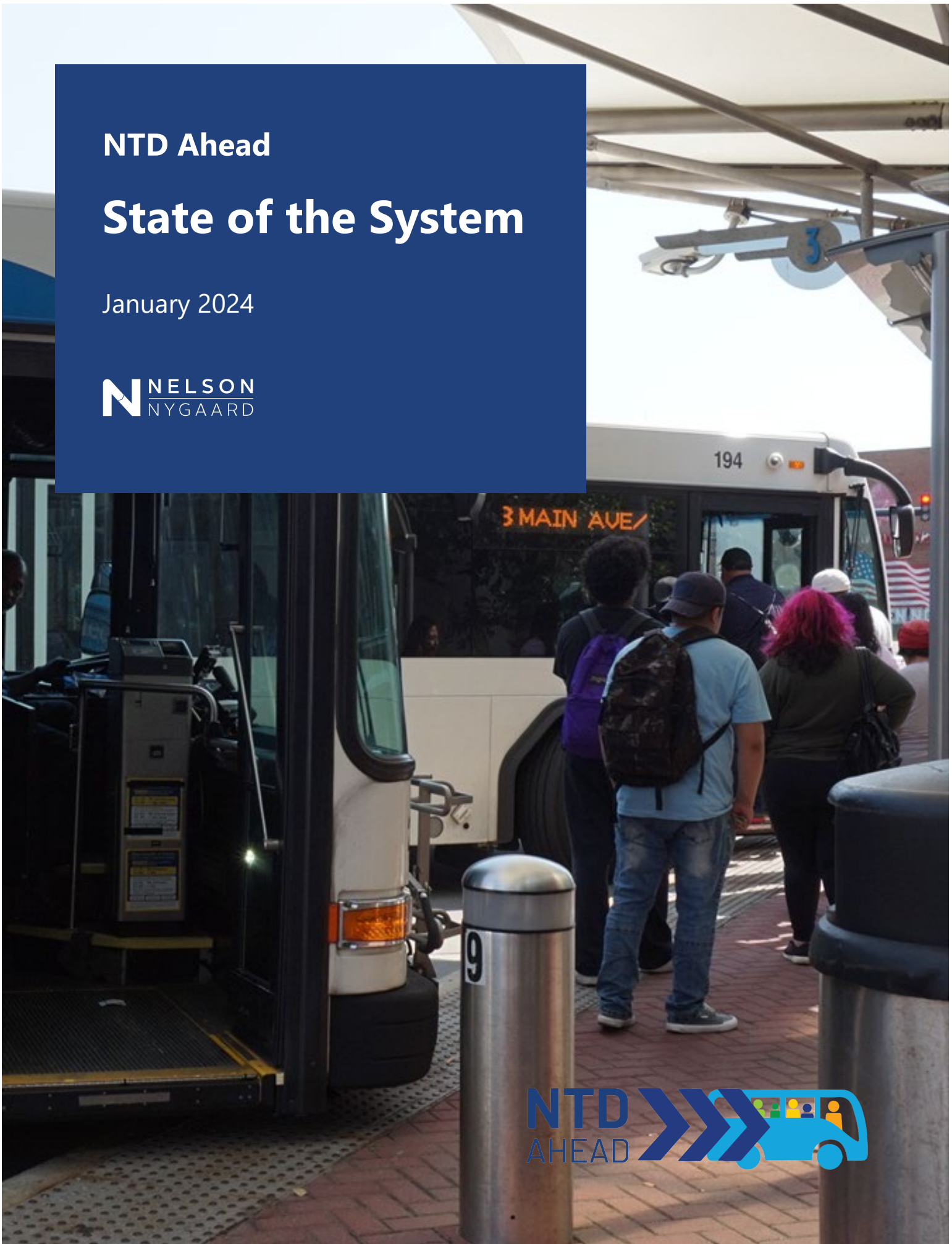


NTD Ahead

State of the System

January 2024

N NELSON
NYGAARD



NTD
AHEAD



Table of Contents

| | Page |
|-----------------------------------------------|-----------|
| 1 Overview..... | 3 |
| The State of the System..... | 3 |
| Strengths and Opportunities..... | 3 |
| 2 Market Analysis | 8 |
| Overview of Transit Demand..... | 8 |
| Underlying Local Transit Demand..... | 9 |
| Activity Centers..... | 21 |
| Travel Patterns | 23 |
| 3 Analysis of Existing Services..... | 25 |
| System Overview..... | 25 |
| Spans and Frequencies..... | 30 |
| Performance Metrics | 38 |
| On-Time Performance | 49 |
| Facilities | 51 |
| Fares..... | 52 |
| Fleet | 53 |
| 4 Meeting the Demand for Transit | 54 |
| Comparing Demand & Transit Service..... | 54 |
| Key Findings..... | 60 |

1 OVERVIEW

NTD Ahead is a project by Norwalk Transit District (NTD) to rethink bus service in Norwalk and southern Fairfield County. It is a comprehensive operational analysis of NTD's transit services and will result in a plan to improve bus service so that it reflects the resources available today while also giving the Norwalk community a roadmap for improving transit services over the next decade.

NTD Ahead is a multistep planning process that will provide NTD with clear, implementable recommendations to make transit service in Norwalk more accessible and convenient. One of the first steps of the study is to develop a baseline understanding of the context of current transit service in Norwalk and southern Fairfield County.

Norwalk Transit District, created in 1973 by the City of Norwalk and governed by a Board of Commissioners, provides transit service in Norwalk and Wilton. While primarily providing transit service to the community of Norwalk, NTD also operates the Coastal Link regional transit service in partnership with Greater Bridgeport Transit and Milford Transit District. NTD also operates several contracted services on behalf of other communities, including operating transit services for the Westport Transit District and the community of Greenwich. In addition, NTD operates paratransit services for several communities beyond Norwalk, including Stamford.

THE STATE OF THE SYSTEM

The State of the System provides a comprehensive overview of Norwalk Transit District's (NTD) current bus network, the population that it serves, and the environment in which it operates. It is divided into three chapters: Market Analysis, Analysis of Existing Services, and Meeting the Demand for Transit. These chapters answer the following questions:

1. **Market Analysis** – Where is public transit most needed?
2. **Analysis of Existing Services** – How well is the current transit network working today?
3. **Meeting the Demand for Transit** – How does the demand for transit compare to the transit provided today? Where are the gaps?

This document provides the foundation for route planning scenarios in the following phase of the project.

STRENGTHS AND OPPORTUNITIES

Based on the analyses completed throughout this document, a site visit in mid-September 2023, and what was learned during Pop-Up events that took place in early October 2023, this section inventories notable strengths and opportunities for improvement. This work forms the basis for the development of service scenarios and recommendations.

Strengths



Service is aligned with where there is demand.

- Generally, NTD's transit services operate in areas where there is greater underlying demand for transit service. It also serves major activity centers such as the Hospital, Community College, and Metro-North stations.



Schedules are consistent, making service easier to understand.

- Most routes operate the same way for every trip, making them predictable.
- How often a route runs is consistent throughout the day for most routes, making schedules predictable for passengers.
- Most routes begin and end their trip at the WHEELS Hub, making it easy for people to transfer between routes and identify a place to access transit service.



NTD facilitates connections to other transit services, helping people to travel regionally.

- NTD coordinates with Greater Bridgeport Transit and Milford Transit to offer Coastal Link service, a regional bus route.
- Several NTD services provide connections to Metro-North service. This provides a potential first-/last-mile service to train service.

Opportunities: Service Design



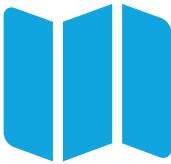
Routes should be Simple & Less Circuitous – Transit service is more accessible and attractive when it is easy to understand. Design attributes such as operating bi-directionally along streets, using major corridors, and keeping routes direct help make routes simpler and reduce travel times.

There are opportunities to simplify some routes in NTD's network. One way to simplify routes is to explore reducing the number of routes that pulse from the WHEELS Hub to facilitate more direct service to places of interest, and simpler alignments.



Expand Hours of Service - People need transit 7 days a week. Transit becomes more attractive and reliable when there is more availability.

NTD operates limited evening and weekend service. Most routes stop operating by 8 PM on weekdays. Explore extending the span of service of WHEELS bus routes weekdays and consider introducing more weekend service.



Expand Service Coverage – Ideally, transit service is provided where there is underlying demand for transit service.

There are opportunities to re-think the level of transit service provided in different communities. Some areas have some level of demand for transit service but don't have service or service that matches the demand.



Increase Service Frequency – Frequent service is more attractive to passengers because it offers more flexibility and convenience. When transit operates more frequently, it has less of an impact on people's schedules.

Underlying demand for service suggests there is demand for more frequent service in some areas. Our analyses suggest some areas with bus service could support frequent transit service (15-minutes or better), a level of service not available today.



Reduce Service Duplication – Service duplication is when more than one route operates along a corridor. It means there is a concentration of resources along a corridor, which could potentially be spread out.

There is some service duplication in NTD's network, with some commuter shuttles and bus routes operating along the same corridors and to the same destinations. Reducing service duplication provides an opportunity to reallocate resources throughout the network and area and think through how to make the network easier for all passengers to understand.



Rethink Network Design – NTD's network design should fit its goals and improve the rider experience. There is an opportunity to rethink the pulse system as other aspects of NTD's system are updated.

The current pulse relies on buses leaving the hub at similar intervals, limiting schedule flexibility. This system is efficient given the current run structure, but frequency changes may make other network designs more viable.

Opportunities: Infrastructure



Improve Bus Stop Amenities & Formalize Bus Stops – Bus Stops are entry-points into a transit system. Providing a clearly marked and comfortable place for people to wait for a bus can help communicate where the bus goes and contribute to a more pleasant transit experience.

Not all bus stops have the same amenities or are in comfortable locations for pedestrians. Improving bus stop facilities can help market the service and provide clearer and more comfortable waiting locations for passengers.

NTD allows bus drivers to use their discretion regarding people flagging down a bus. Reducing this practice can make service more predictable and reliable, because it is clear where a bus will stop, and unplanned stops can delay service. It can also help the network develop better ridership by stop data.



Simplify the Fare Payment System – The process of passenger boarding, which involves paying the fare, can impact running times. Making it easier for people to pay a fare and bus drivers to accept the fare can reduce boarding times.

Today, there are multiple ways for people to pay for bus service and not all work smoothly. Improving and simplifying fare payment can reduce the time it takes to board the bus and confusion.



Offer more fare options for low-income members of the community – Ideally, people regardless of their income-level should have access to transit service. In the Norwalk area, people with lower household incomes are more likely to use the bus.

NTD offers reduced fares for people who are older or have a disability. NTD could explore a fare reduction program for lower-income members of the community to help expand access to bus service.



Improve Jointly-Provided Service – All services NTD offers should be easy for people to understand and access. Additionally, coordination between transit agencies should incorporate easy transfers between services.

NTD provides services throughout southern Connecticut and along with two other transit providers in the region, offers Coastal Link service. Coordinate with partner agencies to make using services like Coastal Link easier and more predictable regardless of which provider is operating the trip or where a passenger is along the route. Bus stop signage should also be present and clear throughout the route.



Reconsider the hub location – Transit hubs are a place where people know they can find transit service and transfer between services. A redesign of transit service can be an opportunity to reconsider the location of these hubs.

Transit hubs are places people know they can find transit service and information about transit service. Given changes in Norwalk, there may be an opportunity to re-think where the WHEELS Hub is located. This study is also an opportunity to consider whether or not it makes sense to have more than one transit hub.

2 MARKET ANALYSIS

Developing a holistic understanding of the market for transit helps us determine the places transit should go, what service should look like, and the level of service provided. This involves:

- Analyzing the population and employment density of a community, as well as its socioeconomic characteristics – to identify where there is a market for transit service and the level of service that may be appropriate,
- Analyzing travel patterns throughout the community – to understand the connections transit can help foster, and
- Identifying where there are major activity centers – to inform the places transit should serve.

While NTD operates transit service primarily in the Norwalk area, it also serves regional destinations in Fairfield and New Haven Counties. This chapter showcases both local and regional analyses.

OVERVIEW OF TRANSIT DEMAND

Underlying transit demand is strongly related to six factors:



Population and Population Density: Since transit relies on having more people near service, higher population density makes it feasible to provide higher levels of service.



Socioeconomic Characteristics: Socioeconomic characteristics influence people's likelihood to use transit, and different population groups have a higher or lower propensity to use transit than the overall population. For example, households with many cars are much less likely to use transit than those with one or none.



Employment and Employment Density: The location and density of jobs is a strong indicator of transit demand, as traveling to and from work often accounts for the most frequent type of transit trip. Job sites may also represent destinations for customers or others accessing services.



Land Use and Development Patterns: In all places, there is a strong correlation between development patterns and transit ridership. In areas with denser development, mixed-use development, and a good pedestrian environment, transit can become very convenient, making it attractive and well used.



Major Activity Centers: Large employers, universities, tourism destinations, and other high-activity areas attract large volumes of people and can generate many transit trips.




























UNDERLYING LOCAL TRANSIT DEMAND

More than any other factors, population density and employment density are the primary drivers of transit demand. This is because:

- The reach of transit is generally limited to within one-quarter to one-half mile (or a five- to ten-minute walk) of a transit route. As a result, the size of the travel market is directly related to the density of people and jobs in an area.
- Transit service frequencies, in turn, are closely related to market size. Bigger markets support more frequent service, while smaller markets can support less frequent service.

Therefore, population and job densities help indicate where it makes sense to provide transit service, and the level of service that may be appropriate. For example, a community with 15 households per acre is likely able to support 30-minute service. The relationship between population and job density and appropriate service type is shown in Figure 1.

Figure 1 Relationship Between Density and Level of Transit Service

| LAND USE | | | TRANSIT | |
|--------------------------------------------------------------------------------------------------------------------------|--------------------|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|
| Land Use Type | Residents per Acre | Jobs per Acre | Appropriate Types of Transit | Frequency of Service |
|  Downtowns & High Density Corridors | >45 | >25 |     |  10 mins or better |
|  Urban Mixed-Use | 30-45 | 15-25 |    |  10-15 minutes |
|  Neighborhood & Suburban Mixed-Use | 15-30 | 10-15 |  |  15-30 minutes |
|  Mixed Neighborhoods | 10-15 | 5-10 |   |  30-60 minutes |
|  Low Density | 2-10 | 2-5 |    |  60 mins or less or On Demand |
|  Rural | <2 | <2 |   |  On Demand |

Source: Composite data compiled by Nelson\Nygaard

Population Density

Population density is an important indicator of transit demand, since more people living closer to a transit stop means more potential riders. Since NTD operates services in Norwalk, Greenwich, and parts of both Fairfield and New Haven counties, it is important to understand regional population density in addition to local population density.

Regionally, densities are greatest in Norwalk, Bridgeport, and Fairfield. Outside of these areas, densities are generally very low or not transit supportive (Figure 2).

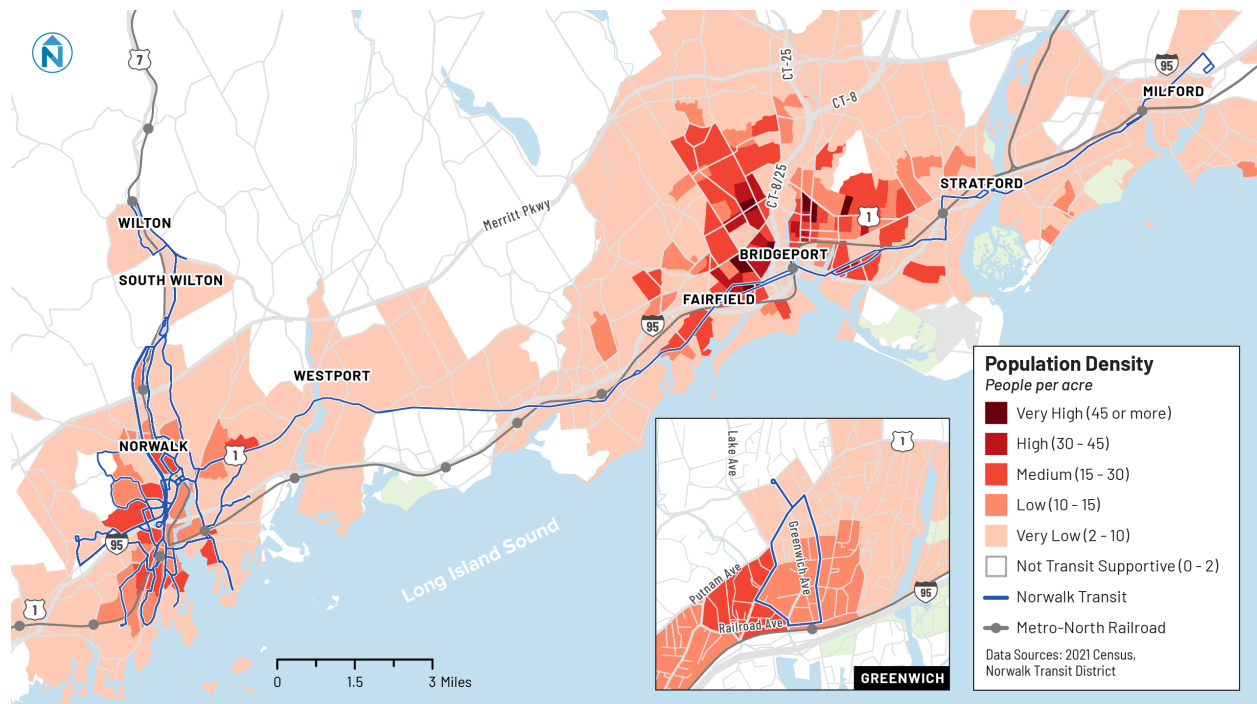
Population density within the NTD service area varies—some areas have moderate densities while others have very low densities that are less likely to support fixed-route transit service (Figure 3).

Population density is greatest in:

- West Norwalk
- South Norwalk
- East Norwalk
- Along Main Avenue
- Along Westport Avenue

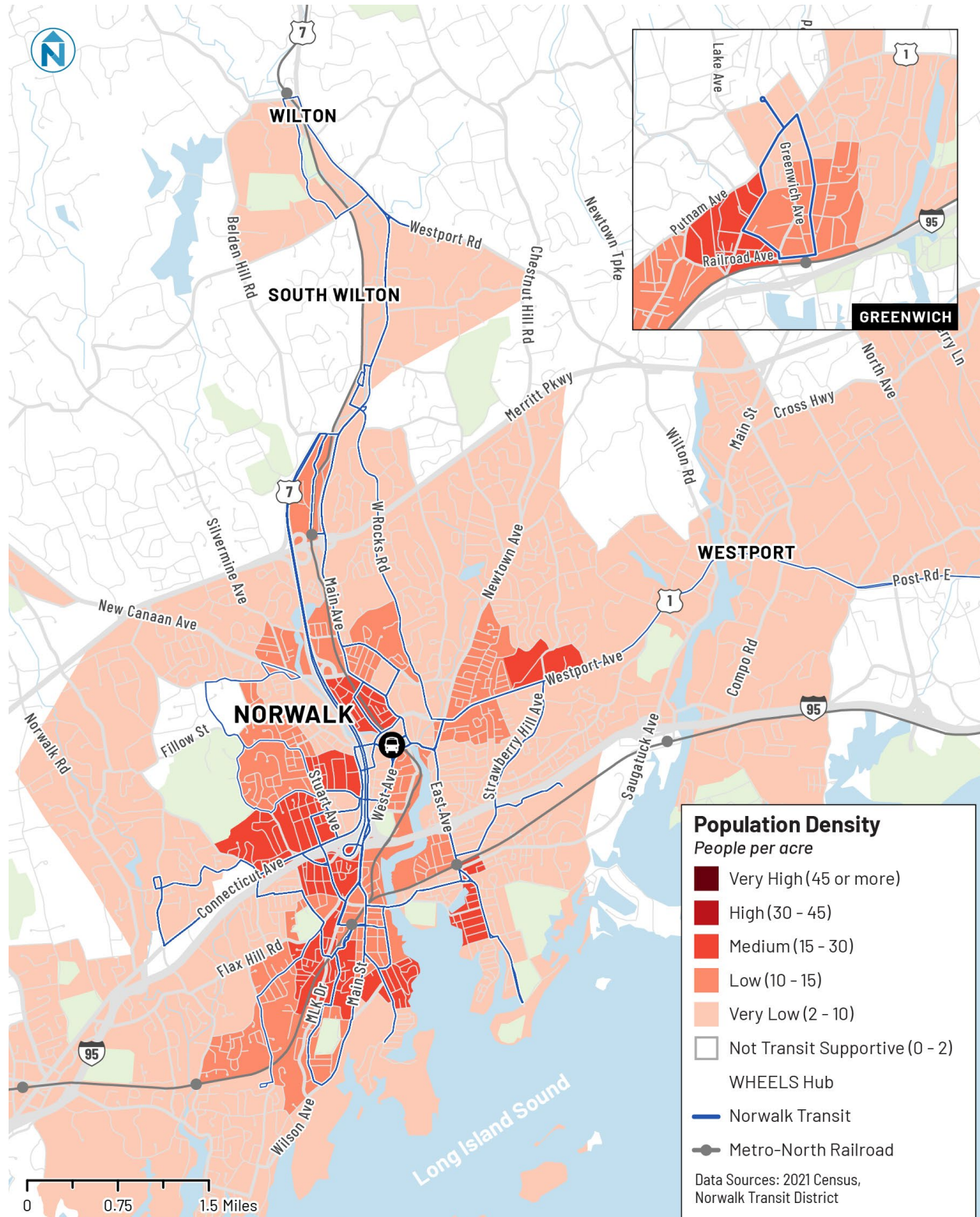
Population density declines outside of these more central areas. Neighborhoods north of Merritt Parkway are likely not dense enough to support fixed route transit.

Figure 2 Population Density: Regional



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Figure 3 Population Density: Local



Transit Propensity

In addition to population density, socioeconomic characteristics can be an indicator of likelihood to use or demand transit service because some groups of people are more likely to use transit than others. Investing in quality transit services in these communities means that transit will run where it will be used the most, as well as where it is needed the most.

Transit Propensity Factors

Transit propensity factors consider demographic characteristics for the population aged 16 and over who are employed. These factors measure the likelihood of certain demographic groups to use the bus relative to the study area’s general population (see Figure 4). Values greater than 1.0 indicate groups that ride the bus more than the overall population, and values less than 1.0 indicate groups that ride the bus less than the overall population. For example, residents who make a household income of less than \$35,000 annually are 4.41 times more likely to ride the bus than the general population. Overall, residents living in a household with no vehicle were the most likely demographic group to use the bus, with over eight times the likelihood than the average resident.

Figure 4 Transit Propensity Factors

| Demographic Group | Transit Propensity |
|-----------------------------|--------------------|
| Race and Ethnicity | |
| White | 0.23 |
| Non-White | 2.25 |
| Household Vehicle Ownership | |
| No Car | 8.69 |
| One Car | 1.43 |
| Two or More Cars | 0.51 |
| Household Income | |
| Less than \$35,000 | 4.41 |
| \$35,000 - \$50,000 | 3.04 |
| \$50,000 - \$75,000 | 0.99 |
| More than \$75,000 | 0.39 |

Source: CTPP 5-Year Data Set (2012-2016)

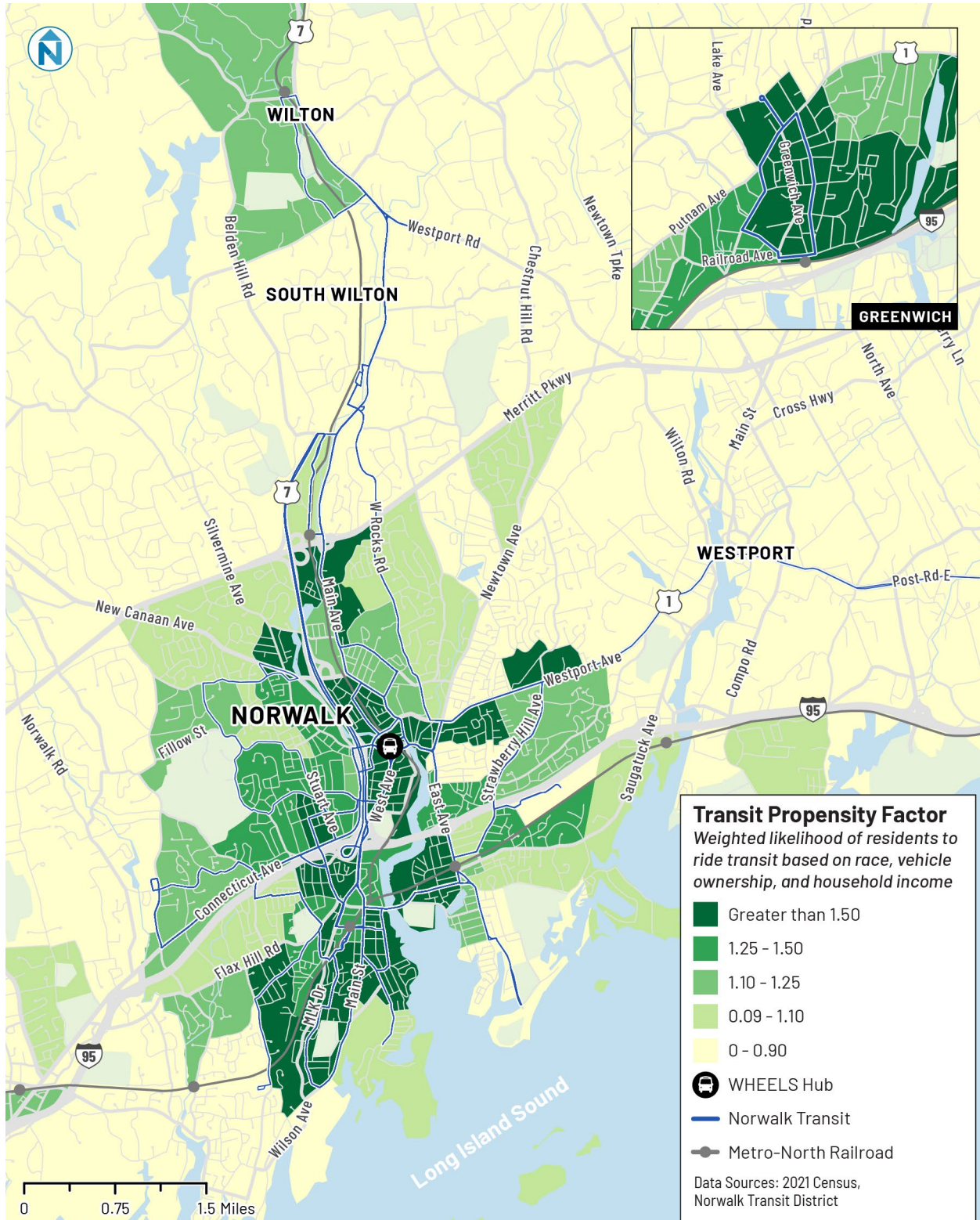
Transit Propensity Index

When significant numbers of people from high transit propensity groups live near each other, they can influence the underlying demand for transit to an extent that is not captured by total population alone. Conversely, in a location where there are many people from low transit propensity groups, the level of transit demand may be lower than the total population alone would indicate. For each census block group in Figure 5, the project team calculated the Transit Propensity Index, or the weighted likelihood of residents to take the bus based on the Transit Propensity Factors described above.

Transit propensity is high throughout the area, especially:

- Norwalk Center
- South Norwalk
- Along Westport Avenue
- Along Greenwich Avenue in Greenwich

Figure 5 Transit Propensity Index



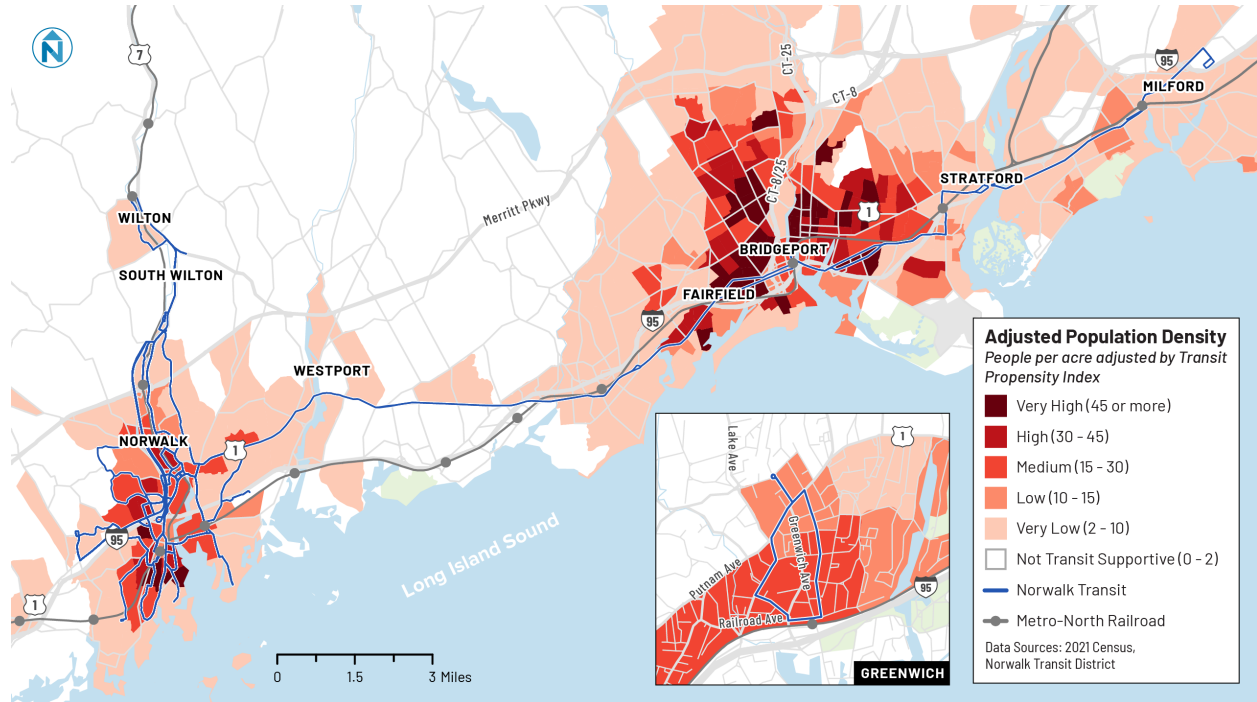
Adjusted Population Density

Adjusted population density combines the population density and transit propensity analyses. This analysis shows where there is a greater potential underlying demand for transit in the region than population density alone in many areas.

Regionally, Norwalk, Bridgeport, and Fairfield have the greatest adjusted population densities (Figure 6). In NTD's service area (Figure 7), the adjusted population density is greatest in:

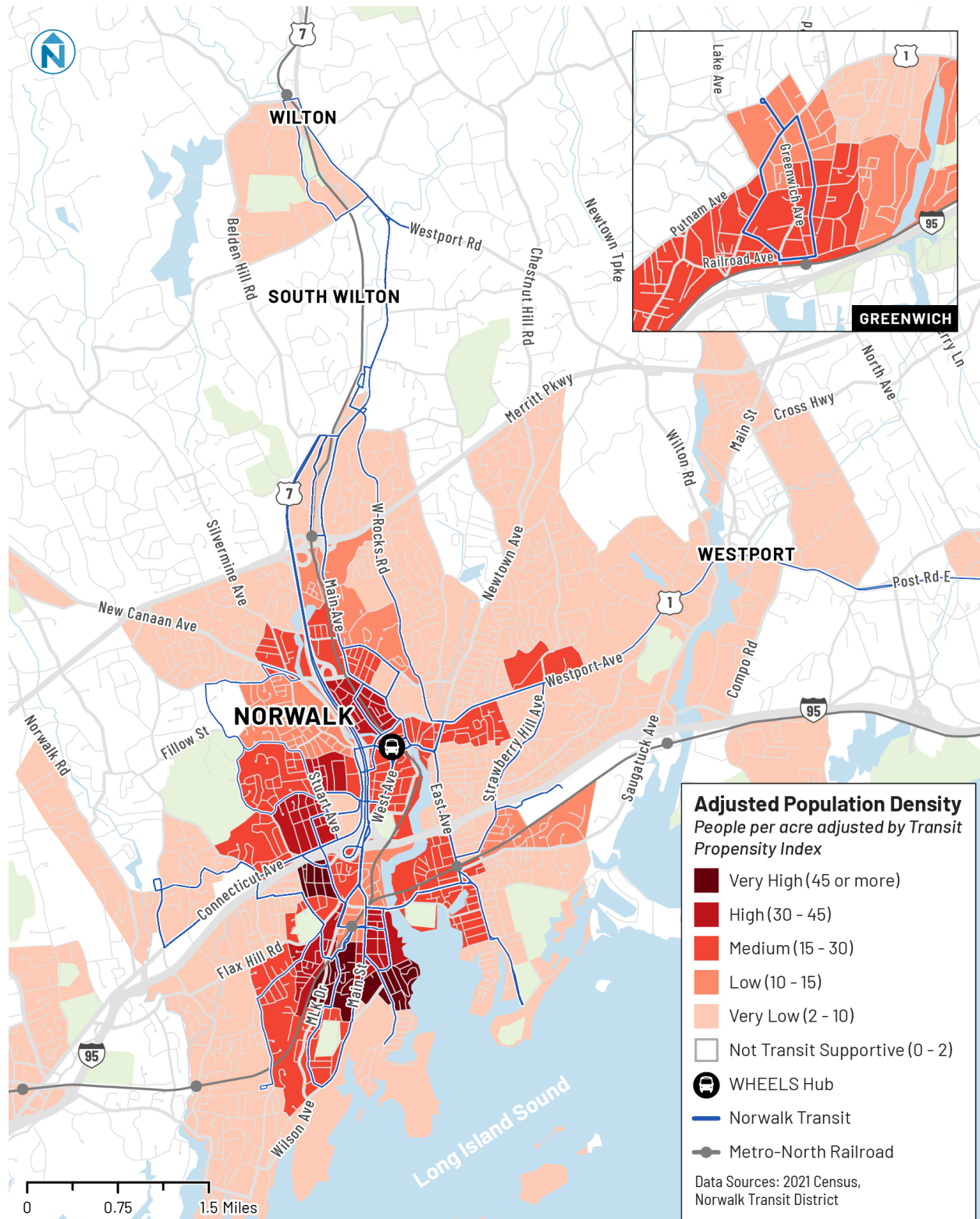
- South Norwalk
- The neighborhoods surrounding the WHEELS Hub
- Around the Greenwich Shuttle

Figure 6 Adjusted Population Density: Regional



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Figure 7 Adjusted Population Density: Local



Employment Density

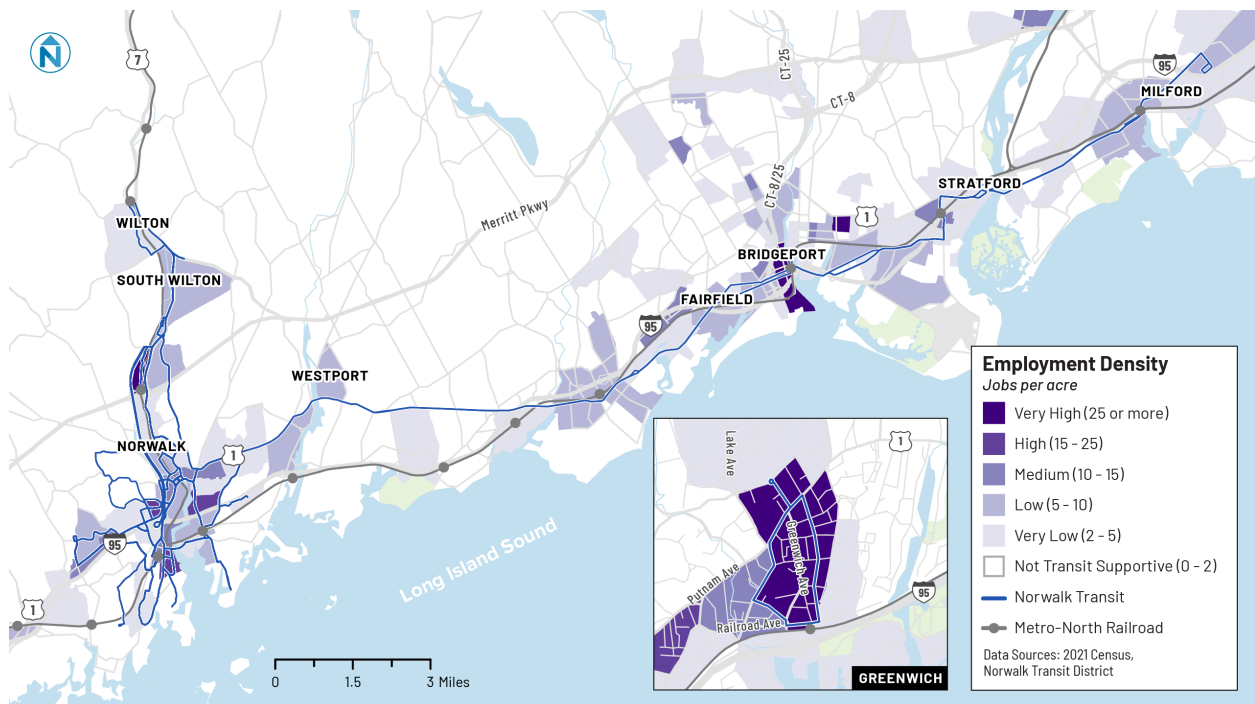
Like population density, employment density is a key indicator for where there is a market for transit, and the level of service that market could potentially support. It does not just indicate demand based on employment in an area, but demand that comes from services the jobs provide, for example, people going shopping and students going to school. The more jobs there are in an area, the greater the potential demand for transit.

Regionally, greater job densities are found in places such as Bridgeport's downtown, the heart of Greenwich, and the Merritt 7 zone (Figure 8).

From Norwalk to Milford, jobs are concentrated along major highways, railway networks, and downtown cores. There is greater job density in (see Figure 9):

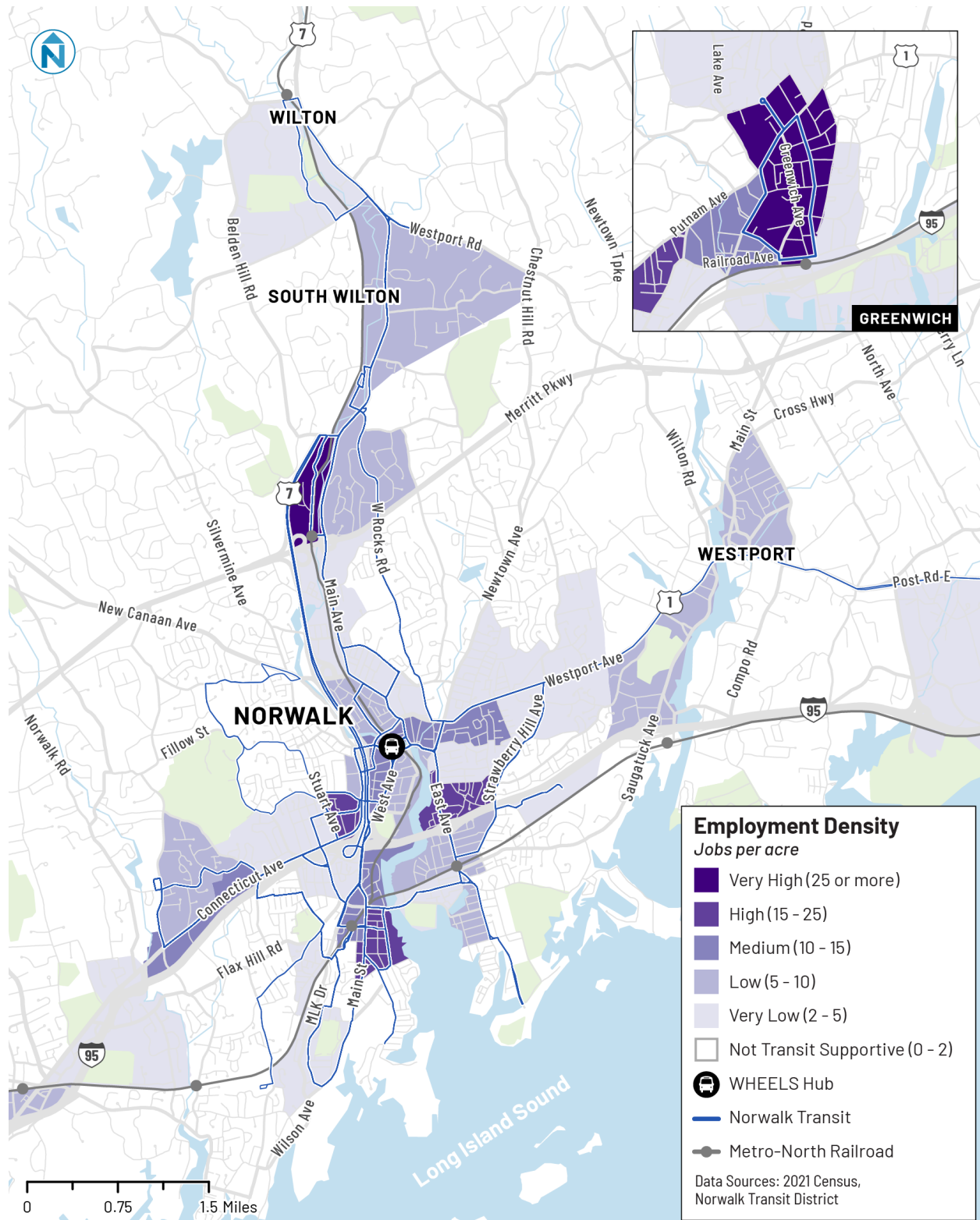
- Merritt 7
- Norwalk Center
- areas close to Connecticut Avenue and Main Street
- along Main Street in Westport and
- along Greenwich Avenue in Greenwich

Figure 8 Employment Density: Regional



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Norwalk Transit District

Figure 9 Employment Density: Local



Composite Demand

Population density, socioeconomic characteristics, and employment density all influence the demand for public transit. Combining this information into one map, Composite Demand, provides a more holistic picture of the potential underlying demand for transit throughout the service area. It also captures areas with a mix of uses (residential, job centers, commercial areas) that can generate particularly high transit ridership.

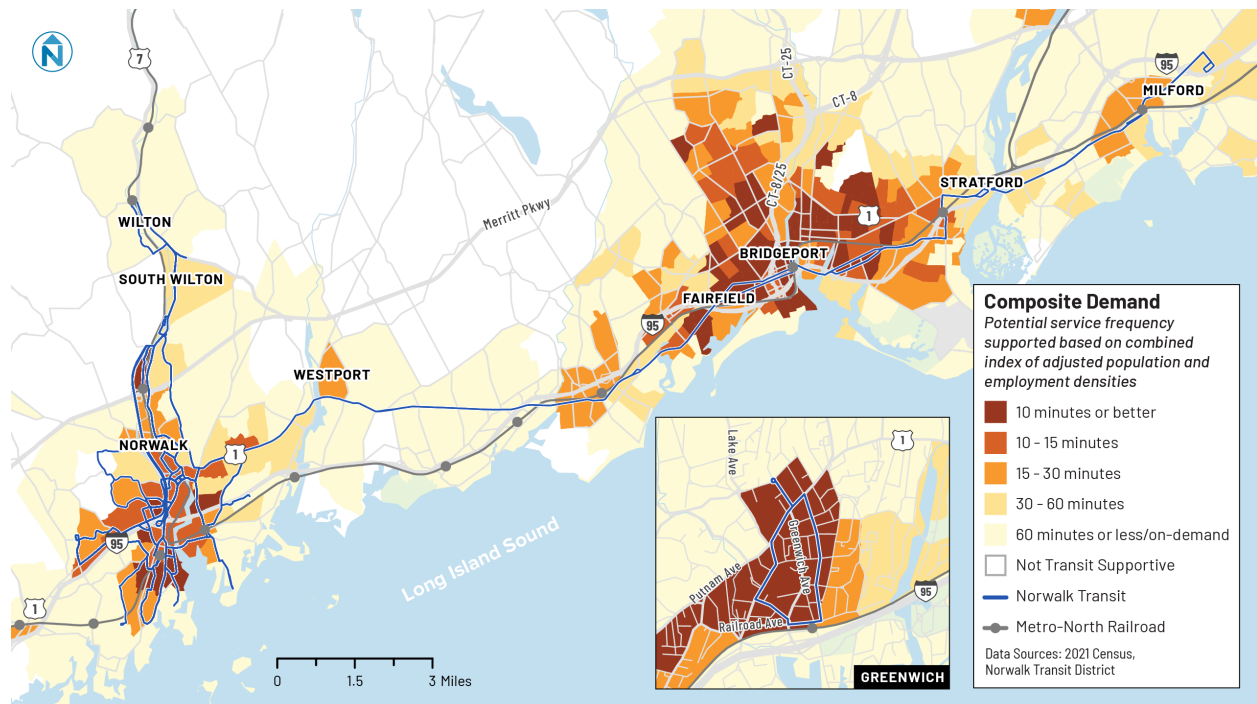
Norwalk, Fairfield, Bridgeport, Stratford, and Milford have areas with greater composite demand regionally (Figure 10).

As shown in Figure 11, most of Norwalk is supportive of fixed route transit and many areas can support transit service with frequencies of 30-minutes or better. The core of the city can support frequent transit every 10 to 15 minutes. Demand is greatest in:

- South Norwalk
- Merritt 7
- Along Main Street
- Along Connecticut Avenue

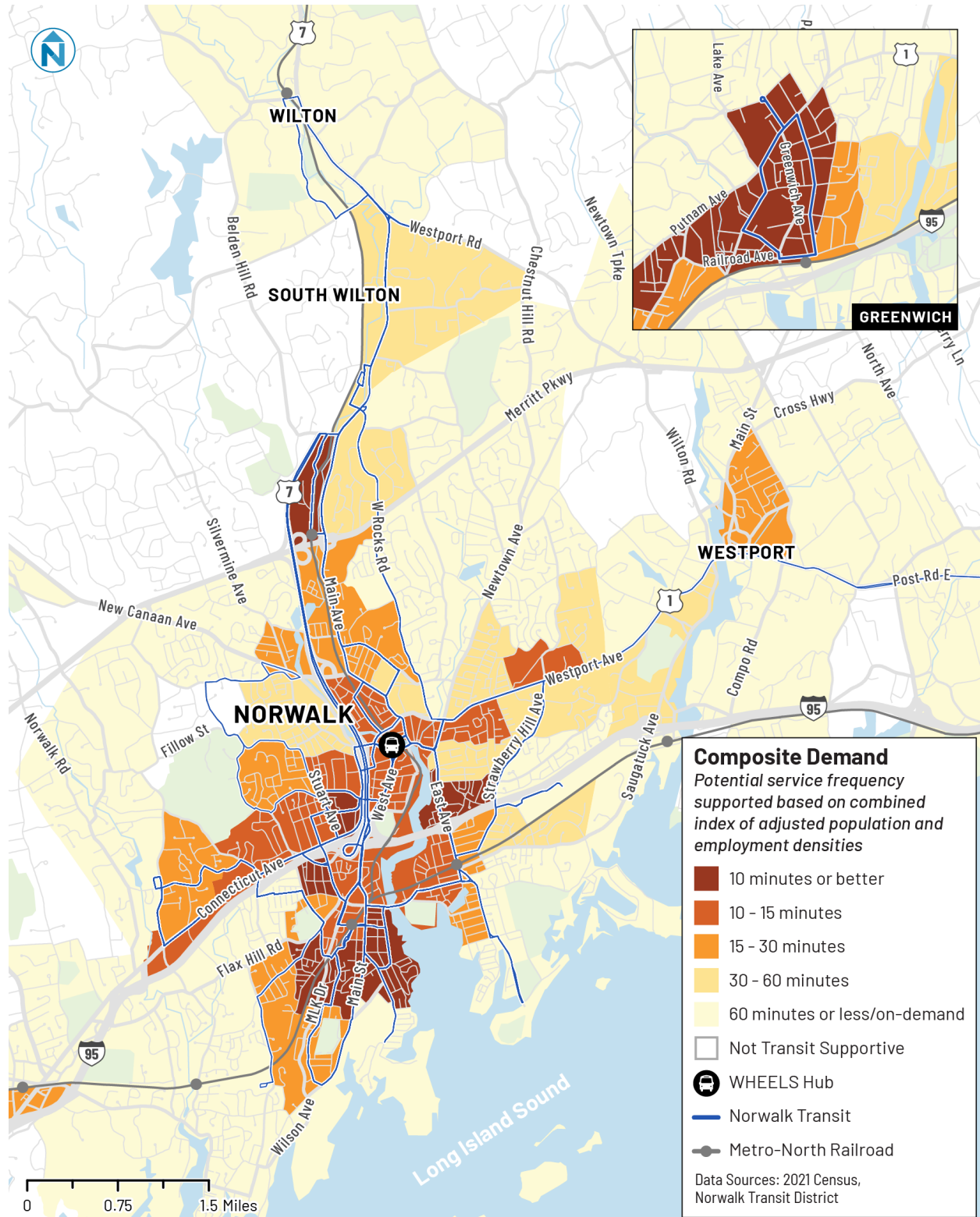
There are also pockets of greater demand along Westport Avenue in the east into Westport.

Figure 10 Composite Demand: Regional



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Norwalk Transit District

Figure 11 Composite Demand: Local



ACTIVITY CENTERS

Major activity centers are places such as shopping centers, hospitals, and schools that attract many people and trips. These places can generate demand for transit that may not be captured by analyses of underlying demand and may warrant transit service regardless of the underlying density where they are located. Figure 12 shows activity centers in and around Norwalk.

In Norwalk Transit District's service area, activity centers are generally well-served by transit. Notable activity centers are in South Norwalk and Norwalk Center, and along corridors that are served by transit such as: Main Avenue and Connecticut Avenue. The places that have less access to transit service are local K-12 schools in the community.

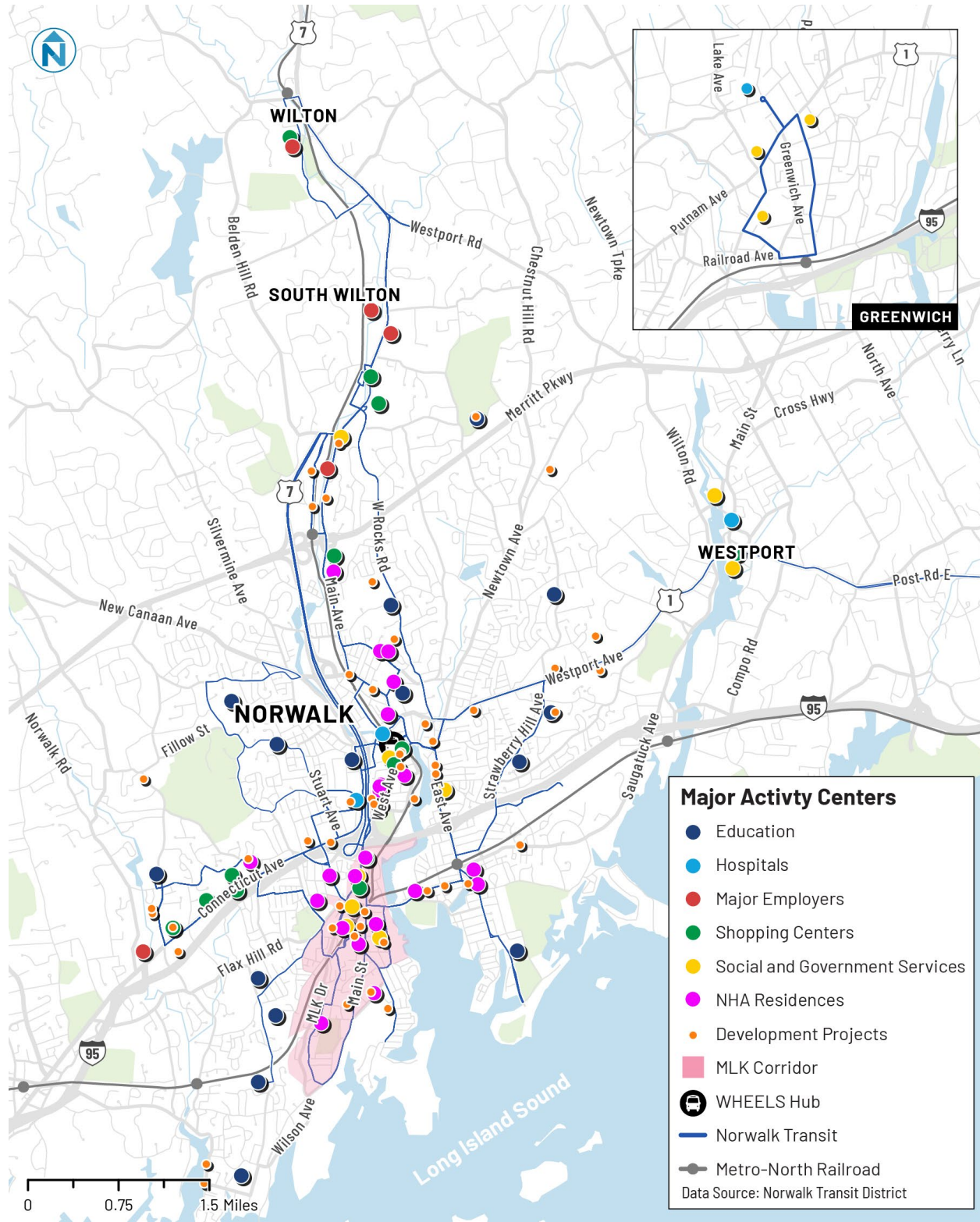
Norwalk Housing Authority (NHA) residences are generally served by NTD. There is also transit service within the MLK Corridor, an area where the South Norwalk Investment Program intends to invest in housing.¹ Most of the other development projects are in proximity to transit, but some are in areas without transit service.

Activity centers can also provide an idea as to when transit service may be warranted. Places such as hospitals may benefit from later or overnight services, while a shopping center may not need service very early in the morning.

¹ Norwalk Redevelopment Agency. Draft 7 of Redevelopment Projects Map (August 2, 2023)

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Norwalk Transit District

Figure 12 Major Activity Centers



TRAVEL PATTERNS

Analyzing how people are traveling between different areas regardless of mode can help us determine where there may be untapped demand for transit. Using Replica data, which models travel activity, we illustrate where people are traveling to within and around Norwalk. Using this information, we can identify significant connections transit could help facilitate.

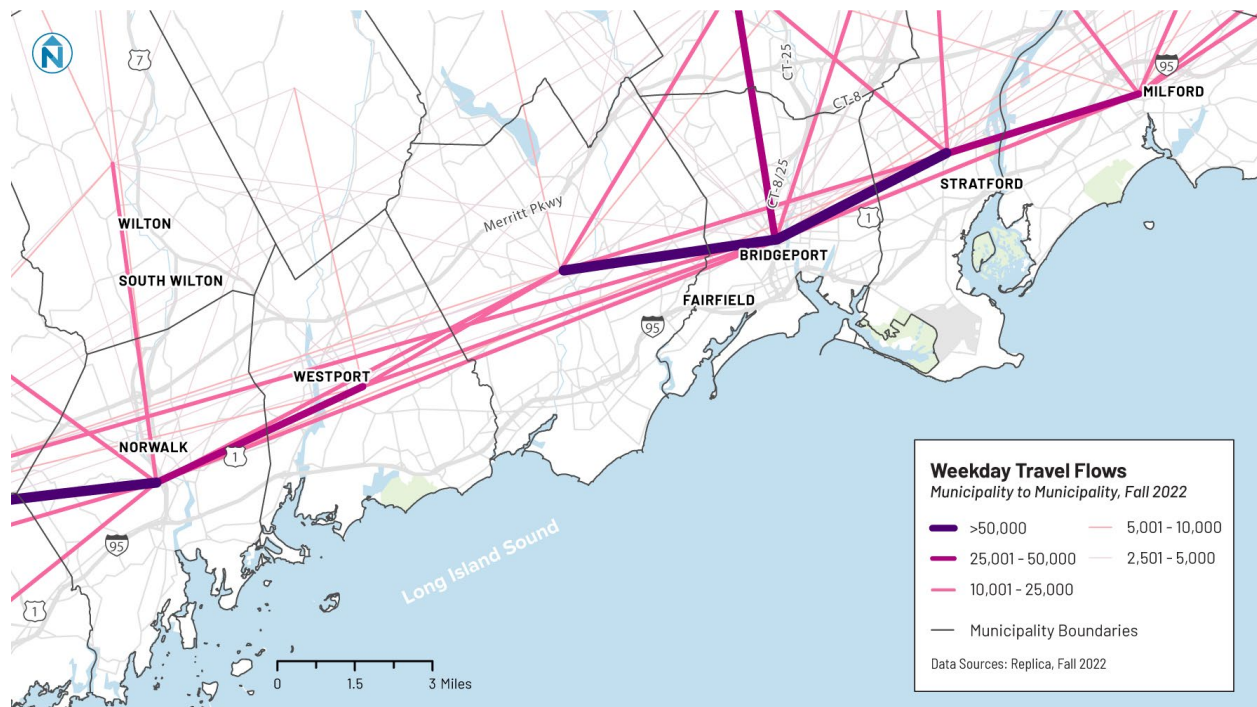
Regionally, there are strong east-west travel flows between coastal communities, especially involving Bridgeport (Figure 13). There are also significant travel flows between Norwalk and Stamford.

In NTD's service area (Figure 14), areas with commercial corridors have notable travel activity:

- There is a lot of activity to and from western Norwalk, an area with shopping along Connecticut Avenue and Norwalk Community College.
- People throughout the community are also traveling to northeastern Norwalk, which has shopping, office buildings, and apartments along Main Avenue.

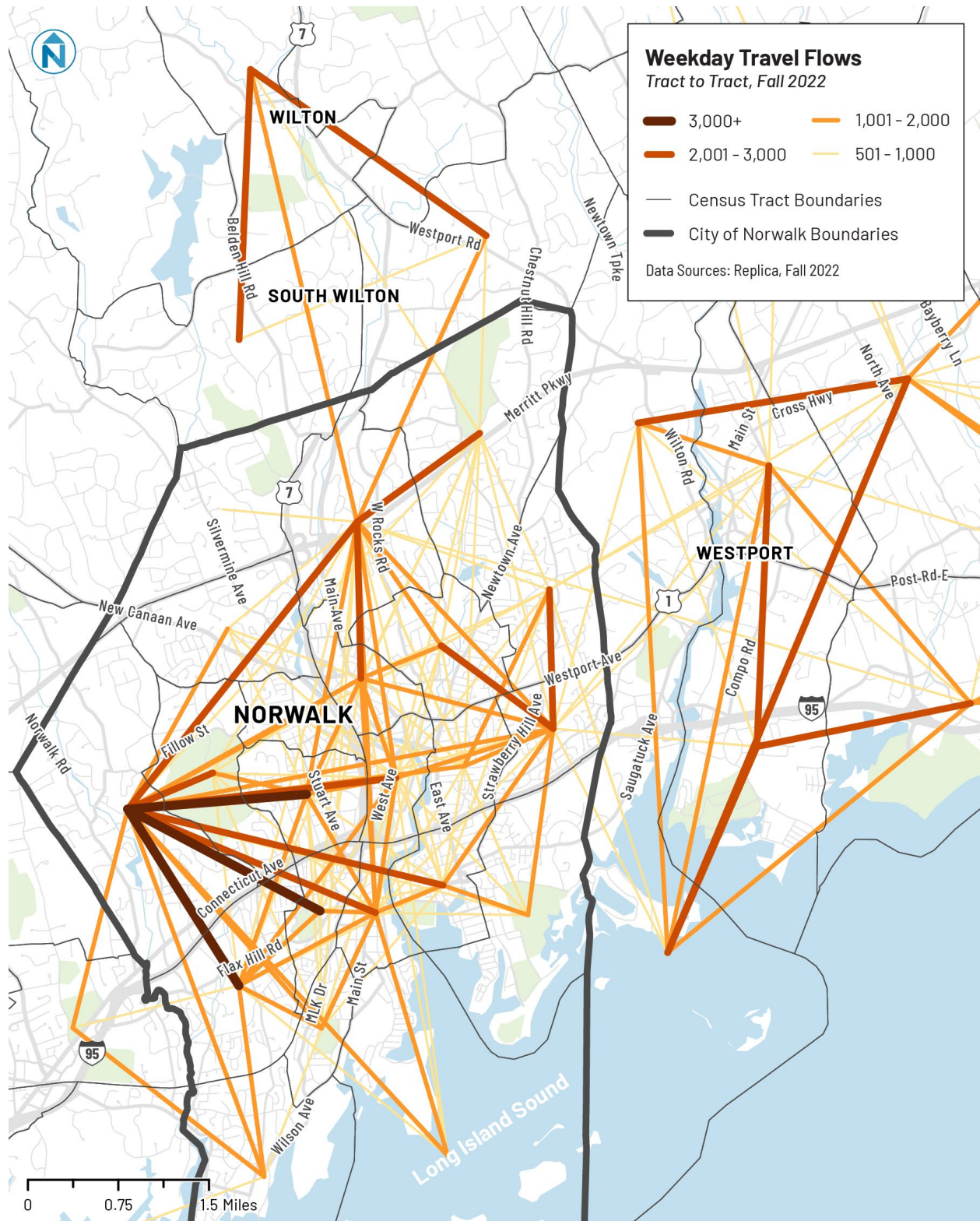
While Norwalk and Westport show a regional connection that is important (Figure 13), when viewed at a smaller scale (Figure 14), there is not a Norwalk and Westport census tract pair with relatively large travel flows between them.

Figure 13 Regional Weekday Travel Flows



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Figure 14 Local Weekday Travel Flows



3 ANALYSIS OF EXISTING SERVICES

This chapter provides an overview of the services NTD offers and transit facilities in the system, and an analysis of how the system is performing. Discussions in this chapter include:

- Service types and design
- Span and frequency of service
- Ridership metrics
- Facilities, fleet, and fare structure overview

The statistics regarding the Coastal Link describe the service Norwalk Transit District provides. Coastal Link data from NTD's transit partners was not included in the analysis.

This chapter is accompanied by route profiles, an in-depth analysis of each bus and shuttle route (see **APPENDIX A**).

SYSTEM OVERVIEW

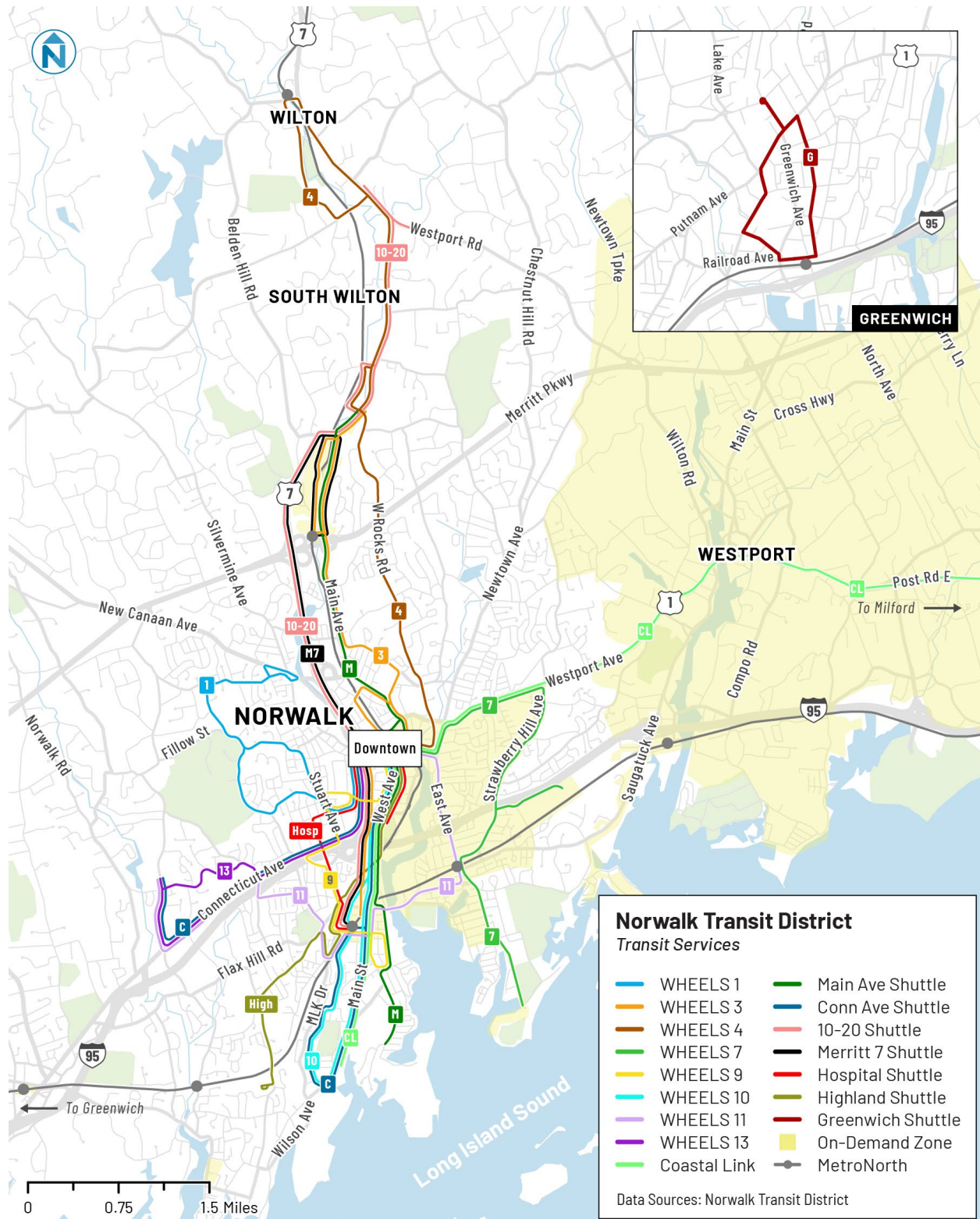
NTD provides fixed-route bus and shuttle services, on-demand shuttle services in Norwalk and Westport, and paratransit services and services for Older Adults that vary from community to community. The system is made up of 9 bus routes, 8 shuttle routes, and 2 on-demand shuttle zones (Figure 15). In 2022, nearly 1.4 million unlinked passenger trips were made.²

Much of NTD's service is designed to connect people with downtown Norwalk and Metro-North services. The network is radial, with most bus and shuttle routes serving and pulsing from WHEELS Hub in downtown Norwalk. Two shuttles provide connections to Metro-North service, and bypass downtown Norwalk to do so. The Greenwich Shuttle route does not operate in Norwalk at all.

² Federal Transit Administration, National Transit Database

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Norwalk Transit District

Figure 15 Norwalk Transit District Services



Bus Routes

There are 9 bus routes: 8 local WHEELS bus routes and the Coastal Link, a regional service. WHEELS Routes 1, 3, 4, 7, 9, 10, 11, and 13 serve Norwalk and Wilton in a pulse system, with timed transfers every 20 minutes between routes at the WHEELS Hub. Buses wait for each other so that riders can transfer more easily between them. The Coastal Link is a regional route that NTD operates with Greater Bridgeport Transit and Milford Transit. It serves Norwalk, Westport, Fairfield, Bridgeport, Stratford, and Milford.

Shuttles

Five Commuter Shuttles connect people to and from Metro-North stations:

- 10-20 Westport Rd Shuttle
- Merritt 7 Commuter Shuttle
- Norwalk Hospital Commuter Shuttle
- SNRR/Highland Avenue Express Shuttle
- Greenwich Central Loop Commuter Shuttle

Two Evening & Weekend Shuttles serve Norwalk:

- Conn Avenue Shuttle
- Main Avenue Shuttle

Wheels2U Service

Wheels 2U is NTD's on-demand shuttle (or microtransit) service. There are 2 zones:

- Wheels 2U Norwalk – operating Thursday to Sunday, trips can be made within the service area which includes two points outside of Norwalk: a drop-off/pick-up location in Rowayton and Darien Train Station.
- Wheels 2U Westport – operating on weekdays, all trips must begin or end at either the Saugatuck or Green Farms Metro-North stations.

Paratransit & Senior Services

NTD provides Paratransit and Senior Services to multiple communities in Connecticut (Figure 16).

Figure 16 Paratransit & Senior Services

| Norwalk | Westport | Stamford | Wilton |
|-----------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> ▪ Dispatch-A-Ride/Norwalk ADA ▪ Rider's Choice | <ul style="list-style-type: none"> ▪ Westport: A Town-to-Town service ▪ Westport Elderly & Disabled | <ul style="list-style-type: none"> ▪ Easy Access/Stamford ADA | <ul style="list-style-type: none"> ▪ Town to Town Wilton (Medical Trips) |

Route Design

NTD operates as a pulse system, with most buses beginning and ending their trips at the WHEELS Hub. Some routes also have less direct alignments than they could have, meaning the pathway between the beginning and end of the route is not as simple as it could be. Many WHEELS routes operate with loops, for example, Route 10 operates as a loop through South Norwalk and Route 4 loops through Wilton to begin operating south to Norwalk.

There is some service duplication in NTD’s network. For example, the Merritt 7 and 10-20 Westport Road shuttles have very similar alignments, along a corridor also served by WHEELS bus routes. Additionally, the Night and Sunday shuttles operate on similar corridors as the WHEELS bus routes, but with entirely different branding and schedules.

For more discussion on the design of individual routes, see **Appendix A**.

Neighboring Transit Systems

NTD is one of several transit providers operating in Southern Connecticut, which is served by other bus and rail providers.

Westport Transit District

NTD manages and operates transit services in Westport. Wheels2U Westport provides on-demand service between Westport and the Saugatuck and Greens Farms train stations. The Coastal Link bus makes stops in Westport and provides service to Norwalk, Fairfield, Bridgeport, Stratford, and Milford. NTD operates two ADA paratransit services in Westport: Town to Town Westport and Westport Elderly & Disabled.

CTrail/Metro-North

CTrail, operating on Metro North’s New Haven Line, serves Norwalk Transit District’s service area, making stops at 8 stations in the area. Metro North connects people to places such as New York City, New Haven, and Danbury.

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Norwalk Transit District**

NTD connects to Metro-North service at the following stations: South Norwalk, Saugatuck Station, Green Farms Station, and Greenwich Station. Coastal Link Service provides connections to Fairfield, Bridgeport, Stratford, and Milford Stations. Wheels2U also serves Darien Station.

CTtransit

CTtransit provides transit services throughout Connecticut. Bus Routes 341 and 345 connect Stamford and Norwalk.

HARtransit

HARtransit is a transit provider operating north of NTD. 7Link operates between Danbury and Norwalk.

Milford Transit District

Milford Transit District provides local bus service in Milford and is one of the partner agencies jointly providing Coastal Link service with NTD.

Greater Bridgeport Transit (GBT)

GBT provides local bus service in Bridgeport and the surrounding areas and is one of the partner agencies jointly providing Coastal Link service with NTD.

SPANS AND FREQUENCIES

Bus service levels are defined by two characteristics: span of service and frequency. These characteristics influence how convenient and available transit service is for people to use. Span of service refers to the hours that a bus route operates during the day. Service that runs early and later during the day is more convenient, allowing people to travel when they want. Frequency—how often the bus comes—has three primary benefits:

- **Reduces waiting time:** The frequency of a route represents the longest amount of time a customer would have to wait.
- **Makes transfers to other routes easy:** Routes that intersect frequently create easy connections and expand the reach of the overall network.
- **Improves service reliability:** In the event of a service disruption or breakdown, another bus will arrive sooner.

Weekday

On weekdays, WHEELS bus routes and the Coastal Link typically operate between 6 AM and 8 PM. Coastal Link has the longest span of service, with the last trip beginning just before 10 PM. Route 1 has the shortest span of service and a gap in service during the midday (Figure 17).

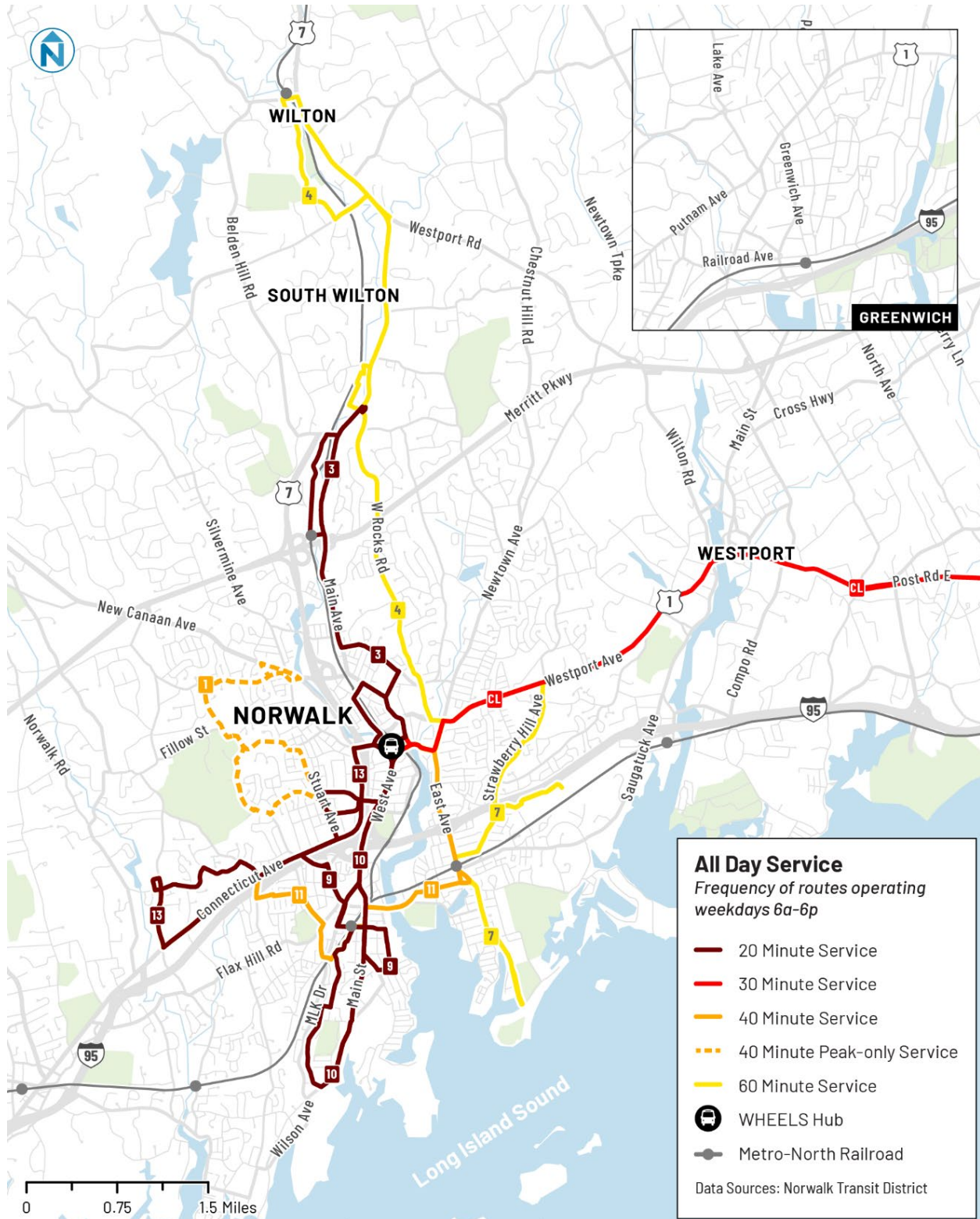
Routes generally have consistent frequencies all day, ranging from every 20 minutes to every 60 minutes. There is 20-minute service along north-south corridors and to the west (Routes 3, 9, 10, and 13, as shown in Figure 18). Coastal Link service operates every 30 minutes, except for the last hour.

Figure 17 Weekday Span of Service, WHEELS Bus & Coastal Link

| | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|--------------|---------|----|----|--------|----|----|----|----|---------|----|----|---------------|----|----|----|----|----|
| Name | AM PEAK | | | MIDDAY | | | | | PM PEAK | | | EVENING/NIGHT | | | | | |
| Route 1 | 40 | 40 | 40 | 40 | | | | 40 | 40 | 40 | 40 | 40 | | | | | |
| Route 3 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | | | |
| Route 4 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | | | | |
| Route 7 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | | | | |
| Route 9 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | | | |
| Route 10 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | | | |
| Route 11 | 40 | 20 | 20 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | | | |
| Route 13 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | | | |
| Coastal Link | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 60 |

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Norwalk Transit District

Figure 18 Weekday Frequency of Service



Saturday

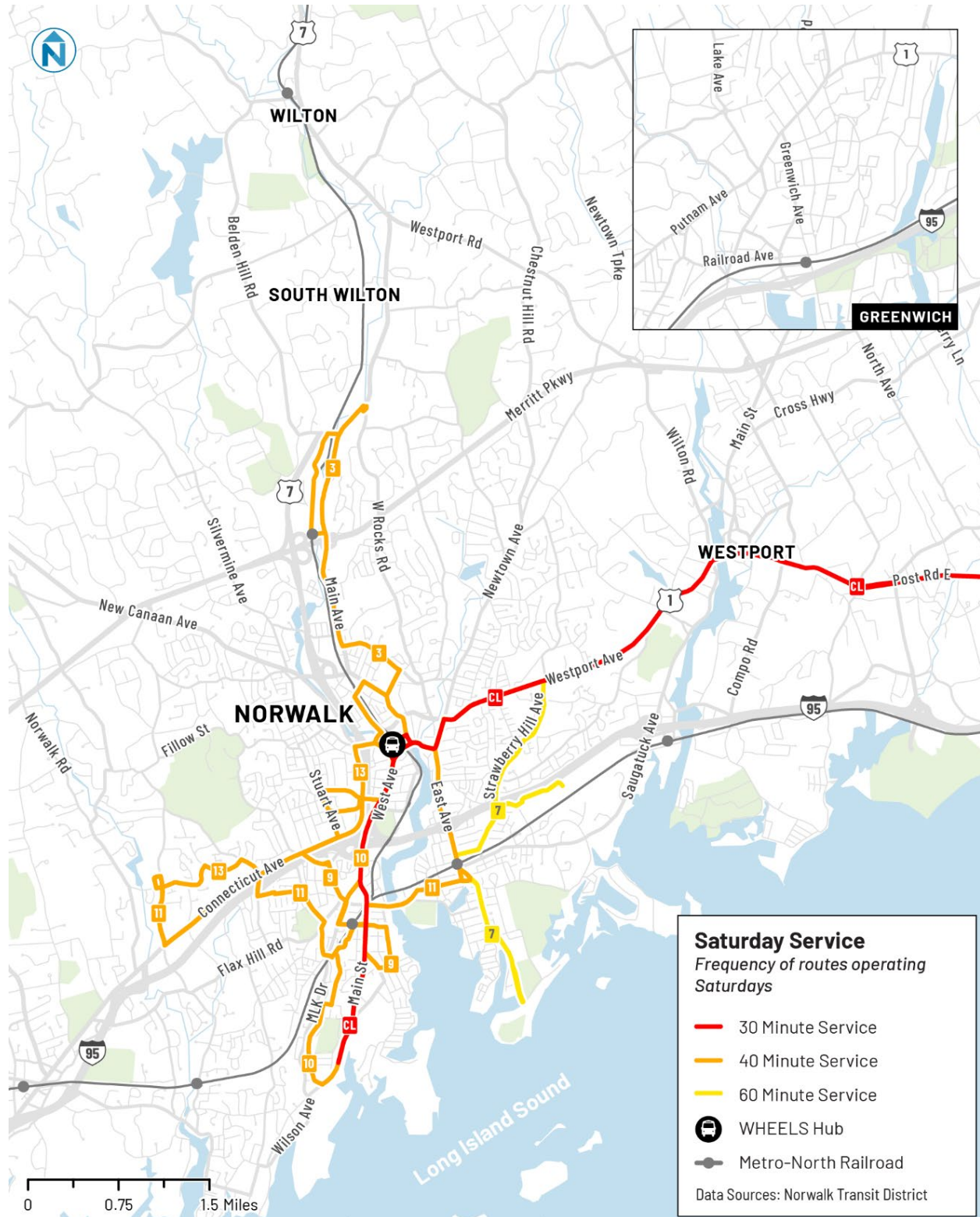
On Saturdays, WHEELS bus routes and Coastal Link bus service typically operate between 6 AM and 6 PM. Most routes (3, 9, 10, 11) operate with 40-minute service, while the Coastal Link runs 30-minute service most of the day and Route 7 offers hourly service (Figure 19). Because Routes 1 and 4 do not operate on Saturdays, there is no transit access in Wilton, South Wilton, West Norwalk (Figure 20).

Figure 19 Saturday Span of Service, WHEELS Bus & Coastal Link

| | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|--------------|---------|----|----|--------|----|----|----|----|----|---------|----|----|---------------|----|----|---|----|
| Name | AM PEAK | | | MIDDAY | | | | | | PM PEAK | | | EVENING/NIGHT | | | | |
| Route 3 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | | | | |
| Route 7 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | | | | |
| Route 9 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | | | | |
| Route 10 | | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | | | | |
| Route 11 | | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | | | | |
| Route 13 | | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | | | | |
| Coastal Link | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 60 | 60 | 60 | | |

NTD Ahead | State of the System
Norwalk Transit District

Figure 20 Saturday Frequency of Service



Commuter Shuttles

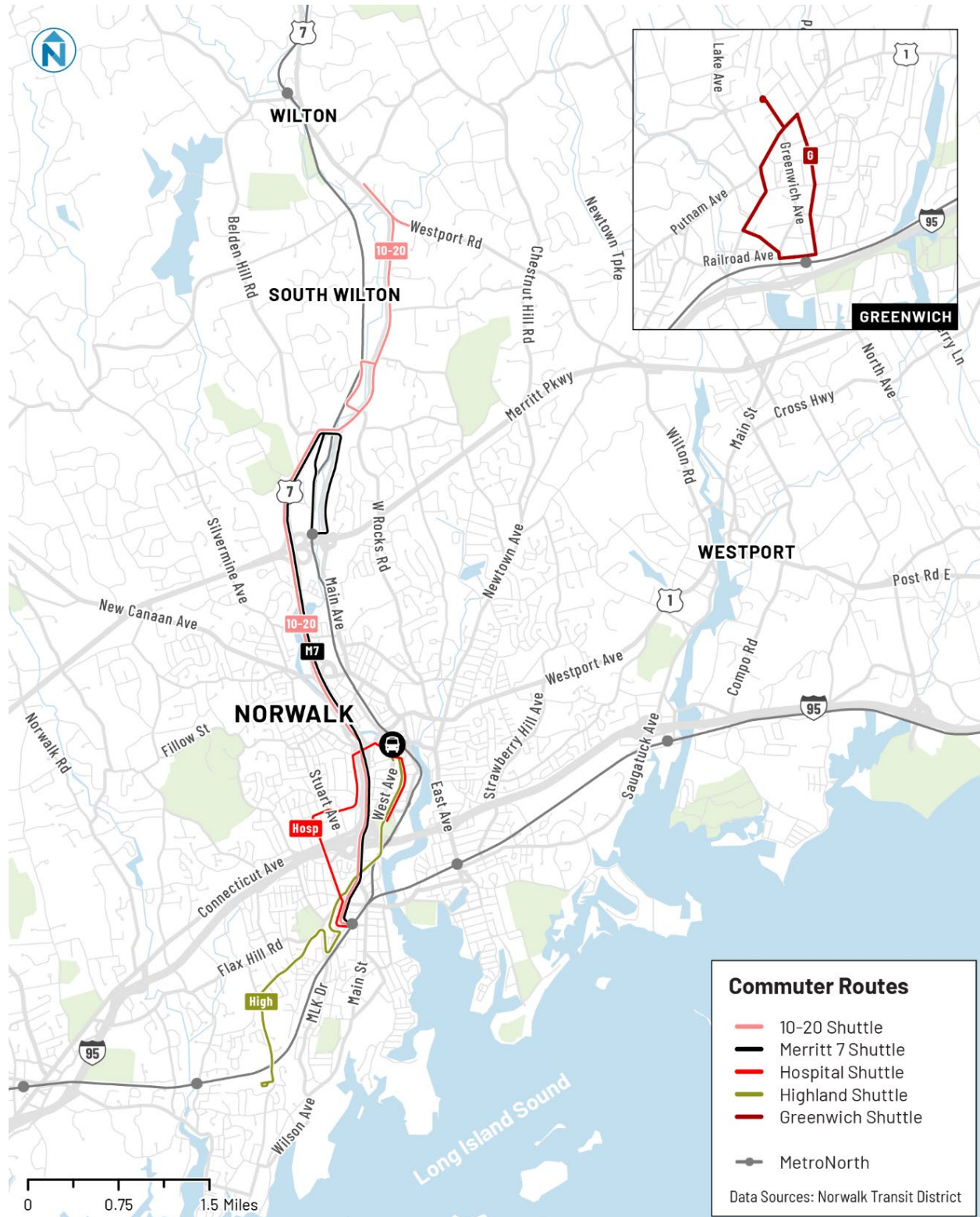
NTD’s commuter shuttles typically serve Metro-North Railroad Stations and are timed with Metro-North service. The commuter shuttles operate during weekday peak periods, running from 6 AM to 9 AM and again from 3 PM to 6 PM, with an average of 30-minute service. The SNRR/Highland Avenue Shuttle is an exception, with consistent 40-minute service from 6 AM to 9 AM and from 1 PM to 7 PM (Figure 21 and Figure 22).

Figure 21 Commuter Shuttle Span of Service

| | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|----------------|---------|----|----|--------|----|----|----|----|----|---------|----|----|---------------|----|---|---|----|
| Name | AM PEAK | | | MIDDAY | | | | | | PM PEAK | | | EVENING/NIGHT | | | | |
| Greenwich | | 30 | 30 | 30 | | | | | | | 30 | 30 | 30 | | | | |
| Hospital | 30 | 30 | 30 | 30 | | | | | | 30 | 30 | 30 | 30 | | | | |
| Merritt 7 | 30 | 30 | 30 | 30 | | | | | | | 30 | 30 | 30 | | | | |
| 10-20 Westport | | 30 | 30 | 30 | | | | | | | 30 | 30 | 30 | | | | |
| SNRR/Highland | 40 | 40 | 40 | 40 | | | | 40 | 40 | 40 | 40 | 40 | 40 | 40 | | | |

NTD Ahead | State of the System
Norwalk Transit District

Figure 22 Map of Commuter Shuttle Service



Nights & Sunday

The Main Avenue and Connecticut Avenue shuttles operate nights Monday to Saturday with hourly service between 6 PM and 8 PM. The two shuttles also operate Sundays between 9 AM and 8 PM every 80 minutes. The Coastal Link also runs on Sundays, providing hourly service between 9 AM and 7 PM (Figure 23).

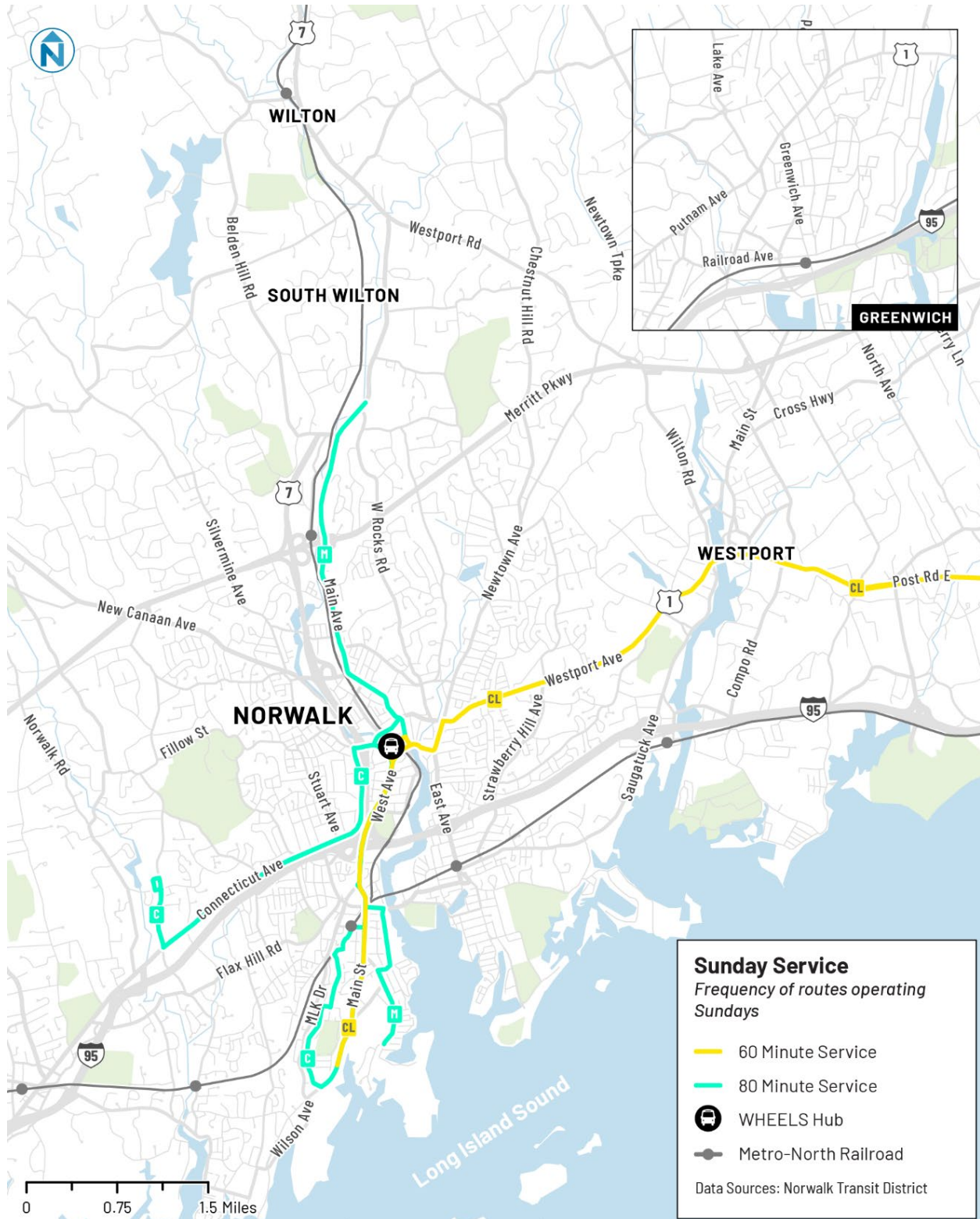
Because NTD service is limited on weeknights and Sundays, there is no transit access to Wilton, South Wilton, East Norwalk, and West Norwalk (Figure 24).

Figure 23 Nights & Sundays Span of Service

| | | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---------|--------------|---------|---|---|--------|----|----|----|----|----|---------|----|----|---------------|----|----|---|----|
| Name | | AM PEAK | | | MIDDAY | | | | | | PM PEAK | | | EVENING/NIGHT | | | | |
| Mon-Sat | Main Ave | | | | | | | | | | | | | 60 | 60 | 60 | | |
| | CT Ave | | | | | | | | | | | | | 60 | 60 | 60 | | |
| Sunday | CT Ave | | | | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | | | |
| | Main Ave | | | | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | | | |
| | Coastal Link | | | | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | | | | |

NTD Ahead | State of the System
Norwalk Transit District

Figure 24 Routes Operating Nights & Sundays



Wheels2U

Wheels2U Norwalk operates from 5 PM to 11 PM on Thursdays, Fridays, and Saturdays, and from noon to 9PM on Sundays. Wheels2U Westport operates at peak times on weekdays, from 5:45 AM to 10 AM and from 4 PM to 9:30 PM.

PERFORMANCE METRICS

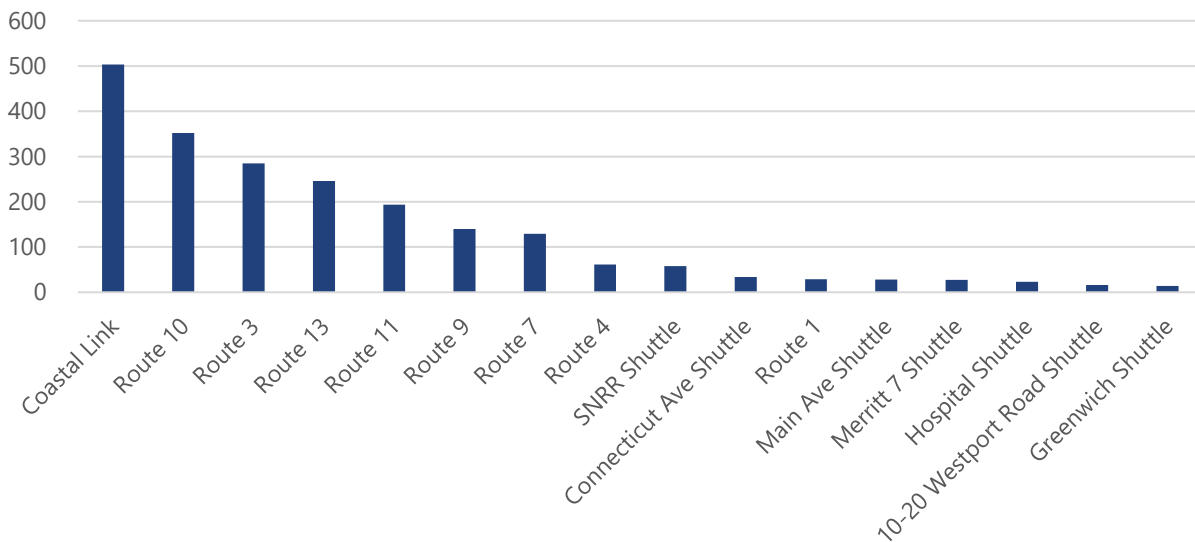
Fixed Route Ridership

Analyzing ridership and ridership trends is important for understanding a transit network and identifying opportunities to improve transit service. Examining ridership by route, location, and time of day helps indicate where services are working well, where additional service may be needed, and where there are opportunities for improvement.

Ridership by Route

NTD ridership varies by route. As shown in Figure 25, NTD's highest ridership weekday routes in May 2023 were the Coastal Link, followed by Route 10, and Route 3. Only Coastal Link ridership served by NTD is presented in this chart. The highest ridership local routes, Routes 10 and 3, both operate north to south, and combined, span Norwalk. NTD's commuter shuttles had the lowest average weekday ridership. The Greenwich and 10-20 Westport Road shuttles have the lowest ridership in the system.

Figure 25 Average Weekday Ridership by Route, May 2023

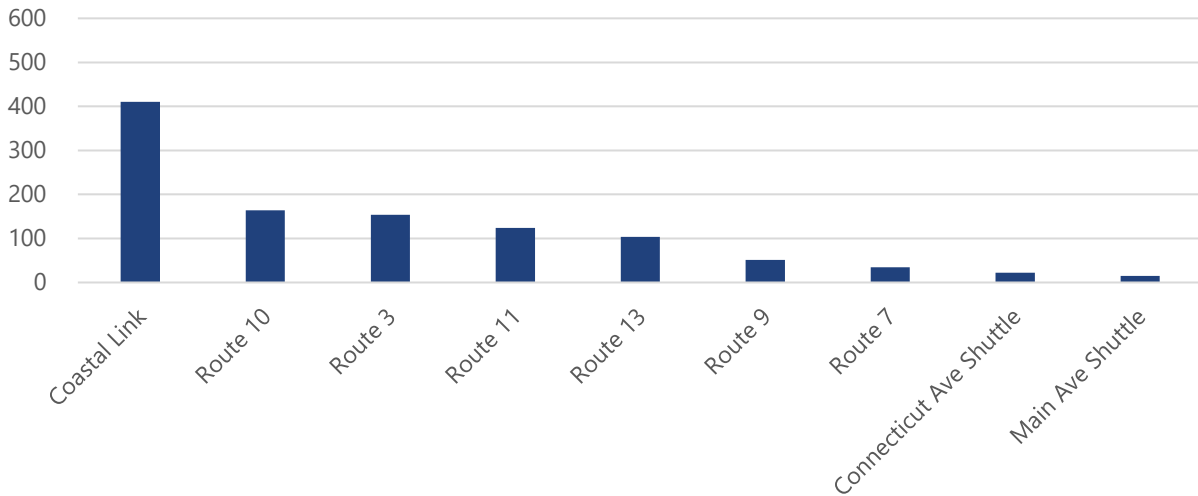


Source: Norwalk Transit District

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Norwalk Transit District

On Saturdays, the Coastal Link remains the highest ridership route, again followed by Route 10 and Route 3. The Connecticut Avenue and Main Avenue shuttles have the lowest Saturday ridership (Figure 26).

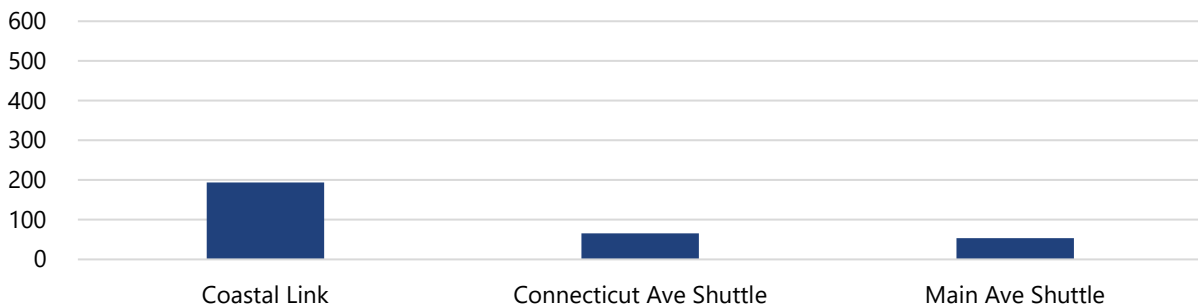
Figure 26 Average Saturday Ridership by Route, May 2023



Source: Norwalk Transit District

In Figure 27, the Coastal Link leads Sunday ridership with an average of 200 riders while Connecticut Avenue and Main Avenue shuttles average around 60 riders.

Figure 27 Average Sunday Ridership by Route, May 2023



Source: Norwalk Transit District

Ridership by Stop

Ridership activity throughout NTD's service also varies (Figure 28). Unsurprisingly, there is a concentration of activity around the WHEELS hub. Other high ridership locations include:

- South Norwalk
- Medical District

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Norwalk Transit District**

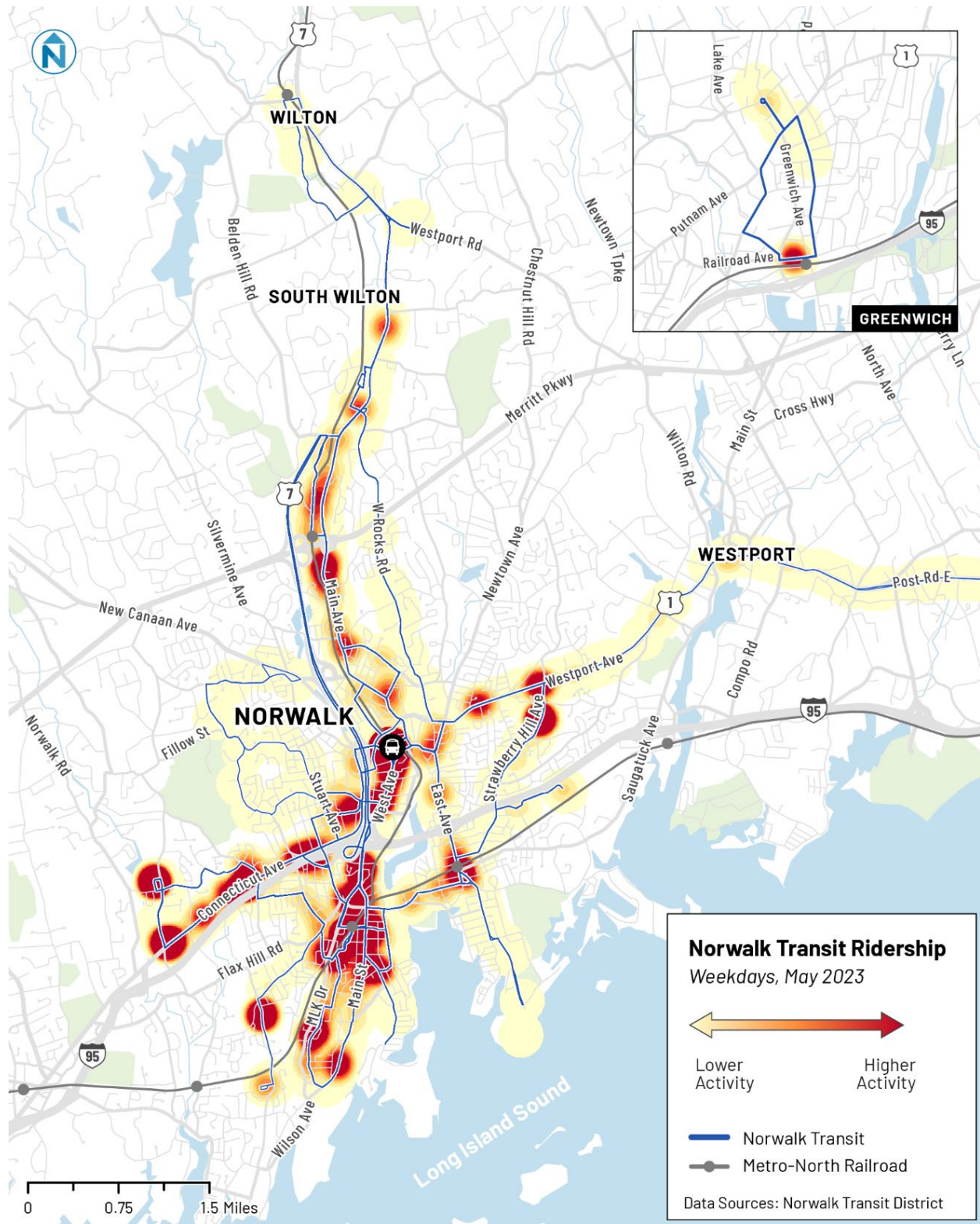
- The Connecticut Avenue corridor
- and Main Avenue near Merritt 7

Ridership is lower in places such as:

- Wilton
- West Rocks Road portion of Wheels Route 4
- along WHEELS Route 1

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Norwalk Transit District

Figure 28 Transit Ridership Activity

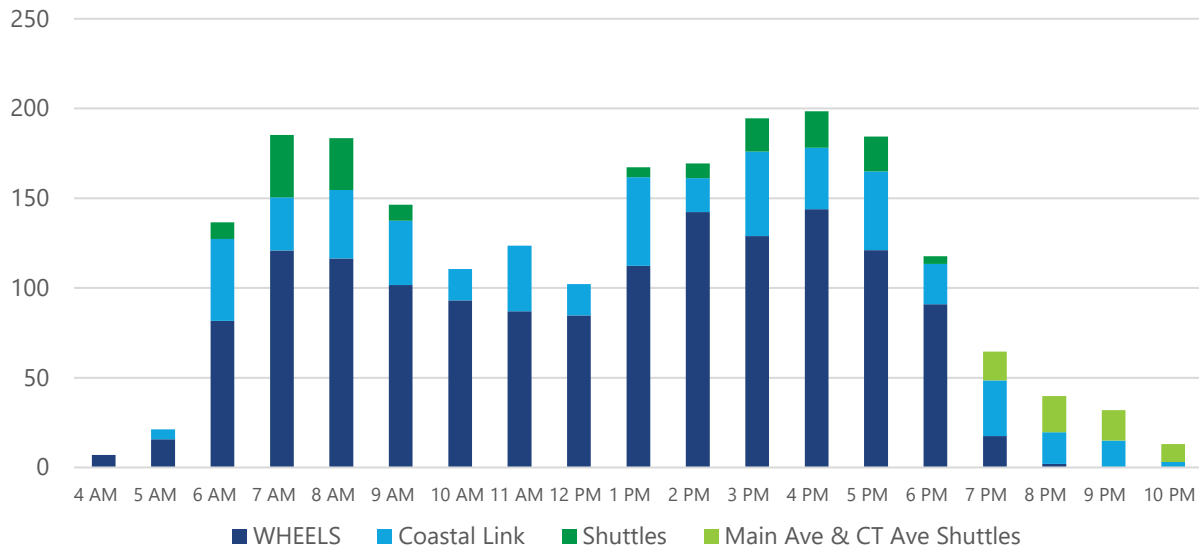


Ridership by Time of Day

Weekday

For much of the day, between 100 and 200 passengers are served an hour, as shown in Figure 29. Weekday ridership is highest during the AM and PM rush hours, peaking at 4 PM with 198 riders. On average, PM peak ridership is slightly higher than AM peak ridership. During weekdays, commuter shuttle service peaks during the 7 AM and 8 AM hours while Coastal Link ridership remains relatively consistent throughout the day. Overall, NTD service maintains a relatively high level of ridership during the midday.

Figure 29 Average Weekday Ridership by Hour



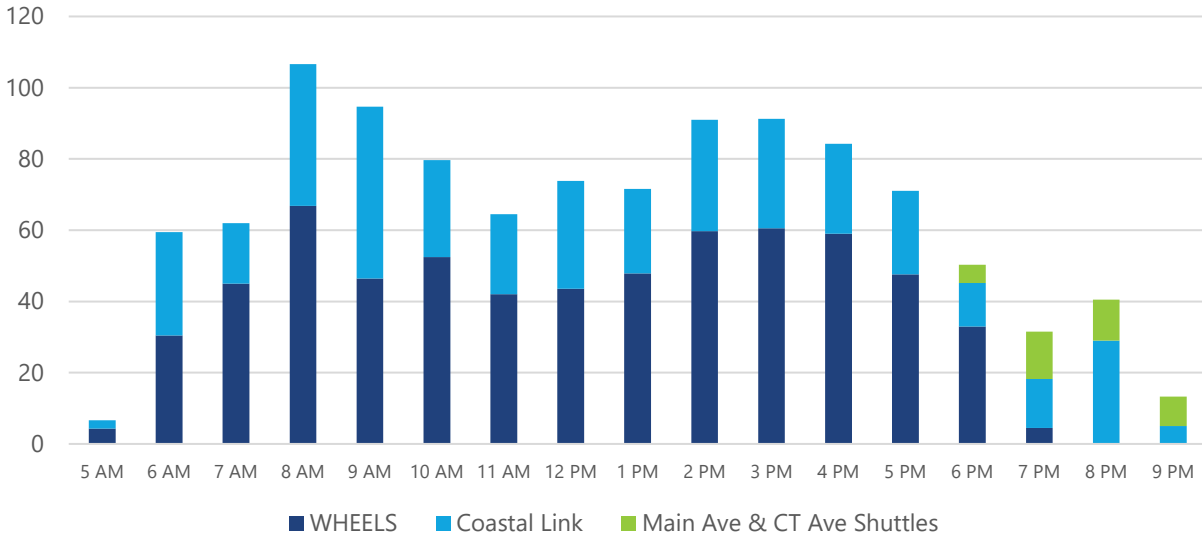
Source: Norwalk Transit District, May 2023

Saturday

Average Saturday ridership is greatest between 8 AM and 10 AM and 2 PM to 4 PM, as shown in Figure 30. The Main Avenue and Connecticut Avenue Shuttles average 10 passengers per hour on Saturdays, and commuter shuttles do not operate. Coastal Link ridership peaks around 9 AM every day but remains relatively high until around 6pm.

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Norwalk Transit District**

Figure 30 Average Saturday Ridership by Hour

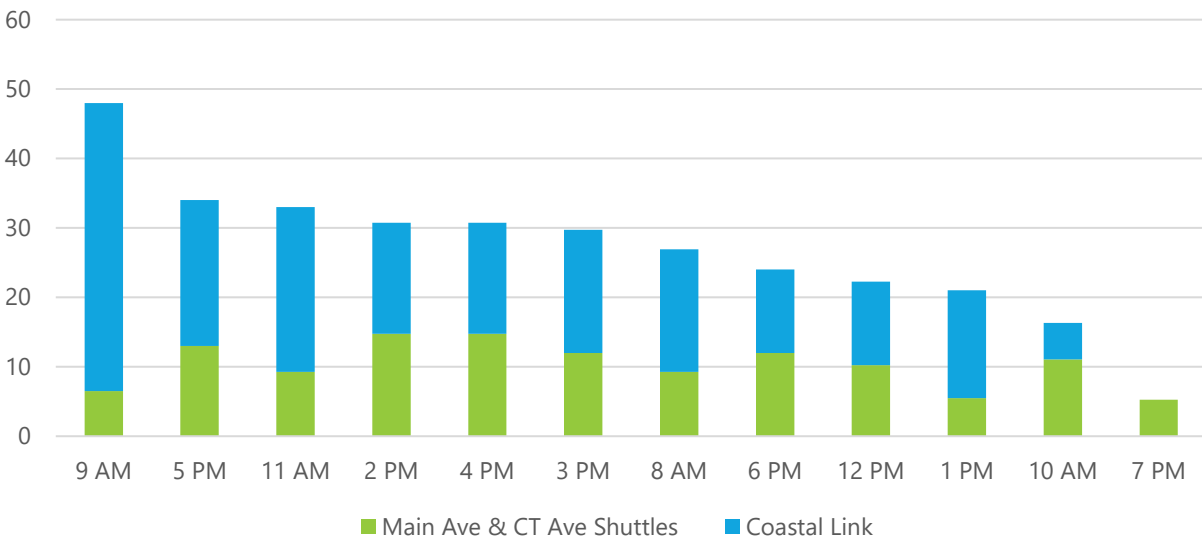


Source: Norwalk Transit District, May 2023

Sunday

Average Sunday ridership peaks at 9 AM, led by the Coastal Link’s ridership peak at 9 AM, as shown in Figure 31. Outside of the AM peak, the Coastal Link generally maintains steady ridership, with an average of 16 passengers per hour. The shuttles have relatively consistent ridership throughout the day, with between 5 and 15 passengers per hour. WHEELS Bus does not operate on Sunday.

Figure 31 Average Sunday Ridership by Hour



Source: Norwalk Transit District, May 2023

Wheels2U Ridership

Wheels2U Westport has greater ridership activity than Wheels2U Norwalk, with over 7,000 passenger trips made from January through March of 2023 compared to over 760 trips made by WHEELS2U Norwalk. However, both services have similar levels of productivity, serving 1 to 2 passengers per vehicle hour. The similar levels of productivity can be ascribed to the fact that Wheels2U Westport operates with 7 vehicles in service, whereas Wheels2U Norwalk operates with 2 vehicles in service.

Wheels2U Norwalk

Between January and March 2023, Wheels2U Norwalk completed 762 trips, with an average of 18 riders per service day. Figure 32 to Figure 34 show average ridership by time of day.

Figure 32 Average Weekday Norwalk Ridership

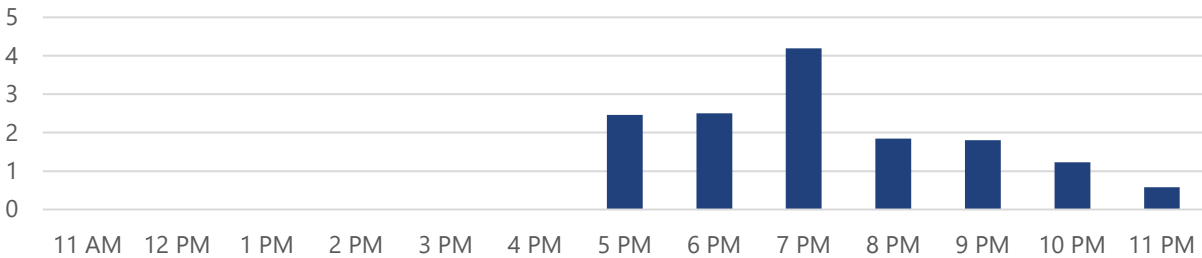


Figure 33 Average Saturday Norwalk Ridership

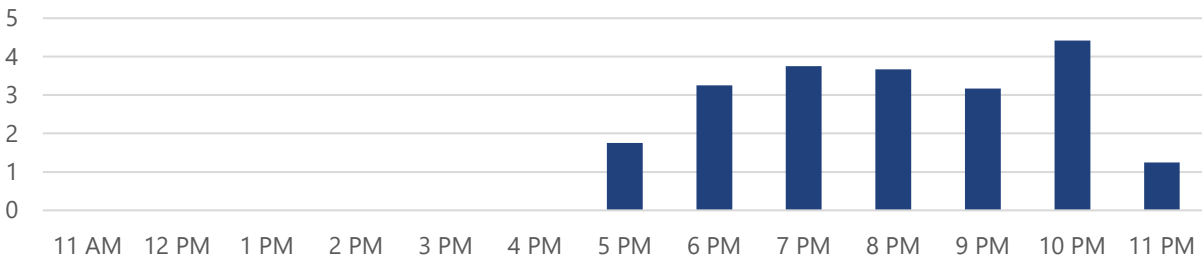
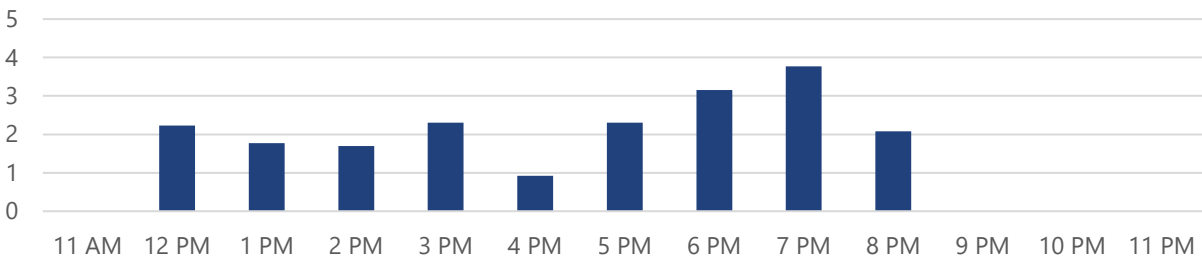


Figure 34 Average Sunday Norwalk Ridership

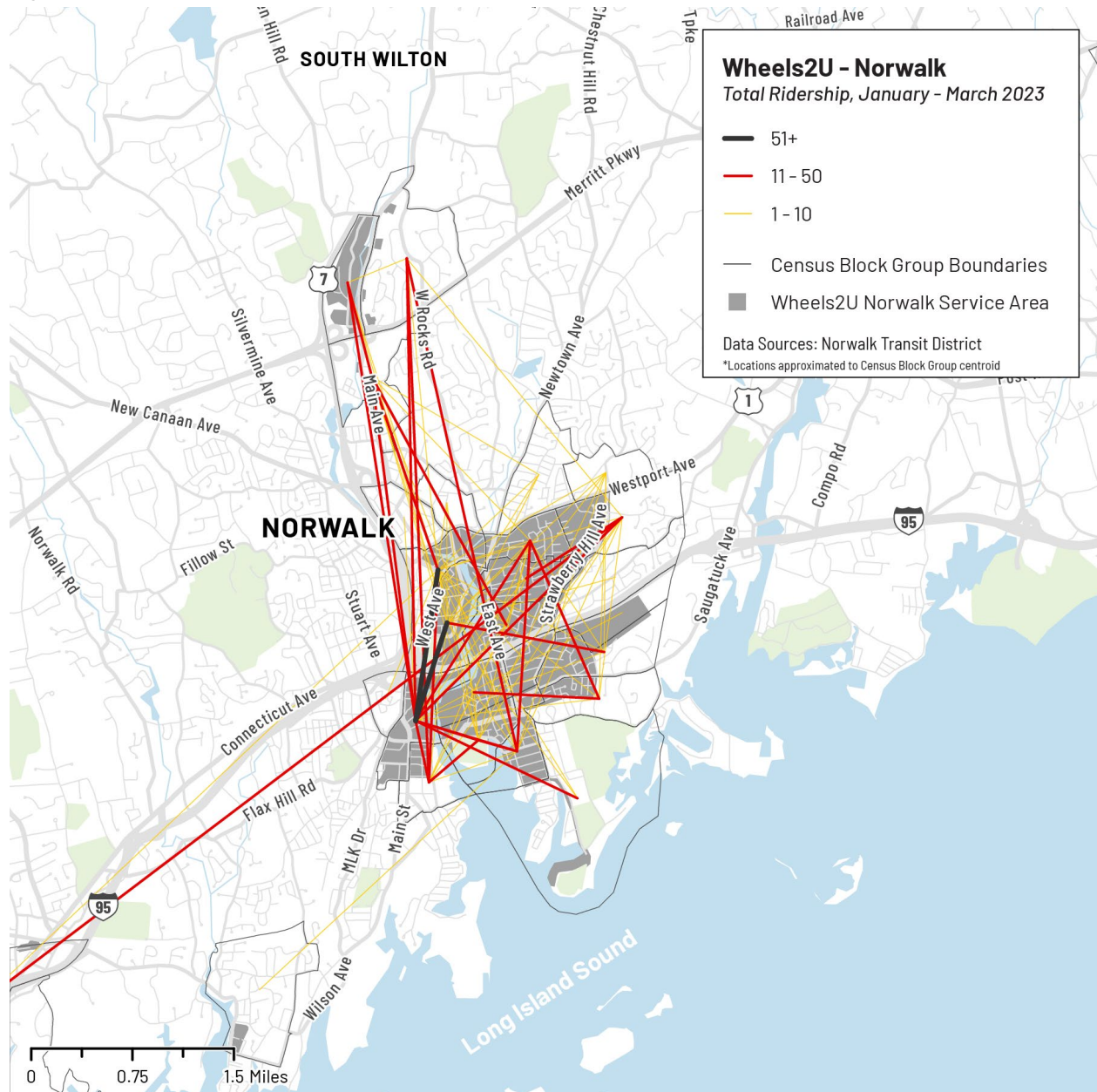


Source: Norwalk Transit District., January – March 2023

NTD Ahead | State of the System
Norwalk Transit District

Figure 35 shows the amount of travel between the census block groups within the Wheels2U Norwalk service area. There is ridership throughout the zone, with the greatest connections at South Norwalk Railroad station.

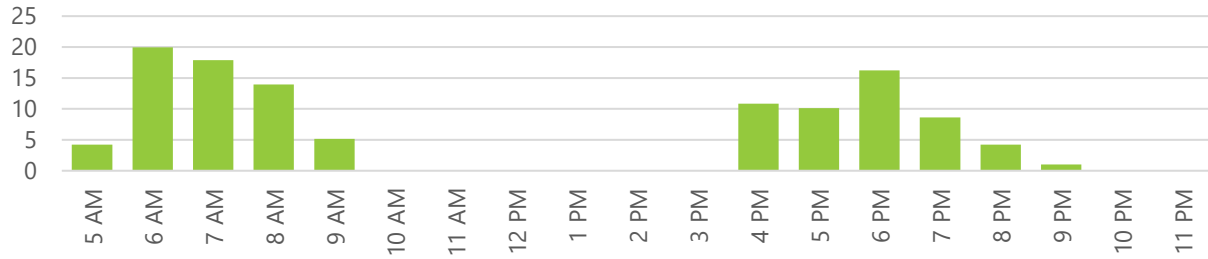
Figure 35 Wheels2U Norwalk Travel Flows



Wheels2U Westport

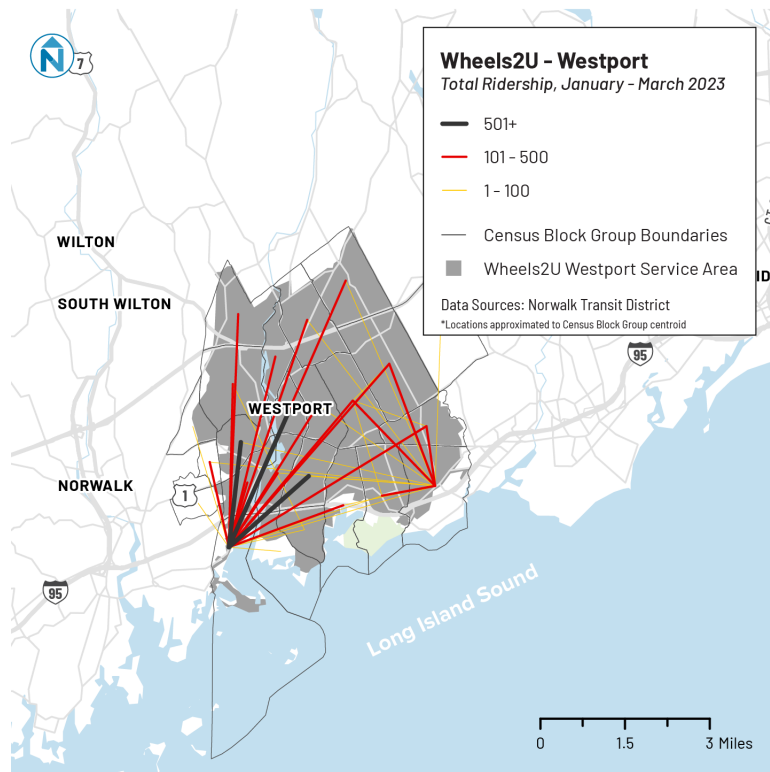
Between January and March 2023, Wheels2U Westport completed 7,224 trips, averaging 116 riders per service day. Figure 36 shows the average ridership by time of day.

Figure 36 Average Weekday Westport Ridership



As shown in Figure 37, most Wheels2U Westport trips start or end at the Westport train station.

Figure 37 Wheels2U Westport Travel Flows

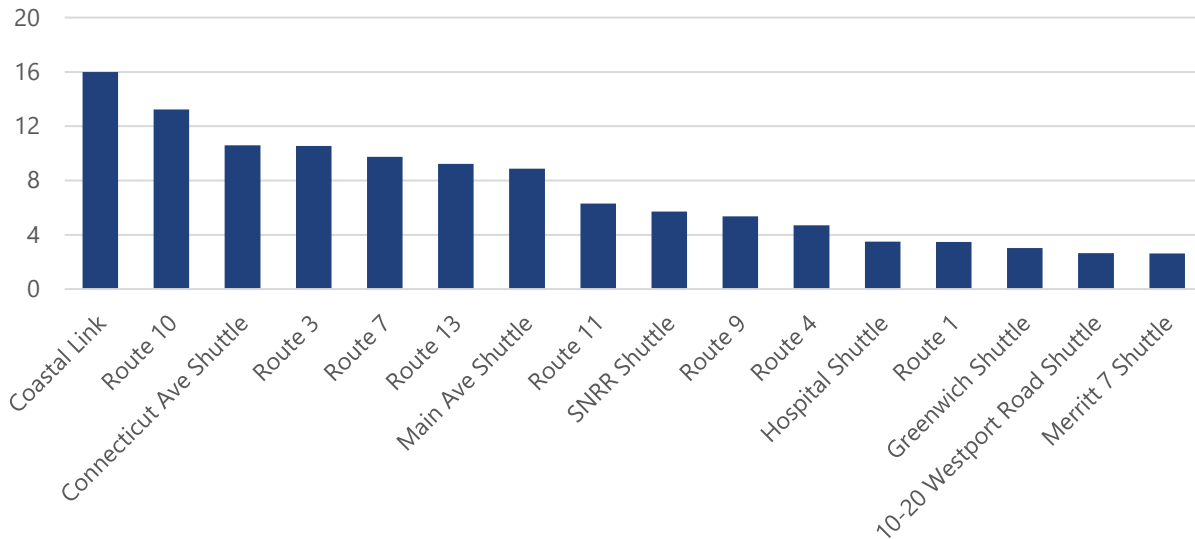


Bus and Shuttle Productivity

Passengers served per vehicle revenue hour is one measure of productivity. It communicates the amount of ridership a service gets (the number of trips taken) per the amount of service that is provided (for every hour of service).

On weekdays, the average number of passengers served per revenue hour ranges from 3 to 16 for NTD's bus routes. Coastal Link, Route 10, and Connecticut Avenue Shuttle have the highest productivity (Figure 38). The commuter shuttles have the lowest productivity (measured by passengers per vehicle hour). Merritt 7 Shuttle is the least productive service, serving 3 riders per revenue hour.

Figure 38 Average Weekday Boardings per Revenue Hour

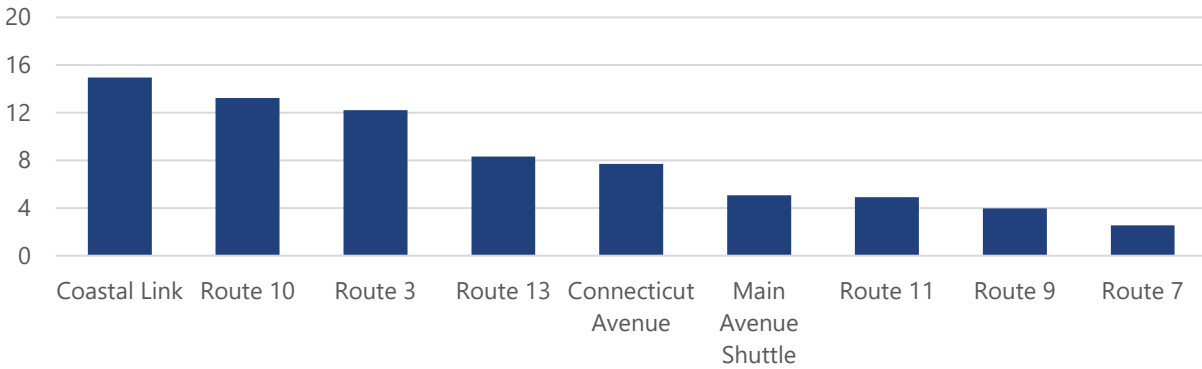


Source: Norwalk Transit District, May 2023

NTD Ahead | State of the System
Norwalk Transit District

The Coastal Link remains the most productive route on Saturdays, followed by Route 10 and Route 3. Routes 9 and 7 are the least productive Saturday routes on average (Figure 39).

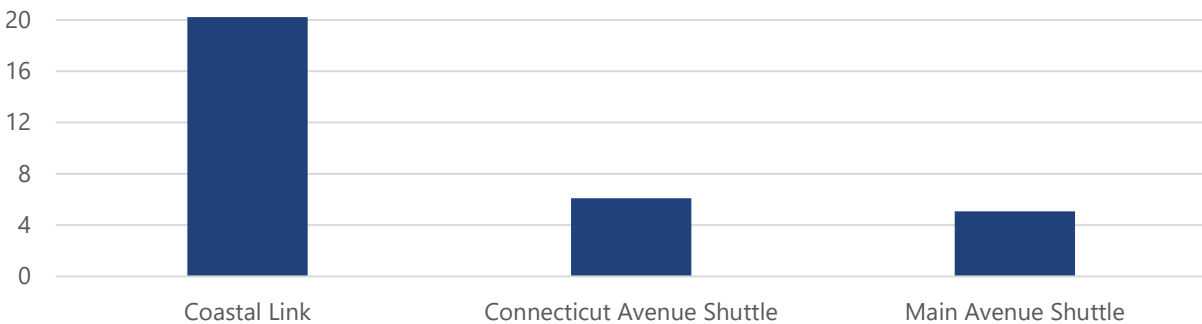
Figure 39 Average Saturday Boardings per Revenue Hour



Source: Norwalk Transit District, May 2023

On Sundays, the Coastal Link is much more productive than Connective Avenue and Main Avenue Shuttles (Figure 40).

Figure 40 Average Sunday Boardings per Revenue Hour



Source: Norwalk Transit District, May 2023

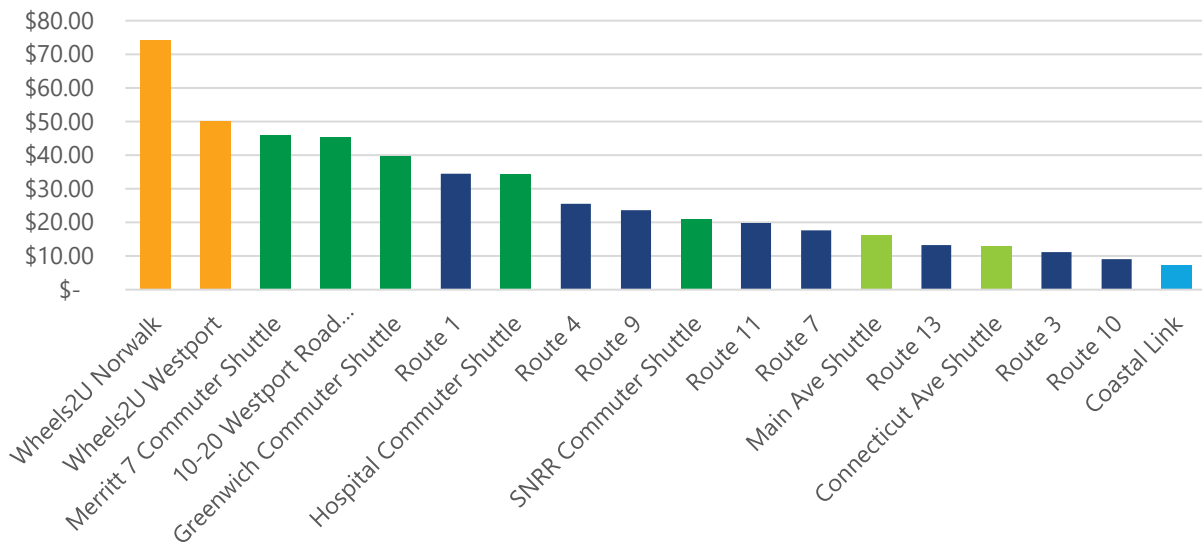
Wheels2U Productivity

Between January and March 2023, Wheels2U Norwalk operated with two vehicles, and Wheels2U Westport operated with seven vehicles. The Norwalk service averaged 1.1 passengers per vehicle hour, while the Westport service averaged 1.7 passengers per vehicle hour. This productivity is lower than any WHEELS bus or shuttle route in the system.

Cost Efficiency

Another way to measure the productivity of a route is to analyze the cost per passenger trip of each route. As shown in Figure 41, the amount that NTD spends per rider varies by route, ranging from an average of \$7 to \$74 per passenger trip. Coastal Link, WHEELS bus routes, and the evening/Sunday shuttles tend to be more efficient cost-wise. Wheels2U and commuter shuttles have higher costs per passenger trip.

Figure 41 Cost per Passenger Trip by Route



Source: Norwalk Transit District, Jan-March 2023 for Wheels2U services and May 2023 for all other routes

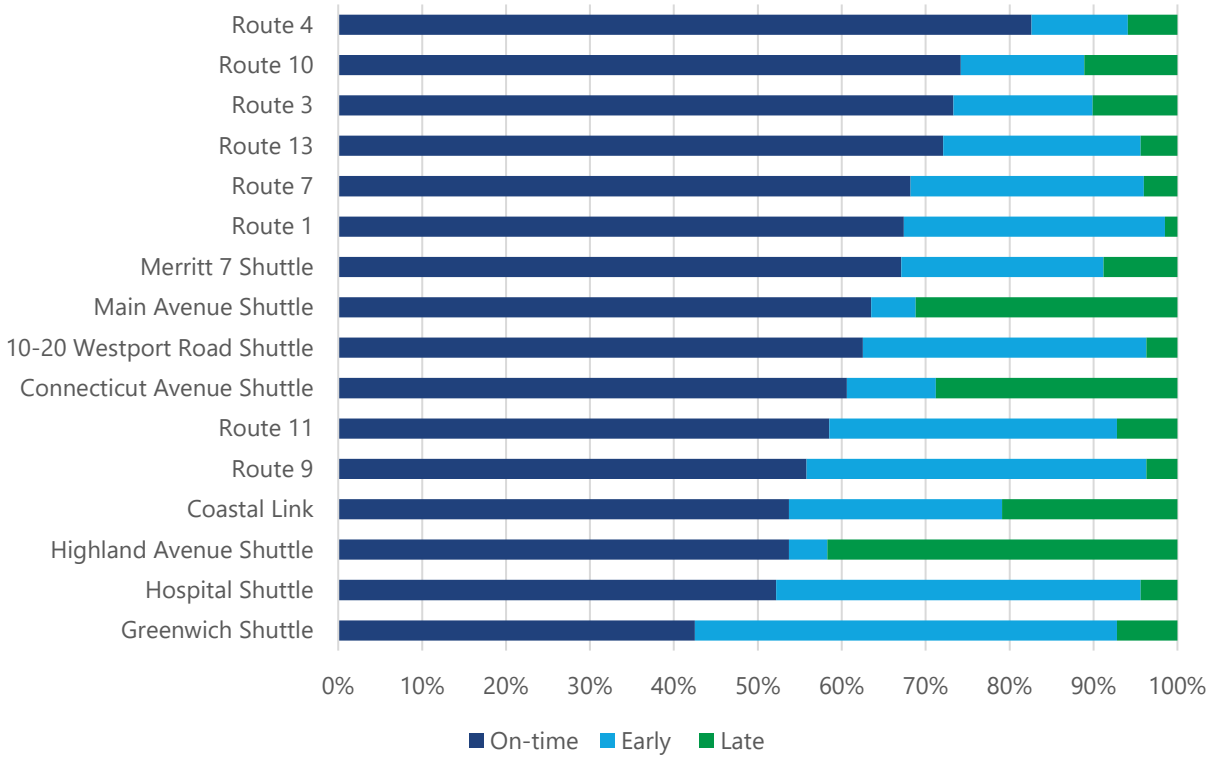
ON-TIME PERFORMANCE

There are several factors that impact the reliability of a bus route, including road congestion, ridership levels, how schedules are built, and driver breaks. On-time performance (OTP) is a metric that reflects service quality. In the context of transit service, on-time performance is measured by the time a bus arrives or leaves a timepoint as published in their schedules. This measure is also typically defined as a range; in the case of NTD, a bus is considered “on-time” if it departs from a scheduled timepoint less than 2 minutes early or less than 5 minutes late.

NTD aims to achieve 90% OTP systemwide. However, in May 2023, no routes in the system met NTD’s standard, with a systemwide average of 63% (Figure 42). Route 4 has the best OTP at 87%, followed by Route 10 and Route 3. The commuter shuttles feature some of the lowest OTP in the system, with the Highland Avenue Shuttle, Hospital Shuttle, and Greenwich Shuttle all under 54% OTP. NTD’s routes are also early more often than they are late, which particularly reduces reliability for riders who depend on the posted schedule to time their arrival at the bus stop.

NTD Ahead | State of the System
Norwalk Transit District

Figure 42 On-time Performance by Route



Source: Norwalk Transit District, May 2023. Note: NTD is in the process of reviewing and revising how OTP data is collected to ensure more accuracy.

FACILITIES

Investing in transit facilities can improve the quality of the bus riding experience, providing comfort to transit riders waiting for a bus. Facilities also impact transit operations; for example, facilities can impact the number of buses that can be stored and maintenance capabilities.



Transit Center

The WHEELS Hub on Burnell Boulevard is the center of NTD's transit pulse system. Nearly all NTD routes begin, end, or stop at the Hub as part of their regularly scheduled service. The Hub features seating, shelter, multiple bus bays, ticket machines, and variable message signage.

Bus Stops

NTD has over 190 bus stops with varying levels of amenities. More than half (54%) of NTD's stops do not have bus boarding signs and only 17% of NTD's bus stops have a shelter.³ Not all bus stops and/or amenities are in comfortable locations for all pedestrians. For example, many bus stops do not have a landing pad.

Some of NTD's stops are shared with CT Transit.



³ Data from Norwalk Bike/Walk Commission.

NTD permits passengers to flag down buses, like hailing a cab. However, drivers have discretion about whether to stop when flagged down. To flag down a stop, a person needs to know which streets routes operate along. This creates challenges for new riders and bus operators and can impact on-time performance.

NTD Facilities

NTD’s maintenance facility, bus storage, and administrative headquarters are located at 275 Wilson Avenue. This facility is currently being renovated and NTD’s temporary administrative headquarters are located at 20 Marshall Street.

FARES

NTD bus fare (Figure 43) can be paid with cash, a fare card, and tokens. Riders aged 65 and above and people with disabilities board for half fare. There is no reduced fare program for passengers with lower incomes.

Figure 43 NTD Fare Structure

| Method | Trip Type | Fare | Half Fare |
|------------------|------------------|-----------|-----------|
| Cash | 90-minute trip | \$ 1.75 | \$ 0.85 |
| | | | |
| Fare Card | 1 Day Unlimited | \$ 4.00 | \$ 2.00 |
| | 7 Day Unlimited | \$ 17.50 | \$ 8.75 |
| | 10 Ride Card | \$ 17.50 | \$ 8.75 |
| | 31 Day Unlimited | \$ 70.00 | \$ 35.00 |
| Token | Single trip | \$ 1.75 | |
| | 10-trip pack | \$ 17.50 | |
| | 20-trip pack | \$ 35.00 | |
| | 40-trip pack | \$ 70.00 | |
| | 100-trip pack | \$ 175.00 | |

Source: [NTD Fares](#)

Paratransit fares vary by destination: \$3.50 per ride in-town, \$7.00 per ride in two towns, \$10.50 per ride in three towns, \$2.80 per ride for Stamford Easy Access. WHEELS2U fares vary by group size, with a \$2 fare per ride, per person, and \$6 maximum per group. Riders pay using a credit card in the mobile app.

NTD is one of several transit providers operating in Southern Connecticut, and riders transfer between multiple systems. Each system has a different fare payment system, which complicates these transfers. There is an opportunity to improve fare coordination between regional agencies.

Coastal Link

Coastal Link is operated by three different transit providers: NTD, Greater Bridgeport Transit, and Milford Transit. Each provider operates a share of Coastal Link trips. Because each provider has their own way of operating bus service, and there is not one set of infrastructure for Coastal Link service, there can be confusion regarding acceptable fare payments and identifying which stops are Coastal Link stops.

FLEET

NTD’s fleet includes 74 vehicles. Sixty-one percent of the vehicles are within their useful life period. Cutaway buses, which are used for WHEELS 2U and paratransit service, are the most in need of replacement, with more than 60% of their active fleet beyond their useful life (Figure 44). Useful life, as defined by the Federal Transit Administration, is the age after which an asset is no longer fit for use because it does not deliver transit service of acceptable quality.⁴ Vehicles that have met their useful life requirements are eligible for disposal.

Figure 44 Summary of NTD Fleet

| Service Type | Number of Vehicles | Vehicles within useful life | Vehicles past scheduled replacement date | Predominate Vehicle Type |
|--------------|--------------------|-----------------------------|------------------------------------------|--------------------------|
| WHEELS Bus | 21 | 18 | 3 | 35-foot bus |
| Coastal Link | 3 | 2 | 1 | 40-foot bus |
| Shuttle | 15 | 12 | 3 | 29-foot bus |
| WHEELS 2U | 35 | 13 | 22 | 25-foot cutaway |
| Total | 74 | 45 | 29 | |

Source: Norwalk Transit System, June 2023

⁴ Useful Life of Transit Buses and Vans, [FTA](#)

4 MEETING THE DEMAND FOR TRANSIT

Transit service works best when it connects areas with the highest concentrations of people and jobs, especially residents and employees who are more likely to use transit service. This analysis compares the underlying demand for transit with ridership and frequency. We also compare ridership to the location of major activity centers. These comparisons are used to assess how well the demand for transit is aligned with existing transit services.

Today, NTD service is generally aligned with where people want to go and where there is demand for service. However, there are opportunities to improve this alignment. In places where there is a mismatch between service and potential demand for service, there is an opportunity to explore why there is a mismatch and potential recommendations to better serve that area.

COMPARING DEMAND & TRANSIT SERVICE

Composite Demand & Ridership

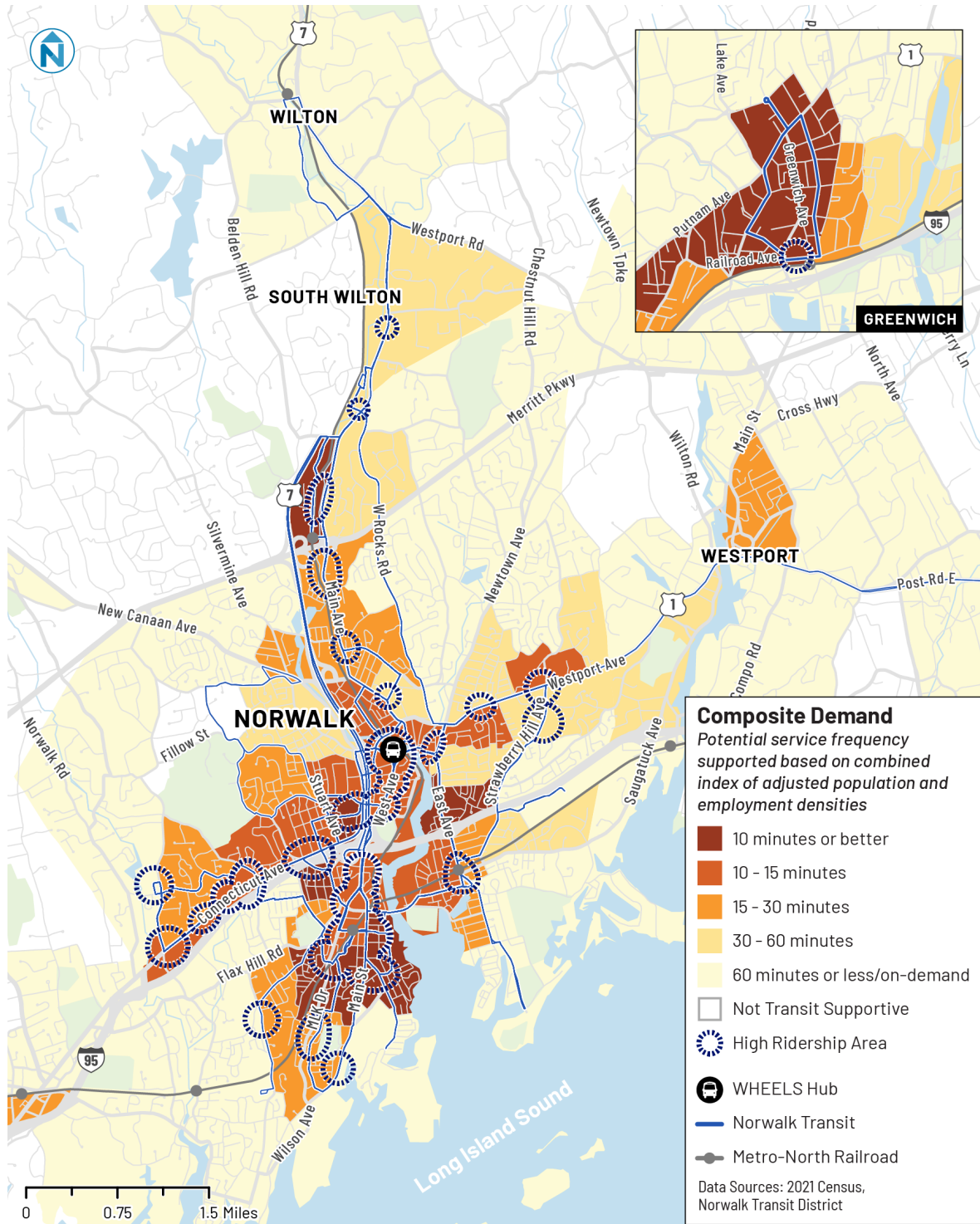
By comparing composite demand (the potential underlying demand for service) and where there is the greater ridership activity, we can identify if there are areas where we would expect greater ridership but for one reason or another people are not taking transit there.

Ridership in NTD's network generally aligns with underlying demand for transit service (Figure 45). Ridership is highest in areas with greater underlying demand for transit. South Norwalk stands out as an area well served by NTD and well utilized by the community.

There are opportunities to better align transit service with the underlying demand:

- In a census block group in East Norwalk there is high composite demand, however, ridership there is not particularly high.
- In Westport, there is a small area with greater underlying demand for transit service that is served by the Coastal Link but not WHEELS Bus. It is, however, covered by Wheels2U.

Figure 45 Composite Demand & Areas with Greater Ridership



Composite Demand & Service Frequency

Many areas in NTD's service area could support more frequent service than is currently operated based on an analysis of composite demand (see Figure 46). These areas include:

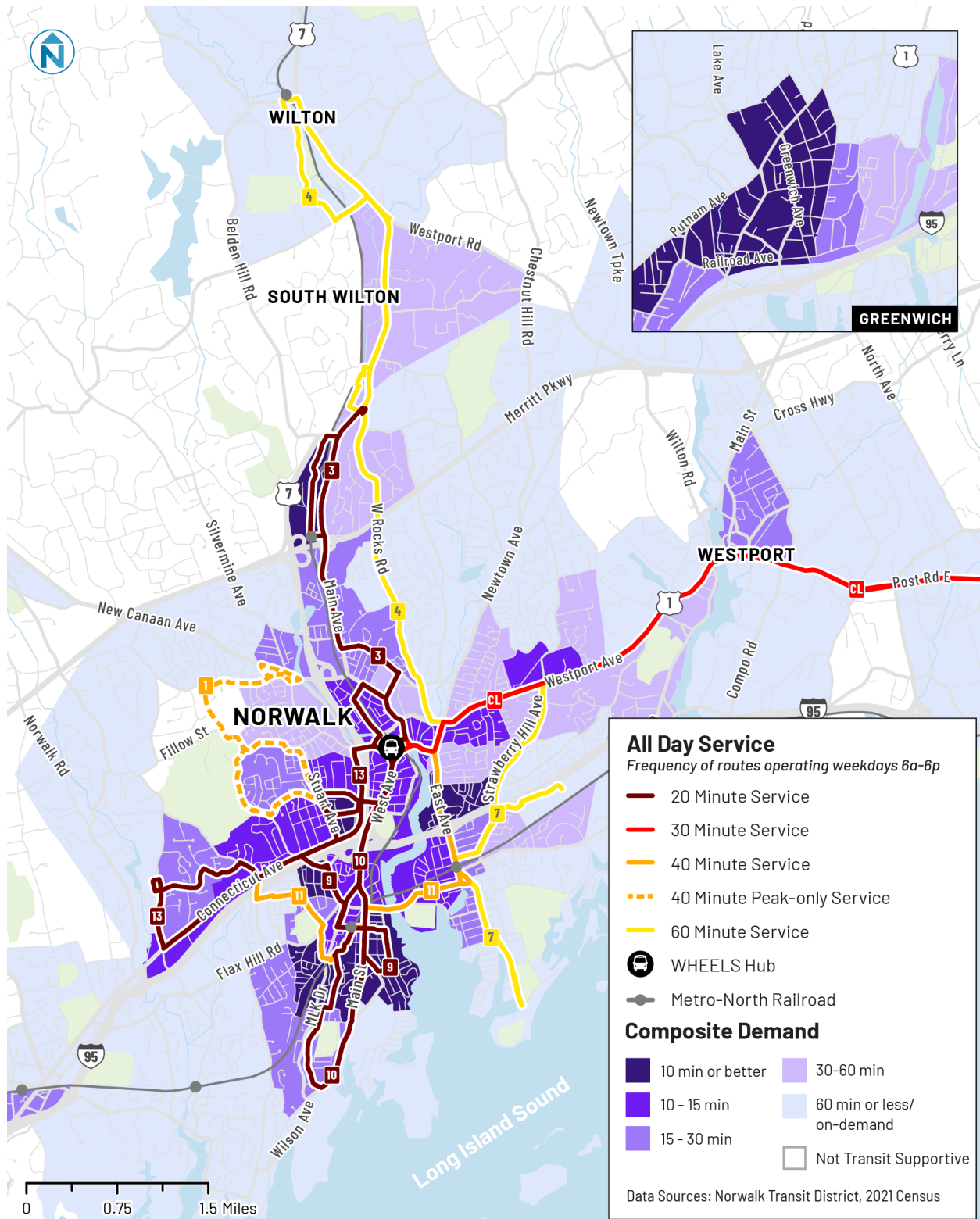
- West Norwalk
- South Norwalk
- East Norwalk

For example, much of South Norwalk could support 15-minute service or better and Route 10 operates every 20 minutes.

Much of the outer areas of Norwalk, Wilton, and Westport have densities that are generally less supportive of greater levels of transit service. NTD may consider exploring infrequent service or alternatives to fixed-route service in these areas.

NTD Ahead | State of the System
Norwalk Transit District

Figure 46 Composite Demand & Bus Route Frequency

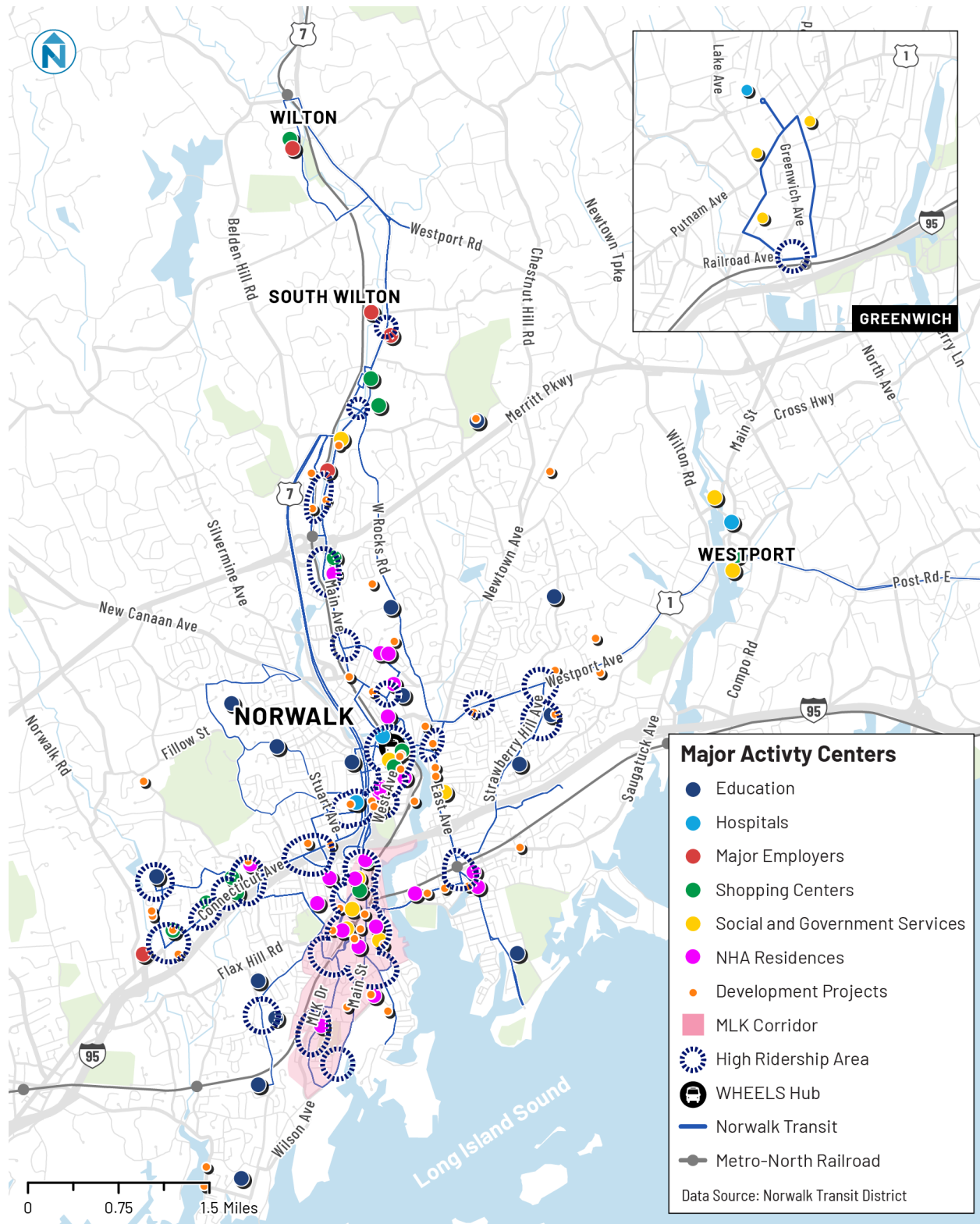


Major Activity Centers & Ridership

In our assessment of how well NTD meets the needs of its service area and ridership activity, we can also compare ridership and where there are major activity centers. Areas with greater ridership largely align with where there are noted activity centers, although not perfectly.

As shown in Figure 47, ridership often aligns with where there is shopping, NHA housing, and hospitals. There may be opportunities to better serve shopping along Route 7 (Gateway Shopping Center and Walmart).

Figure 47 Major Activity Centers & Areas with Greater Ridership



KEY FINDINGS

The State of the System provides an understanding of NTD transit service and the market for transit service in the communities it operates in. Key findings from the State of the System are as follows.

- NTD service aligns relatively well with where there is demand for transit service. However, there are opportunities to improve route alignments and service levels.
- While current bus routes generally align with existing demand, NTD's current route structure has significant redundancy. Major corridors are often served by multiple routes at different times and on different days, creating a learning curve for passengers.
- The potential demand for transit is highest in South Norwalk, East Norwalk, and along major corridors such as Main Avenue and Connecticut Avenue. These areas can support more frequent service and longer spans.
- NTD's schedules are simple and easy to understand because of consistent headways throughout the day. However, there is limited evening and weekend service.
- NTD's ridership, productivity, and cost efficiency vary greatly by route, signaling opportunities to rebalance how NTD invests in service by geography and purpose.
- There are opportunities to improve bus stop amenities and formalize bus stop locations, moving away from a flag stop system to increase reliability and travel times. In addition, formalizing bus stop locations will improve opportunities to invest in passenger-facing infrastructure such as shelters that will make service more recognizable and accessible for passengers. Formalizing bus stops will also allow for greater opportunities to better coordinate corridors where multiple routes exist (either operated by NTD or neighboring transit agencies).
- Plans by the City of Norwalk to redevelop Burnell Boulevard, including NTD's transit center, will have significant operational impacts on NTD. The conversion of Burnell Boulevard to two-way traffic operations will reduce the overall available right-of-way.
- Fare collections are currently uncoordinated with neighboring transit districts, creating challenges for passenger riding regionally, especially on services that are jointly operated.
- Connectivity to Metro North rail service can be improved. NTD's transit center on Burnell Boulevard is disconnected from the rail network, requiring an additional transfer for passengers wishing to connect to the Metro North at South Norwalk Train Station
- NTD's regional focus for paratransit service should be examined to understand if operational costs can be reduced by adding additional dispatch facilities. Current deadhead travel times can be long for service dispatched out of Norwalk and providing service further west.
- NTD and Housatonic Area Regional Transit previously jointly operated Route 7L, connecting Norwalk and Danbury. NTD's service was abruptly discontinued, and HART continues

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Norwalk Transit District**

operating reduced service along this route. NTD should explore opportunities to reestablish this connection.