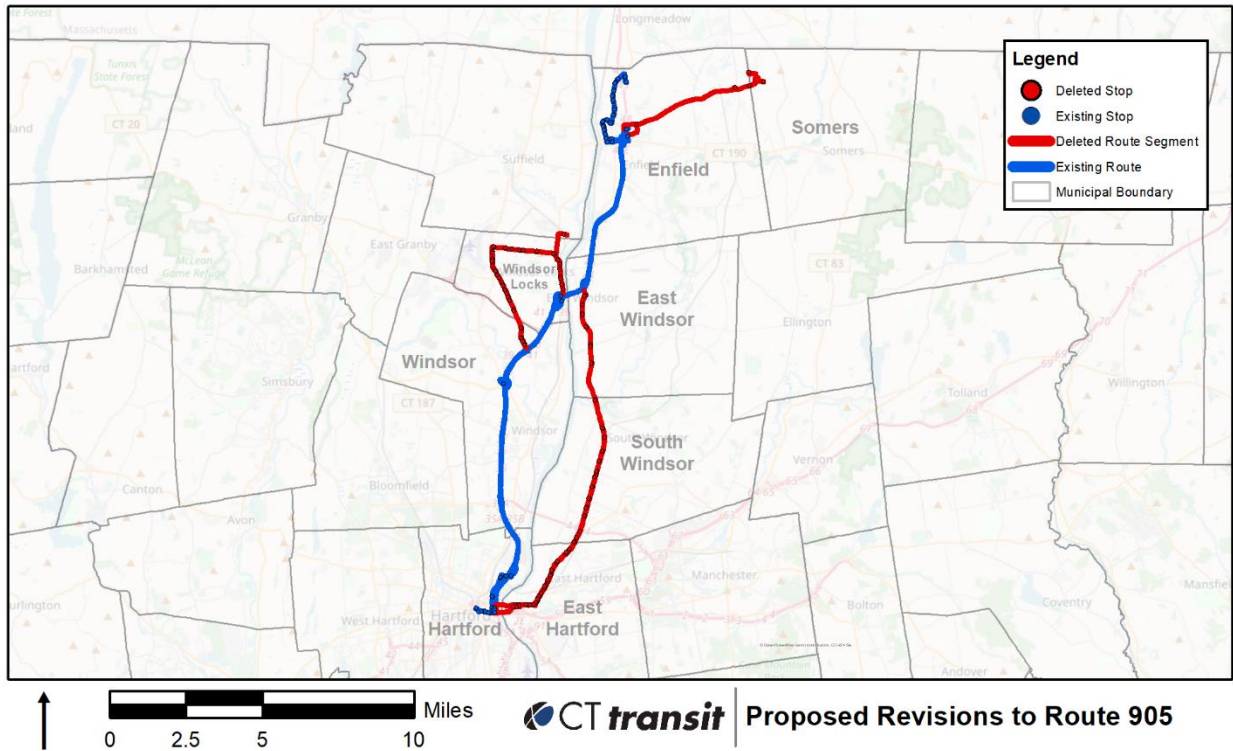
Local service to East Hartford, South Windsor & East Windsor is proposed to be discontinued and replaced by a part-time extension of Route 96.

Local service within Windsor Locks is proposed to be discontinued and replaced by the new Route 24.

Local service to Kennedy Road & Old County Road to be discontinued and replaced by the rerouted Route 34.



The proposed route changes are displayed in Figure 13.



**Figure 13 - 905 Enfield-Somers/Windsor Locks Express**

**906 Cromwell Express**

**Pre-Pandemic and Current Service Plan**

The route serves the Cromwell Park & Ride on Industrial Park Road in Middletown just south of the Cromwell town line. It also makes local stops along CT 372 in Cromwell (West Street and Berlin Road). Service operates approximately every 30 minutes in the peak direction and every 30-60 minutes in the reverse direction. A single midday round-trip is also operated.

**Proposed Route Changes**

Peak direction service will continue to operate every 30 minutes and reverse-peak and midday service will be maintained. Some trips on Route 906 will be replaced by trips on Routes 919.

**907 Newington Express**

**Pre-Pandemic and Current Service Plan**

Route 907 serves the Newington Park & Ride. Service operates approximately every 30 minutes in the peak direction only. All trips on Route 907 are interlined with Route 45 – Berlin Turnpike route at the Newington Park & Ride.

### **Proposed Route Changes**

Due to particularly low ridership, it is recommended that the number of trips on Route 907 be reduced from four trips each peak to three trips and the schedule be standardized at a 40-minute headway to provide customers with the widest possible array of travel options.

### **909 Farmington-Unionville Express**

#### **Pre-Pandemic and Current Service Plan**

The route serves the Farmington and St. Mary’s-Unionville Park & Rides. Two AM trips and two PM trips operate in the peak direction; two reverse-commute trips are also provided, one in the AM and one in the PM.

#### **Proposed Route Changes**

It is proposed that the route continue at its current level of two trips each peak, however the schedule should be adjusted to provide better spacing between trips to make the service more attractive to potential riders. Two reverse peak trips per day (one AM and one PM) would be operated.

### **910 Rocky Hill-Century Hills Express**

#### **Pre-Pandemic and Current Service Plan**

The route serves Rocky Hill and Century Hills making local stops along Silas Deane Highway, Elm Street, West Street, Cromwell Avenue, Cold Spring Road and Century Hills Drive. Service operates every 30 minutes in both the peak and reverse directions.

#### **Proposed Route Changes**

It is proposed that the schedule be standardized to a 40-minute headway, with six round-trips per day (3 AM and 3 PM).

### **912 Simsbury-Granbury Express**

#### **Pre-Pandemic and Current Service Plan**

Route 912 serves Winslow, Iron Horse, Sand Pit, and First Congregational P&Rs. A single midday round-trip also operates. Headways in peak direction is 15 - 20 minutes, supplemented by reverse-commute trips in off-peak.

Reverse-commute trips on Route 912 currently charge a local fare (\$1.75), versus a distance-based express fare (a policy left over from a former Jobs Access Program).

### **Proposed Route Changes**

It is proposed that peak headway be widened from every 15 minutes to every 30 minutes, and all trips travel the full route to both Simsbury and Granby.

There are no changes to reverse commute schedule are proposed.

## **913 Manchester-Buckland-Storrs Express**

### **Pre-Pandemic and Current Service Plan**

Route 913 links Hartford with the University of Connecticut at Storrs, making stops at the Buckland and Tolland Park & Rides, the Shoppes at Buckland Hills, Mansfield Four Corners, and the Nash-Zimmer Transportation Center in downtown Storrs. In Fall 2019, regular and no school weekday service operated at a 60-minute peak and midday headway; 90-minute off-peak headway at night and weekends. These headways remain in effect today.

Hartford-bound buses bypass Buckland Park and Ride during AM peak on weekdays (service provided by Route 903).

No school schedule in effect when UCONN not in session (90-minute service on weekdays during midday).

### **Proposed Route Changes**

The current headways are proposed to remain in effect with the addition of service to Reservoir Park & Ride throughout the day. A bus stop is proposed to be added at Reservoir Road Park & Ride in Vernon.

## **914 Marlborough-Colchester Express**

### **Pre-Pandemic and Current Service Plan**

Route 914 serves the Marlborough, Lake Hayward and Colchester Town Garage Park & Rides and also makes local stops at Marlborough Town Hall and the Colchester Green.

In Fall 2019, Route 914 service operated every 20-30 minutes in the peak direction and every 30-40 minutes in the reverse direction. One midday round-trip operates on Route 914. Although most trips

operated the full route, some trips operated only to Marlborough (914M) or Colchester (914C) to increase capacity on historically busy trips.

In Fall 2020, in response to decreased demand during the Coronavirus pandemic, separate trips on Routes 914M & 914C are no longer necessary. As a result, all trips on Route 914 now serve both Marlborough and Colchester.

Service on Route 914 now operates at a 30-minute headway in the peak direction and an hourly headway in the reverse direction.

### **Proposed Route Changes**

It is proposed that all trips continue to operate to both Marlborough and Colchester at a 30-minute headway in the peak direction and an hourly headway in the reverse direction. Reverse peak and midday service would be maintained. All trips will serve Marlborough and Colchester in both directions. Some early morning, midday & early evening trips will operate in combination with Route 904.

## **915 Windsor Express**

### **Pre-Pandemic and Current Service Plan**

In Fall 2019, service to Windsor operated approximately every 20-30 minutes in the peak direction only; reverse-commute service was provided by several limited-stop local bus lines, including Routes 30X and 36X.

As of Fall 2020, all service on Route 915 now operates in combination with Route 905 at a 40-minute headway in the peak direction only.

### **Proposed Route Changes**

This route would be discontinued.

It is proposed to replace the service between Poquonock Park & Ride and Hartford with limited-stop local service provided by Routes 30X, 34X and 36X.

The proposed route changes are displayed in Figure 14.

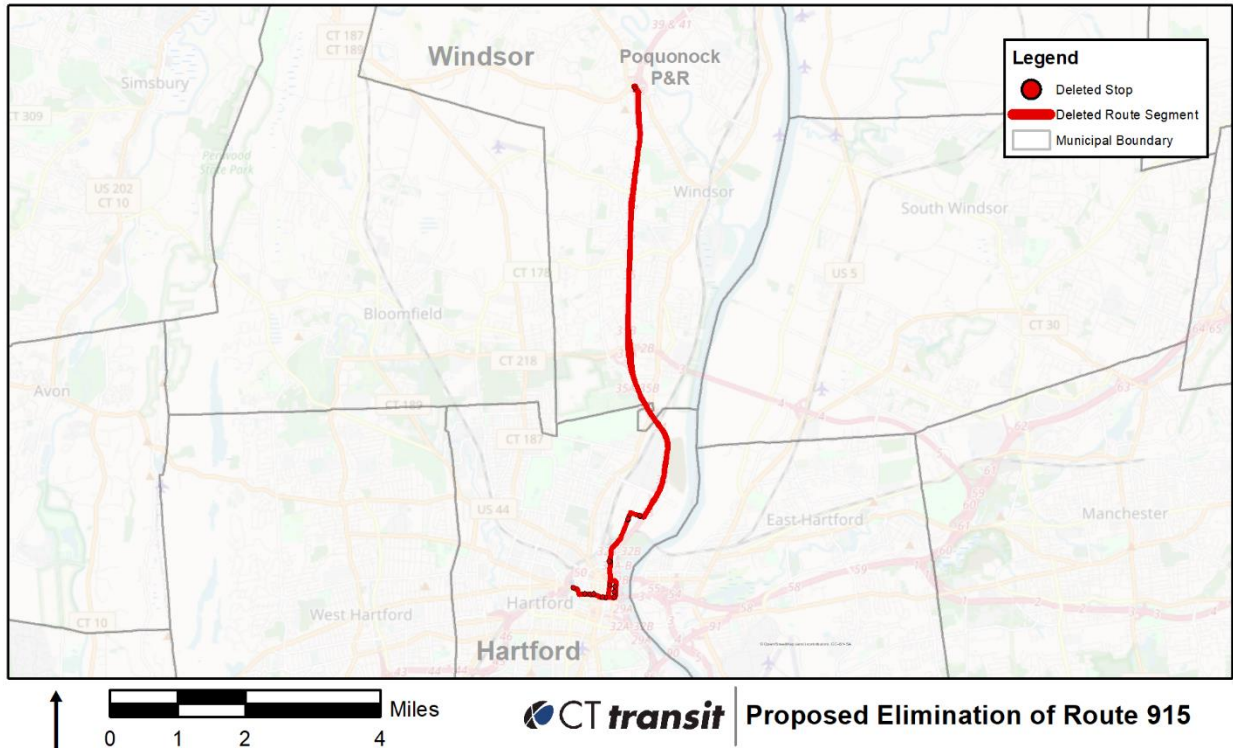


Figure 14 - 915 Windsor Express

### 917 Tolland-Vernon Express

#### Pre-Pandemic and Current Service Plan

Route 917 serves the Green Circle, Vernon, Reservoir Road and Tolland Park & Rides. Midday trips on Route 917 make an additional stop at the Buckland Park & Ride, which is also served during the midday by Route 913.

In Fall of 2019, Route 917 operated in the peak direction only at a 10-minute headway, with two one-way outbound trips during midday.

As of Fall 2020, service on Route 917 operates at a 20-minute headway in the peak direction, with two one-way outbound trips during midday.

#### Proposed Route Changes

The route would be discontinued and rebranded as Route 903.

The Route 917 bus stop at the Tolland Park & Ride, which is underutilized, would be discontinued.

Replacement service to Green Circle, Vernon & Reservoir Road Park & Rides would be provided by Route 903.

Replacement service to Reservoir Road & Tolland Park & Rides would be provided by Route 913.

The proposed route changes following the rebranding are displayed in Figure 15.

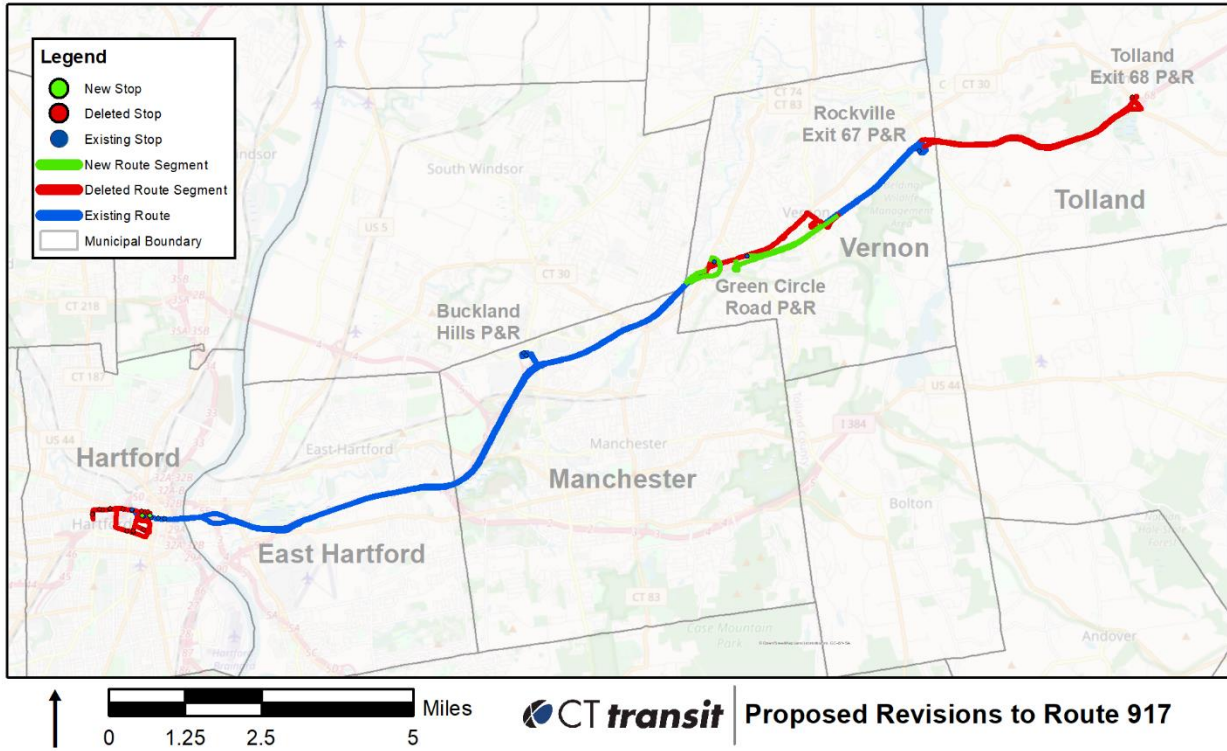


Figure 15 - 917 Tolland-Vernon Express

### 918 Willimantic-Coventry Express

#### Pre-Pandemic and Current Service Plan

The route serves Bolton, Andover, Columbia, and Mansfield P&Rs, with local stops in downtown Willimantic. Service is operated every 30 minutes in the peak direction with one outbound trip at midday.

The 918C branch of this route serves the Bolton and Second Congregational Park & Rides. Service on the 918C branch consists of a one inbound trip in the morning and one outbound trip in the afternoon.

#### Proposed Route Changes

It is proposed to discontinue service to two underutilized stops on Main Street at AutoZone and Jackson Street and Ash Street, add new bus stops at High Street at Eastern Connecticut State University campus and Manchester Center (midday & reverse-peak only).

In downtown Willimantic, the route is being adjusted from operating on Jackson Ave to High Street to serve Eastern CT State University.

New limited reverse-commute service will be added to the schedule: 6:00AM outbound, 1:45PM inbound and 5:45PM inbound trips. Midday outbound service would be maintained, and a midday return trip added to the schedule.

The proposed route changes are displayed in Figure 16.



Figure 16 - 918 Willimantic-Coventry Express

### 919 Meriden Express

#### Pre-Pandemic and Current Service Plan

The route serves the Bee Street Park & Ride in Meriden, makes local stops along East and West Main Streets, and terminates at Centennial Plaza. Two AM trips and two PM trips operate in the peak direction only. A midday trip on Route 919 operates on the weekday before most major holidays.

#### Proposed Route Changes

Due to particularly low ridership along East and West Main Streets in Meriden and at Centennial Plaza, Route 919 should be truncated at the Bee Street Park & Ride. These areas would continue to be served by CTtransit Routes 565 (West Main Street) and 566 (East Main Street). Additional stops are proposed at the Country Club Road and Cromwell Park & Rides.

Four peak direction trips per day (2 AM, 2 PM) would continue to be operated and a midday round trip introduced.

### 921 Middletown-Old Saybrook Express

#### Pre-Pandemic and Current Service Plan

The route serves the Silver Street (Middletown), Chester, Essex and Old Saybrook Park & Rides and also makes stops at Old Saybrook Railroad Station and at Elm & Main Streets in downtown Old Saybrook.

Service operates every 30 minutes in the peak direction only. A single midday outbound trip also operates.

#### Proposed Route Changes

The bus stop at Elm & Main Streets in Old Saybrook should be discontinued due to low ridership. Instead, a stop should be added at the Old Saybrook Transportation Center, adjacent to the Old Saybrook Railroad Station, to facilitate connections with 9 Town Transit<sup>1</sup> local bus service.

No changes to the headway are recommended at this time. However, two reverse-commute trips and a midday return trip are proposed to be added to the schedule. The schedule will be coordinated with Shore Line East trains to/from New London & New Haven.

### 923 Bristol Express (CTfastrak)

#### Pre-Pandemic and Current Service Plan

The 923 serves the Todd Street and Lake Avenue Park & Rides in Bristol and terminates at the Bristol Post Office in downtown Bristol. Service operates every 20-30 minutes in the peak direction only. A single midday round-trip is also provided.

#### Proposed Route Changes

In response to changes in ridership patterns, it is recommended that the schedule for Route 923 be standardized at a 30-minute headway in the peak direction.

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<sup>1</sup> 9 Town Transit provides public transit for Chester, Clinton, Deep River, Durham, Essex, East Haddam, Haddam, Killingworth, Lyme, Old Lyme, Old Saybrook, and Westbrook, with connections to New Haven, New London and Middletown areas.



Due to low ridership, both midday trips on Route 923 are recommended for elimination. Alternate service would be provided by CTfastrak Route 102.

**924 Southington-Cheshire Express (CTfastrak)**

**Pre-Pandemic and Current Service Plan**

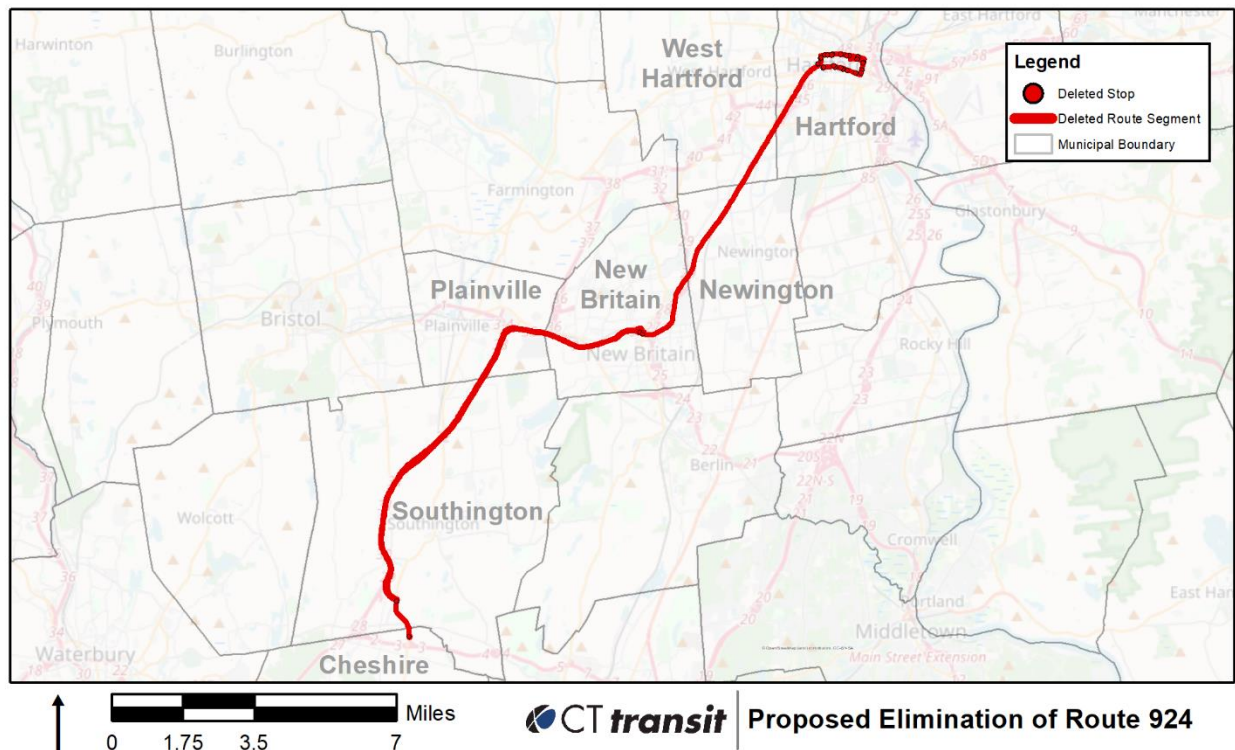
Route 924 serves the Plantsville and Milldale Park & Rides. Service operates every 30 minutes in the peak direction only. Reverse-commute, midday and weekend service is provided by Route 928.

**Proposed Route Changes**

This route would be discontinued.

In the interest of optimizing efficiency, peak direction service on Route 924 is proposed to be replaced by service on the combined Route 928.

The proposed route changes are displayed in Figure 17.



**Figure 17 - 924 Southington-Cheshire Express (CTfastrak)**

### 925 Cheshire-Waterbury Express (CTfastrak)

#### Pre-Pandemic and Current Service Plan

The route serves the Cheshire and Hamilton Avenue Park & Rides. Route 925 makes additional stops at St. Mary’s Hospital in Waterbury and at the Waterbury Green, and terminates at Waterbury Railroad Station.

Service operates every 30 minutes in the peak direction only. Reverse-commute, midday and weekend service is provided by Route 928.

#### Proposed Route Changes

This route would be discontinued.

In the interest of optimizing efficiency, peak direction service on Route 925 is proposed to be replaced by service on the combined Route 928.

The proposed route changes are displayed in Figure 18.

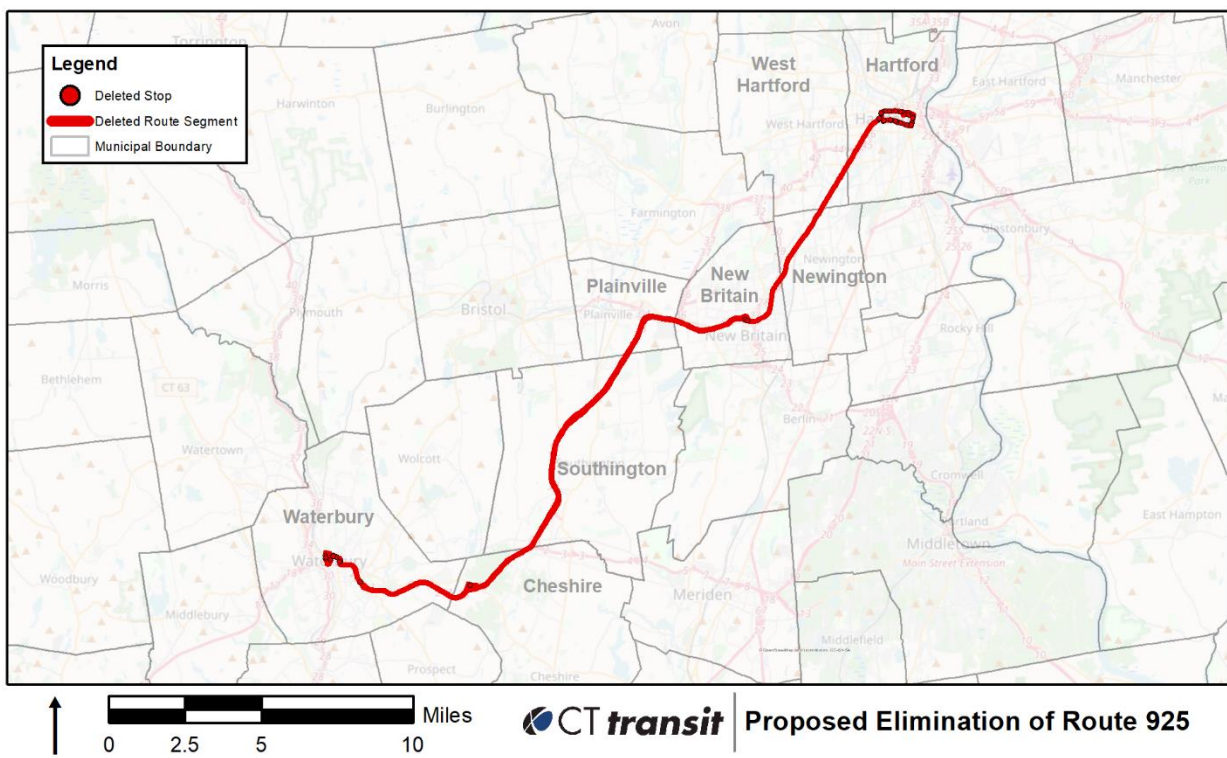


Figure 18 - 925 Cheshire-Waterbury Express (CTfastrak)

**926 Winstead Express (CTfastrak)**

**Pre-Pandemic and Current Service Plan**

The 926 operates express through Avon and Canton, making local stops in New Hartford, servicing the Barkhamsted Park & Ride, and ending at Northwest Connecticut Community College in Winsted. Two AM trips and two PM trips operate in the peak direction only.

**Proposed Route Changes**

It is proposed to modify Route 926 to make local stops through Canton and Avon to replace eliminated 901 trips.

It is proposed that a bus stop be established at the existing New Hartford P&R at Route 219 at Central Avenue.

A midday round trip is proposed to be introduced, operating in combination with Route 927.

The proposed route changes are displayed in Figure 19.



**Figure 19 - 926 Winstead Express (CTfastrak)**

## 927 Torrington Express

### Pre-Pandemic and Current Service Plan

The route operates express through Avon and Canton, servicing the St. Paul’s-Torrington Park & Ride and terminating at the former Kelley Transit facility on John Street in Torrington.

Two AM trips and two PM trips operate in the peak direction only.

### Proposed Route Changes

It is proposed to modify Route 927 to make local stops through Canton and Avon to replace eliminated 901 trips.

The inbound routing is proposed to be adjusted and a stop added at Christopher Road P&R at the junction of Routes 4, 8 & 202 (Exit 44) in Torrington.

The terminus of 927 is proposed to be relocated from John Street between Mason and Water Streets to Torrington Library on Litchfield Street.

The existing bus stop on John Street is proposed to be relocated one block east to Prospect Street, maintaining access to service for current riders.

A midday round trip is proposed to be introduced, operating in combination with Route 926.

The proposed route changes are displayed in Figure 20.



Figure 20 - 927 Torrington Express

### 928 Southington-Cheshire-Waterbury Express

#### Pre-Pandemic and Current Service Plan

Route 928 is a combined version of Route 924 and 925, serving the same destination points as both routes.

Service operates hourly in both directions at all times on weekdays and weekends, except in the peak direction on weekdays when Routes 924 and 925 are in operation.

#### Proposed Route Changes

Reverse-commute and midday service on Route 928 is proposed to continue to operate on an hourly schedule.

It is proposed to reduce service to a 90-minute headway on weekday nights, Saturdays, and Sundays.

The schedule would be coordinated with Waterbury Branch trains to/from Bridgeport.

### 950 New Haven-Hartford Express

#### Pre-Pandemic and Current Service Plan

The 950 serves the Wolcott Hill (Wethersfield), Country Club Road (Middletown) and Devine Street (North Haven) Park & Rides and also makes local stops in downtown New Haven, including the New Haven Green and New Haven Union Station.

Service operates approximately every 30 minutes in both directions during the AM and PM peak. A single midday round-trip also operates.

#### Proposed Route Changes

The addition of a bus stop at Meriden Transit Center and State Street Station (Chapel and State Streets) are recommended. Northbound buses traveling to Hartford in the morning and southbound buses departing Hartford in the afternoon would no longer serve the Country Club Road Park & Ride, with that service instead being provided by Route 919.

Midday service is proposed to be expanded from one round trip to three round trips.

It is proposed that Route 950 buses cross-honor CTrail Hartford Line tickets during midday.

The proposed route changes are depicted in Figure 21.

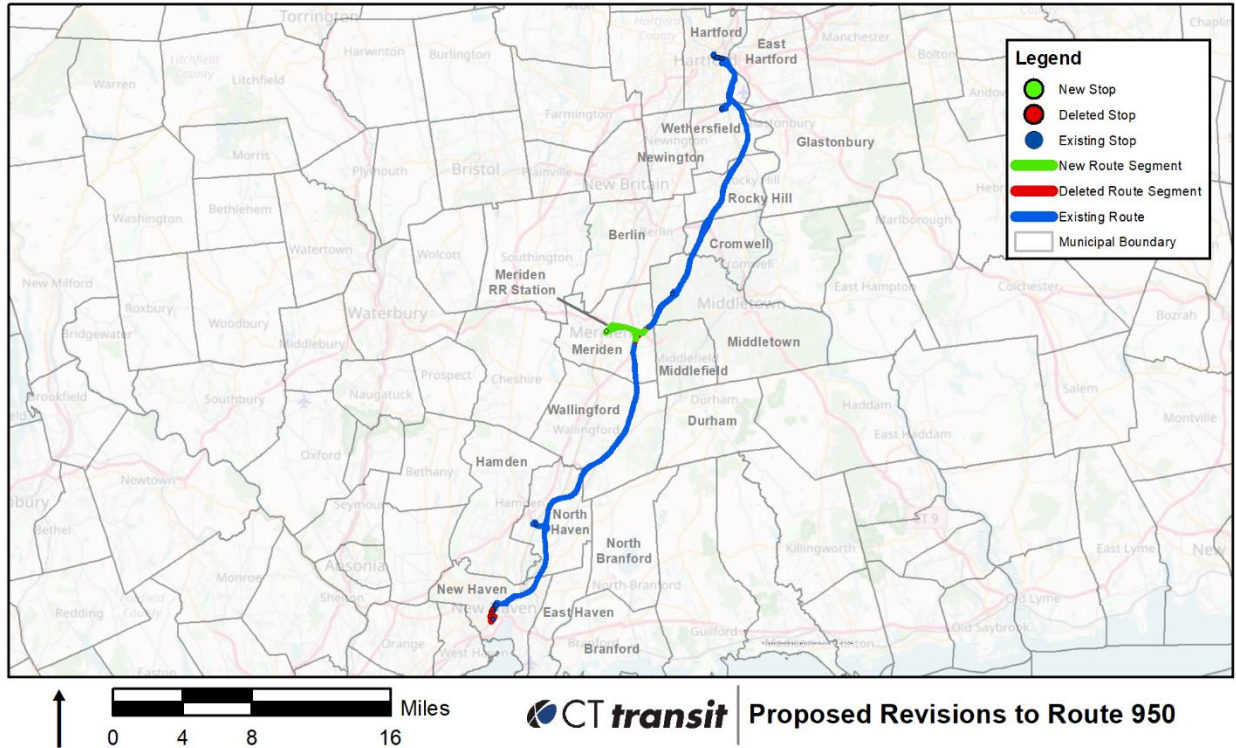


Figure 21 - 950 New Haven-Hartford Express

**24 Windsor/Windsor Locks**

**Pre-Pandemic and Current Service Plan**

Not applicable.

**Proposed Route Changes**

This new route mitigates proposed alignment changes on Routes 34 and 905. This new route would originate from Windsor Locks Station, serving the Windsor Locks Park & Ride and travel north on Main Street (CT 159), through downtown Windsor Locks, then west on North Street to Ella Grasso Turnpike and Bradley International Airport.

From the airport, the route would continue southward along Ella Grasso Turnpike and Poquonock Avenue (CT 75), serving the Poquonock Park & Ride, and ending in Windsor Center at Windsor Station.

Upon the completion of the new Windsor Locks Station in late 2023/early 2024, the terminus for Route 24 would be relocated to the new station and service provided to the Windsor Locks Park & Ride on a part time basis to maintain connectivity with Route 905.

Headways are proposed to be every 60 minutes during the AM & PM peak and approximately every 120 minutes during midday and in the evening.

The proposed route changes are displayed in Figure 22.

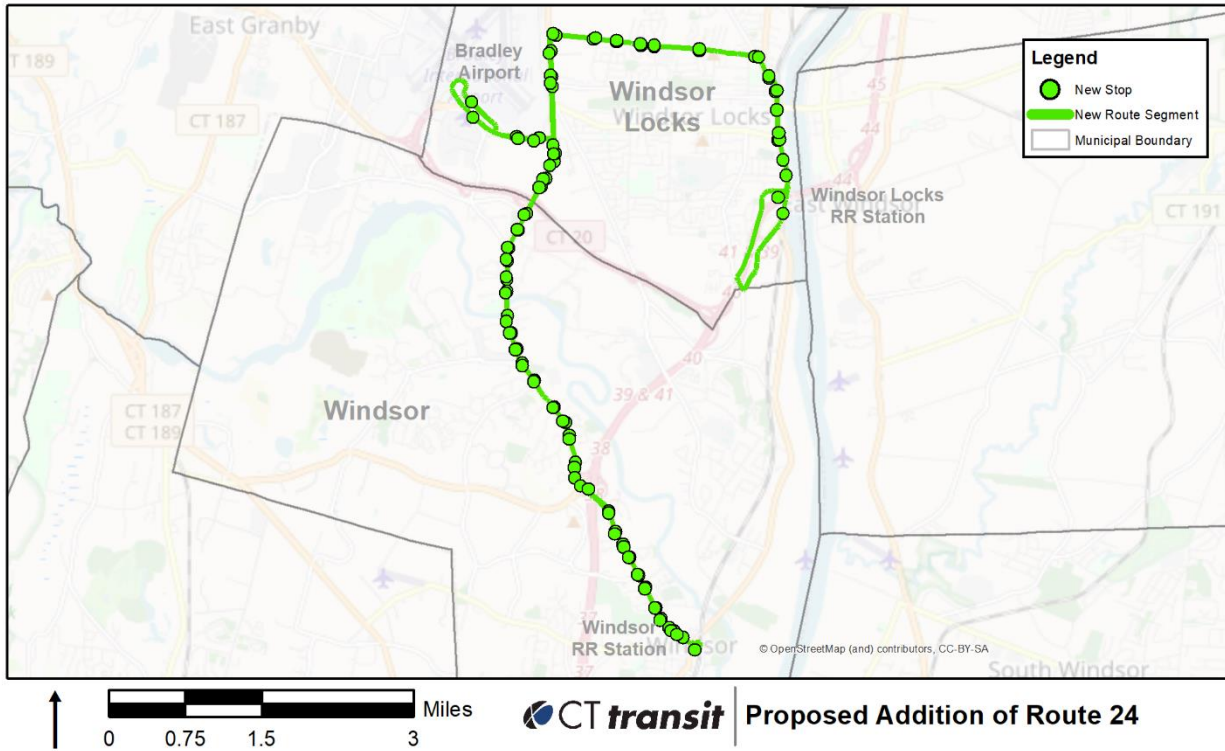


Figure 22 – 24 Windsor/Windsor Locks

**96 John Fitch Boulevard**

**Pre-Pandemic and Current Service Plan**

Route 96 is a local bus route operating between South Windsor/East Hartford and Hartford.

**Proposed Route Changes**

Service to East Windsor would be maintained by extending one AM trip and one PM trip on Route 96 (John Fitch Boulevard) from its current terminus at Sullivan Avenue in South Windsor, through East Windsor to Windsor Locks.

A connection with Route 905 would be available at the Windsor Locks Park & Ride and with the CTrail Hartford Line at Windsor Locks Railroad Station.

The proposed route changes are displayed in Figure 23.

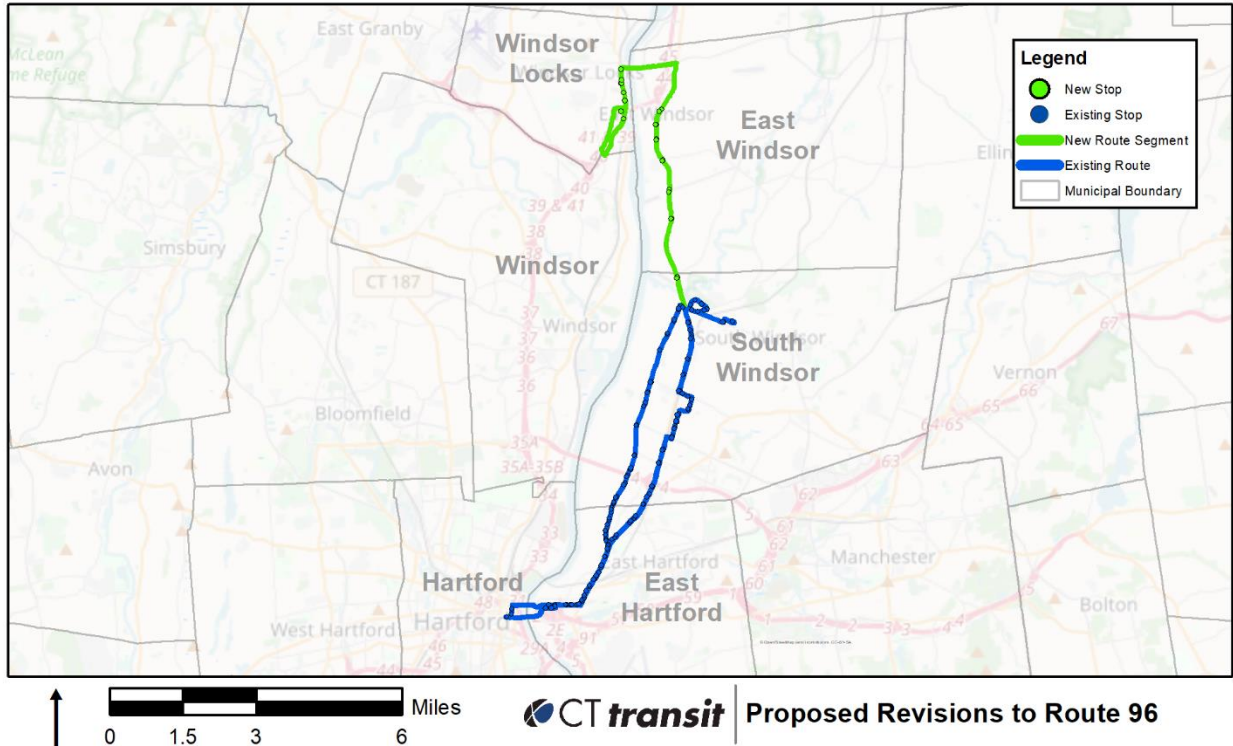


Figure 23 - 96 John Fitch Boulevard

*Hartford Major Service Change Summary*

Twenty-nine Hartford bus routes including Express, shuttle and local routes are proposed to have service changes. These changes include increasing peak period headways, eliminating or adding peak period, midday, and/or weekend service, route truncations or extensions, and route eliminations. Of these routes, the changes to 20 routes exceed the thresholds for a Major Service Change.

In addition to the service changes, two fare changes are being proposed:

- The elimination of local fares on reverse commute trips on Route 912, and
- Cross-honoring Hartford Line rail tickets during midday (except the 10-trip pass) on Route 950.

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

*New Haven Local Bus System Changes*

Funding for expanded service for the CTtransit New Haven Division is included in Governor Lamont’s Budget Proposal for FY 2022 – FY 2023. The effort to improve the Greater New Haven region’s transit system has been a long-term effort.

For the riding public, the following recommendations are made:

- “\$1,169,634 is provided in both years of the biennium to extend the daily bus schedule in the Greater New Haven area to 1 a.m. to adjust the public transportation schedule to meet the



current needs reflective of 2021 travel patterns. We have learned through the public health pandemic of major gaps in transportation service specifically for essential workers in hospitals, nursing homes and grocery stores; for example, whereby expansion of service will support maintaining economic opportunities;"

This change will specifically meet the transportation needs of workers who work beyond the 8 AM-5 PM schedule. In addition to improved transportation access for workers, this funding increase will also improve access to transit for individuals to connect across the Greater New Haven Region, spread load capacities and establish a supportive transit system for existing high ridership lines.

*New Haven Major Service Change Summary*

**Proposed Span of Service - Weekdays**

Nineteen New Haven local bus routes or route variations are proposed to have their span of service expanded during weekdays. Of these routes, the changes to 15 routes would result in a Major Service Change under the Span of Service Change criterion (an action resulting in at least a one-hour change in service span.)

**Proposed Span of Service - Saturdays**

For proposed Saturday span of service expansions, 17 routes exceeded the Major Service Change threshold for service change actions resulting in at least a one-hour change in service span.

**Proposed Span of Service - Sundays**

For proposed Sunday span of service expansions, eight routes exceeded the Major Service Change threshold for service change actions resulting in at least a one-hour change in service span.

For most of the New Haven local bus routes, the span of service increase applies only to a route variation instead of the entire route. Maps displaying the route segments for the New Haven bus routes where span of service is increased are included in **Appendix D**. The results of the Major Service Change threshold analysis are presented in **Appendix E**.

## Bus Service Equity Analysis

### Service Equity Analysis Methodology

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

According to CTDOT's Title VI Program, bus system service areas are each defined as all census tracts that are within (and touching) within 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. Census 2013-2017 American Community Survey (ACS) data was utilized in the analysis.

For consistency with the CTDOT's current Title VI program, the 2013-2017 ACS data will be utilized in the 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.

A service equity analysis for routes with proposed major threshold changes on the Hartford Division and New Haven Division was performed as detailed below.

### *Hartford Division (express service and commuter shuttle routes only)*

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

#### 1. Headway Changes

- a) A number of express routes are proposed to have peak or off-peak headways widened. An increase in headways is considered a negative change as riders will experience longer wait times between vehicles serving a stop. The project team performed an analysis to determine if routes with proposed headway increases are more minority/low-income serving than the Hartford express system average and thus experiencing a disparate impact/disproportionate burden by the proposed headway change. To do this, the project team calculated the percent of low income and minority populations within the service area. The percent of low income and minority populations of each route were then compared to the average percent of low-income and minority population of the entire Hartford express route system service area to determine if routes with proposed headway changes are 15% more minority/low income serving than the entire Hartford express route system.
- b) Two shuttle routes (Asylum Hill and Columbus Boulevard) are proposed to have peak headways widened. The analysis described in 1a (above) was performed for these two routes; however, the demographics of each of these shuttle routes were compared to average demographics of the local Hartford bus network service area to determine if the shuttle routes are 15% more minority/low-income serving than the entire Hartford local route system.

## 2. Service Changes

- a) A number of express routes are proposed to have a decrease in span of service or elimination of a period of service (e.g. elimination of midday service on Route 923). A decrease in service is considered a negative change. For these routes, the project team calculated the percent of low-income and minority populations within the service area. 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 entire Hartford express route system service area to determine if routes with proposed service eliminations are 15% more minority/low-income serving than the entire Hartford Express route system.
- b) Six express routes are proposed to experience a service increase through an increase in span of service and an addition or increase of midday, weekend, or reverse commute service which is considered a positive change. The above 2a analysis was performed; however, the project team determined if the routes experiencing the service increases were 15% less minority/low-income serving than the Hartford express system average and thus creating a disparate impact/disproportionate burden.
- c) Two shuttle routes (Asylum Hill and Columbus Boulevard) are proposed to have midday service eliminated. The above 2a analysis for negative service changes was performed for these two routes; however, the demographics of each of these shuttle routes was compared to the average demographics of the local Hartford bus network service area to determine if the shuttle routes are 15% more minority/low-income serving than the entire Hartford local route system.

## 3. Route Changes

- a) There are a number of express routes and one shuttle route (Asylum Hill Shuttle) with proposed stop eliminations which is considered a negative change. The 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.
- b) There is one shuttle route (Columbus Boulevard) and one local route (Route 96) where a route extension is proposed which is a positive change. The above 3a analysis was performed; however, if the minority/low-income percent change was 15% less than the non-minority/non-low-income percent change, then the extension was considered to have a disparate impact/disproportionate burden.

- c) There are three express routes that are proposed to be eliminated (Routes 915, 924 and 925). As a route elimination is a negative change that impacts the entire demographics of an area previously served by the route. The 1a analysis was performed to determine that routes proposed for elimination were not 15% more minority/low-income serving than the Hartford express system average and thus experiencing a disparate impact/disproportionate burden.
- d) There is one new proposed local route (Route 24) and one new proposed shuttle route (State Capital shuttle). The 1a analysis was performed using a 0.25-mile service area buffer to determine if the new routes proposed are 15% less minority/low-income serving than the local Hartford bus system average and thus creating a disparate impact/disproportionate burden.

*New Haven Division (local service)*

The equity analysis for the New Haven Division local routes with proposed service changes that met the major service change threshold were analyzed for the following:

1. Span of Service Change Analysis

- a) There are fifteen New Haven Division routes where a span of service increase (positive change) is proposed but it only applies to a route variation (i.e. portion of the route). For each of these routes, the project team mapped the route variation and calculated the low-income/non-low-income and minority/non-minority populations of its service area. Then the team calculated the low-income/non-low-income and minority/non-minority populations of the service area of the full route. The team then calculated the percent difference for the minority and low-income populations (between full route and route variation) and compared it to the calculated percent difference for the non-minority and non-low-income populations (full route and route variation). If the minority/low-income percent change was 15% less than the non-minority/non-low-income percent change, then the span of service increase was considered to have a disparate impact/disproportionate burden.
- e) There are three routes (Routes 201, 254, and Union Station Shuttle) where a span of service increase is proposed for the entire route. This is a benefit for the entire route, regardless of minority/non-minority or low-income/non-income population location along the route. The 1a analysis (under Headway Changes) was performed to determine if the three routes are 15% less minority/low-income serving than the local New Haven bus system average and thus creating a disparate impact/disproportionate burden.

If 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*

Hartford Division

There are ten Hartford Division express routes whose proposed changes were considered a negative change. Table 31 below displays the results of the Disparate Impact Analysis where nine of the ten routes analyzed experienced a disparate impact.

Table 32 below displays the results of the Disparate Impact Analysis for the two shuttle routes with proposed major service changes, both of which experience a disparate impact.

**Table 31 – Disparate Impact Analysis for Hartford Division Express Routes with Negative Proposed Service Changes**

		902	903	905	909	915	917	923	924	925	928	Total Hartford Express Bus System
<b>Proposed Change: Headways</b>		N/A	Widen Peak Headways	Widen Peak Headways	N/A	N/A		N/A	N/A	N/A	Widen Off Peak Headway	
<b>Proposed Change: Service</b>		Decrease in Span of Service	N/A	N/A	Decrease in Span of Service	Route Elimination	Route Elimination	Eliminate Midday Service	Route Elimination	Route Elimination	Decrease in Span of Service on Weekdays and Sunday	
<b>Total Population Served</b>		<b>299,431</b>	<b>271,984</b>	<b>373,269</b>	<b>280,041</b>	<b>252,945</b>	<b>372,114</b>	<b>432,938</b>	<b>398,195</b>	<b>497,862</b>	<b>526,965</b>	<b>1,806,243</b>
<b>Minority Population</b>	<b>Number of Persons</b>	181,236	176,872	205,026	160,319	169,323	195,409	218,457	207,347	270,880	272,874	650,060
	<b>% of Route</b>	60.53%	65.03%	54.93%	57.25%	66.94%	52.51%	50.46%	52.07%	54.41%	51.78%	35.99%
<b>% Variation from Total Express Bus System</b>		24.54%	29.04%	18.94%	21.26%	30.95%	16.52%	14.47%	16.08%	18.42%	15.79%	N/A
<b>Disparate Impact?</b>		Y	Y	Y	Y	Y	Y	N	Y	Y	Y	

**Table 32 – Disparate Impact Analysis for Hartford Division Shuttle Routes with Negative Proposed Service Changes**

		<b>Asylum Hill Shuttle</b>	<b>Columbus Boulevard Shuttle</b>	<b>Total Hartford Local Bus System</b>
<b>Proposed Change: Headways</b>		Widen Peak Headways	Widen Peak Headways	
<b>Proposed Change: Service</b>		Eliminate Midday Service	Eliminate Midday Service, Decrease in Span of Service	
<b>Total Population Served</b>		<b>22,280</b>	<b>10,584</b>	<b>691,780</b>
<b>Minority Population</b>	<b>Number of Persons</b>	18,764	7,700	300,094
	<b>% of Route</b>	84.22%	72.75%	43.38%
<b>% Variation from Total Local Hartford Bus System</b>		40.84%	29.37%	N/A
<b>Disparate Impact?</b>		Y	Y	

There are six express routes whose proposed changes are considered a positive change. The minority population in the service area of each of these routes was calculated and compared to the average minority population in the service area of the entire Hartford Express bus system. Table 33 below displays the results of the Disparate Impact Analysis for these six routes. None of these routes experience a disparate impact.

**Table 33 – Disparate Impact Analysis for Hartford Division Express Routes with Positive Proposed Service Changes**

		905	918	921	926	927	950	Total Hartford Express Bus System
<b>Proposed Change: Service</b>		Increase in Weekend Service, Increase in Span of Service	Midday return trip added, Reverse-peak service introduced	Reverse Commute Service Added, Add Midday Return Trip	Add Midday and Reverse Commute Service, Increase in Span of Service	Add Midday and Reverse Commute Service, Increase in Span of Service	Add Midday Service, Add New Stop to Existing Route	
<b>Total Population Served</b>		<b>299,431</b>	<b>372,300</b>	<b>271,984</b>	<b>373,269</b>	<b>497,862</b>	<b>526,965</b>	<b>1,806,243</b>
<b>Minority Population</b>	<b>Number of Persons</b>	205,026	195,135	164,433	169,133	173,782	15,538	650,060
	<b>% of Route</b>	54.93%	52.41%	52.76%	52.50%	50.52%	42.94%	35.99%
<b>% Variation from Total Express Bus System*</b>		18.94%	16.42%	16.77%	16.51%	14.53%	6.95%	N/A
<b>Disparate Impact?</b>		N	N	N	N	N	N	

\*Positive numbers signify that the route is more minority serving than the Express Bus system as a whole.

There is one new proposed local route (Route 24) and one new proposed shuttle route (State Capital shuttle). Table 34 displays the results of the Disparate Impact Analysis for these two routes, one of which has a disparate impact.



**Table 34 – Disparate Impact Analysis for Hartford Division Local Routes with Positive Proposed Service Changes**

		SCS	24	Total Hartford Local Bus System
Proposed Change: Service		New Route	New Route	
<b>Total Population Served</b>		<b>22,528</b>	<b>29,305</b>	<b>691,780</b>
<b>Minority Population</b>	<b>Number of Persons</b>	18,974	8,108	300,094
	<b>% of Route</b>	84.22%	27.67%	43.38%
<b>% Variation from Total Express Bus System</b>		40.84%	-15.71%*	N/A
<b>Disparate Impact?</b>		N	Y	

\*The negative number indicates that the route is less minority-serving than the Express Bus system as a whole.

There are four Express routes and one shuttle (Asylum Hill Shuttle) with proposed changes that are considered a negative change. Table 35 displays the results of this analysis.

**Table 35 – Disparate Impact Analysis for Hartford Division Express and Shuttle Routes with Proposed Stop Eliminations**

Hartford Route with Proposed Stop Eliminations	902	905	917	918	AHS
Existing route: minority	181,236	205,026	195,409	195,135	18,764
Existing route: non-minority	118,195	168,243	176,705	177,165	3,516
Proposed modified route: minority	179,389	181,111	189,107	190,370	16,959
Proposed modified route: non-minority	108,442	129,526	159,490	160,194	3,235
Percent difference minority (existing route to proposed route)	-1.02%	-11.66%	-3.23%	-2.44%	-9.62%
Percent difference non-minority (existing route to proposed route)	-8.25%	-23.01%	-9.74%	-9.58%	-7.99%
Variance (minority to non-minority)*	-7.23%	-11.35%	-6.52%	-7.14%	1.63%
Disparate Impact?	N	N	N	N	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.

There are two routes with proposed route extensions that are considered a positive change. Table 36 displays the results of this analysis.

**Table 36 – Disparate Impact Analysis for Hartford Division Routes with Proposed Route Extensions**

Hartford Route with Proposed Extension	CBS	96
Existing service: minority	7,700	18,030
Existing service: non-minority	2,884	20,323
Proposed extended route: minority	18,107	20,219
Proposed extended route: non-minority	4,440	28,022
Percent difference minority (existing route to proposed route)	135.16%	12.14%
Percent difference non-minority (existing route to proposed route)	53.95%	37.88%
Variance (minority population to non-minority population)*	-81.20%	25.74%
Disparate Impact?	N	Y

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

[New Haven Division](#)

A span of service increase (positive change) is proposed for 18 New Haven Division routes. For 15 of these routes, it only applies to a portion of the route while the entire route is proposed for a span of service increase for the remaining three routes. Table 37 and Table 38 display the results of this analysis.

Table 37 – Disparate Impact Analysis for New Haven Division Routes with Proposed Span of Service Increase on a Route Variation (Part 1)

New Haven Route with Major Service Change	204 weekday	204 weekend	206 weekday	206 weekend	215 weekday	215 weekend	223 weekday	223 weekend	224 weekday	224 weekend	229 weekday	229 weekend	234 weekday	234 weekend	237 weekday	237 weekend
Existing service: minority	26,431	42,678	26,050	52,945	42,437	72,583	31,501	45,638	31,375	41,439	63,918	94,069	36,299	40,977	46,388	46,839
Existing service: non-minority	39,986	52,224	26,249	42,346	76,698	114,439	18,420	23,864	32,342	34,731	82,843	99,689	28,555	26,838	26,527	19,790
Proposed extended service: minority	23,977	41,712	24,634	52,945	42,437	72,583	31,501	45,638	30,582	41,439	63,918	94,069	30,242	40,977	29,772	46,839
Proposed extended service: non-minority	25,432	42,221	21,513	42,346	76,698	114,439	18,420	23,864	29,160	34,731	82,843	99,689	17,759	26,838	16,431	19,790
Percent difference minority (existing route to proposed route)	-9.28%	-2.26%	-5.44%	0.00%	0.00%	0.00%	0.00%	0.00%	-2.53%	0.00%	0.00%	0.00%	-16.69%	0.00%	-35.82%	0.00%
Percent difference non-minority (existing route to proposed route)	-36.40%	-19.15%	-18.04%	0.00%	0.00%	0.00%	0.00%	0.00%	-9.84%	0.00%	0.00%	0.00%	-37.81%	0.00%	-38.06%	0.00%
Variance (minority population to non-minority population)*	-27.11%	-16.89%	-12.61%	0.00%	0.00%	0.00%	0.00%	0.00%	-7.31%	0.00%	0.00%	0.00%	-21.12%	0.00%	-2.24%	0.00%
Disparate Impact?	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N

\*A negative number represents that the span of service increase results in more of a positive impact on minority populations compared to non-minority populations. Zero percent indicates that the existing route and route variation serve the same census tracts and minority/non-minority populations.

Table 38 – Disparate Impact Analysis for New Haven Division Routes with Proposed Span of Service Increase on a Route Variation (Part 2)

New Haven Route with Major Service Change	241 weekday	241 weekend	246 weekday	246 weekend	255 weekday	255 weekend	261 weekday	261 weekend	268 weekday	268 weekend	271 weekday	271 Saturday	271 Sunday	274 weekday	274 weekend
Existing service: minority	38,879	53,552	43,914	50,690	55,242	61,167	46,418	53,548	43,207	50,570	38,408	49,324	46,065	14,061	34,408
Existing service: non-minority	23,715	28,117	27,401	31,369	80,810	81,599	46,825	56,014	28,251	25,157	55,319	65,789	47,509	8,244	17,844
Proposed extended service: minority	38,879	53,552	43,914	50,690	53,169	61,167	45,414	52,426	40,926	50,570	32,685	41,940	46,065	14,061	34,408
Proposed extended service: non-minority	23,715	28,117	27,401	31,369	71,679	81,599	40,475	48,286	19,854	25,157	23,282	27,482	47,509	8,244	17,844
Percent difference minority (existing route to proposed route)	0.00%	0.00%	0.00%	0.00%	-3.75%	0.00%	-2.16%	-2.10%	-5.28%	0.00%	-14.90%	-14.97%	0.00%	0.00%	0.00%
Percent difference non-minority (existing route to proposed route)	0.00%	0.00%	0.00%	0.00%	-11.30%	0.00%	-13.56%	-13.80%	-29.72%	0.00%	-57.91%	-58.23%	0.00%	0.00%	0.00%
Variance (minority population to non-minority population)*	0.00%	0.00%	0.00%	0.00%	-7.55%	0.00%	-11.40%	-11.70%	-24.44%	0.00%	-43.01%	-43.26%	0.00%	0.00%	0.00%
Disparate Impact?	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N

\*A negative number represents that the span of service increase results in more of a positive impact on minority populations compared to non-minority populations. Zero percent indicates that the existing route and route variation serve the same census tracts and minority/non-minority populations.

Table 39 demonstrates that there is a disparate impact on one of the three routes (Route 201) with a proposed span of service increase on the entire route.

**Table 39 – Disparate Impact Analysis for New Haven Division Routes with Proposed Span of Service Increase on an Entire Route**

		USS	201	254	Total New Haven Local Bus System
<b>Total Population Served</b>		15,439	91,886	51,761	610,792
<b>Minority Population</b>	<b>Number of Persons</b>	8,144	16,813	33,801	237,356
	<b>% of Route</b>	52.75%	18.30%	65.30%	38.36%
<b>% Variation from Total New Haven Bus System*</b>		13.89%	-20.56%	26.44%	N/A
<b>Disparate Impact?</b>		N	Y	N	

\*A negative number represents that routes with proposed positive service changes are less minority serving than the bus system as a whole.

*Evaluation of Disproportionate Burden to Low-Income Populations*

*Hartford Division*

There are ten Hartford Express routes whose proposed changes include widening of headways, decrease in span of service, or elimination of a route or period of route service. Table 40 below displays the results of the Disproportionate Burden Analysis for these ten routes.

There are two shuttle routes whose proposed changes include widening of headways and elimination of midday service. Table 41 below displays the results of the Disproportionate Burden Analysis for these two routes.



Table 40 – Disproportionate Burden Analysis for Hartford Division Express Routes with Negative Proposed Service Changes

		902	903	905	909	915	917	923	924	925	928	Total Hartford Express Bus System
<b>Proposed Change: Headways</b>		N/A	Widen Peak Headways	Widen Peak Headways	N/A	N/A		N/A	N/A	N/A	Widen Off Peak Headway	
<b>Proposed Change: Service</b>		Decrease in Span of Service	N/A	N/A	Decrease in Span of Service	Route Elimination	Route Elimination	Eliminate Midday Service	Route Elimination	Route Elimination	Decrease in Span of Service on Weekdays and Sunday	
<b>Total Population Served</b>		<b>287,173</b>	<b>262,240</b>	<b>354,935</b>	<b>269,822</b>	<b>242,772</b>	<b>361,745</b>	<b>419,299</b>	<b>383,050</b>	<b>483,646</b>	<b>509,996</b>	<b>1,735,492</b>
<b>Low-Income Population</b>	<b>Number of Persons</b>	86,227	78,625	87,012	74,564	72,810	87,544	110,305	98,913	137,929	139,013	327,004
	<b>% of Route</b>	30.03%	29.98%	24.51%	27.63%	29.99%	24.20%	26.31%	25.82%	28.52%	27.26%	18.84%
<b>% Variation from Total Express Bus System</b>		11.18%	11.14%	5.67%	8.79%	11.15%	5.36%	7.46%	6.98%	9.68%	8.42%	N/A
<b>Disproportionate Burden?</b>		N	N	N	N	N	N	N	N	N	N	

**Table 41 – Disproportionate Burden Analysis for Hartford Division Shuttle Routes with Negative Proposed Service Changes**

		<b>Asylum Hill Shuttle</b>	<b>Columbus Boulevard Shuttle</b>	<b>Total Hartford Local Bus System</b>
<b>Proposed Change: Headways</b>		Widen Peak Headways	Widen Peak Headways	
<b>Proposed Change: Service</b>		Eliminate Midday Service	Eliminate Midday Service, Decrease in Span of Service	
<b>Total Population Served</b>		<b>22,006</b>	<b>9,244</b>	<b>672,569</b>
<b>Low-Income Population</b>	<b>Number of Persons</b>	9,854	3,001	137,869
	<b>% of Route</b>	44.78%	32.46%	20.50%
<b>% Variation from Total Local Hartford Bus System</b>		24.28%	11.97%	N/A
<b>Disproportionate Burden?</b>		Y	N	

Six Express routes are proposed to experience a service increase which can be considered a positive change. Table 42 below displays the results of the Disproportionate Burden Analysis for these six routes.

**Table 42 – Disproportionate Burden Analysis for Hartford Division Express Routes with Positive Proposed Service Changes**

		905	918	921	926	927	950	Total Hartford Express Bus System
<b>Proposed Change: Service</b>		Increase in Weekend Service, Increase in Span of Service	Midday return trip added, Reverse-peak service introduced	Reverse Commute Service Added; Add Midday Return Trip	Add Midday and Reverse Commute Service, Increase in Span of Service	Add Midday and Reverse Commute Service, Increase in Span of Service	Add Midday Service; Add New Stop to Existing Route	
<b>Total Population Served</b>		<b>354,935</b>	<b>357,880</b>	<b>297,612</b>	<b>311,986</b>	<b>333,052</b>	<b>31,720</b>	<b>1,735,492</b>
<b>Low-income Population</b>	<b>Number of Persons</b>	87,012	92,844	79,390	76,442	80,139	6,833	327,004
	<b>% of Route</b>	24.51%	25.94%	26.68%	24.50%	24.06%	21.54%	18.84%
<b>% Variation from Total Express Bus System*</b>		5.67%	7.10%	7.83%	5.66%	5.22%	2.70%	N/A
<b>Disproportionate Burden?</b>		N	N	N	N	N	N	

\*Positive numbers signify that the route is more low-income serving than the Express Bus system as a whole.

There is one new proposed local route (Route 24) and one new proposed shuttle route (State Capital Shuttle). Table 43 displays the results of the Disproportionate Burden Analysis for these two routes.

**Table 43 – Disproportionate Burden Analysis for Hartford Division Local Routes with Positive Proposed Service Changes**

		SCS	24	Total Hartford Local Bus System
Proposed Change: Service		New Route	New Route	
<b>Total Population Served</b>		<b>22,249</b>	<b>28,917</b>	<b>672,569</b>
<b>Low-Income Population</b>	<b>Number of Persons</b>	9,655	2,757	137,869
	<b>% of Route</b>	43.40%	9.53%	20.50%
<b>% Variation from Total Express Bus System*</b>		22.90%	-10.96%	N/A
<b>Disproportionate Burden?</b>		N	N	

\*The negative number indicates that the route is less low-income-serving than the Express Bus system as a whole.

There are four express routes and one shuttle (Asylum Hill Shuttle) with proposed stop eliminations which can be considered a negative change. Table 44 displays the results of this analysis and indicates that there are no disproportionate burdens.

**Table 44 – Disproportionate Burden Analysis for Hartford Division Express and Shuttle Routes with Proposed Stop Eliminations**

Hartford Route with Proposed Stop Eliminations	902	905	917	918	AHS
Existing route: low-income	86,227	87,012	87,544	92,844	9,854
Existing route: non-low-income	200,946	267,923	274,201	265,036	12,152
Proposed modified route: low-income	85,492	79,294	85,492	91,646	8,712
Proposed modified route: non-low-income	190,188	215,290	252,348	244,570	11,296
Percent difference low-income (existing route to proposed route)	-0.85%	-8.87%	-2.34%	-1.29%	-11.59%
Percent difference non-low-income (existing route to proposed route)	-5.35%	-19.64%	-7.97%	-7.72%	-7.04%
Variance (low-income to non-low-income)*	-4.50%	-10.77%	-5.63%	-6.43%	4.55%
Disproportionate Burden?	N	N	N	N	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.

There are two routes (Columbus Boulevard Shuttle and Route 96) with proposed route extensions which can be considered a positive change. Table 45 displays the results of this analysis.

**Table 45 – Disproportionate Burden Analysis for Hartford Division Routes with Proposed Route Extensions**

Hartford Route with Proposed Extension	CBS	96
Existing service: low-income	3,001	6,578
Existing service: non-low-income	6,243	30,308
Proposed extended route: low-income	8,649	7,568
Proposed extended route: non-low-income	12,479	38,930
Percent difference low-income (existing route to proposed route)	188.20%	15.05%
Percent difference non-low-income (existing route to proposed route)	99.89%	28.45%
Variance (low-income population to non-low-income population)*	-88.32%	13.40%
Disproportionate Burden?	N	N

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

**New Haven Division**

A span of service increase (positive change) is proposed for 18 New Haven Division routes. For 15 of these routes, it only applies to a portion of the route while the entire route is proposed for a span of service increase for the remaining three routes. Table 46 and Table 47 display the results of this analysis.

**Table 46 – Disproportionate Burden Analysis for New Haven Division Routes with Proposed Span of Service Increase on a Route Variation (Part 1)**

New Haven Route with Major Service Change	204 weekday	204 weekend	206 weekday	206 weekend	215 weekday	215 weekend	223 weekday	223 weekend	224 weekday	224 weekend	229 weekday	229 weekend	234 weekday	234 weekend	237 weekday	237 weekend
Existing service: low-income	15,133	25,169	13,453	28,528	20,904	35,785	16,298	24,103	15,063	21,700	33,904	52,056	15,512	19,477	19,767	23,209
Existing service: non-low-income	46,631	63,955	34,228	60,853	92,743	143,407	29,272	39,824	43,947	48,713	101,691	129,359	43,905	42,246	44,867	37,325
Proposed extended service: low-income	12,916	23,898	12,227	28,528	20,904	35,785	16,298	24,103	14,772	21,700	33,904	52,056	13,408	19,477	15,067	23,209
Proposed extended service: non-low-income	32,025	54,257	29,406	60,853	92,743	143,407	29,272	39,824	40,271	48,713	101,691	129,359	29,170	42,246	25,464	37,325
Percent difference low-income (existing route to proposed route)	-14.65%	-5.05%	-9.11%	0.00%	0.00%	0.00%	0.00%	0.00%	-1.93%	0.00%	0.00%	0.00%	-13.56%	0.00%	-23.78%	0.00%
Percent difference non-low-income (existing route to proposed route)	-31.32%	-15.16%	-14.09%	0.00%	0.00%	0.00%	0.00%	0.00%	-8.36%	0.00%	0.00%	0.00%	-33.56%	0.00%	-43.25%	0.00%
Variance (low-income population to non-low-income population)*	-16.67%	-10.11%	-4.97%	0.00%	0.00%	0.00%	0.00%	0.00%	-6.43%	0.00%	0.00%	0.00%	-20.00%	0.00%	-19.47%	0.00%
Disproportionate Burden?	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N

\*A negative number represents that the span of service increase results in more of a positive impact on low-income populations compared to non-low-income populations. Zero percent indicates that the existing route and route variation serve the same census tracts and low-income/non-low-income populations.

**Table 47 – Disproportionate Burden Analysis for New Haven Division Routes with Proposed Span of Service Increase on a Route Variation (Part 2)**

New Haven Route with Major Service Change	241 weekday	241 weekend	246 weekday	246 weekend	255 weekday	255 weekend	261 weekday	261 weekend	268 weekday	268 weekend	271 weekday	271 Saturday	271 Sunday	274 weekday	274 weekend
Existing service: low-income	18,941	26,462	20,671	23,803	29,787	32,197	23,795	27,208	21,516	26,519	20,185	26,825	25,256	8,415	19,468
Existing service: non-low-income	36,193	47,021	42,743	50,355	99,644	104,036	61,230	74,055	42,119	40,619	65,510	79,281	59,646	9,439	24,875
Proposed extended service: low-income	18,941	26,462	20,671	23,803	29,090	32,197	23,080	26,548	20,112	26,519	17,029	21,125	25,256	8,415	19,468
Proposed extended service: non-low-income	36,193	47,021	42,743	50,355	89,225	104,036	54,629	65,875	32,942	40,619	31,256	37,746	59,646	9,439	24,875
Percent difference low-income (existing route to proposed route)	0.00%	0.00%	0.00%	0.00%	-2.34%	0.00%	-3.00%	-2.43%	-6.53%	0.00%	-15.64%	-21.25%	0.00%	0.00%	0.00%
Percent difference non-low-income (existing route to proposed route)	0.00%	0.00%	0.00%	0.00%	-10.46%	0.00%	-10.78%	-11.05%	-21.79%	0.00%	-52.29%	-52.39%	0.00%	0.00%	0.00%
Variance (low-income population to non-low-income population)*	0.00%	0.00%	0.00%	0.00%	-8.12%	0.00%	-7.78%	-8.62%	-15.26%	0.00%	-36.65%	-31.14%	0.00%	0.00%	0.00%
Disproportionate Burden?	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N

\*A negative number represents that the span of service increase results in more of a positive impact on low-income populations compared to non-low-income populations. Zero percent indicates that the existing route and route variation serve the same census tracts and low-income/non-low-income populations.



For the three routes where a span of service increase is proposed for the entire route, the benefit is borne by the entire route, regardless of low-income or non-low-income population location along the route. Table 48 demonstrates that there are no disproportionate burdens created by the proposed span of service increased on the three routes.

**Table 48 – Disproportionate Burden Analysis for New Haven Division Routes with Proposed Span of Service Increase on an Entire Route**

		USS	201	254	Total New Haven Local Bus System
<b>Total Population Served</b>		11,043	89,220	46,064	470,261
<b>Low-Income Population</b>	<b>Number of Persons</b>	4,544	12,323	17,002	118,688
	<b>% of Route</b>	41.15%	13.81%	36.91%	25.24%
<b>% Variation from Total New Haven Bus System*</b>		15.91%	-11.43%	11.67%	N/A
<b>Disproportionate Burden?</b>		N	N	N	

\*A negative number represents that routes with proposed positive service changes are less minority serving than the bus system as a whole.

Bus Service Change Impacts and Alternatives

The routes in Table 49 and Table 50 have been identified as having proposed service changes that trigger either a Disparate Impact and/or Disproportionate Burden. Alternatives or explanations for the proposed service change impacts are included.

**Table 49 – Service Change Impacts and Alternatives - Hartford Express Bus System**

Route	Disparate Impact (Minority Populations)	Disproportionate Burden (Low Income Populations)	Route Change Causing Impact	Mitigation or Justification
<b>902 – Corbins-Farm Springs Express</b>	Y	N	<ul style="list-style-type: none"> <li>Decrease in Span of Service</li> </ul>	<p>Pre-Pandemic weekday ridership on Route 902 averaged 2 passengers per trip in the peak and 4 passengers per trip in the reverse directions.</p> <p>Ridership is currently averaging 2 passengers per trip in each direction on Route 902.</p> <p>Due to very low ridership and the availability of alternative service on CTfastrak Routes 121 &amp; 128, Route 902 service to the Corbins Park &amp; Ride is recommended for elimination.</p>
<b>903 – Buckland-Vernon Express</b>	Y	N	<ul style="list-style-type: none"> <li>Widen Peak Headways</li> </ul>	<p>Pre-Pandemic, peak direction ridership on Route 903 averaged 19 passengers per trip. In October 2020, peak direction ridership on this route averaged 2 passengers per trip.</p> <p>Ridership levels on Route 903 no longer warrant the frequency of service currently provided.</p>
<b>905 – Windsor Locks-Enfield Express</b>	Y	N	<ul style="list-style-type: none"> <li>Widen Peak Headways</li> <li>Route Modification</li> </ul>	<p>Pre-Pandemic, peak direction ridership on Route 905 averaged 17 passengers per trip. In October 2020, peak direction ridership on this route averaged 3 passengers per trip.</p> <p>Ridership on Route 903 no longer warrant the frequency of service currently provided.</p> <p>Local service to East Hartford, South Windsor &amp; East Windsor discontinued; replaced by a part-time extension of Route 96.</p>

Route	Disparate Impact (Minority Populations)	Disproportionate Burden (Low Income Populations)	Route Change Causing Impact	Mitigation or Justification
				<p>Local service within Windsor Locks discontinued; replaced by new Route 24.</p> <p>Local service to Kennedy Road &amp; Old County Road discontinued; replaced by rerouted Route 34.</p>
<b>909 – Farmington-Unionville Express</b>	Y	N	<ul style="list-style-type: none"> <li>Decrease in Span of Service</li> </ul>	<p>The schedule is proposed to be adjusted to provide better spacing between trips to make the service more attractive to potential riders.</p>
<b>915 - Windsor Express</b>	Y	N	<ul style="list-style-type: none"> <li>Route Elimination</li> </ul>	<p>Replacement service between Poquonock Park &amp; Ride and downtown Hartford provided by limited-stop local Routes 30X, 34X &amp; 36X.</p>
<b>917 – Vernon-Tolland Express</b>	Y	N	<ul style="list-style-type: none"> <li>Route Elimination</li> </ul>	<p>Pre-pandemic, Route 917 operated in the peak direction only at a 10-minute headway prior to the pandemic, with two one-way outbound trips during midday.</p> <p>Service on Route 917 presently operates at a 20-minute headway in the peak direction.</p> <p>In October 2020, peak direction ridership on this route averaged 1 passenger per trip.</p> <p>Ridership on Route 903 no longer warrants the frequency of service currently provided.</p> <p>Replacement service to Green Circle, Vernon &amp; Reservoir Road Park &amp; Rides provided by Route 903.</p>

Route	Disparate Impact (Minority Populations)	Disproportionate Burden (Low Income Populations)	Route Change Causing Impact	Mitigation or Justification
				Replacement service to Reservoir Road & Tolland Park & Rides provided by Route 913.
<b>924 – Southington-Cheshire Express</b>	Y	N	<ul style="list-style-type: none"> <li>Route Elimination</li> </ul>	Replacement service provided by Route 928.
<b>925 – Waterbury Express</b>	Y	N	<ul style="list-style-type: none"> <li>Route Elimination</li> </ul>	Replacement service provided by Route 928.
<b>928 – Southington-Cheshire-Waterbury Express</b>	Y	N	<ul style="list-style-type: none"> <li>Widen Off Peak Headway</li> <li>Decrease in Span of Service on Weekdays and Sunday</li> </ul>	<p>Pre-Pandemic reverse-peak ridership on Route 928 averaged 6 passengers per trip while midday and evening ridership averaged 8 and 4 passengers per trip, respectively.</p> <p>Reverse-commute and midday service on Route 928 should continue to operate on an hourly schedule; however, the level of service on Route 928 at night far outweighs demand in the corridor. It is therefore recommended that night service be reduced to a 90-minute headway, maintaining connections with CTtransit local service in Waterbury and the Metro-North Waterbury Line to the extent that is practical.</p> <p>As on weeknights, ridership on Route 928 on Saturdays and Sundays does not justify hourly service. It is therefore recommended that service be reduced to a 90-minute headway on weekends, again maintaining connections with CTtransit local service in Waterbury and the Metro-North Waterbury Branch to the extent that is practical.</p>



Route	Disparate Impact (Minority Populations)	Disproportionate Burden (Low Income Populations)	Route Change causing Impact	Mitigation or Justification
<b>24 - Windsor/Windsor Locks</b>	Y	N	<ul style="list-style-type: none"> <li>• Add New Route</li> </ul>	<p>New route serving discontinued segments of Routes 34 &amp; 905, including: Main Street, North Street &amp; Ella Grasso Turnpike in Windsor Locks and Poquonock Avenue in Windsor. Although slightly non-minority favoring, the new route will be providing service to a large number of minority riders as well.</p>
<b>96 - John Fitch Boulevard</b>	Y	N	<ul style="list-style-type: none"> <li>• Route Extension</li> </ul>	<p>Two trips each weekday extended from South Windsor, through East Windsor to Windsor Locks. Although slightly non-minority favoring, the route extension will provide service to discontinued segments of Route 905.</p>
<b>Asylum Hill Shuttle</b>	Y	Y	<ul style="list-style-type: none"> <li>• Widen Peak Headways</li> <li>• Eliminate Midday Service</li> </ul>	<p>Prior to the pandemic, service on Asylum Hill Shuttle operated approximately every 3-5 minutes.</p> <p>Pre-pandemic ridership averaged 200 daily passenger trips.</p> <p>The service currently averages 17 passenger trips per day under the special stand-alone schedule.</p> <p>Ridership on this route no longer warrants the frequency of peak service currently provided.</p> <p>Midday service would be discontinued, and customers accommodated by local service on Routes 62, 64 and 66.</p>

Route	Disparate Impact (Minority Populations)	Disproportionate Burden (Low Income Populations)	Route Change causing Impact	Mitigation or Justification
<p><b>Columbus Boulevard Shuttle</b></p>	<p>Y</p>	<p>N</p>	<ul style="list-style-type: none"> <li>• Widen Peak Headways</li> <li>• Eliminate Midday Service</li> <li>• Decrease in Span of Service</li> </ul>	<p>Prior to the pandemic, the Columbus Boulevard Shuttle operated every 5-10 minutes during the AM &amp; PM peak, with two midday trips on each route.</p> <p>The Columbus Boulevard Shuttle averaged 25 daily passenger trips (0.7 passengers per trips) prior to the pandemic and currently averages 12 passenger trips per day.</p> <p>Ridership on this route no longer warrants the frequency of peak service currently provided.</p> <p>Midday service would be discontinued, and customers accommodated by other services including CTfastrak Route 121 and the dash shuttle.</p>

Table 50 – Service Change Impacts and Alternatives -New Haven Local Bus System

Route	Disparate Impact (Minority Populations)	Disproportionate Burden (Low Income Populations)	Route Change causing Impact	Mitigation or Justification
201	Y	N	<ul style="list-style-type: none"> <li>Increase in Span of Service</li> </ul>	<p>The span of service change triggers a disparate impact as that route is slightly non-minority favoring.</p> <p>However, this is a change that benefits both minority and non-minority riders on the route by providing them with additional service.</p> <p>In addition, multiple routes across the New Haven local bus system are receiving additional span of service with the proposed span of service changes; this route was not singled out to be the only route receiving additional service.</p>



Bus Fare Equity Analysis

Two fare changes are being considered by the CTDOT:

- **Elimination of local fares on reverse commute trips on Route 912** – Certain reverse-commute trips on Route 912 between Granby and Hartford charge a local bus fare instead of the typical commuter bus fare. CTDOT is proposing to eliminate this exception, and fares on these trips would be regular express bus fares. This change is considered a fare increase, as the commuter fares are more expensive than local bus fares.
- **Cross-honoring of Hartford Line rail tickets during midday (except the 10-trip pass) on Route 950** – Route 950, which runs between Hartford and New Haven along a similar alignment to CTrail Hartford Line rail service, would accept monthly, weekly, and single-ride fare media from the Hartford Line rail service on its express bus service. The purpose of this fare change is to expand midday service between New Haven and Hartford for Hartford Line users. This is considered a fare decrease for Route 950 monthly pass users because the Hartford Line monthly pass is less expensive.

This section contains the analysis of expected fare impacts on minority and low-income riders and outlines findings relative to the thresholds set by the CTDOT Disparate Impact/Disproportionate Burden Policies.

**WEEKDAY SERVICE (No Service Saturday or Sunday)**

	Granby > Simsbury > Via Route 185 > Hartford								
Timepoints	9	8	7	6	5	4	3	2	1
	First Congregational Park & Ride	State Sand Pit Park & Ride	St. Mary's Church (Street Stop)	Iron Horse Park & Ride	Winslow Place Park & Ride	University of Hartford on Bloomfield Avenue	Asylum & Woodland	Bushnell Park Asylum & Union	Downtown Hartford Central Row South
Route									
	AM								
912	5:50	6:03	6:07	6:11	6:18	6:30	*6:36	*6:41	*6:45
912	6:10	6:23	6:27	6:31	6:38	6:50	*6:56	*7:01	*7:05
912	6:30	6:43	6:47	6:51	6:58	7:10	*7:16	*7:21	*7:25
912	6:48	7:01	7:05	7:10	7:19	7:32	*7:40	*7:46	*7:50
912	7:13	7:26	7:30	7:35	7:44	7:57	*8:05	*8:11	*8:15
912	..	..	..	8:15	8:24	8:37	*8:45	*8:51	*8:55
	PM								
912	\$1:25	\$1:36	\$1:40	\$1:44	\$1:52	\$2:04	*2:10	*2:15	*2:20
912	..	..	\$3:05	\$3:09	\$3:17	\$3:29	*3:35	*3:41	*3:45
912	\$4:44	\$4:55	\$4:59	..	\$5:05	\$5:17	*5:23	*5:28	*5:33
912	\$6:09	\$6:20	\$6:24	..	\$6:30	\$6:42	*6:48	*6:53	*6:58

\*Highlighted times charge local bus fare

**Figure 24 - Route 912 Inbound Weekday Schedule**

**WEEKDAY SERVICE (No Service Saturday or Sunday)**

	<b>Hartford &gt; Via Route 185 &gt; Simsbury &gt; Granby</b>								
Timepoints	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>
	Downtown Hartford Central Row North	Asylum & Union	Asylum & Woodland	University of Hartford on Bloomfield Avenue	Winslow Place Park & Ride	Iron Horse Park & Ride Lot on Jim Gallagher Way	St. Mary's School (Street Stop)	State Sand Pit Park & Ride	First Congregational Park & Ride
Route									
	<b>AM</b>								
<b>912</b>	\$5:50	\$5:54	\$5:59	\$6:05	\$6:18	..	6:24	\$6:29	6:40
<b>912</b>	\$6:15	\$6:19	\$6:24	\$6:30	\$6:43	..	6:49	\$6:54	7:05
<b>912S</b>	\$7:35	\$7:39	\$7:44	\$7:50	\$8:03	8:09	..	..	..
	<b>PM</b>								
<b>912</b>	12:20	12:23	12:29	12:35	12:50	12:56	12:58	1:03	1:15
<b>912S</b>	2:20	2:23	2:29	2:35	2:50	2:56	2:58	..	..
<b>912</b>	3:40	3:43	3:50	3:56	4:11	4:17	4:19	4:24	4:36
<b>912</b>	4:05	4:09	4:17	4:23	4:39	4:45	4:47	4:52	5:04
<b>912</b>	4:25	4:29	4:37	4:43	4:59	5:05	5:07	5:12	5:24
<b>912</b>	4:50	4:54	5:02	5:08	5:24	5:30	5:32	5:37	5:49
<b>912</b>	5:15	5:19	5:27	5:33	5:49	5:55	5:57	6:02	6:14
<b>912</b>	5:45	5:49	5:57	6:03	6:19	6:25	6:27	6:32	6:44
<b>912</b>	6:30	6:34	6:42	6:48	7:04	7:10	7:12	7:17	7:29

\*Highlighted times charge local bus fare

**Figure 25 - Route 912 Outbound Weekday Schedule**

Fare Equity Analysis Methodology

The Connecticut DOT Title VI program lays out the following process for undertaking a Title VI fare equity analysis:

- Determine the number and percent of users of each fare medium proposed for increase or decrease;
- Review fares before the change and after the change;
- Analyze the fare media usage rates 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;
- Compare the impacts for each particular fare medium between minority users and overall users;
- Compare the impacts for each particular fare medium between low-income users and overall users; and
- Identify alternatives and mitigation strategies when the impacts exceed the thresholds established with the disparate impact and disproportionate burden policies.

As described above, CTDOT is proposing two fare changes to the Route 912 and Route 950. The detailed methodology for this fare equity analysis is presented below.

### Analysis of Current Bus Fare Usage

There are several constraints on the analysis of fare change impacts:

- 1) **On-Board Demographic Information:** There is no on-board demographic information for the Hartford Express bus routes impacted by the proposed fare changes. *CTtransit* was planning to conduct on-board surveys in 2020 but the COVID-19 pandemic forced its postponement.
- 2) **Mid-Day Hartford Line Market Demand:** While there have been periodic requests from the general public for mid-day *CTrail* Hartford Line service between Hartford and New Haven, there are no official estimates for latent demand.
- 3) **COVID-19 Precautions:** The ongoing COVID-19 pandemic and associated social distancing guidelines make surveying challenging, particularly on the higher ridership Route 950.

Based on the limitations presented above, two separate approaches for collecting the demographic information needed to assess the impacts of the fare changes were used.

### Route 912 Demographic Information

The Route 912 is estimated to have fewer than five passengers per trip on the reverse commute trips that would be impacted. Based on the small number of riders, it was determined that a limited surveying effort could be undertaken by *CTtransit* staff while adhering to COVID-19 social distancing precautions. The survey conducted on impacted reverse-commute trips asked passengers to respond to the following:

- Race/Ethnicity
- Household Income
- Size of Household
- Fare Medium Used
- Location of boarding and alighting

Using this information, the project team assessed the demographic composition of ridership as well as fare usage patterns in order to determine disparate impacts or disproportionate burdens resulting from the proposed fare change.

### Route 950 Demographic Information

The fare change on the Route 950 must take two impacts into account:

- 1) The impact to current users of Route 950, and
- 2) The potential shift of riders from the Hartford Line to Route 950.

Due to the level of ridership and number of trips impacted on Route 950, conducting on-board surveys while adhering to COVID-19 social distancing guidelines was not feasible. Therefore, an assessment of fare impacts employed three separate datasets to ascertain potential adverse impacts of the proposed fare changes:

- **New Haven Area On-Board Survey Data:** There is recent on-board survey data for bus routes in the New Haven area (not including the Route 950). This New Haven Division demographic information was used to assess fare usage patterns more generally of CTtransit riders.
- **Hartford Line On-Board Survey Data:** There is recent on-board survey data for Hartford Line users. This was used to assess demographics of riders who might shift from the Hartford Line to the Route 950 and any potential adverse impacts resulting from that shift.
- **Census Information:** Because demographic information for the Route 950 users is not available, census information was used to supplement available demographic information.

#### *Estimation of Bus Fare Change Impacts*

Based on the assessment of demographic and fare usage characteristics for the Route 912 and Route 950, estimations were made regarding expected changes in fare usage patterns. The assumptions are as follows:

- **Route 912:** Route 912 riders currently paying the local fare (\$1.75 one way) will experience a fare increase of \$1.79 (the average cost of a zonal express fare on Route 912 is \$3.54).
- **Route 950:** Route 950 riders currently using a monthly express bus pass (\$204) will switch to a monthly Hartford Line pass (\$168, a \$36 discount). Honoring CTrail Hartford Line fare media will result in an increase of ridership on the Route 950 by 10% (approximately two additional passenger trips per weekday switching from the Hartford Line to the Route 950) with demographics of new riders reflective of Hartford Line monthly pass users.

#### *Determination of Disparate Impact and Disproportionate Burden*

Using these assumptions, the impacts of the fare increases were analyzed singly (for each fare change) and as a package (included in an analysis of overall fare burden by minority and low-income riders as compared to the system as a whole). The Disparate Impacts / Disproportionate Burden analysis for each fare medium was as follows:

- 1) **Disparate Impacts / Disproportionate Burden Analysis for each Bus Fare Medium:** The project team compared the proportion of minority and low-income riders using each fare medium to overall ridership usage rates of each fare medium separately (local fares on Route 912 and monthly passes on Route 950):
  - a) **Elimination of Local Fares on Route 912:** If the minority/low-income passengers use the local fare medium more often at a differential of 10 percentage points or more than the overall ridership on the Route 912, then it was considered a disparate impact and/or disproportionate burden.
  - b) **Honoring of Hartford Line Passes on Route 950:** Because honoring Hartford Line passes is considered a fare reduction for monthly bus pass users, if minority/low-income passengers use monthly passes less often at a differential of 10 percentage points or more than overall ridership on the Route 950, then it was considered a disparate impact and/or disproportionate burden.

- 2) **Disparate Impacts / Disproportionate Burden Analysis for Bus Fare Change Package:** The project team also compared the fare changes as a total package for average fare paid overall between minority/low-income vs. overall riders:
- a) **Elimination of Local Fares for Reverse Commute trips on Route 912:** For the fare increase (elimination of Route 912 local fares), if fares increase 5 percentage points or greater for minority/low-income riders more than fares for overall riders as a total package (combined with the Route 950 fare changes), it was considered a disparate impact and/or disproportionate burden.
  - b) **Honoring of Hartford Line Passes on Route 950:** For the fare decrease (honoring Hartford Line monthly passes on the Route 950), if the fares decrease 5 percentage points or greater for overall riders more than for minority/low-income riders as a total package (combined with the Route 912 fare changes), it was considered a disparate impact and/or disproportionate burden.

Should disparate impacts or disproportionate burdens be found then mitigations can be recommended to minimize the adverse impacts. If there is no mitigation feasible, then a justification must be developed to explain why the changes meet a substantial need that is in the public's interest and that alternatives would have more severe adverse effects than the proposed alternative.

#### Fare Change Analysis Overview

Fare changes proposed for the Route 912 and Route 950 have no finding of disparate impact or disproportionate burden. This is due to two primary reasons:

- The fare changes impact a very small fraction of overall ridership, which results in the impacts being far below the thresholds established in the CTDOT SAFE policy.
- Bus fare usage rates do not vary substantially between minority, low-income, and general ridership. This means that fare changes impacting a specific fare medium are less likely to have disparate impacts or disproportionate burdens on the riders.

Table 51 shows fare usage patterns among minority and low-income riders relative to all CTtransit riders in the unshaded areas. The green-shaded section shows the usage rates of minority and low-income riders as compared to all riders on the Route 950, and the blue-shaded section shows the usage rates of minority and low-income riders as compared to all riders on the Route 912. Note that there were no users of the monthly pass on the Route 950 pre-fare-change and that the Hartford Line monthly pass is not honored on the Route 950 pre-fare-change (both are included only for reference).

**Table 51 – Pre-Fare-Change CY 2019 Bus Fare Medium Use Proportion by User Type**

<b>Fare Medium</b>	<b>Minority</b>	<b>Low Income</b>	<b>All Riders</b>
On-Board Single Fare	36.6%	34.2%	35.6%
2 Hour Pass	7.8%	8.2%	7.4%
All Day Pass	11.6%	11.1%	10.8%
3/5/7 Day Pass Average	2.2%	2.1%	2.1%
10-Ride Pass	4.9%	4.8%	5.7%
31-Day Pass	13.7%	12.9%	13.3%
Cash On-Board Reduced Average	9.7%	11.0%	9.4%
10-Ride Pass Reduced Average	2.6%	3.5%	3.6%
31-Day Pass S/D	6.8%	8.5%	7.8%
GoCT Card	0.8%	0.5%	1.0%
Commuter Cash Fare*	0.5%	0.4%	0.4%
Commuter 10-Ride Ticket*	1.0%	1.0%	1.2%
Commuter 31-Day Pass*	1.7%	1.6%	1.7%
Hartford Line Monthly Pass**	0.0%	0.0%	0.0%
950 Express Cash Fare*	85.3%	85.1%	82.7%
950 Commuter 10-Ride Ticket*	14.7%	14.9%	17.3%
950 Commuter 31 Day Pass***	0.0%	0.0%	0.0%
912 Local Fare	26.9%	29.2%	34.8%
912 Express Cash Fare*	10.3%	10.0%	8.5%
912 Commuter 10-Ride Ticket*	23.8%	23.7%	23.8%
912 Commuter 31 Day Pass*	39.1%	37.0%	33.0%

\*Commuter fare usage was estimated based on general usage patterns due to a lack of on-board survey data

\*\*Pre-fare-change the Hartford Line monthly pass is not honored on Route 950

\*\*\*There were no recorded users of the Commuter 31-Day Pass on the Route 950

Post-fare-change estimates of fare usage patterns are shown in Table 52. It is assumed that all users of the Route 912 local fare will shift to using the regular single trip commuter fare and is included for reference only. It is also assumed that ridership on the Route 950 will increase by 10% as Hartford Line monthly pass users migrate to using the bus. The Route 950 monthly pass medium is included for reference only, it is assumed that no riders will use that fare medium post-fare-change.

**Table 52 – Post-Fare-Change Estimated Bus Fare Medium Use by User Type**

<b>Fare Media</b>	<b>Minority</b>	<b>Low Income</b>	<b>All Riders</b>
On-Board Single Fare	36.6%	34.2%	35.5%
2 Hour Pass	7.8%	8.2%	7.4%
All Day Pass	11.6%	11.1%	10.8%
3/5/7 Day Pass Average	2.2%	2.1%	2.1%
10-Ride Pass	4.9%	4.8%	5.7%
31-Day Pass	13.7%	12.9%	13.3%
Cash On-Board Reduced Average	9.7%	11.0%	9.4%
10-Ride Pass Reduced Average	2.6%	3.5%	3.6%
31-Day Pass S/D	6.8%	8.5%	7.8%
GoCT Card	0.8%	0.5%	1.0%
Commuter Cash Fare	0.5%	0.5%	0.5%
Commuter 10-Ride Ticket	1.0%	1.0%	1.2%
Commuter 31-Day Pass	1.7%	1.6%	1.7%
<b>Hartford Line Monthly Pass*</b>	<b>6.2%</b>	<b>1.6%</b>	<b>9.1%</b>
950 Express Cash Fare	80.1%	83.7%	75.2%
950 Commuter 10-Ride Ticket	13.7%	14.7%	15.7%
950 Commuter 31 Day Pass**	0.0%	0.0%	0.0%
<b>912 Local Fare***</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>
912 Express Cash Fare	37.1%	39.3%	43.2%
912 Commuter 10-Ride Ticket	23.8%	23.7%	23.8%
912 Commuter 31 Day Pass	39.1%	37.0%	33.0%

\*Post-fare-change it is assumed that there will be a 10% increase in ridership from customers shifting from the Hartford Line

\*\*Post-fare-change it is assumed no riders will use the Route 950 monthly pass

\*\*\*Post-fare-change it is assumed Route 912 local fare users will shift to commuter cash fare

Using CTtransit fare sales and usage information, the average fare paid per boarding was calculated for each fare medium in Table 53.

**Table 53 – Average Bus Fare per Boarding by Fare Medium**

Fare Medium	Average Fare Paid per Boarding
On-Board Single Fare	\$1.13
2 Hour Pass	\$1.11
All Day Pass	\$1.75
3/5/7 Day Pass Average*	\$1.30
10-Ride Pass	\$1.58
31-Day Pass	\$1.58
All Day/2-Hour Reduced Average*	\$0.97
10-Ride Pass Reduced Average*	\$0.96
31-Day Pass S/D	\$0.77
GoCT Card	\$1.30
Commuter Cash Fares Average*	\$3.54
Commuter 10-Ride Tickets Average*	\$3.12
Commuter 31-Day Pass Average*	\$2.74
Hartford Line Monthly Pass	\$4.20

\*The project team consolidated some fare media due to customer survey response categories

Using the fare usage rates shown in Table 52 and Table 53, average fare paid per trip is broken down in Table 54 for minority, low-income, and all riders. Note that the aggregate impact of these fare changes is less than one penny on average. Calculation tables for this analysis can be found in **Appendix F**.

**Table 54 – Bus Fare Change Impacts Summary Table**

	Minority	Low Income	Overall Ridership
Average Estimated Existing Fare per Boarding	\$1.30	\$1.28	\$1.30
Average Estimated Proposed Fare per Boarding	\$1.30	\$1.28	\$1.30

*Evaluation of Disparate Impacts to Minority Populations*

Based on the analysis of expected impacts of the proposed fare changes, there is no finding of disparate impact to minority riders resulting from the fare changes. Table 55 shows that minority riders experienced an average fare increase of 0.058% while all riders experienced an average fare increase of 0.089%. This indicates that while fares increased modestly overall, the increase was felt by general riders at a higher rate than minority riders, and the difference does not exceed the 5-percentage point threshold laid out in the CTDOT SAFE policy.



**Table 55 – Bus Fare Disparate Impact Analysis as a Package**

	Existing Average Fare	Proposed Average Fare	% Difference
Minority	\$1.30	\$1.30	0.058%
All Riders	\$1.30	\$1.30	0.089%
Difference			-0.031%

\*A negative number represents a larger burden to riders overall than to minority riders.

The difference in impact for the individual fare changes does not exceed the 10-percentage point threshold for minority riders. Table 56 shows the proportion of minority riders and riders as a whole using each fare medium. The findings are the following:

- **Route 912 Local Fare:** Minority riders used the Route 912 local fare for 26.9% of all trips, while all riders used that fare for 34.8% of all trips. Therefore, the burden of higher fares falls on overall riders at a higher rate than minority riders. The difference does not exceed the 10-percentage point threshold laid out in the CTDOT SAFE policy.
- **Route 950 Monthly Fare:** There were no users of the monthly fare on the Route 950, and so therefore there are no expected impacts to existing ridership on the Route 950.
- **Hartford Line Monthly Fare (Estimated):** Based on the demographic information from the Hartford Line on-board survey, overall ridership is likely to benefit more than minority riders from being able to use a relatively less expensive Hartford Line monthly pass on the Route 950 bus. However, the difference does not exceed the 10-percentage point threshold laid out in the CTDOT SAFE policy.

**Table 56 – Disparate Impact Bus Single-Fare Analysis**

	912 Local Fare	950 Commuter 31 Day Fare (Existing)*	Hartford Line Monthly Fare (Estimated)
Minority	26.9%	0.0%	6.2%
Overall Ridership	34.8%	0.0%	9.1%
<b>Difference</b>	<b>-7.9%</b>	<b>0.0%</b>	<b>2.9%</b>

\*There are no current users of the Route 950 monthly fare

*Evaluation of Disproportionate Burden to Low-Income Populations*

Based on the analysis of expected impacts of the proposed fare changes, there is no finding of disproportionate burden to low-income riders.

Table 57 shows that low-income riders and riders overall each experienced on average less than a penny of fare increase as a result of the proposed fare change. Because low-income riders experienced a smaller increase in average fares than riders overall, the difference between the two numbers was negative and does not exceed the 5-percentage point threshold for a disproportionate burden.

**Table 57 – Disproportionate Burden Bus Fare Analysis as a Package**

	Existing Average Fare	Proposed Average Fare	% Difference*
Low-Income	\$1.28	\$1.28	0.056%
All Riders	\$1.30	\$1.30	0.089%
Difference			-0.034%

\*A negative number represents a larger burden to riders overall than to minority riders.

The difference in impact for the individual proposed fare changes does not exceed 10 percentage points for low-income riders. Table 58 shows the proportion of low-income riders and riders as a whole using each fare medium. The findings are the following:

- **Route 912 Local Fare:** Low-income riders used the Route 912 local fare for 29.2% of all trips, while all riders used that fare for 34.8% of all trips. Therefore, the burden of higher fares falls on overall riders at a higher rate than low-income riders. The difference does not exceed the 10-percentage point threshold laid out in the CTDOT SAFE policy.
- **Route 950 Monthly Fare:** There were no users of the monthly fare on the Route 950, and so therefore there are no expected impacts from existing ridership on the Route 950.
- **Hartford Line Monthly Fare (Estimated):** Based on the demographic information from the Hartford Line on-board survey, overall ridership is likely to benefit more than low-income riders from being able to use a relatively less expensive Hartford Line monthly pass on the Route 950 bus. However, the difference does not exceed the 10-percentage point threshold laid out in the CTDOT SAFE policy.

**Table 58 – Disproportionate Burden Bus Single-Fare Analysis**

	912 Local Fare	950 Commuter 31 Day Fare (Existing)*	Hartford Line Monthly Fare (Estimated)
Low-Income	29.2%	0.0%	1.6%
Overall Ridership	34.8%	0.0%	9.1%
<b>Difference</b>	<b>-5.5%</b>	<b>0.0%</b>	<b>7.5%</b>

\*There are no current users of the Route 950 monthly fare

Alternatives to Proposed Fare Changes

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

Appendix A – COVID Rail Major Service Change Threshold Analysis Results

The threshold analysis results for any proposed change that exceeded the major service change threshold for the New Haven Line mainline, the New Canaan Line, the Danbury Line, the Waterbury Line, or Shore Line East are presented in this appendix.

## New Haven Line

### New Haven Line (NHL) Main Line – Major Service Change

#### Threshold Analysis Results

The New Haven Line Main Line is operated by Metro-North Railroad for CTDOT between New Haven/Stamford to/from Grand Central Terminal (GCT).

The New Haven Line Main Line service was re-slotted to a weekend standardized frequency, which represented service reductions to station service, train and vehicle-mile frequency compared to Pre-COVID that exceed the 25% threshold, to be considered a major service change in all days of the week. The span of service did not differ more than one hour on the New Haven Line Main Line.

**Table A1 - NHL Main Line Service Change Threshold Analysis**

TITLE VI		Service Changes			
NHL-Main Line	M-F	Sat	Sun	Per Week	
Pre-Covid	254	141	127	1538	
COVID	129	83	83	811	
Reduction	49.2%	41.1%	34.6%	47.3%	

### NHL New Canaan Branch

#### Threshold Analysis Results

The New Canaan Branch is operated by Metro-North Railroad for CTDOT providing service between New Canaan to/from Stamford.

The New Canaan Branch service was re-slotted to interconnect with Haven Line Main Line service, which represented minimal weekday service reduction, and no change to weekend service levels, compared to Pre-COVID service. The span of service did not differ more than one hour on the New Canaan Branch. No major service change thresholds were exceeded.

**Table A2 - New Canaan Branch Service Change Threshold Analysis**

TITLE VI		Service Changes		
<u>New Canaan</u>	<u>M-F</u>	<u>Sat</u>	<u>Sun</u>	<u>Per Week</u>
Pre-Covid	41	37	37	279
COVID	38	37	37	264
Reduction	7.3%	0.0%	0.0%	5.4%

**NHL Danbury Branch – Major Service Change**

**Threshold Analysis Results**

The Danbury Branch is operated by Metro-North Railroad for CTDOT between Danbury to/from South Norwalk.

The Danbury Branch service was re-slotted to interconnect with Haven Line Main Line service, which represented weekday service reductions to station service, train and vehicle-mile frequency compared to Pre-COVID that exceed the 25% threshold, to be considered a major service change. The Danbury Branch also received a 1-hour westbound service span increase, and a 1-hour eastbound service span decrease weekdays.

**Table A3 - Danbury Branch Service Change Threshold Analysis**

TITLE VI		Service Changes		
<u>Danbury</u>	<u>M-F</u>	<u>Sat</u>	<u>Sun</u>	<u>Per Week</u>
Pre-Covid	28	12	12	164
COVID	16	12	12	104
Reduction	42.9%	0.0%	0.0%	36.6%

**NHL Waterbury Branch**

**Threshold Analysis Results**

The Waterbury Branch is operated by Metro-North Railroad for CTDOT between Waterbury to/from Bridgeport/South Norwalk.

The Waterbury Branch service was re-slotted to interconnect with Haven Line Main Line service, not impacting service frequency. The span of service did not change on the Waterbury Branch. No major service change thresholds were exceeded.

**Table A4 - Waterbury Branch Service Change Threshold Analysis**

TITLE VI	Service Changes			
<u>Waterbury</u>	<u>M-F</u>	<u>Sat</u>	<u>Sun</u>	<u>Per Week</u>
Pre-Covid	15	12	12	99
COVID	15	12	12	99
Reduction	0.0%	0.0%	0.0%	0.0%

## Shore Line East

### CTrail Shore Line East – Major Service Change

#### Threshold Analysis Results

The Shore Line East CTrail service is operated by Amtrak for CTDOT between New London/Old Saybrook to/from New Haven.

The Shore Line East service was re-slotted to interconnect with New Haven Line Main Line and Amtrak services, which represented weekday and weekend service reductions to station service, train and vehicle-mile frequency compared to Pre-COVID that exceed the 25% threshold, to be considered a major service change. There was also a five-hour reduction in the westbound weekend service span.

**Table A5 - SLE Service Change Threshold Analysis**

TITLE VI	Service Changes			
<u>SLE</u>	<u>M-F</u>	<u>Sat</u>	<u>Sun</u>	<u>Per Week</u>
Pre-Covid	36	21	21	222
COVID	16	16	16	112
Reduction	55.6%	23.8%	23.8%	49.5%

Appendix B – COVID Rail Service Equity Analysis Schedule Analysis Table

- NHL Weekday COVID Service Changes (To New York)

<b>NEW HAVEN LINE Weekday COVID Service Changes</b>																		
<b>TO NEW YORK</b>	NHL 2019 MF		NHL 2019 MF PEAK		NHL 2019 MF OFF-PK		NHL 2021 MF		NHL 2021 MF PEAK		NHL 2021 MF OFF-PK		TOTAL		PEAK		OFF-PK	
	Stops	Avg. Headway	AM Stops	Avg. Headway	Stops	Avg. Headway	Stops	Avg. Headway	AM Stops	Avg. Headway	Stops	Avg. Headway	STOP REDUCTION	HEADWAY INCREASE	STOP REDUCTION	HEADWAY INCREASE	STOP REDUCTION	HEADWAY INCREASE
<b>Monday-Friday</b>																		
Stations																		
NH-State St.	8	92	2	38	6	83	0	0	0	0	0	0	100%	-100%	100%	-100%	100%	-100%
New Haven	44	27	16	15	28	34	29	41	8	26	21	45	34%	50%	50%	66%	25%	33%
West Haven	44	27	16	15	28	34	29	41	8	26	21	45	34%	50%	50%	67%	25%	33%
Milford	42	28	14	18	28	34	29	41	8	26	21	45	31%	43%	43%	45%	25%	33%
Stratford	42	28	14	18	28	34	29	41	8	26	21	45	31%	43%	43%	44%	25%	33%
Bridgeport	49	24	20	12	29	33	29	41	8	26	21	45	41%	68%	60%	113%	28%	38%
Fairfield Metro	43	28	16	16	27	35	29	41	8	26	21	45	33%	47%	50%	67%	22%	28%
Fairfield	43	28	16	15	27	35	29	41	8	26	21	45	33%	47%	50%	68%	22%	28%
Southport	27	44	9	24	18	54	22	54	6	36	16	60	19%	24%	33%	51%	11%	11%
Green's Farms	28	42	9	24	19	51	22	54	6	36	16	60	21%	29%	33%	51%	16%	18%
Westport	39	31	13	19	26	36	28	42	7	30	21	45	28%	37%	46%	61%	19%	23%
East Norwalk	28	42	10	21	18	54	22	54	6	36	16	60	21%	29%	40%	70%	11%	11%
South Norwalk	48	25	20	12	28	34	30	39	9	23	21	45	38%	58%	55%	90%	25%	33%
Rowayton	25	47	8	29	17	54	23	52	7	30	16	60	8%	9%	13%	5%	6%	10%
Darien	37	33	12	22	25	36	30	39	9	23	21	45	19%	21%	25%	5%	16%	24%
Noroton Heights	28	43	10	27	18	51	24	49	8	28	16	60	14%	14%	20%	4%	11%	17%
Stamford	106	12	44	6	62	15	64	19	21	12	43	23	40%	64%	52%	93%	31%	49%
Old Greenwich	44	28	15	19	29	33	30	41	8	30	22	45	32%	46%	47%	62%	24%	37%
Riverside	44	28	15	19	29	33	30	41	8	30	22	45	32%	46%	47%	62%	24%	37%
Cos Cob	44	28	15	19	29	33	30	41	8	30	22	45	32%	46%	47%	62%	24%	37%
Greenwich	63	20	22	12	41	23	34	36	12	20	22	45	46%	85%	45%	64%	46%	95%



- NHL Weekday COVID Service Changes (To New Haven)

NEW HAVEN LINE Weekday COVID Service Changes																		
TO NEW HAVEN	NHL 2019 MF		NHL 2019 MF PEAK		NHL 2019 MF OFF-PK		NHL 2021 MF		NHL 2021 MF PEAK		NHL 2021 MF OFF-PK		TOTAL		PEAK		OFF-PK	
	Stops	Avg. Headway	PM Stops	Avg. Headway	Stops	Avg. Headway	Stops	Avg. Headway	PM Stops	Avg. Headway	Stops	Avg. Headway	STOP REDUCTION	HEADWAY INCREASE	STOP REDUCTION	HEADWAY INCREASE	STOP REDUCTION	HEADWAY INCREASE
Monday-Friday																		
Stations																		
Greenwich	62	20	18	14	44	26	36	35	11	21	25	44	42%	74%	39%	55%	43%	68%
Cos Cob	45	28	13	18	32	32	33	38	10	23	23	46	27%	37%	23%	29%	28%	44%
Riverside	45	28	13	18	32	32	33	38	10	23	23	46	27%	37%	23%	28%	28%	44%
Old Greenwich	45	28	13	18	32	32	33	38	10	23	23	46	27%	37%	23%	28%	28%	44%
Stamford	110	11	38	7	72	15	62	20	19	13	43	25	44%	80%	50%	100%	40%	70%
Noroton Heights	34	36	10	26	24	41	25	50	5	45	20	51	26%	37%	50%	71%	17%	24%
Darien	42	29	11	24	31	34	31	40	9	26	22	50	26%	36%	18%	11%	29%	47%
Rowayton	31	39	10	26	21	45	23	54	5	45	18	56	26%	40%	50%	71%	14%	24%
South Norwalk	52	23	19	14	33	32	31	40	9	26	22	50	40%	69%	53%	89%	33%	54%
East Norwalk	32	39	11	24	21	47	23	54	5	45	18	56	28%	41%	55%	85%	14%	19%
Westport	44	28	12	22	32	33	32	38	11	21	21	51	27%	38%	8%	-6%	34%	53%
Green's Farms	30	40	10	27	20	48	23	54	5	45	18	56	23%	35%	50%	67%	10%	16%
Southport	31	40	10	27	21	47	23	54	5	45	18	56	26%	36%	50%	67%	14%	19%
Fairfield	47	26	15	17	32	33	32	38	11	20	21	50	32%	48%	27%	17%	34%	52%
Fairfield Metro	47	26	15	17	32	33	32	38	11	20	21	50	32%	48%	27%	17%	34%	53%
Bridgeport	53	24	18	14	35	32	32	38	11	20	21	50	40%	63%	39%	42%	40%	56%
Stratford	50	25	16	16	34	33	32	38	11	20	21	50	36%	54%	31%	25%	38%	54%
Milford	50	25	16	16	34	33	32	38	11	20	21	50	36%	54%	31%	25%	38%	54%
West Haven	51	24	16	16	35	32	32	38	11	20	21	50	37%	57%	31%	25%	40%	56%
New Haven	51	25	16	16	35	32	32	39	11	20	21	51	37%	58%	31%	23%	40%	58%
NH-State St.	8	88	1	0	7	50	0	0	0	0	0	0	100%	-100%	100%	0%	100%	-100%

- NHL Weekend COVID Service Changes (To New York)

<b>NEW HAVEN LINE Weekend COVID Service Changes</b>						
<b>TO NEW YORK</b>	NHL 2019 SS		NHL 2021 SS			
<b>Saturday/Sunday/Hol.</b>	Stops	Avg.	Stops	Avg.	STOP	HEADWAY
Stations		Headway		Headway	REDUCTION	INCREASE
NH-State St.	0	0	0	0	0%	0%
New Haven	33	36	20	60	39%	68%
West Haven	32	37	20	60	37%	60%
Milford	33	36	20	60	39%	68%
Stratford	32	37	20	60	37%	60%
Bridgeport	33	36	20	60	39%	68%
Fairfield Metro	32	37	20	60	37%	60%
Fairfield	32	37	20	60	37%	60%
Southport	20	60	20	60	0%	0%
Green's Farms	20	60	20	60	0%	0%
Westport	32	37	20	60	37%	60%
East Norwalk	20	60	20	60	0%	0%
South Norwalk	32	37	20	60	37%	60%
Rowayton	20	60	20	60	0%	0%
Darien	32	37	20	60	37%	60%
Noroton Heights	20	60	20	60	0%	0%
Stamford	66	19	41	30	37%	61%
Old Greenwich	35	36	21	60	39%	66%
Riverside	34	36	21	60	38%	64%
Cos Cob	34	36	21	60	38%	64%
Greenwich	34	36	21	60	38%	64%

– NHL Weekend COVID Service Changes (To New Haven)

<b>NEW HAVEN LINE Weekend COVID Service Changes</b>						
<b>TO NEW HAVEN</b>	NHL 2019 SS		NHL 2021 SS			
<b>Saturday/Sunday/Hol.</b>	Stops	Avg.	Stops	Avg.	STOP	HEADWAY
Stations		Headway		Headway	REDUCTION	INCREASE
Greenwich	35	36	21	61	40%	69%
Cos Cob	35	36	21	61	40%	69%
Riverside	35	36	21	61	40%	69%
Old Greenwich	35	36	21	61	40%	69%
Stamford	68	18	41	31	40%	67%
Noroton Heights	21	60	21	60	0%	0%
Darien	34	36	21	60	38%	65%
Rowayton	21	60	21	60	0%	0%
South Norwalk	34	36	21	60	38%	65%
East Norwalk	21	60	21	60	0%	0%
Westport	34	36	21	60	38%	65%
Green's Farms	21	60	21	60	0%	0%
Southport	21	60	21	60	0%	0%
Fairfield	34	36	21	60	38%	65%
Fairfield Metro	34	36	21	60	38%	65%
Bridgeport	34	36	21	60	38%	65%
Stratford	34	36	21	60	38%	65%
Milford	34	36	21	59	38%	65%
West Haven	34	36	21	59	38%	65%
New Haven	34	37	21	60	37%	62%
NH-State St.	0	0	0	0	0%	0%

- Danbury Branch Weekday COVID Service Changes (To South Norwalk)

**DANBURY BRANCH Weekday COVID Service Changes**

TO SOUTH NORWALK	DBY 2019 MF		DBY 2019 MF PEAK		DBY 2019 MF OFF-PK		DBY 2021 MF		DBY 2021 MF PEAK		DBY 2021 MF OFF-PK		TOTAL		PEAK		OFF-PK	
	Stops	Avg. Headway	AM Stops	Avg. Headway	Stops	Avg. Headway	Stops	Avg. Headway	AM Stops	Avg. Headway	Stops	Avg. Headway	STOP REDUCTION	HEADWAY INCREASE	STOP REDUCTION	HEADWAY INCREASE	STOP REDUCTION	HEADWAY INCREASE
<b>Monday-Friday</b>																		
Stations																		
Danbury	14	79	5	36	9	101	8	156	3	73	5	192	43%	98%	40%	104%	44%	90%
Bethel	14	79	5	36	9	101	8	156	3	73	5	192	43%	98%	40%	106%	44%	90%
Redding	14	79	5	36	9	101	8	156	3	73	5	192	43%	98%	40%	106%	44%	90%
Branchville	14	79	5	36	9	101	8	156	3	73	5	192	43%	99%	40%	106%	44%	90%
Cannondale	14	78	5	36	9	101	8	156	3	73	5	192	43%	99%	40%	104%	44%	90%
Wilton	14	78	5	36	9	101	8	156	3	73	5	192	43%	99%	40%	104%	44%	90%
Merritt 7	14	78	5	36	9	101	8	156	3	72	5	192	43%	98%	40%	103%	44%	90%
South Norwalk	14	79	5	36	9	101	8	156	3	73	5	192	43%	98%	40%	104%	44%	90%

- Danbury Branch Weekday COVID Service Changes (To Danbury)

TO DANBURY	DBY 2019 MF		DBY 2019 MF PEAK		DBY 2019 MF OFF-PK		DBY 2021 MF		DBY 2021 MF PEAK		DBY 2021 MF OFF-PK		TOTAL		PEAK		OFF-PK	
	Stops	Avg. Headway	PM Stops	Avg. Headway	Stops	Avg. Headway	Stops	Avg. Headway	PM Stops	Avg. Headway	Stops	Avg. Headway	STOP REDUCTION	HEADWAY INCREASE	STOP REDUCTION	HEADWAY INCREASE	STOP REDUCTION	HEADWAY INCREASE
<b>Monday-Friday</b>																		
Stations																		
South Norwalk	14	78	5	39	9	102	8	131	2	148	6	144	43%	68%	60%	282%	33%	41%
Merritt 7	14	78	5	39	9	102	8	131	2	148	6	145	43%	68%	60%	284%	33%	42%
Wilton	14	78	5	38	9	102	8	131	2	148	6	145	43%	68%	60%	287%	33%	42%
Cannondale	14	78	5	38	9	102	8	131	2	148	6	145	43%	68%	60%	292%	33%	42%
Branchville	14	78	5	38	9	102	8	131	2	148	6	145	43%	68%	60%	295%	33%	42%
Redding	14	77	5	38	9	101	8	131	2	148	6	145	43%	69%	60%	295%	33%	43%
Bethel	14	77	5	38	9	101	8	131	2	148	6	145	43%	69%	60%	292%	33%	43%
Danbury	14	77	5	36	9	100	8	130	2	148	6	144	43%	69%	60%	308%	33%	44%

– Danbury Branch Weekend COVID Service Changes (To South Norwalk)

<b>DANBURY BRANCH Weekend COVID Service Changes</b>						
<b>TO SOUTH NORWALK</b>	DBY 2019 SS		DBY 2021 SS			
<b>Saturday/Sunday/Hol.</b>	Stops	Avg.	Stops	Avg.	STOP	HEADWAY
Stations		Headway		Headway	REDUCTION	INCREASE
Danbury	6	189	6	189	0%	0%
Bethel	6	189	6	189	0%	0%
Redding	6	189	6	189	0%	0%
Branchville	6	189	6	189	0%	0%
Cannondale	6	189	6	189	0%	0%
Wilton	6	189	6	189	0%	0%
Merritt 7	6	189	6	189	0%	0%
South Norwalk	6	189	6	189	0%	0%

– Danbury Branch Weekend COVID Service Changes (To Danbury)

<b>TO DANBURY</b>	DBY 2019 SS		DBY 2021 SS			
<b>Saturday/Sunday/Hol.</b>	Stops	Avg.	Stops	Avg.	STOP	HEADWAY
Stations		Headway		Headway	REDUCTION	INCREASE
South Norwalk	6	183	6	183	0%	0%
Merritt 7	6	183	6	183	0%	0%
Wilton	6	183	6	183	0%	0%
Cannondale	6	183	6	183	0%	0%
Branchville	6	183	6	183	0%	0%
Redding	6	183	6	183	0%	0%
Bethel	6	183	6	183	0%	0%
Danbury	6	183	6	183	0%	0%

- SLE Weekday COVID Service Changes (To New Haven)

**SHORE LINE EAST Weekday COVID Service Changes**

TO NEW HAVEN	SLE 2019 MF		SLE 2019 MF PEAK		SLE 2019 MF OFF-PK		SLE 2021 MF		SLE 2021 MF PEAK		SLE 2021 MF OFF-PK		TOTAL		PEAK		OFF-PK	
	Stops	Avg. Headway	AM Stops	Avg. Headway	Stops	Avg. Headway	Stops	Avg. Headway	AM Stops	Avg. Headway	Stops	Avg. Headway	STOP REDUCTION	HEADWAY INCREASE	STOP REDUCTION	HEADWAY INCREASE	STOP REDUCTION	HEADWAY INCREASE
Monday-Friday																		
Stations																		
New London	7	169	1	0	6	189	6	198	1	0	5	218	14%	17%	0%	0%	17%	15%
Old Saybrook	18	63	4	36	14	72	8	141	1	0	7	144	56%	123%	75%	-100%	50%	98%
Westbrook	18	63	4	36	14	72	8	141	1	0	7	144	56%	123%	75%	-100%	50%	98%
Clinton	8	38	4	36	4	43	4	116	1	0	3	113	50%	206%	75%	-100%	25%	160%
Madison	8	38	4	36	4	43	4	116	1	0	3	113	50%	206%	75%	-100%	25%	160%
Guilford	18	63	4	36	14	72	8	140	1	0	7	143	56%	122%	75%	-100%	50%	98%
Branford	17	61	4	36	13	71	8	140	1	0	7	143	53%	128%	75%	-100%	46%	103%
NH-State St.	17	61	4	35	13	71	7	130	1	0	6	131	59%	111%	75%	-100%	54%	86%
New Haven	18	58	4	36	14	65	8	140	1	0	7	143	56%	142%	75%	-100%	50%	119%

- SLE Weekday COVID Service Changes (To New London)

TO NEW LONDON	SLE 2019 MF		SLE 2019 MF PEAK		SLE 2019 MF OFF-PK		SLE 2021 MF		SLE 2021 MF PEAK		SLE 2021 MF OFF-PK		TOTAL		PEAK		OFF-PK	
	Stops	Avg. Headway	PM Stops	Avg. Headway	Stops	Avg. Headway	Stops	Avg. Headway	PM Stops	Avg. Headway	Stops	Avg. Headway	STOP REDUCTION	HEADWAY INCREASE	STOP REDUCTION	HEADWAY INCREASE	STOP REDUCTION	HEADWAY INCREASE
Monday-Friday																		
Stations																		
New Haven	18	59	6	34	12	70	8	141	1	0	7	124	56%	138%	83%	-100%	42%	78%
NH-State St.	17	60	6	34	11	72	7	146	1	0	6	127	59%	144%	83%	-100%	45%	76%
Branford	17	60	6	34	11	72	7	146	1	0	6	127	59%	144%	83%	-100%	45%	76%
Guilford	18	59	6	34	12	70	8	141	1	0	7	126	56%	139%	83%	-100%	42%	80%
Madison	13	58	7	29	6	98	3	149	1	0	2	62	77%	156%	86%	-100%	67%	-36%
Clinton	13	58	7	29	6	97	3	149	1	0	2	62	77%	156%	86%	-100%	67%	-36%
Westbrook	18	59	6	34	12	70	8	142	1	0	7	126	56%	139%	83%	-100%	42%	80%
Old Saybrook	18	60	6	34	12	70	8	142	1	0	7	127	56%	139%	83%	-100%	42%	80%
New London	6	192	3	66	3	340	6	199	1	0	5	191	0%	3%	67%	-100%	-67%	-44%

– SLE Weekend COVID Service Changes (To New Haven)

<b>SHORE LINE EAST Weekend COVID Service Changes</b>						
<b>TO NEW HAVEN</b>	SLE 2019 SS		SLE 2021 SS			
<b>Saturday/Sunday/Hol.</b>	Stops	Avg.	Stops	Avg.	STOP	HEADWAY
Stations		Headway		Headway	REDUCTION	INCREASE
New London	8	141	6	198	25%	40%
Old Saybrook	10	110	8	141	20%	29%
Westbrook	10	110	8	141	20%	29%
Clinton	4	120	4	120	0%	0%
Madison	4	120	4	120	0%	0%
Guilford	10	109	8	140	20%	29%
Branford	9	105	8	140	11%	33%
NH-State St.	9	105	7	130	22%	24%
New Haven	10	109	8	148	20%	36%

– SLE Weekday COVID Service Changes (To New London)

<b>TO NEW LONDON</b>	SLE 2019 SS		SLE 2021 SS			
<b>Saturday/Sunday/Hol.</b>	Stops	Avg.	Stops	Avg.	STOP	HEADWAY
Stations		Headway		Headway	REDUCTION	INCREASE
New Haven	11	105	8	141	27%	34%
NH-State St.	10	104	7	146	30%	40%
Branford	10	104	7	146	30%	40%
Guilford	11	105	8	141	27%	34%
Madison	6	95	3	149	50%	56%
Clinton	6	95	3	149	50%	56%
Westbrook	11	105	8	142	27%	34%
Old Saybrook	11	106	8	142	27%	34%
New London	8	142	6	199	25%	40%

Appendix C – COVID Rail Fare Equity Analysis Tables



Table C1 – Pre-COVID Fare Usage Rates by User Type

Fare Medium	Minority	Low Income	All Riders
Monthly Pass	42.4%	35.1%	38.5%
Weekly Pass	4.1%	6.4%	3.1%
Reduced 10-Trip	0.4%	1.9%	0.9%
Reduced One-Way	1.8%	8.3%	3.7%
10 Trip Peak	2.4%	0.0%	4.5%
10 Trip Off-Peak	1.9%	0.8%	3.0%
One Way Peak Average	15.8%	22.3%	15.0%
One Way Off-Peak Average	22.6%	23.8%	18.7%
Mail & Ride	8.7%	1.4%	12.6%
<b>Total</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>

Table C2 – Pre-COVID Fare Medium Usage by User Type

Fare Medium	Minority	Low Income	All Riders
Monthly Pass	3,595,391	475,581	15,503,936
Weekly Pass	346,158	86,540	1,240,400
Reduced 10-Trip	34,929	26,197	349,290
Reduced One-Way	150,081	112,561	1,500,810
10 Trip Peak	202,490	0	1,802,160
10 Trip Off-Peak	159,415	11,387	1,195,610
One Way Peak Average	1,341,458	301,828	6,036,562
One Way Off-Peak Average	1,915,584	322,851	7,533,195
Mail & Ride	741,906	19,023	5,060,180
<b>Total</b>	<b>8,487,412</b>	<b>1,355,967</b>	<b>40,222,143</b>

Table C3 – Pre-COVID Total Fares Paid by User Type

Total Fares Paid	Minority	Low Income	All Riders
Monthly Pass	\$22,822,509	\$3,018,850	\$98,414,522
Weekly Pass	\$4,482,882	\$1,120,721	\$16,063,661
Reduced 10-Trip	\$312,773	\$234,580	\$3,127,733
Reduced One-Way	\$1,343,597	\$1,007,698	\$13,435,973
10 Trip Peak	\$2,007,181	\$0	\$17,863,911
10 Trip Off-Peak	\$1,026,232	\$73,302	\$7,696,739
One Way Peak Average	\$28,305,909	\$6,368,829	\$127,376,589
One Way Off-Peak Average	\$31,953,755	\$5,385,464	\$125,660,833
Mail & Ride	\$4,615,218	\$118,339	\$31,478,156
<b>Total</b>	<b>\$96,870,056</b>	<b>\$17,327,784</b>	<b>\$441,118,118</b>

Table C4 – Pre-COVID Total Fares Paid and Average Fare Paid by User Type

	Minority	Low Income	All Riders
Total Fares Paid	\$96,870,056	\$17,327,784	\$441,118,118
Total Count of Fares Paid	8,487,412	1,355,967	40,222,143
Average Fare Paid	\$11.41	\$12.78	\$10.97

Table C5 – COVID Fare Usage Rates by User Type

Fare Medium	Minority	Low Income	All Riders
Monthly Pass	51.1%	36.5%	51.1%
Weekly Pass	4.1%	6.4%	3.1%
Reduced 10-Trip	0.4%	1.9%	0.9%
Reduced One-Way	1.8%	8.3%	3.7%
10 Trip Peak	0.0%	0.0%	0.0%
10 Trip Off-Peak	4.3%	0.8%	7.5%
One Way Peak Average	0.0%	0.0%	0.0%
One Way Off-Peak Average	38.4%	46.1%	33.7%
Mail & Ride	0.0%	0.0%	0.0%
<b>Total</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>

Table C6 – COVID Fare Medium Usage by User Type

	Minority	Low Income	All Riders
Monthly Pass	4,337,297	494,604	20,564,116
Weekly Pass	346,158	86,540	1,240,400
Reduced 10-Trip	34,929	26,197	349,290
Reduced One-Way	150,081	112,561	1,500,810
10 Trip Peak	0	0	0
10 Trip Off-Peak	361,905	11,387	2,997,770
One Way Peak Average	0	0	0
One Way Off-Peak Average	3,257,042	624,679	13,569,757
Mail & Ride	0	0	0
<b>Total</b>	<b>8,487,412</b>	<b>1,355,967</b>	<b>40,222,143</b>

Table C7 – COVID Total Fares Paid by User Type

Total Fares Paid	Minority	Low Income	All Riders
Monthly Pass	\$27,531,915	\$3,139,604	\$130,535,089
Weekly Pass	\$4,482,882	\$1,120,721	\$16,063,661
Reduced 10-Trip	\$312,773	\$234,580	\$3,127,733
Reduced One-Way	\$1,343,597	\$1,007,698	\$13,435,973
10 Trip Peak	\$0	\$0	\$0
10 Trip Off-Peak	\$2,329,761	\$73,302	\$19,298,144
One Way Peak Average	\$0	\$0	\$0
One Way Off-Peak Average	\$54,330,549	\$10,420,243	\$226,356,410
Mail & Ride	\$0	\$0	\$0
<b>Total</b>	<b>\$90,331,478</b>	<b>\$15,996,148</b>	<b>\$408,817,010</b>

Table C8 – COVID Total Fares Paid and Average Fare Paid by User Type

	Minority	Low Income	All Riders
Total Estimated Fares Paid	\$90,331,478	\$15,996,148	\$408,817,010
Total Estimated Fares Used	8,487,412	1,355,967	40,222,143
Average Estimated Fare Paid	\$10.64	\$11.80	\$10.16

Appendix D – New Haven Bus Routes with Span of Service Expansions

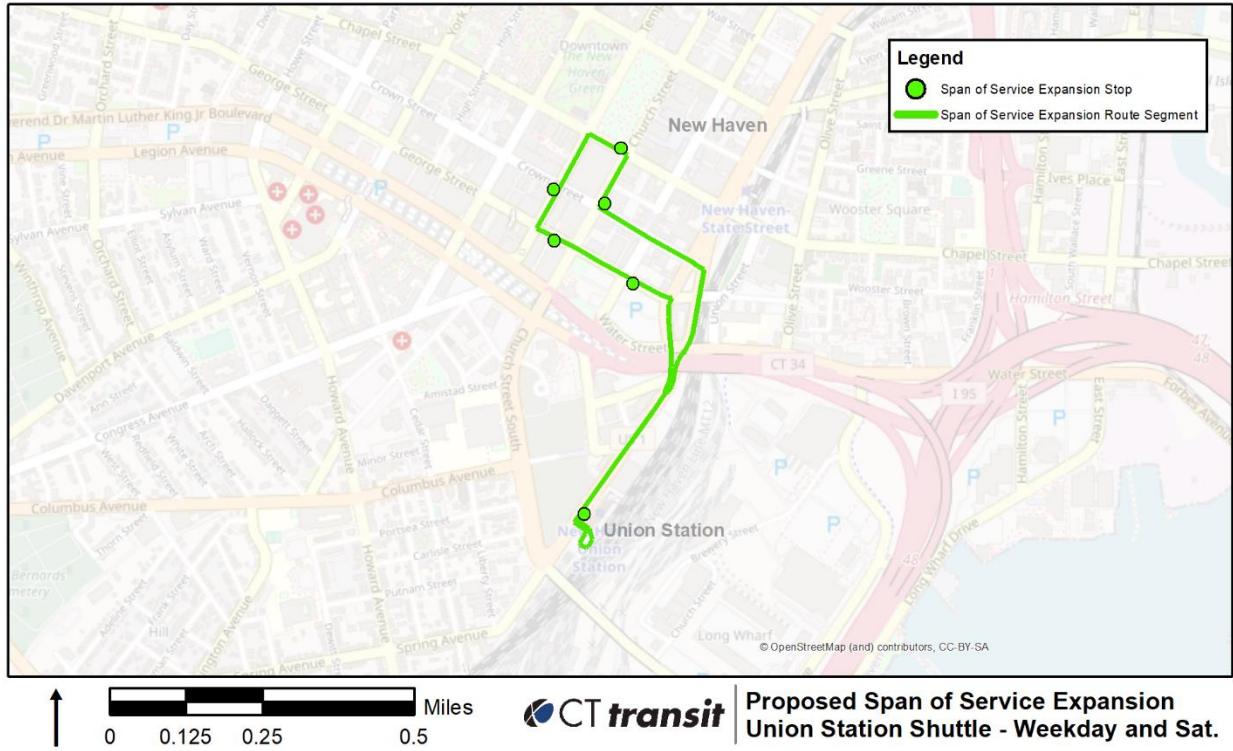


Figure D1 – Union Station Shuttle Proposed Span of Service Expansion

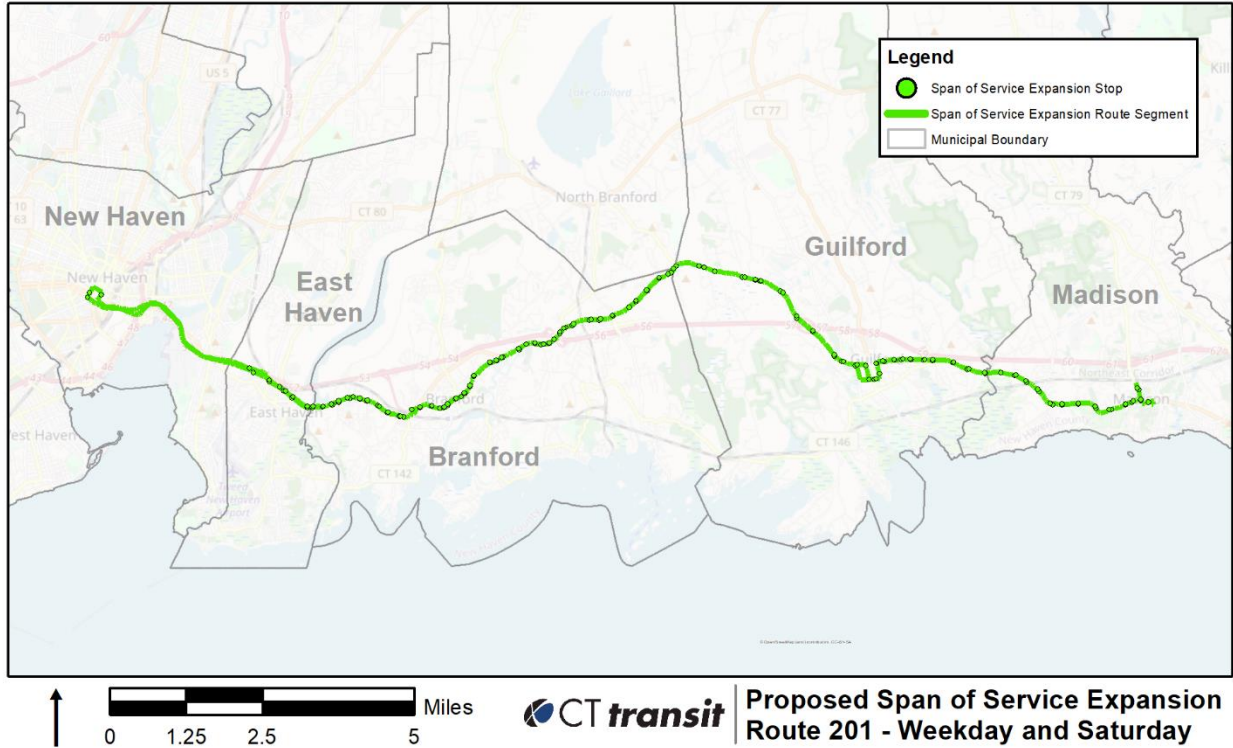


Figure D2 – Route 201 Proposed Span of Service Expansion

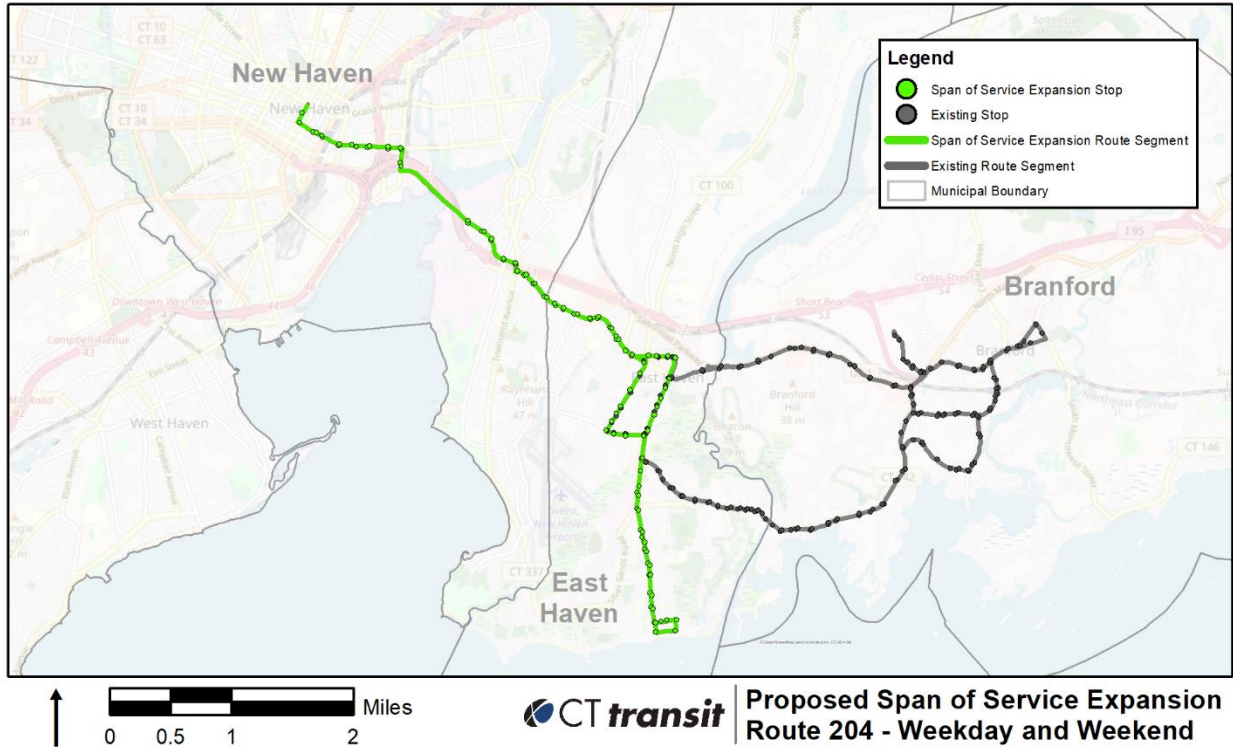


Figure D3 – Route 204 Proposed Span of Service Expansion

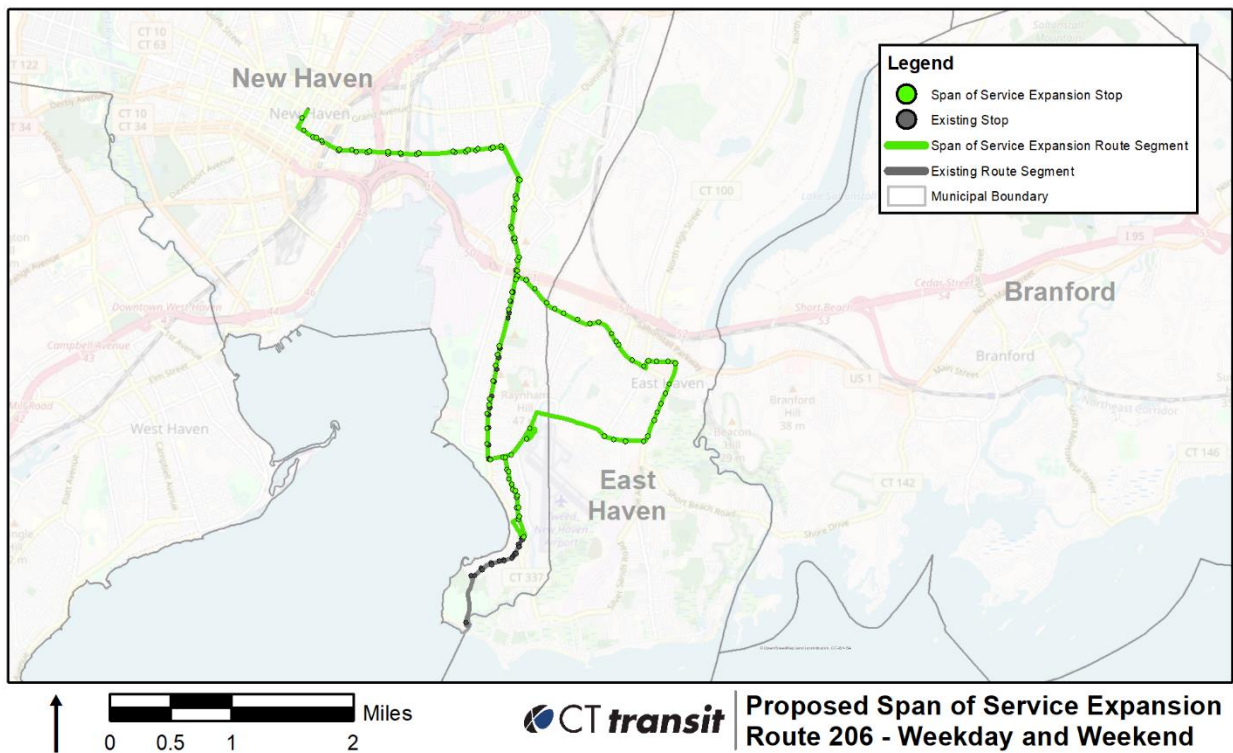


Figure D4 – Route 206 Proposed Span of Service Expansion

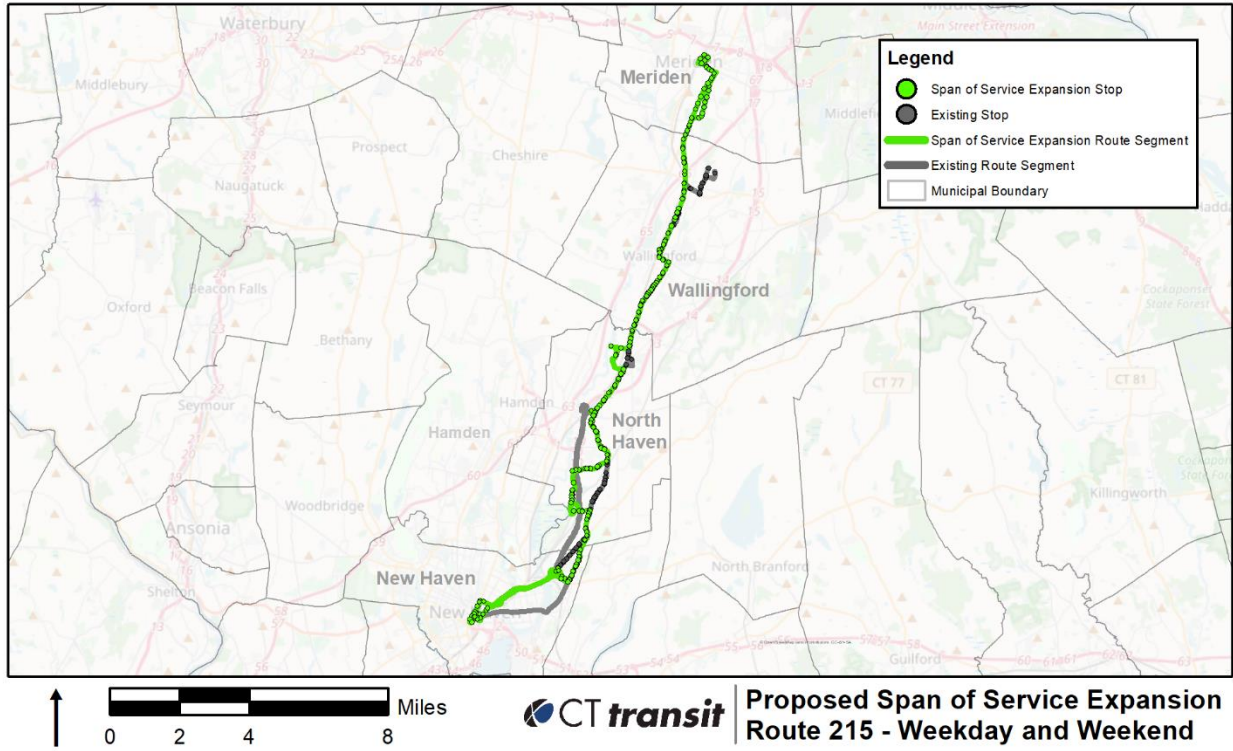


Figure D5 – Route 215 Proposed Span of Service Expansion

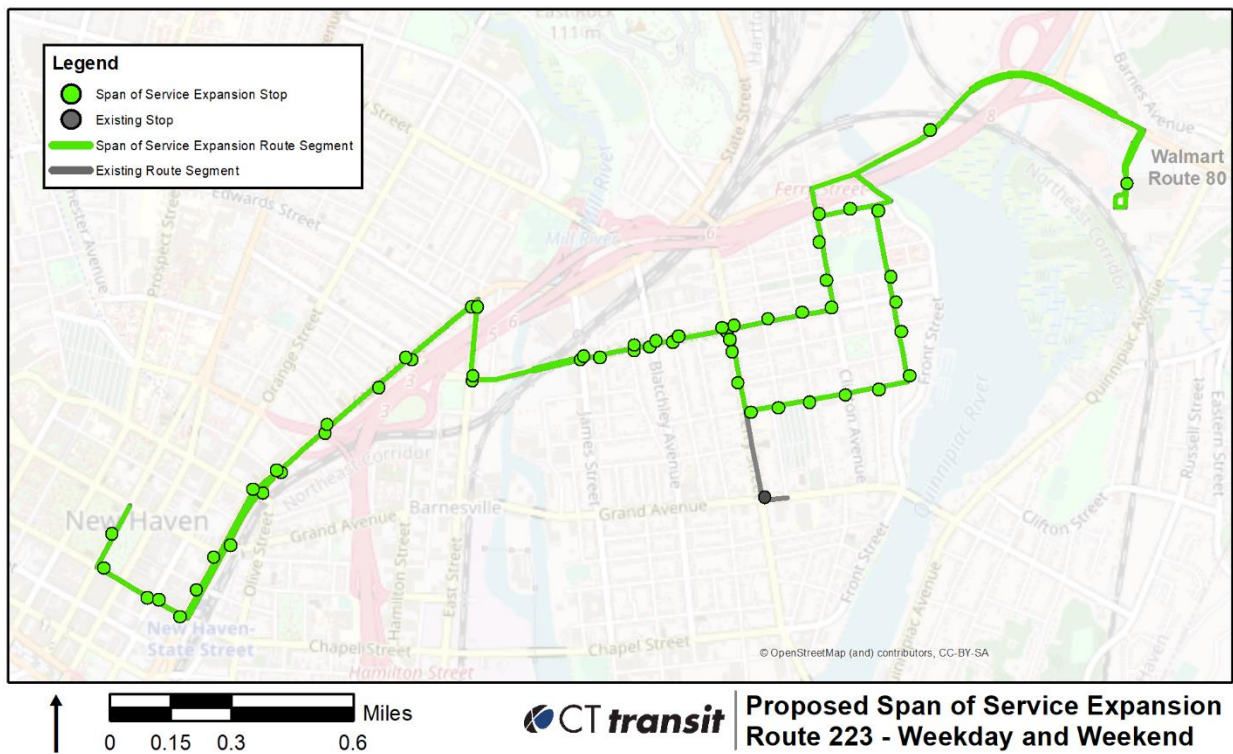


Figure D6 – Route 223 Proposed Span of Service Expansion

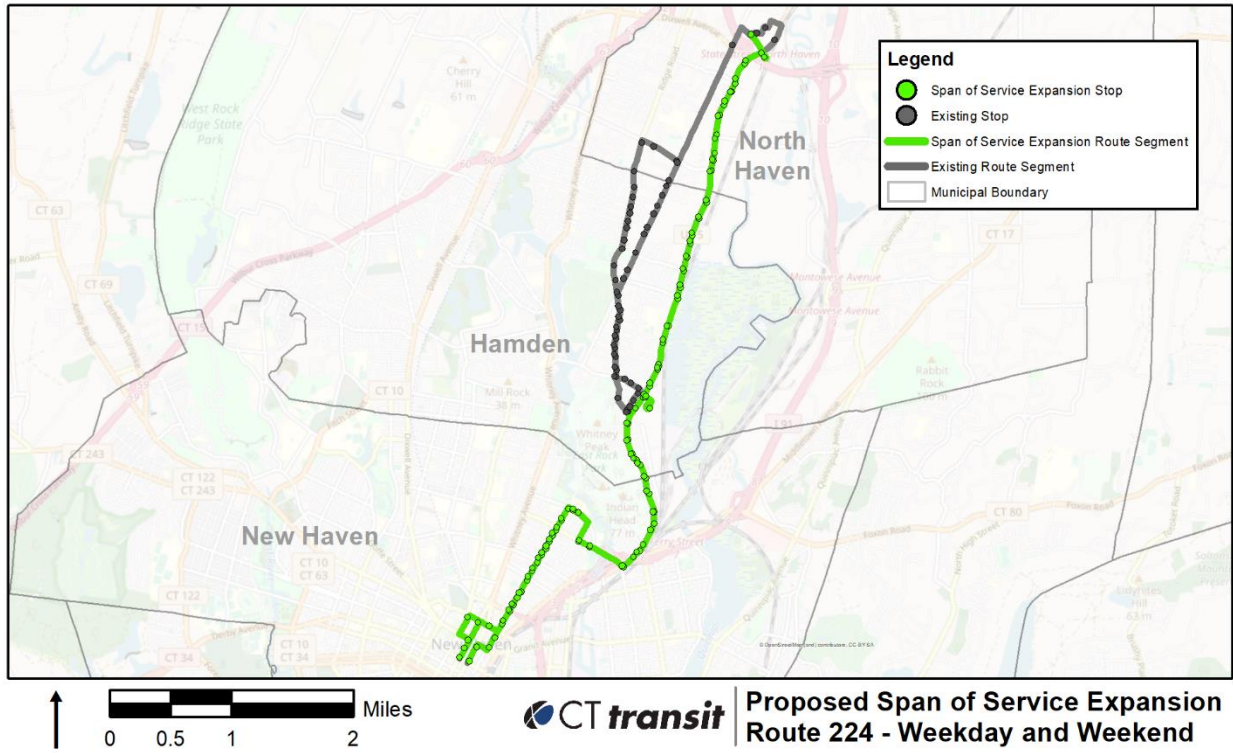


Figure D7 – Route 224 Proposed Span of Service Expansion

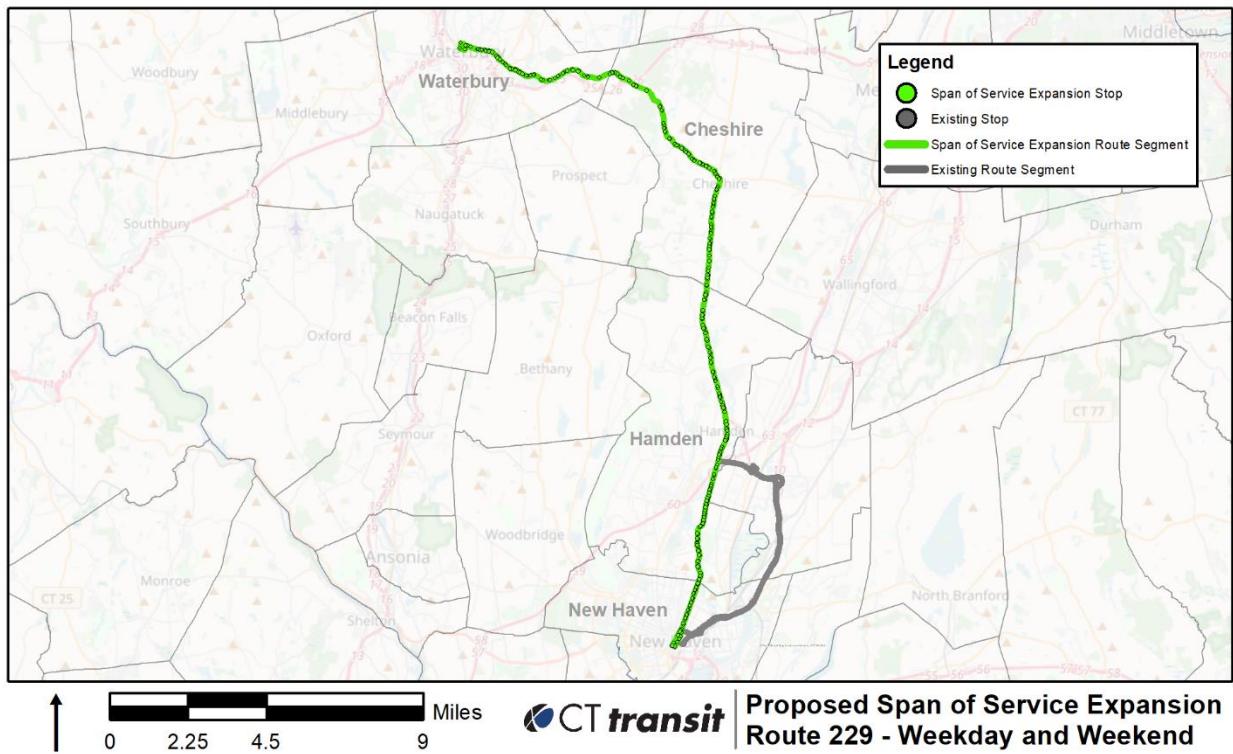


Figure D8 – Route 229 Proposed Span of Service Expansion



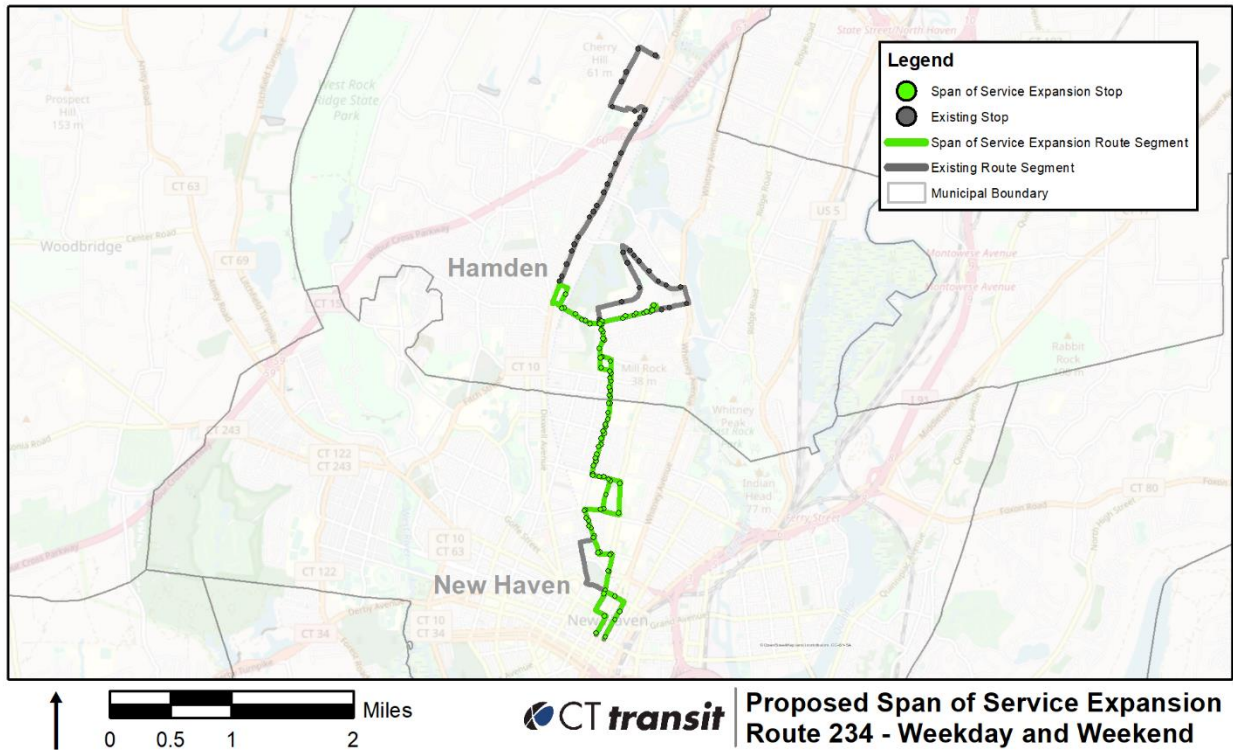
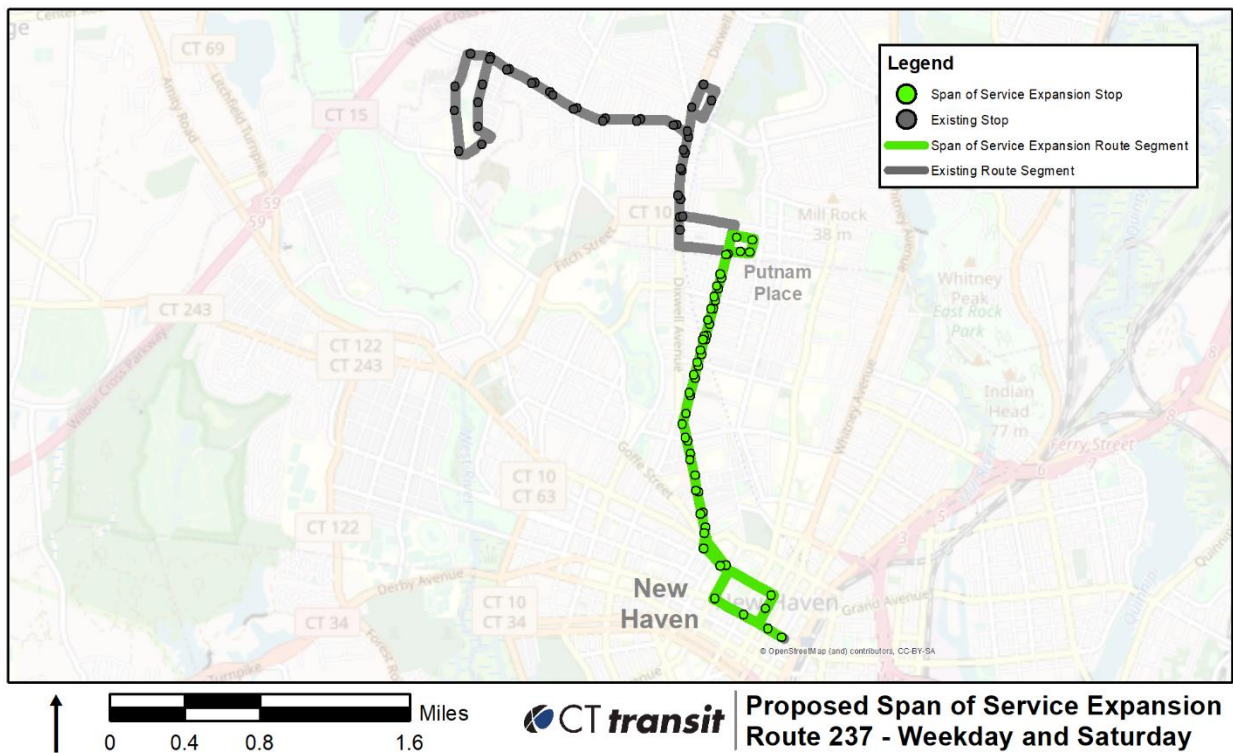


Figure D9 – Route 234 Proposed Span of Service Expansion



**Figure D10 – Route 237 Proposed Span of Service Expansion**

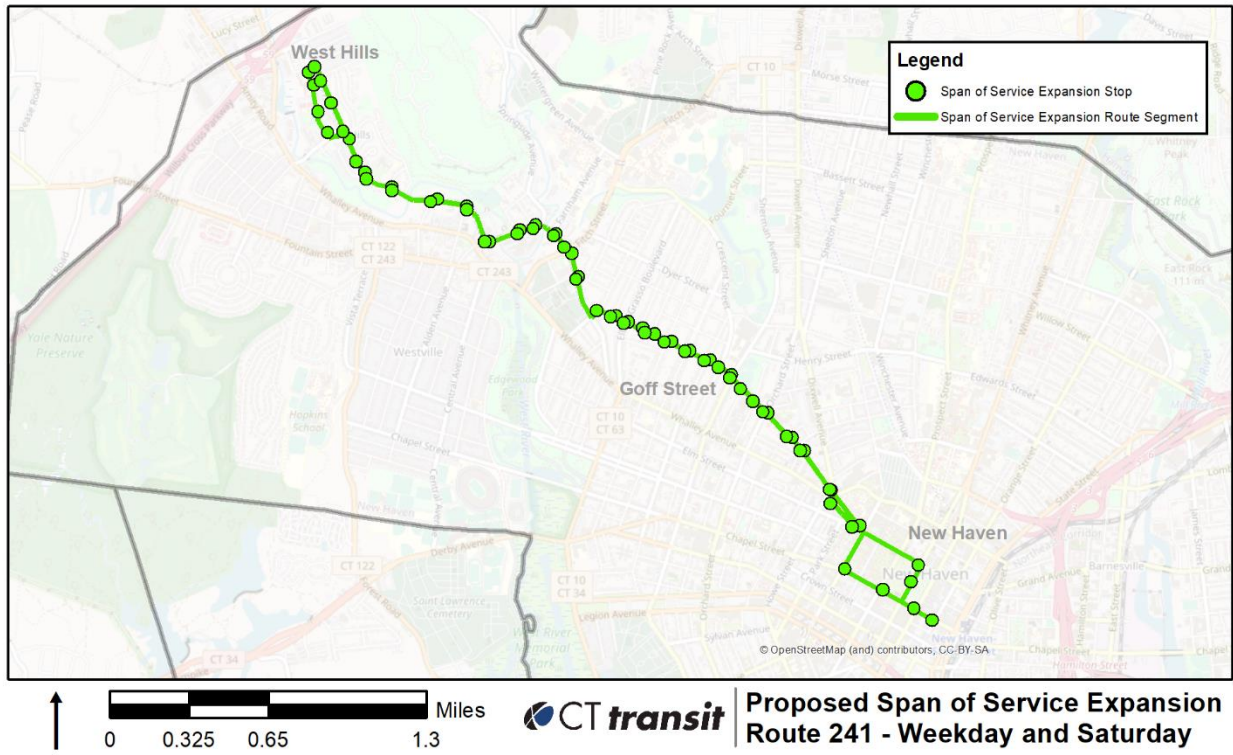


Figure D11 – Route 241 Proposed Span of Service Expansion

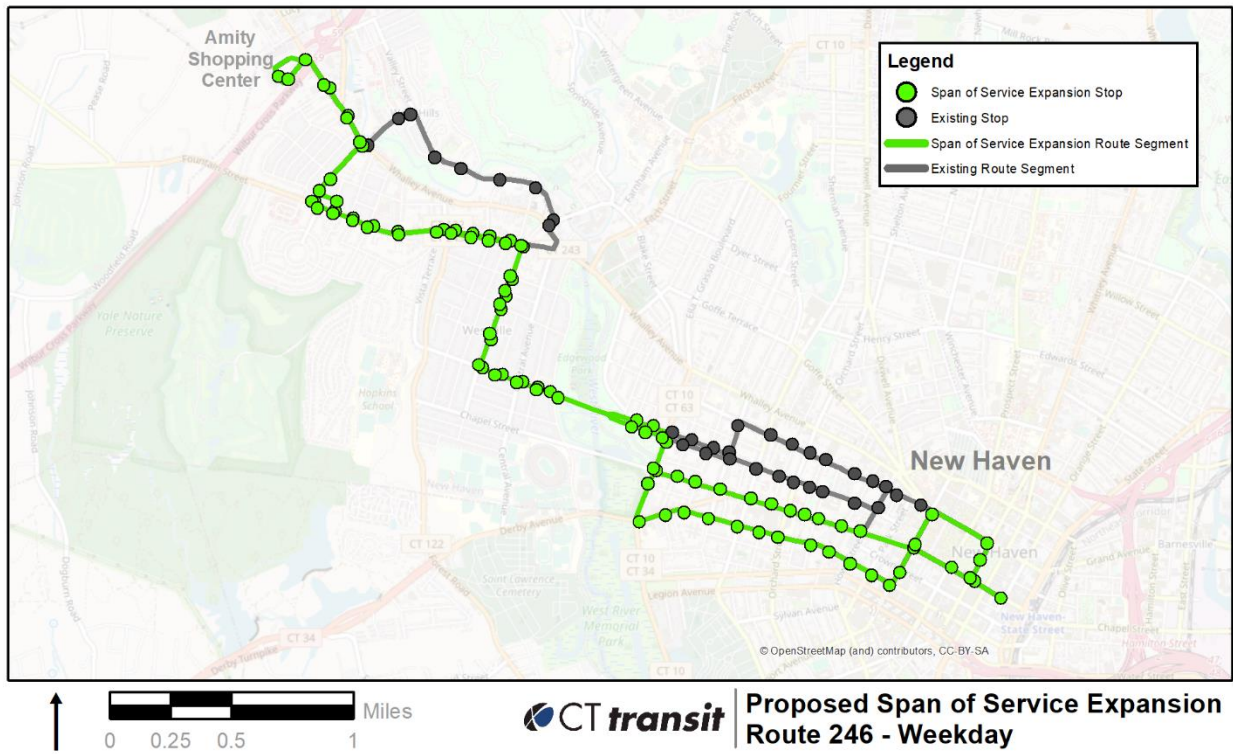
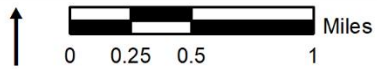
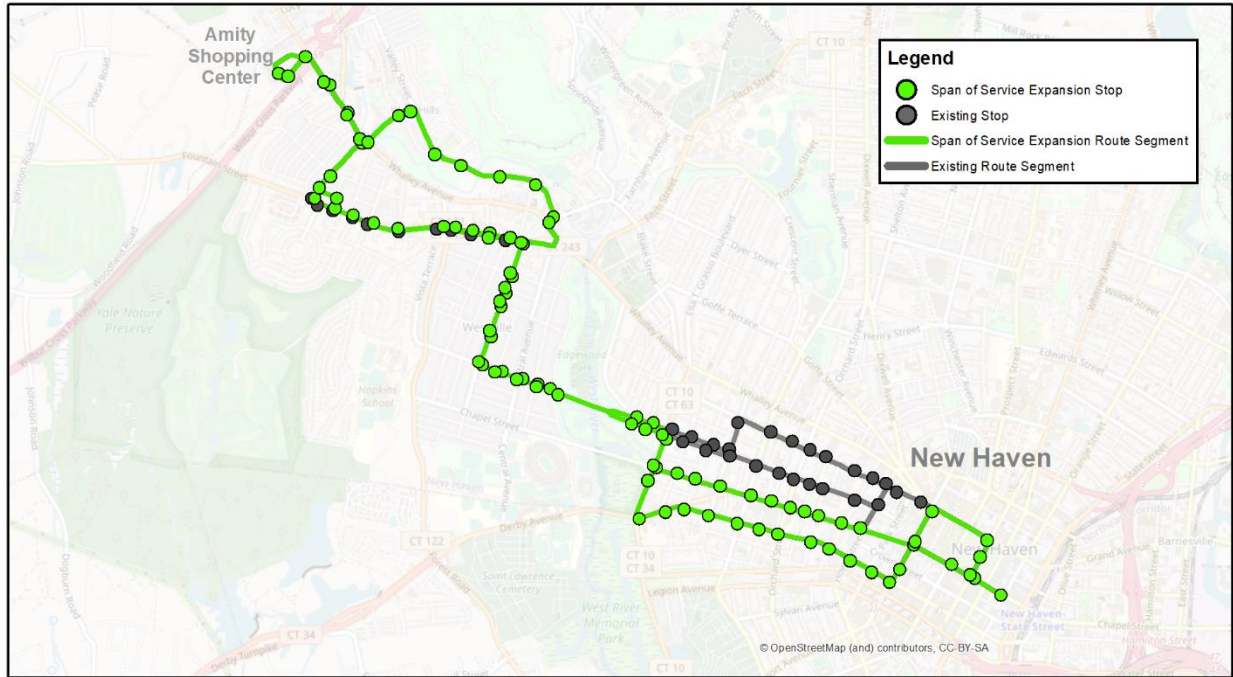
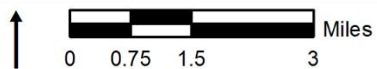
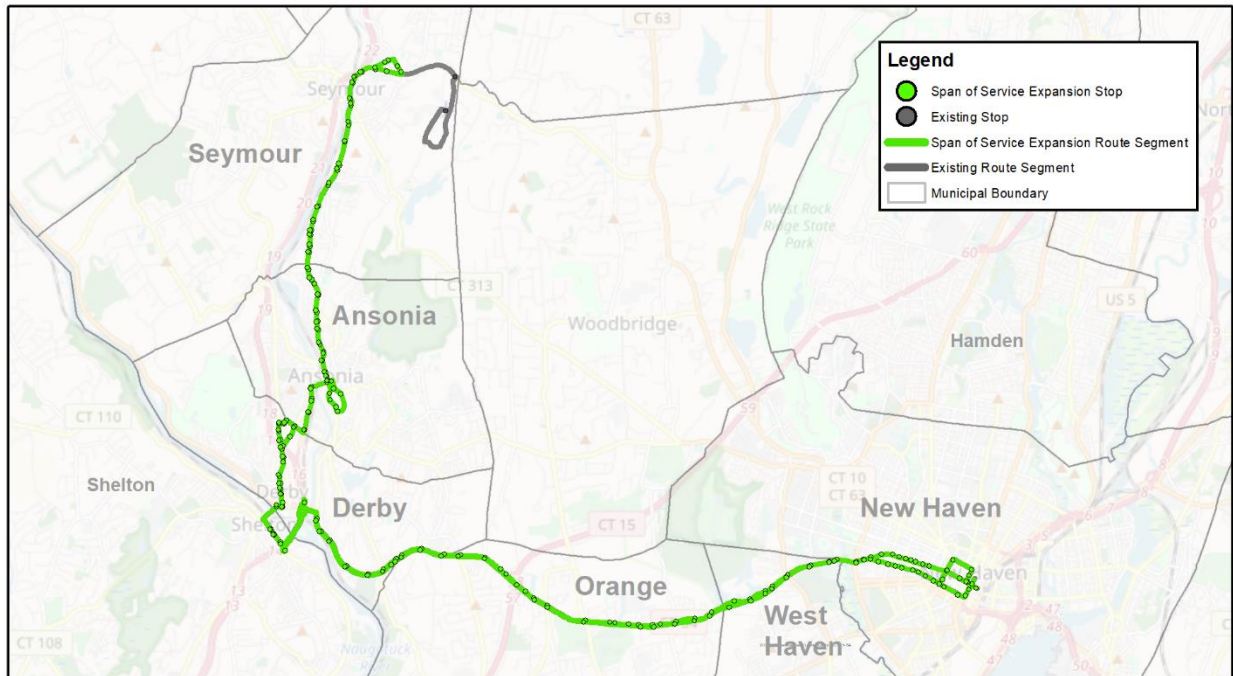


Figure D12 – Route 246 Proposed Span of Service Expansion



Proposed Span of Service Expansion  
Route 246 - Saturday and Sunday

Figure D13 – Route 246 Proposed Span of Service Expansion



Proposed Span of Service Expansion  
Route 255 - Weekday and Saturday

Figure D14 – Route 255 Proposed Span of Service Expansion

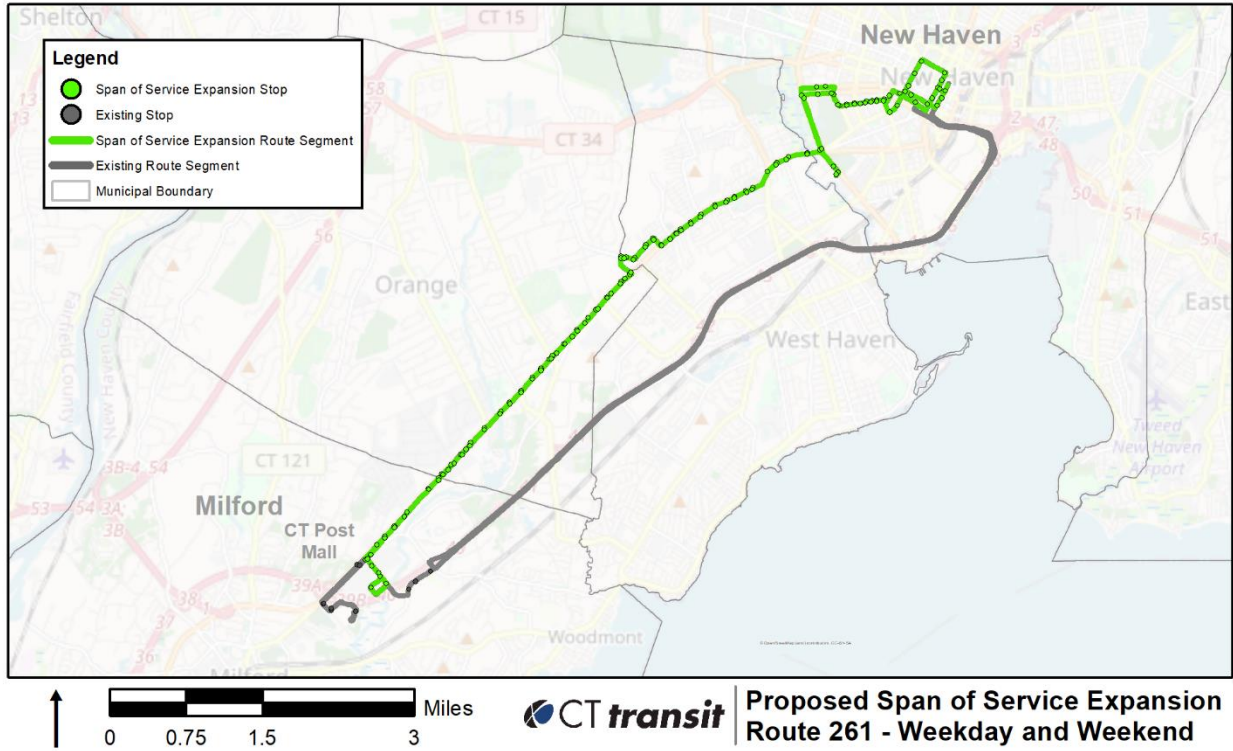


Figure D15 – Route 261 Proposed Span of Service Expansion

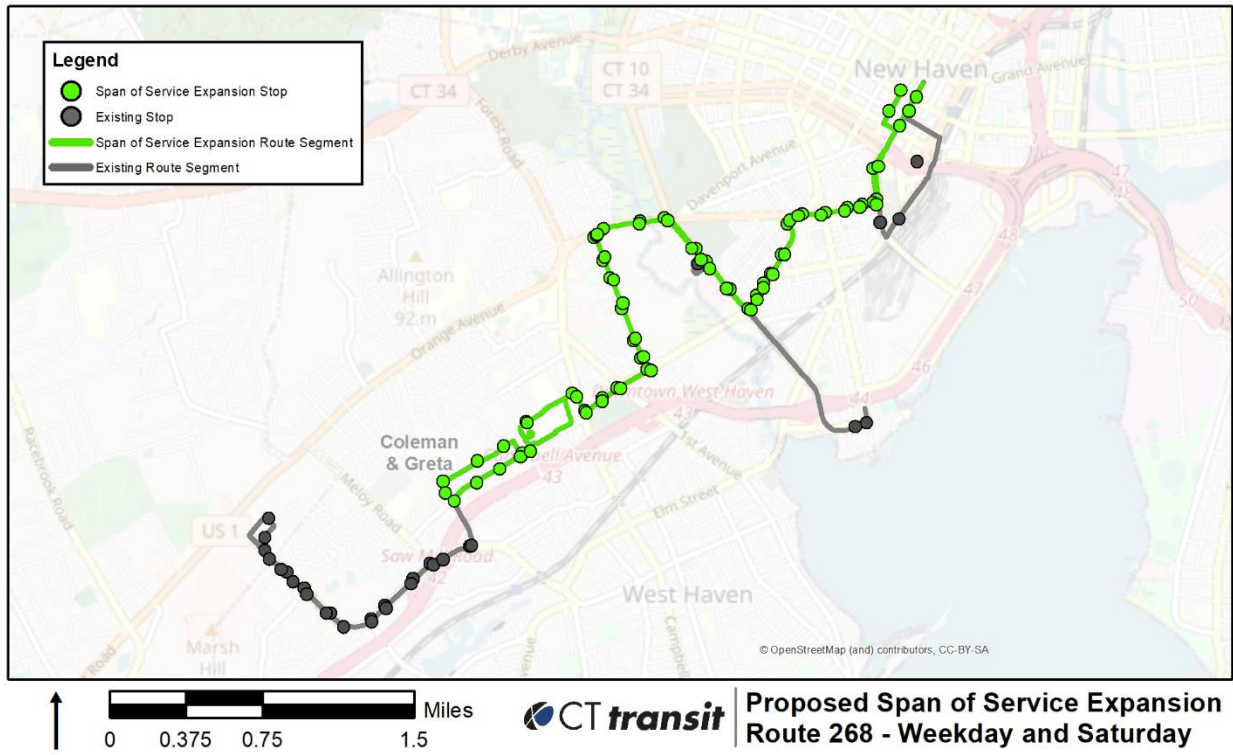
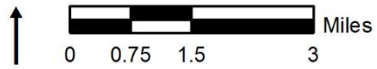
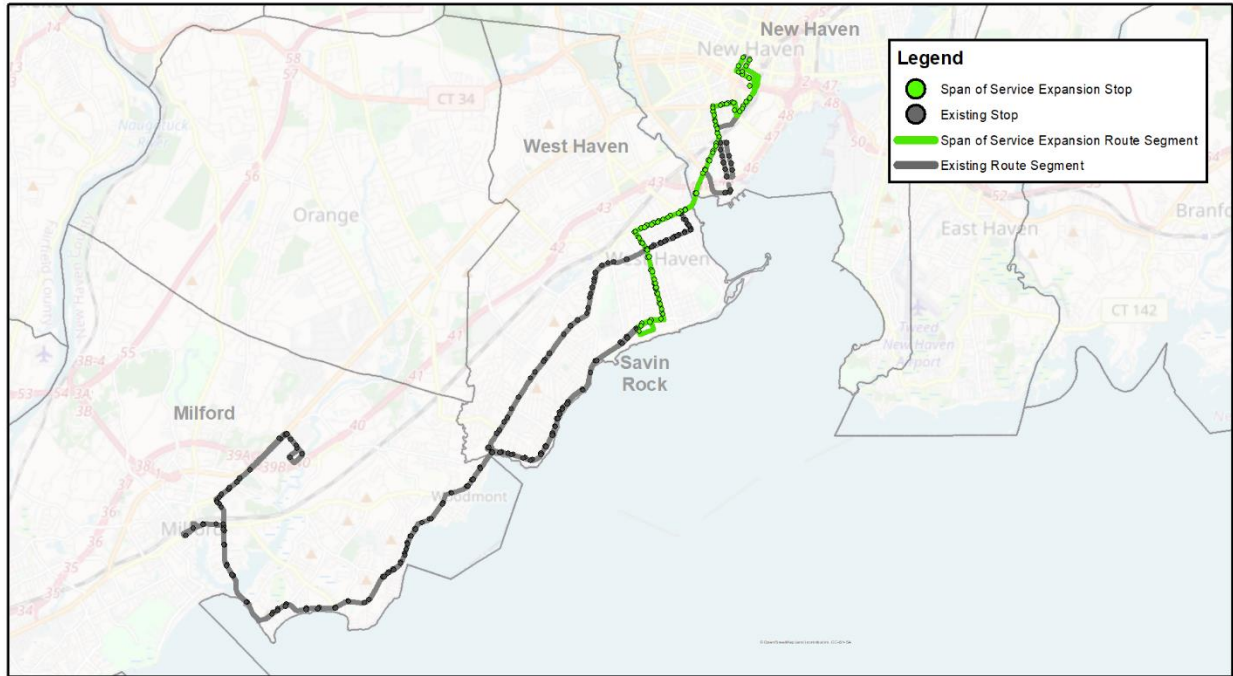
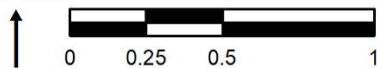
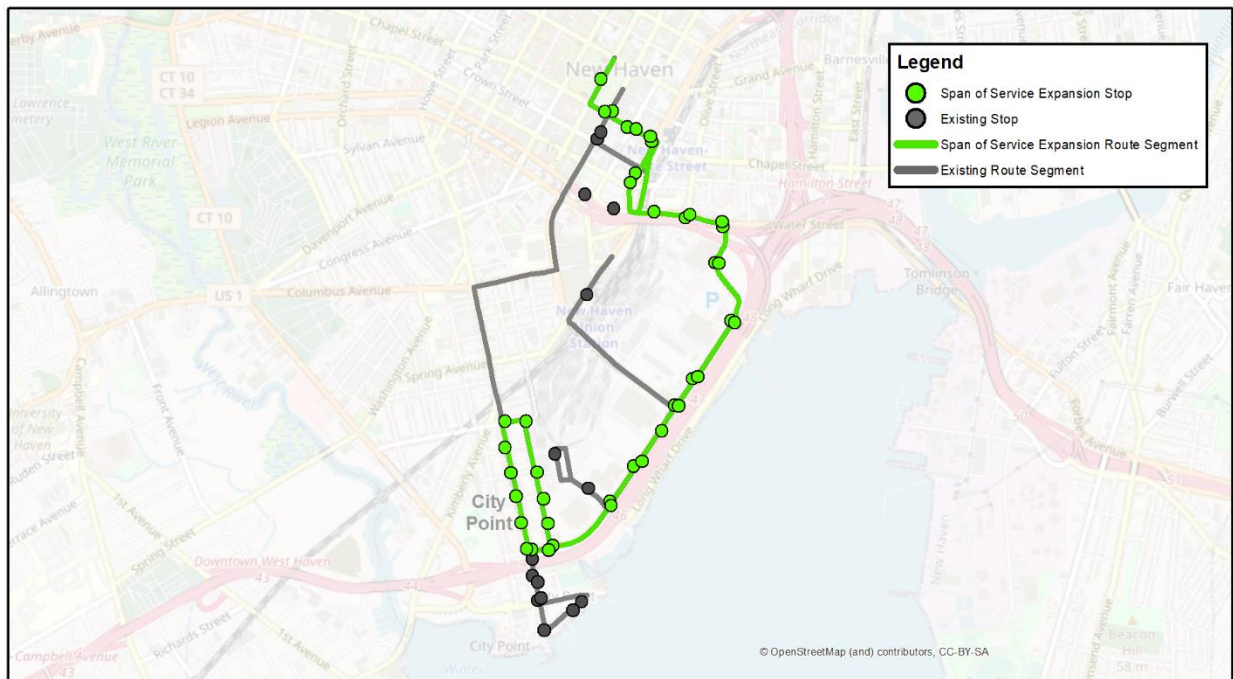


Figure D16 – Route 268 Proposed Span of Service Expansion



**CT transit** | Proposed Span of Service Expansion Route 271 - Weekday and Weekend

**Figure D17 – Route 271 Proposed Span of Service Expansion**



**CT transit** | Proposed Span of Service Expansion Route 274 - Weekday and Saturday

**Figure D18 – Route 274 Span of Service Expansion**





Appendix E – Bus Major Service Change Threshold Analysis Results

The threshold analysis results for any proposed change that exceeded the major service change threshold for the Hartford Express and Shuttle Bus and New Haven Local Bus routes are presented in this appendix.

## Hartford Express Bus Routes

### Asylum Hill Shuttle

#### 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 change in Annual Revenue Vehicle Miles criterion (25% or more change).

**Table E1 - Asylum Hill Shuttle Threshold Analysis**

Route	Route Length (miles)			
	Current	Proposed	Change	Percent Change
Asylum Hill Shuttle	2.2	1.4	-0.8	<b>36.4%</b>

Route	Service	Revenue Miles					
		Current		Proposed		Change	Percent Change
		Daily	Annual	Daily	Annual		
Asylum Hill Shuttle	Weekday	110	28,050	25	6375	-21,675	<b>77.3%</b>

### Columbus Boulevard Shuttle

#### 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).

**Table E2 - Columbus Boulevard Shuttle Threshold Analysis**

Route	Route Length (miles)			
	Current	Proposed	Change	Percent Change
Columbus Boulevard Shuttle	0.6	3.2	2.6	<b>433.3%</b>

Route	Revenue Miles						
	Service	Current		Proposed		Change	Percent Change
		Daily	Annual	Daily	Annual		
Columbus Boulevard Shuttle	Weekday	19	4,845	38	9,690	4,845	100.0%

		Service Span						
		Current			Proposed			Change (hr:mm)
Route	Service	First Trip Starts	Last Trip Ends	Span	First Trip Starts	Last Trip Ends	Span	
Columbus Boulevard Shuttle	Weekday	6:50	18:27	11:37	6:53	17:27	10:34	-1.05

**State Capitol Shuttle**

**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).

**Table E3 - State Capitol Shuttle Threshold Analysis**

Route	Route Length (miles)			
	Current	Proposed	Change	Percent Change
State Capitol Shuttle	0.0	1.8	1.8	100.0%

Route	Revenue Miles						
	Service	Current		Proposed		Change	Percent Change
		Daily	Annual	Daily	Annual		
State Capitol Shuttle	Weekday	0	0	34	8,670	8,670	100.0%

		Service Span						
		Current			Proposed			Change (hr:mm)
Route	Service	First Trip Starts	Last Trip Ends	Span	First Trip Starts	Last Trip Ends	Span	

State Capitol Shuttle	Weekday	0:00	0:00	0:00	6:45	17:40	10:55	10.92
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**901 Avon-Canton Express**

**Threshold Analysis Results**

No major service change thresholds were exceeded.

**902 Corbin-Farm Springs Express**

**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).

**Table E4 - Route 902 Threshold Analysis**

Route	Route Length (miles)			
	Current	Proposed	Change	Percent Change
902	14.9	11.3	-3.6	-24.2%

Route	Service	Revenue Miles				Change	Percent Change
		Current		Proposed			
		Daily	Annual	Daily	Annual		
902	Weekday	147	37485	23	5865	-31620	-84.4%

Route	Service	Service Span						Change (hr:mm)
		Current			Proposed			
		First Trip Starts	Last Trip Ends	Span	First Trip Starts	Last Trip Ends	Span	
902	Weekday	6:31	17:53	11:22	7:30	16:55	9:25	-1.95

**903 Manchester-Buckland Express**

**Threshold Analysis Results**

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

Table E5 - Route 903 Threshold Analysis

Route	Revenue Miles						
	Service	Current		Proposed		Change	Percent Change
		Daily	Annual	Daily	Annual		
903	Weekday	201	51255	102	26010	-25,245	-49.3%

904 Glastonbury Express

Threshold Analysis Results

No major service change thresholds were exceeded.

905 Enfield-Somers/Windsor Locks Express

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).

Table E6 – Route 905 Threshold Analysis

Route	Route Length (miles)			
	Current	Proposed	Change	Percent Change
905	50.9	25.1	-25.8	-50.7%

Route	Revenue Miles						
	Service	Current		Proposed		Change	Percent Change
		Daily	Annual	Daily	Annual		
905	Weekday	1,095	279,225	652	166,260	-112,965	-40.5%
	Saturday	60	3,120	123	6,396	3,276	105.0%
	Sunday	60	3,480	123	7,134	3,654	105.0%

Route	Service	Service Span						
		Current			Proposed			Change (hr:mm)
		First Trip Starts	Last Trip Ends	Span	First Trip Starts	Last Trip Ends	Span	
905	Weekday	5:47	19:14	13:27	5:55	19:45	13:50	0.38
	Saturday	11:20	14:45	3:25	7:15	18:50	11:35	8.17
	Sunday	11:20	14:45	3:25	7:15	18:50	11:35	8.17

**906 Cromwell Express**

**Threshold Analysis Results**

No major service change thresholds were exceeded.

**907 Newington Express**

**Threshold Analysis Results**

No major service change thresholds were exceeded.

**909 Farmington-Unionville Express**

**Threshold Analysis Results**

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

**Table E7 - Route 909 Threshold Analysis**

		Service Span						
		Current			Proposed			Change (hr:mm)
Route	Service	First Trip Starts	Last Trip Ends	Span	First Trip Starts	Last Trip Ends	Span	
909	Weekday	6:10	18:23	12:13	6:35	17:45	11:10	-1.05

**910 Rocky Hill-Century Hills Express**

**Threshold Analysis Results**

No major service change thresholds were exceeded.

**912 Simsbury-Granbury Express**

**Threshold Analysis Results**

No major service change thresholds were exceeded.

**913 Manchester-Buckland-Storrs Express**

**Threshold Analysis Results**

No major service change thresholds were exceeded.

**914 Marlborough-Colchester Express**

**Threshold Analysis Results**

No major service change thresholds were exceeded.

**915 Windsor Express**

**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).

**Table E8 - Route 915 Threshold Analysis**

Route	Route Length (miles)			
	Current	Proposed	Change	Percent Change
915	8.8	0.0	-8.8	-100.0%

Route	Service	Revenue Miles					
		Current		Proposed		Change	Percent Change
		Daily	Annual	Daily	Annual		
915	Weekday	26	6,630	0	0	-6,630	-100.0%

Route	Service	Service Span						
		Current			Proposed			Change (hr:mm)
		First Trip Starts	Last Trip Ends	Span	First Trip Starts	Last Trip Ends	Span	
915	Weekday	7:51	17:59	10:08	0:00	0:00	0:00	-10.13

**917 Tolland-Vernon Express**

**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 change in Annual Revenue Vehicle Miles criterion (25% or more change).

**Table E9 - Route 917 Threshold Analysis**

Route	Route Length (miles)			
	Current	Proposed	Change	Percent Change
917	22.1	0.0	-22.1	-100.0%

Route	Service	Revenue Miles					
		Current		Proposed		Change	Percent Change
		Daily	Annual	Daily	Annual		
917	Weekday	467	119,085	0	0	-119,085	-100.0%

Route	Service	Service Span						
		Current			Proposed			Change (hr:mm)
		First Trip Starts	Last Trip Ends	Span	First Trip Starts	Last Trip Ends	Span	
917	Weekday	6:10	18:42	12:32	0:00	0:00	0:00	-12.53

**918 Willimantic-Coventry Express**

**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).

**Table E10 - Route 918 Threshold Analysis**

Route	Service	Revenue Miles					
		Current		Proposed		Change	Percent Change
		Daily	Annual	Daily	Annual		
918	Weekday	333	84,915	423	107,865	22,950	27.0%

**919 Meriden Express**

**Threshold Analysis Results**

No major service change thresholds were exceeded.

**921 Middletown-Old Saybrook Express**



**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).

**Table E11 - Route 921 Threshold Analysis**

Route	Revenue Miles						
	Service	Current		Proposed		Change	Percent Change
		Daily	Annual	Daily	Annual		
921	Weekday	406	103,530	536	136,680	33,150	32.0%

**923 Bristol Express (CTfastrak)**

**Threshold Analysis Results**

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

**Table E12 - Route 923 Threshold Analysis**

Route	Revenue Miles						
	Service	Current		Proposed		Change	Percent Change
		Daily	Annual	Daily	Annual		
923	Weekday	368	93,840	216	55,080	-38,760	-41.3%

**924 Southington-Cheshire Express (CTfastrak)**

**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).

**Table E13 - Route 924 Threshold Analysis**

Route	Route Length (miles)			
	Current	Proposed	Change	Percent Change
924	23.8	0.0	-23.8	-100.0%

Route	Revenue Miles						
	Service	Current		Proposed		Change	Percent Change
		Daily	Annual	Daily	Annual		
924	Weekday	238	60,690	0	0	-60,690	-100.0%

		Service Span						
		Current			Proposed			Change (hr:mm)
Route	Service	First Trip Starts	Last Trip Ends	Span	First Trip Starts	Last Trip Ends	Span	
924	Weekday	6:07	18:36	12:29	0:00	0:00	0:00	-12.48

**925 Cheshire-Waterbury Express (CTfastrak)**

**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).

**Table E14 - Route 925 Threshold Analysis**

Route	Route Length (miles)			
	Current	Proposed	Change	Percent Change
925	32.9	0.0	-32.9	-100.0%

Route	Revenue Miles						
	Service	Current		Proposed		Change	Percent Change
		Daily	Annual	Daily	Annual		
925	Weekday	329	83,895	0	0	-83,895	-100.0%

		Service Span						
		Current			Proposed			Change (hr:mm)
Route	Service	First Trip Starts	Last Trip Ends	Span	First Trip Starts	Last Trip Ends	Span	
925	Weekday	5:47	18:59	13:12	0:00	0:00	0:00	-13.20

**926 Winstead Express (CTfastrak)**

**Threshold Analysis Results**

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

**Table E15 - Route 926 Threshold Analysis**

		Service Span						
		Current			Proposed			Change
Route	Service	First Trip Starts	Last Trip Ends	Span	First Trip Starts	Last Trip Ends	Span	
926	Weekday	6:15	18:18	12:03	5:15	18:35	13:20	1.28

**927 Torrington Express**

**Threshold Analysis Results**

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

**Table E16 - Route 927 Threshold Analysis**

		Service Span						
		Current			Proposed			Change (hr:mm)
Route	Service	First Trip Starts	Last Trip Ends	Span	First Trip Starts	Last Trip Ends	Span	
927	Weekday	6:10	18:12	12:02	5:35	19:15	13:40	1.63

**928 Southington-Cheshire-Waterbury Express**

**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) and Span of Service criterion (a change in the service span of at least one-hour).

**Table E17 - Route 928 Threshold Analysis**

Route	Revenue Miles						
	Service	Current		Proposed		Change	Percent Change
		Daily	Annual	Daily	Annual		
928	Weekday	1257	320,535	1,431	364,905	44,370	13.8%
	Saturday	1326	68,952	907	47,164	-21,788	-31.6%
	Sunday	977	56,666	628	36,424	-20,242	-35.7%

		Service Span						
		Current			Proposed			
Route	Service	First Trip Starts	Last Trip Ends	Span	First Trip Starts	Last Trip Ends	Span	Change
928	Weekday	4:20	25:48	21:28	4:35	24:55	20:20	-1.13
	Saturday	5:10	24:53	19:43	5:35	24:55	19:20	-0.38
	Sunday	6:45	21:25	14:40	7:05	20:25	13:20	-1.33

950 New Haven-Hartford Express

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).

Table E18 - Route 950 Threshold Analysis

Route	Revenue Miles						
	Service	Current		Proposed		Change	Percent Change
		Daily	Annual	Daily	Annual		
950	Weekday	604	154,020	835	212,925	58,905	38.2%

24 Windsor/Windsor Locks

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).

Table E19 - Route 24 Threshold Analysis

Route	Route Length (miles)			
	Current	Proposed	Change	Percent Change
24	0.0	12.7	12.7	100.0%

Route	Revenue Miles						
	Service	Current		Proposed		Change	Percent Change
		Daily	Annual	Daily	Annual		
24	Weekday	0	0	330	84,150	84,150	100.0%

		Service Span						
		Current			Proposed			Change (hr:mm)
Route	Service	First Trip Starts	Last Trip Ends	Span	First Trip Starts	Last Trip Ends	Span	
24	Weekday	0:00	0:00	0:00	5:38	23:47	18:09	18.15

96 John Fitch Boulevard

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).

Table E20 - Route 96 Threshold Analysis

Route	Route Length (miles)			
	Current	Proposed	Change	Percent Change
96	15.5	22.8	7.3	47.1%

New Haven Local Bus Routes

The results of the threshold analysis are shown below. Any numbers appearing in red indicate that the Major Service Change threshold for Span of Service changes was exceeded.

Table E21 - New Haven Local Division Proposed Span of Service Changes - Weekdays

Route/Route Variation	Weekdays						Change in Span of Service (hours)
	Current			Proposed			
	First Trip Starts	Last Trip Ends	Span (hr/min)	First Trip Starts	Last Trip Ends	Span (hr/min)	
Union Station Shuttle	6:05 AM	10:15 PM	16:10	6:05 AM	12:55 AM	18:50	2.7
201	5:50 AM	7:50 PM	14:00	5:50 AM	1:35 AM	19:45	5.8
204M Momauguin	5:11 AM	7:25 PM	14:14	5:11 AM	12:43 AM	19:32	5.3
206E	5:24 AM	10:29 PM	17:05	5:24 AM	12:40 AM	19:16	2.2
212	5:04 AM	1:45 AM	20:41	5:04 AM	1:45 AM	20:41	0.0
213	6:15 AM	6:07 PM	11:52	6:15 AM	6:07 PM	11:52	0.0
215M Meriden	4:45 AM	7:55 PM	15:10	4:45 AM	1:13 AM	20:28	5.3
223W Walmart	5:21 AM	1:46 AM	20:25	5:21 AM	1:49 AM	20:28	0.1
224D Devine St.	4:54 AM	10:33 PM	17:39	4:54 AM	1:04 AM	20:10	2.5
228H Hamden Plaza	5:17 AM	1:45 AM	20:28	5:17 AM	1:49 AM	20:32	0.1
229 Waterbury	5:18 AM	9:10 PM	15:52	5:18 AM	1:08 AM	19:50	4.0
234P Putnam Place via Davenport Apts.	5:05 AM	11:42 PM	18:37	5:03 AM	12:58 AM	19:55	1.3
237 Marlboro Street	5:50 AM	6:47 PM	12:57	5:50 AM	1:07 AM	19:17	6.3
238	4:59 AM	1:30 AM	20:31	4:59 AM	1:30 AM	20:31	0.0
241 West Hills	5:45 AM	7:45 PM	14:00	5:45 AM	1:07 AM	19:22	5.4
243	4:25 AM	1:37 AM	21:12	4:25 AM	1:37 AM	21:12	0.0
246A Amity Rd.	5:35 AM	9:10 PM	15:35	5:35 AM	1:07 AM	19:32	4.0
254	5:25 AM	6:30 PM	13:05	5:25 AM	6:30 PM	13:05	0.0
255 Ansonia-Seymour	5:30 AM	8:35 PM	15:05	5:30 AM	1:03 AM	19:33	4.5
261 CT Post Mall	5:15 AM	11:43 PM	18:28	5:15 AM	1:15 AM	20:00	1.5
265	4:59 AM	12:42 AM	19:43	4:59 AM	1:17 AM	20:18	0.6
268C Veterans Hosp.-Coleman & Greta	5:58 AM	12:40 AM	18:42	5:52 AM	1:02 AM	19:10	0.5
271S Savin Rock	4:57 AM	10:25 PM	17:28	4:57 AM	12:40 AM	19:43	2.3
272	6:15 AM	11:10 PM	16:55	6:15 AM	11:10 PM	16:55	0.0
274C City Point	5:45 AM	10:12 PM	16:27	5:45 AM	12:26 AM	18:41	2.2
278	5:56 AM	8:35 PM	14:39	5:56 AM	8:35 PM	14:39	0.0

Table E22 - New Haven Local Division Proposed Span of Service Changes - Saturdays

Route/Route Variation	Saturdays						Change in Span of Service (hours)
	Current			Proposed			
	First Trip Starts	Last Trip Ends	Span (hr/min)	First Trip Starts	Last Trip Ends	Span (hr/min)	
Union Station Shuttle	n/a			6:05 AM	12:55 AM	18:50	18.8
201	7:00 AM	6:03 PM	11:03	6:00 AM	1:35 AM	19:35	8.5
204M Momauguin	6:05 AM	7:10 PM	13:05	6:05 AM	12:43 AM	18:38	5.6
206E	5:51 AM	7:28 PM	13:37	5:51 AM	12:43 AM	18:52	5.3
212	5:15 AM	1:49 AM	20:34	5:15 AM	1:49 AM	20:34	0.0
213	n/a			n/a			n/a
215M Meriden	4:45 AM	6:45 PM	14:00	4:45 AM	1:25 AM	20:40	6.7
223W Walmart	5:53 AM	11:04 PM	17:11	5:53 AM	1:04 AM	19:11	2.0
224D Devine St.	5:24 AM	6:35 PM	13:11	5:24 AM	1:03 AM	19:39	6.5
228H Hamden Plaza	6:15 AM	12:50 AM	18:35	5:52 AM	12:42 AM	18:50	0.2
229 Waterbury	5:30 AM	8:33 PM	15:03	5:30 AM	1:08 AM	19:38	4.6
234P Putnam Place via Davenport Apts.	5:53 AM	6:31 PM	12:38	5:50 AM	12:35 AM	18:45	6.1
237 Marlboro Street	6:06 AM	7:10 PM	13:04	6:06 AM	12:58 AM	18:52	5.8
238	5:25 AM	1:40 AM	20:15	5:25 AM	1:40 AM	20:15	0.0
241 West Hills	6:00 AM	7:10 PM	13:10	6:25 AM	1:25 AM	19:00	5.8
243	5:20 AM	1:36 AM	20:16	5:20 AM	1:36 AM	20:16	0.0
246A Amity Rd.	7:15 AM	10:40 PM	15:25	7:15 AM	12:40 AM	17:25	2.0
254	6:10 AM	6:10 PM	12:00	6:10 AM	6:10 PM	12:00	0.0
255 Ansonia-Seymour	6:05 AM	7:40 PM	13:35	6:40 AM	1:03 AM	18:23	4.8
261 CT Post Mall	6:15 AM	11:40 PM	17:25	6:15 AM	1:25 AM	19:10	1.8
265	5:45 AM	12:44 AM	18:59	5:45 AM	12:40 AM	18:55	-0.1
268C Veterans Hosp.-Coleman & Greta	6:28 AM	7:06 PM	12:38	6:28 AM	12:38 AM	18:10	5.5
271S Savin Rock	6:05 AM	10:40 PM	16:35	6:05 AM	12:40 AM	18:35	2.0
272	7:50 AM	8:10 PM	12:20	7:50 AM	8:10 PM	12:20	0.0
274C City Point	6:45 AM	6:28 PM	11:43	6:45 AM	12:32 AM	17:47	6.1
278	n/a			n/a			n/a

**Table E23 - New Haven Local Division Proposed Span of Service Changes - Sundays**

Route/Route Variation	Sundays						Change in Span of Service (hours)
	Current			Proposed			
	First Trip Starts	Last Trip Ends	Span (hr/min)	First Trip Starts	Last Trip Ends	Span (hr/min)	
Union Station Shuttle	n/a			n/a			n/a
201	n/a			n/a			n/a
204M Momauguin	Refer to 206 schedule			Refer to 206 schedule			n/a
206E	7:30 AM	6:37 PM	11:07	7:30 AM	12:42 AM	17:12	6.1
212	6:02 AM	12:45 AM	18:43	6:02 AM	12:56 AM	18:54	0.2
213	n/a			n/a			n/a
215M Meriden	4:45 AM	6:45 PM	14:00	4:45 AM	6:45 PM	14:00	0.0
223W Walmart	7:07 AM	6:47 PM	11:40	7:07 AM	1:07 AM	18:00	6.3
224D Devine St.	7:04 AM	5:48 PM	10:44	7:04 AM	1:03 AM	17:59	7.3
228H Hamden Plaza	7:30 AM	12:40 AM	17:10	7:14 AM	12:53 AM	17:39	0.5
229 Waterbury	8:30 AM	5:45 PM	9:15	7:30 AM	12:55 AM	17:25	8.2
234P Putnam Place via Davenport Apts	6:16 AM	6:25 PM	12:09	6:12 AM	1:05 AM	18:53	6.7
237 Marlboro Street	n/a			n/a			n/a
238	5:56 AM	12:33 AM	18:37	5:56 AM	12:33 AM	18:37	0.0
241 West Hills	n/a			n/a			n/a
243	6:00 AM	12:34 AM	18:34	6:00 AM	12:34 AM	18:34	0.0
246A Amity Rd.	7:30 AM	6:25 PM	10:55	7:30 AM	12:42 AM	17:12	6.3
254	n/a			n/a			n/a
255 Ansonia-Seymour	n/a			n/a			n/a
261 CT Post Mall	6:30 AM	10:43 PM	16:13	6:30 AM	12:43 AM	18:13	2.0
265	5:54 AM	12:35 AM	18:41	5:54 AM	12:35 AM	18:41	0.0
268C Veterans Hosp.-Coleman & Greta	n/a			n/a			n/a
271S Savin Rock	7:30 AM	10:40 PM	15:10	7:30 AM	12:40 AM	17:10	2.0
272	7:20 AM	7:28 PM	12:08	7:20 AM	7:28 PM	12:08	0.0
274C City Point	Refer to Route 271 schedule.			Refer to Route 271 schedule.			n/a
278	n/a			n/a			n/a

**Table E24** Table showing 15 Bus Routes with weekday changes in service span over one hour.



Appendix F – Bus SAFE Fare Equity Analysis Tables

Table F1 - Pre-Fare-Change Bus Fare Usage Rates by User Type

Fare Medium	Minority	Low Income	All Riders
On-Board Single Fare	36.6%	34.2%	35.6%
2 Hour Pass	7.8%	8.2%	7.4%
All Day Pass	11.6%	11.1%	10.8%
3/5/7 Day Pass Average	2.2%	2.1%	2.1%
10-Ride Pass	4.9%	4.8%	5.7%
31-Day Pass	13.7%	12.9%	13.3%
Cash On-Board Reduced Average	9.7%	11.0%	9.4%
10-Ride Pass Reduced Average	2.6%	3.5%	3.6%
31-Day Pass S/D	6.8%	8.5%	7.8%
GoCT Card	0.8%	0.5%	1.0%
Commuter Cash Fare	0.5%	0.4%	0.4%
Commuter 10-Ride Ticket	1.0%	1.0%	1.2%
Commuter 31-Day Pass	1.7%	1.6%	1.7%
Hartford Line Monthly Pass	0.0%	0.0%	0.0%
950 Express Cash Fare	85.3%	85.1%	82.7%
950 Commuter 10-Ride Ticket	14.7%	14.9%	17.3%
950 Commuter 31 Day Pass	0.0%	0.0%	0.0%
912 Local Fare	26.9%	29.2%	34.8%
912 Express Cash Fare	10.3%	10.0%	8.5%
912 Commuter 10-Ride Ticket	23.8%	23.7%	23.8%
912 Commuter 31 Day Pass	39.1%	37.0%	33.0%

**Table F2 - Pre-Fare-Change Bus Fare Medium Usage by User Type**

<b>Fare Medium</b>	<b>Minority</b>	<b>Low Income</b>	<b>All Riders</b>
On-Board Single Fare	2,346,636	2,030,907	3,046,360
2 Hour Pass	499,261	486,293	635,423
All Day Pass	741,915	659,612	922,289
3/5/7 Day Pass Average	141,772	126,666	176,427
10-Ride Pass	313,187	287,392	484,461
31-Day Pass	877,615	763,338	1,142,666
Cash On-Board Reduced Average	623,292	650,037	806,248
10-Ride Pass Reduced Average	166,293	210,280	310,413
31-Day Pass S/D	437,758	505,632	668,157
GoCT Card	50,173	32,499	85,890
Commuter Cash Fare	28,852	25,908	36,745
Commuter 10-Ride Ticket	66,791	61,290	103,317
Commuter 31-Day Pass	109,958	95,640	143,167
Hartford Line Monthly Pass	0	0	0
950 Express Cash Fare	3,321	2,349	4,777
950 Commuter 10-Ride Ticket	570	412	996
950 Commuter 31 Day Pass	0	0	0
912 Local Fare	2,008	2,008	4,016
912 Express Cash Fare	767	689	977
912 Commuter 10-Ride Ticket	1,776	1,629	2,747
912 Commuter 31 Day Pass	2,923	2,543	3,806
<b>Total</b>	<b>6,403,502</b>	<b>5,935,494</b>	<b>8,561,563</b>

**Table F3 - Pre-Fare-Change Total Bus Fares Paid by User Type**

Total Fares Paid	Minority	Low Income	All Riders
On-Board Single Fare	\$2,651,699	\$2,294,925	\$3,442,387
2 Hour Pass	\$554,180	\$539,785	\$705,320
All Day Pass	\$1,298,351	\$1,154,321	\$1,614,006
3/5/7 Day Pass Average	\$184,303	\$164,665	\$229,355
10-Ride Pass	\$494,835	\$454,080	\$765,448
31-Day Pass	\$1,386,631	\$1,206,075	\$1,805,412
Cash On-Board Reduced Average	\$602,468	\$628,320	\$779,312
10-Ride Pass Reduced Average	\$159,261	\$201,388	\$297,288
31-Day Pass S/D	\$337,074	\$389,337	\$514,481
GoCT Card	\$65,225	\$42,249	\$111,657
Commuter Cash Fare	\$102,153	\$91,729	\$130,101
Commuter 10-Ride Ticket	\$208,406	\$191,242	\$322,379
Commuter 31-Day Pass	\$301,204	\$261,984	\$392,172
Hartford Line Monthly Pass	\$0	\$0	\$0
950 Express Cash Fare	\$18,265	\$12,922	\$26,273
950 Commuter 10-Ride Ticket	\$3,079	\$2,226	\$5,379
950 Commuter 31 Day Pass	\$0	\$0	\$0
912 Local Fare	\$2,985	\$2,985	\$5,970
912 Express Cash Fare	\$2,716	\$2,439	\$3,459
912 Commuter 10-Ride Ticket	\$5,541	\$5,084	\$8,571
912 Commuter 31 Day Pass	\$8,008	\$6,965	\$10,426
<b>Total</b>	<b>\$8,345,791</b>	<b>\$7,620,098</b>	<b>\$11,109,316</b>

**Table F4 - Pre-Fare-Change Total Bus Fares Paid and Average Fare Paid by User Type**

	Minority	Low Income	All Riders
Total Fares Paid	\$8,345,791	\$7,620,098	\$11,109,316
Total Count of Fares Paid	6,403,502	5,935,494	8,561,563
Average Fare Paid	\$1.30	\$1.28	\$1.30

Table F5 - Post-Fare-Change Bus Fare Usage Rates by User Type

<b>Fare Media</b>	<b>Minority</b>	<b>Low Income</b>	<b>All Riders</b>
On-Board Single Fare	36.6%	34.2%	35.5%
2 Hour Pass	7.8%	8.2%	7.4%
All Day Pass	11.6%	11.1%	10.8%
3/5/7 Day Pass Average	2.2%	2.1%	2.1%
10-Ride Pass	4.9%	4.8%	5.6%
31-Day Pass	13.7%	12.9%	13.3%
Cash On-Board Reduced Average	9.7%	11.0%	9.4%
10-Ride Pass Reduced Average	2.6%	3.5%	3.6%
31-Day Pass S/D	6.8%	8.5%	7.8%
GoCT Card	0.8%	0.5%	1.0%
Commuter Cash Fare	0.5%	0.5%	0.5%
Commuter 10-Ride Ticket	1.0%	1.0%	1.2%
Commuter 31-Day Pass	1.7%	1.6%	1.7%
<b>Hartford Line Monthly Pass</b>	<b>6.2%</b>	<b>1.6%</b>	<b>9.1%</b>
950 Express Cash Fare	80.1%	83.7%	75.2%
950 Commuter 10-Ride Ticket	13.7%	14.7%	15.7%
950 Commuter 31 Day Pass	0.0%	0.0%	0.0%
<b>912 Local Fare</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>
912 Express Cash Fare	37.1%	39.3%	43.2%
912 Commuter 10-Ride Ticket	23.8%	23.7%	23.8%
912 Commuter 31 Day Pass	39.1%	37.0%	33.0%

Table F6 - Post-Fare-Change Bus Fare Medium Usage by User Type

Fare Medium	Minority	Low Income	All Riders
On-Board Single Fare	2,345,967	2,030,237	3,045,021
2 Hour Pass	499,261	486,293	635,423
All Day Pass	741,246	658,942	920,950
3/5/7 Day Pass Average	141,772	126,666	176,427
10-Ride Pass	312,518	286,723	483,122
31-Day Pass	877,615	763,338	1,142,666
Cash On-Board Reduced Average	623,292	650,037	806,248
10-Ride Pass Reduced Average	166,293	210,280	310,413
31-Day Pass S/D	437,758	505,632	668,157
GoCT Card	50,173	32,499	85,890
Commuter Cash Fare	30,860	27,916	40,761
Commuter 10-Ride Ticket	66,791	61,290	103,317
Commuter 31-Day Pass	109,958	95,640	143,167
Hartford Line Monthly	257	44	577
950 Express Cash Fare	3,321	2,349	4,777
950 Commuter 10-Ride Ticket	570	412	996
950 Commuter 31 Day Pass	0	0	0
912 Local Fare*	0	0	0
912 Express Cash Fare	2,775	2,697	4,993
912 Commuter 10-Ride Ticket	1,776	1,629	2,747
912 Commuter 31 Day Pass	2,923	2,543	3,806
<b>Total</b>	<b>6,403,758</b>	<b>5,935,538</b>	<b>8,562,140</b>

\*Route 912 local fares were subtracted in equal proportions from total cash on board, all day pass, and 10-ride pass (based on the 912 on-board survey results) and added to commuter cash fare totals.

**Table F7 - Post-Fare-Change Total Bus Fares Paid by User Type**

Total Fares Paid	Minority	Low Income	All Riders
On-Board Single Fare	\$2,650,942	\$2,294,168	\$3,440,874
2 Hour Pass	\$554,180	\$539,785	\$705,320
All Day Pass	\$1,297,180	\$1,153,149	\$1,611,663
3/5/7 Day Pass Average	\$184,303	\$164,665	\$229,355
10-Ride Pass	\$493,778	\$453,022	\$763,333
31-Day Pass	\$1,386,631	\$1,206,075	\$1,805,412
Cash On-Board Reduced Average	\$602,468	\$628,320	\$779,312
10-Ride Pass Reduced Average	\$159,261	\$201,388	\$297,288
31-Day Pass S/D	\$337,074	\$389,337	\$514,481
GoCT Card	\$65,225	\$42,249	\$111,657
Commuter Cash Fare	\$109,263	\$98,839	\$144,320
Commuter 10-Ride Ticket	\$208,406	\$191,242	\$322,379
Commuter 31-Day Pass	\$301,204	\$261,984	\$392,172
Hartford Line Monthly	\$1,078	\$187	\$2,425
950 Express Cash Fare	\$18,265	\$12,922	\$26,273
950 Commuter 10-Ride Ticket	\$3,079	\$2,226	\$5,379
950 Commuter 31 Day Pass	\$0	\$0	\$0
912 Local Fare*	\$0	\$0	\$0
912 Express Cash Fare	\$9,825	\$9,548	\$17,678
912 Commuter 10-Ride Ticket	\$5,541	\$5,084	\$8,571
912 Commuter 31 Day Pass	\$8,008	\$6,965	\$10,426
<b>Total</b>	<b>\$8,350,993</b>	<b>\$7,624,409</b>	<b>\$11,119,990</b>

\*Route 912 local fares were subtracted in equal proportions from total cash on board, all day pass, and 10-ride pass (based on the 912 on-board survey results) and added to commuter cash fare totals.

**Table F8 - Post-Fare-Change Total Bus Fares Paid and Average Fare Paid by User Type**

	Minority	Low Income	All Riders
Total Fares Paid	\$8,350,993	\$7,624,409	\$11,119,990
Total Count of Fares Paid	6,403,758	5,935,538	8,562,140
Average Fare Paid	\$1.30	\$1.28	\$1.30