2021

Economic Benefits of COAST

PUBLIC TRANSIT'S IMPORTANCE FOR CURRENT AND FUTURE ECONOMIC DEVELOPMENT IN SOUTHEAST NEW HAMPSHIRE

ROCKINGHAM PLANNING COMMISSION

STRAFFORD REGIONAL PLANNING COMMISSION

Table of Contents

Economic Importance of Public Transit

Executive Summary

This study employs a combination of economic modeling and extensive stakeholder interviews to generate a picture of the importance of public transportation to the economy of southeast New Hampshire. The study focuses primarily on the services of the Cooperative Alliance for Seacoast Transportation (COAST), the public transit agency serving eleven towns in the region, though also considers benefits of human service transportation operated by other agencies by coordinated through COAST's TripLink call center.

The IMPLAN-based economic impact model used for the project estimated that in FY2019 COAST's spending on operations was responsible for $6.31 million in labor income across 120 jobs and $14.28 million in total economic output in the region. COAST also contributes to the regional economy by providing access to employment, medical care and other basic life needs essential to independent living. Using standard methodologies from the Transit Cooperative Research Program (TCRP) the study found benefits of over $11.6 million accruing to individuals and businesses in the region.

Taken together the economic impacts from COAST spending in the region and benefits of access to employment, medical care and other services total an estimated $25.89 million as compared to an FY2019 operating budget of $5.98 million. This represents an economic return on investment of over $4.30 for every $1.00 invested.

The project's qualitative analysis element involved interviews with over twenty stakeholder in municipal economic development, commercial and residential development, chambers of commerce, large and small employers, continuing education and workforce development, healthcare and human services. These highlighted the importance of transit in the region, particularly in supporting access to employment, healthcare and other basic needs critical to independent living. These interviews demonstrate that public transit plays an important role in access to education and healthcare, is tied to housing affordability and development patterns, and is vital for staffing for local businesses.

The report concludes with a summary of findings and recommendations related to future funding and service expansion needs, performance tracking and communication with policymakers.

Many of the issues and results related to this study are included in an online map. You can view it at https://arcg.is/1KeGze.

Public Transit is Important for Current and Future Economic Development in Southeast New Hampshire

---

Introduction

Strafford Regional Planning Commission (SRPC) and Rockingham Planning Commission (RPC) studied the relationship between public transit and the economy in the region of Southeast New Hampshire and southern Maine. Our research uncovered an extensive body of literature on the economic impact of public transit on economies across the United States. This study seeks to apply these lessons and analyses to our unique geographic and fiscal circumstances. New Hampshire's tax structure, features of New England governance like Town Meeting and comparatively weak county governments, and the requirement for state enabling legislation to permit actions by local governments are all factors that directly impact transit operations and possible recommendations for future actions. Unlike transit agencies in most states, COAST relies on municipalities to provide the large majority of non-federal match required to access Federal Transit Administration (FTA) funds, with little assistance from the state. Each municipality generates and contributes separate local revenues, meaning impacts to one local budget have implications for COAST's ability to sustain service for the entire region. State financial support is vital for making public transit sustainable in the future, given rapid growth in need and only minimal growth in federal investment. Our research demonstrates that public transit plays an important role in the region's economy, but its full potential is constrained by challenges that are unique to New Hampshire.

The COVID-19 Pandemic had a huge impact on the economy that will continue to ripple out over years. However, it also provided an interesting window into the economy. It has accelerated the shift to remote work for some sectors and has huge implications for housing, transportation, and employment. But it also revealed the importance of many workforce jobs that require in-person contact. The economy at-large may shift permanently to more remote work, however, diverse transportation options will still be needed for a mobile regional workforce at the local and regional level.

The "Economy" in Context for this Study

It would be inappropriate to examine public transit purely through the lens of profit in private market interests. It fits in with other public services designed to benefit society – such as national defense, the national highway system, and public education. Investment by society in these programs generates benefits beyond the initial "cost". This provides an equity benefit where people who would otherwise have transportation limitations are granted greater access to employment and services (see Burkhardt, Hedrick, and McGavock 1998 in the literature review). But public transit isn't purely a social service, it also generates addition benefits by increasing the mobility of the public. Fares aren't the only measurable benefit public transit generates. There are direct, indirect, and induced economic benefits that are generated by public transit operations; and benefits to individuals and business from the access COAST provides to employment, medical care and other services. The quantitative element of the study report lays these benefits out in detail.

This study emphasized economic impacts from the perspective of individual residents, employees, and consumers. Continued pressure from online retail means that brick-and-mortar retail establishments will be most successful where they are able to create a high-quality user experience. In our region this is most applicable in mixed-use or business-district settings where visitors can access a wide variety of goods and

services. This includes downtown districts that can provide a diverse option of dining and retail experiences, but may also include commercial corridors that provide clusters of essential services such as groceries or medical offices. The experience of individual workers has also become increasingly important as low unemployment, both before and after the COVID-19 pandemic, has dramatically increased competition between businesses for workers.[1]

A comprehensive study of the economic impact of rural transit systems across the country suggested that public transit fits into economic models when:

- Society collectively demands products/services that are not fully reflected in the private market transactions — such as national defense. The government should step in to provide products/services that are not met by private interests but are for the public good.
- Society, collectively, may desire a different distribution of wealth/resources than the private market provides. Such redistribution serves society from an "equity" perspective as opposed to "efficiency" which allocates wealth/resources based on the signals provided from the private perspective of the “market”.

Regional Transit Services

COAST provides both fixed route and demand responsive transit services in greater NH-ME Seacoast area. Fixed route buses follow a predetermined route with stops at specific locations on a repetitive schedule. Demand responsive services require advance reservations and carry riders between home and a range of destinations. While more flexible, demand responsive services are expensive to provide and typically available primarily to older adults and individuals with disabilities unable to ride fixed routes.

Fixed route service is more directly tied to employment transportation and may be responsible for more direct economic impact, but demand response service is vital for maintaining activity and independence for many seniors and people with disabilities. The American Association of Retired People (AARP) estimates that one in five Americans over the age of 65 doesn’t drive. The number of people over age 65 in New Hampshire is projected to almost double in the next 20 years, growing from 220,672 in 2015 to 373,209 in 2030 to 408,522 in 2040. That’s nearly 75,000 non-driving seniors in New Hampshire by 2030. The state’s strategy to handle this growth and manage the public cost of long-term care is centered around older adults being able to age in place in their homes, but this only works if one has transportation to meet basic life needs. Many currently do not.

Public transit providers must adapt to the area they serve, but in general they are faced with a decision. Do we cover a smaller area with fewer people and provide more regular service; or do we cover a larger area to serve more people, but with less regular service? COAST serves a large geographic area connecting several small cities and other towns. In 2020 COAST restructured their routes to try to find a balance between connecting large, spread-out areas and providing more frequent service.

Fixed route transit typically jumps first to mind in thinking about economic impacts of public transportation: carrying workers to jobs and forming a network that can shape land development decisions. Given the region’s changing demographics, though, demand response transit also plays a key role in the regional economy. Because of the rising population of older adults in NH, the demand for this

[1] https://www.nhsbdc.org/blog/2021/06/hiring-tips-tight-labor-market

type of service has grown rapidly over the past decade. Per federal requirements, COAST provides on-demand service for people with disabilities who live within ¾ of a mile of a fixed route bus stop. Between 2008-2018, demand for this service grew 880%, and the cost to COAST to provide those services grew 744% (Data from COAST). The continued health and wellbeing of a growing number of residents in New Hampshire depends on the availability of demand-response service.

Why did we study this issue?

A primary goal of this study is to provide data and analysis to inform local decision-makers and state legislators on the role of public transit in the regional economy. There is substantial research on how public transit contributes to economic development in dense urban settings, but research on its impact in rural and suburban areas is not as common. This is especially true for the context of southeast New Hampshire. While technically considered Urbanized by the US Census Bureau, population density in the region is relatively low and public transit must serve a large area with many miles between population centers and destinations. Unlike public transit agencies in most parts of the country, COAST and other transit agencies in New Hampshire must provide service without significant state financial support, relying almost entirely on municipal contributions and advertising revenue to match federal transit dollars. Public transit is recognized by most as an important part of the transportation system. The research findings presented here show transit also plays a significant role in the broader regional economy, and with more meaningful investment it has the potential to accelerate regional and local economic development.

How did we study this issue?

This study consisted of three parts: a literature review, direct outreach to transit stakeholders to form a qualitative picture of the role of transit in the region, and quantitative analysis using two different economic impact assessment models.

The study process began with a review of existing literature on analyses of economic benefits of public transit – specifically in rural and suburban areas. A summary of the primary sources referenced in this study is provided in the literature review.

SRPC and RPC staff spoke with a range of stakeholders about how transit serves the region and its role in the economy. We conducted interviews with municipal economic development directors, chambers of commerce, employers both large and small, and stakeholders in land development, national defense, finance, hotels and restaurants, housing and human services, healthcare, education, and transportation. The major themes from these interviews are provided in the qualitative analysis section of this study. The direct outreach to stakeholders informed several case studies that provide specific examples of the value of public transit to the region and tie back to concepts from the literature review.

The quantitative element of the study involved two parts: 1) calculation of direct, indirect and induced impacts of COAST spending on operations; and 2) calculation of economic impacts for individuals, and businesses resulting from access employment and services made possible by COAST services. Modeling of direct, indirect and induced impacts was done with an IMPLAN based economic model from the American Public Transit Association (APTA). The access benefit calculation used a methodology from the Transit Cooperative Research Program (TCRP), a program of the Transportation Research Board and the National Research Council. The APTA model results show COAST operations support 116 jobs in the region with combined labor income of $6.1 million and total economic output of $14.28 million. The TCRP

methodology for estimating benefits of access to employment, medical care and other basic life needs to support independent living showed an additional $11.6 million in benefits provided by COAST to individuals and businesses in the region.

Regional Transit Service Profile

Regional Transit History

The New Hampshire Seacoast had public transit services as far back as the late 19th century. Although trolleys are more typically associated with larger cities such as San Francisco, New Hampshire had them too. Electric streetcar systems existed from the 1890s into the 1930s in the region, often operated by the regional electric utilities. Most of these electric railways were converted to bus operation by the late 1920s. Buses are less expensive to operate and more flexible, and at the time were considered the next new and exciting technology.

In the 1970's the University of New Hampshire did not have sufficient on-campus housing so they contracted with local hotels to house some students. To move the students from the off-campus housing to campus they purchased several buses and established routes for the University students; the system became known as Kari-Van.

In 1981 a group of citizens, planners, government representatives, and business owners representing the southeastern region of New Hampshire began meeting to discuss regional transportation as a public service. They were known as the Strafford-Rockingham Transportation Task Force and helped form what quickly became known as the Cooperative Alliance for Seacoast Transportation (COAST). COAST was initially established as a 501c3 non-profit organization in 1981 and subsequently designated as an independent public agency under RSA 239 in 1985. COAST became a direct Federal Transit Administration (FTA) recipient and began contracting with area transit service providers, including the University of New Hampshire, in 1982 to operate routes under the broader COAST umbrella of services.

Concurrent with the formation of COAST in 1981, Governor Hugh J. Gallen established a Blue Ribbon Commission on Seacoast Transportation (BRC) to study public transportation needs in the region and make appropriate recommendations. The BRC study focused on COAST. The BRC turned its attention to capitalizing on the UNH Kari-Van service. Taking on COAST's overall goals as their own, the BRC established four "project objectives" designed to lead to coordination and expansion of service and integration of existing services (including available elderly and disabled service and UNH Kari-Van).

The Blue Ribbon Commission identified four goals:

1. Expansion of existing regional fixed route public transportation.
2. Implementation of a demonstration project opening UNH Kari-Van service to the public.
3. Coordination with social service providers in and contiguous to the service area.
4. Coordination with taxi/shared ride operators to establish a feeder system to the fixed route service.

COAST was envisioned to serve as a regional broker providing staff, marketing, service development, grants management, regional coordination and training to improve coordination of services in the region. By the mid-late 1980s the University of New Hampshire was COAST's primary contractor and operated most COAST fixed routes, as well as the University's routes. This relationship lasted until 1998 when COAST

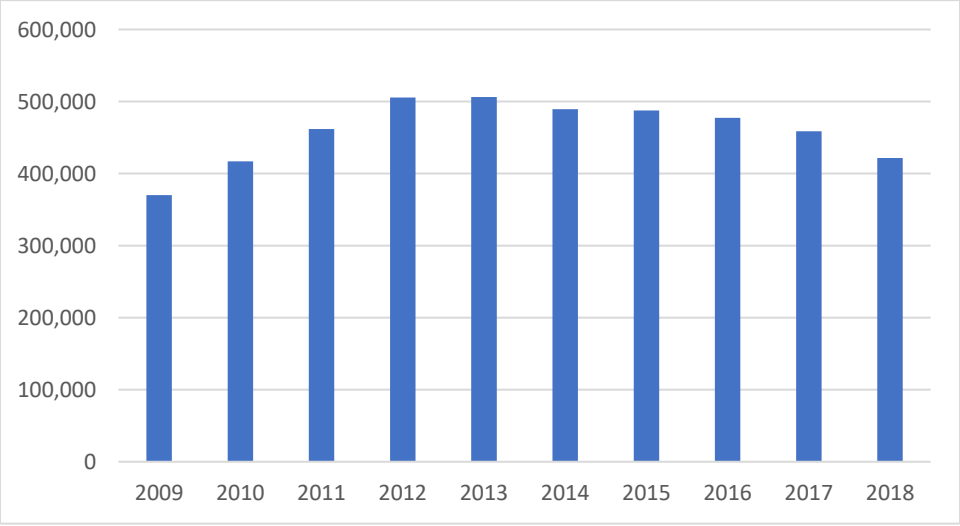
and the University began operating separately and the University system changed its name from Kari-Van to Wildcat Transit.

COAST Transit Service

COAST has grown and expanded its role as the public transit agency serving communities in the greater New Hampshire and southern Maine Seacoast region. COAST operates an extensive fixed route transit service network together with Americans with Disabilities Act (ADA) paratransit and other advance reservation services. As of 2021 COAST provides fixed route services in ten communities including Dover, Rochester, Somersworth, Farmington, Newington, and Portsmouth New Hampshire; and Berwick, South Berwick, Eliot and Kittery Maine. COAST also provides public demand response service in Exeter and Newmarket with a single designated stop in Stratham as part of its Route 7 on Demand service. Between 2002 and 2012 COAST service grew dramatically with the addition of the FastTrans service in Dover and a trolley service connecting Pease Tradeport with downtown Portsmouth and south along Lafayette Road/US1.

In 2012 COAST provided over 506,000 passenger trips, representing 138% growth in trip volume from a decade earlier. This marked a record high volume of fixed route passenger trips for COAST. Ridership has declined approximately 15 percent between 2012 and 2019 (pre-COVID). This can be attributed largely to a steep decline in the cost of gasoline over this period and fewer services being operated. Typically, fixed route transit ridership rises and falls in tandem with gasoline prices. While there is a core segment of transit ridership that lacks access to a private automobile, there is another segment who own cars but do the math on their commuting costs and determine if they can save on expenses by taking the bus. The average price of gas in New England dropped by 38% between 2012 and 2019 so that math has not been as compelling in recent years.

COAST Total Ridership 2009-2018

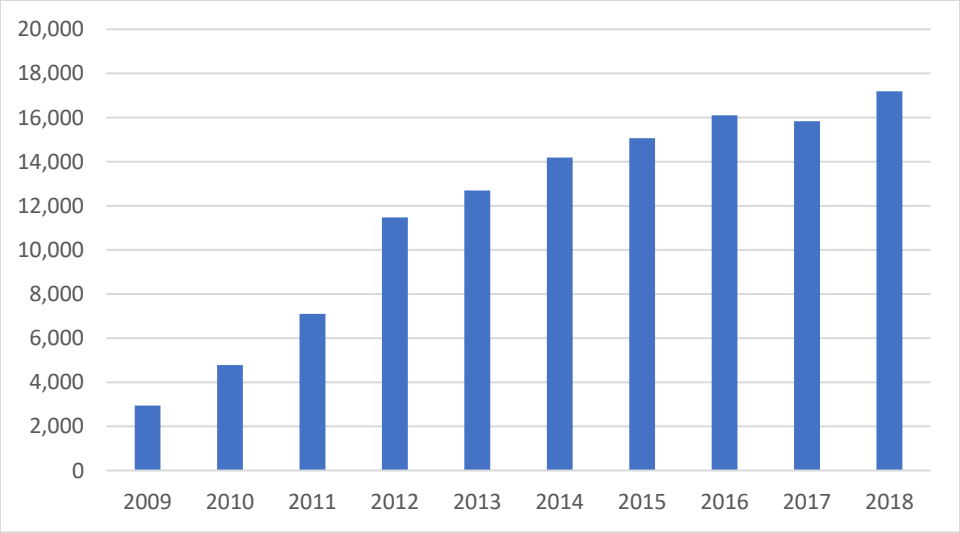


Source: COAST

The ridership picture is different for riders of COAST's demand response transit services who typically do not have the option to drive. Under the Americans with Disabilities Act (ADA), fixed route public transit providers are required to provide complementary door to door paratransit service for individuals with disabilities that prevent them from riding a fixed route bus. ADA paratransit service is provided for trip

origin and destination points within a ¾ mile radius of fixed route bus stops. These paratransit services are critical to people who rely on them to access work, shopping, and other basic life needs. They are also very expensive to provide. Demand for mandated ADA service grew 880% from 2008-2018, and COAST's cost to provide those services grew 744%. This growth in demand for ADA services is likely an early indicator of need for expanded transportation services linked to the region's rapidly growing older adult population.

COAST ADA Paratransit Ridership 2008-2018



Source: COAST

The dramatic increase in ADA demand has also absorbed funds that could otherwise have been used for service improvements like higher frequencies or longer service hours on fixed routes that would increase productivity.

Current Route System

In 2019-2020 COAST undertook a Comprehensive Operations Analysis (COA) to prepare for a major financial transition. Between 2012 and 2020 COAST provided supplemental, higher frequency service during commute hours on their Route 2 trunk line and on their Pease-Portsmouth trolley lines. These services were provided as a traffic mitigation strategy during construction to widen the Spaulding Turnpike and Little Bay Bridges between Dover and Newington. Funding for this higher frequency service ended in June 2020, though while the services were running the project budget also absorbed part of the rapidly escalating cost of ADA paratransit service associated with those routes. With the end of the highway construction project the cost to operate the additional fixed route bus trips went away with the mitigation funding, but not the cost to provide the elevated levels of ADA paratransit service. This and a range of other challenges such as rapidly increasing labor and insurance rates called for a fundamental redesign of COAST's route system based on extensive public input and analysis.

The outcome of the Comprehensive Operations Analysis process was a new route system launched in July 2020 and depicted in the map below. Key features of the new route system include:

- Fifteen individual fixed or flex routes as compared to 10 routes prior to
- Standardized hourly headways for buses

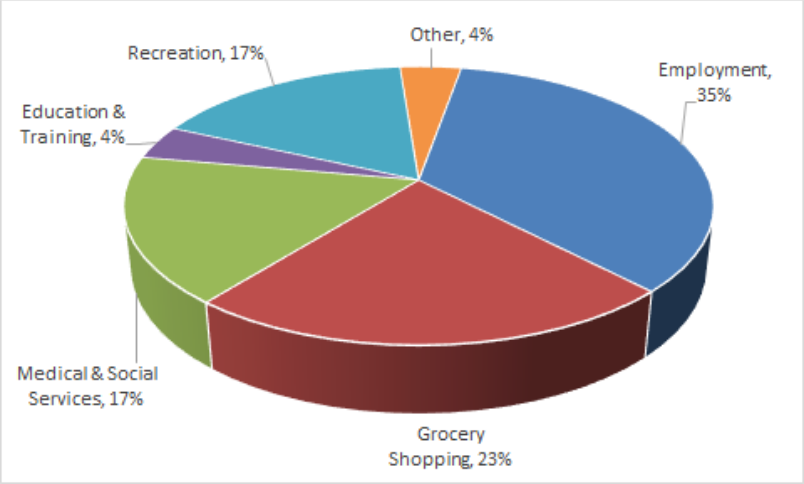
- Clockface scheduling that is more intuitive for riders
- Reduced travel times for most trip types through increased use of express routes
- Reduced wait times at connection points and improved on-time performance
- Some increase of evening and weekend service
- Extended service coverage in key areas identified through public input, paired with elimination of stops or route segments to certain area with very low demand.
- Reduced costs including savings of approximately 11%-17% compared to the prior network and schedule. Part of this savings is in the smaller fleet needed to operate the system

As a system that operates on an hourly frequency, COAST is not designed around maximizing ridership. Rather it is designed to provide broad geographic coverage in the region. Should COAST be able to increase their frequency of service to every 20-30 minutes they would be able to focus much more on ridership as a driving factor in service provision.

New COAST Route System as of July 2020

The figure below shows an estimated breakdown of system-wide trips by purpose based on the 2016 Fixed Route Rider Survey. This survey included a much larger sample size and different questions than the 2019 Comprehensive Operations Analysis. This shows employment trips making up approximately 35 percent of total service, medical trips including dialysis representing about 17 percent of trips, grocery shopping 23 percent, personal and recreation trips 17 percent, education and training four percent and other trip types four percent.

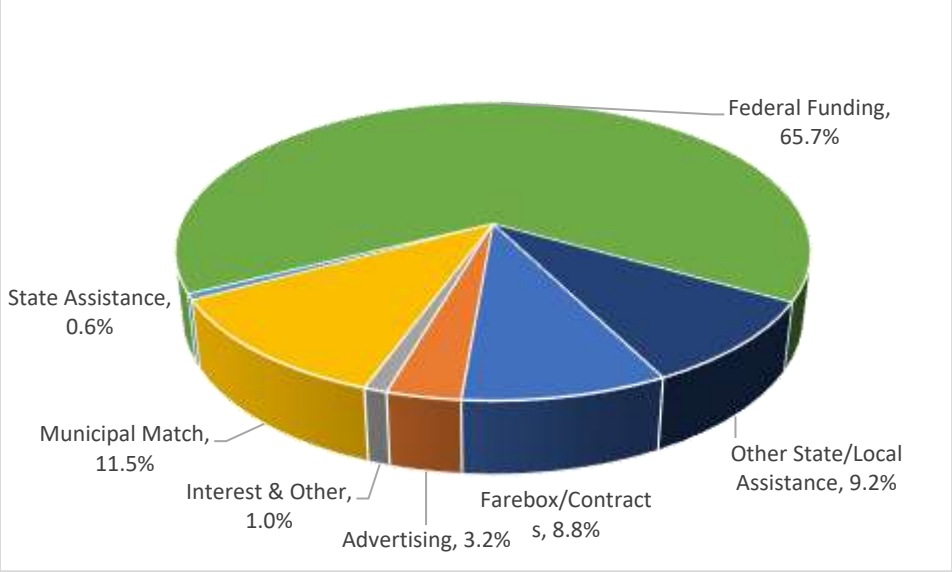
COAST Fixed Route Transit Trips by Purpose



Source: COAST Rider Survey

The figure below shows a breakdown of COAST funding by source for fiscal year 2020. Federal funding makes up a large majority of transit funding for most small transit systems around the country, and certainly in New Hampshire where state funding plays a particularly small role in supporting public transportation. In FY2020 Federal funding made up approximately 65 percent of total funding for COAST. These federal funds must be matched with non-federal dollars at varying rates depending on the use of the funding. Federal operating assistance must by matched 50%/50% with non-federal funds, while capital expenses such as vehicles and preventive maintenance are eligible for an 80% federal share. Municipal contributions make up 11.5 percent of total funding, farebox revenue 8.8 percent, revenue from advertising 3.2 percent, and other non-federal revenues 9.2 percent. State funding composed only 0.6 percent of COAST's budget. The percentage that each of these revenue sources comprise of the annual operating budget has shifted quite dramatically due to the COVID-19 pandemic which first started affecting COAST during the middle of their fiscal year 2020.

COAST Funding by Source



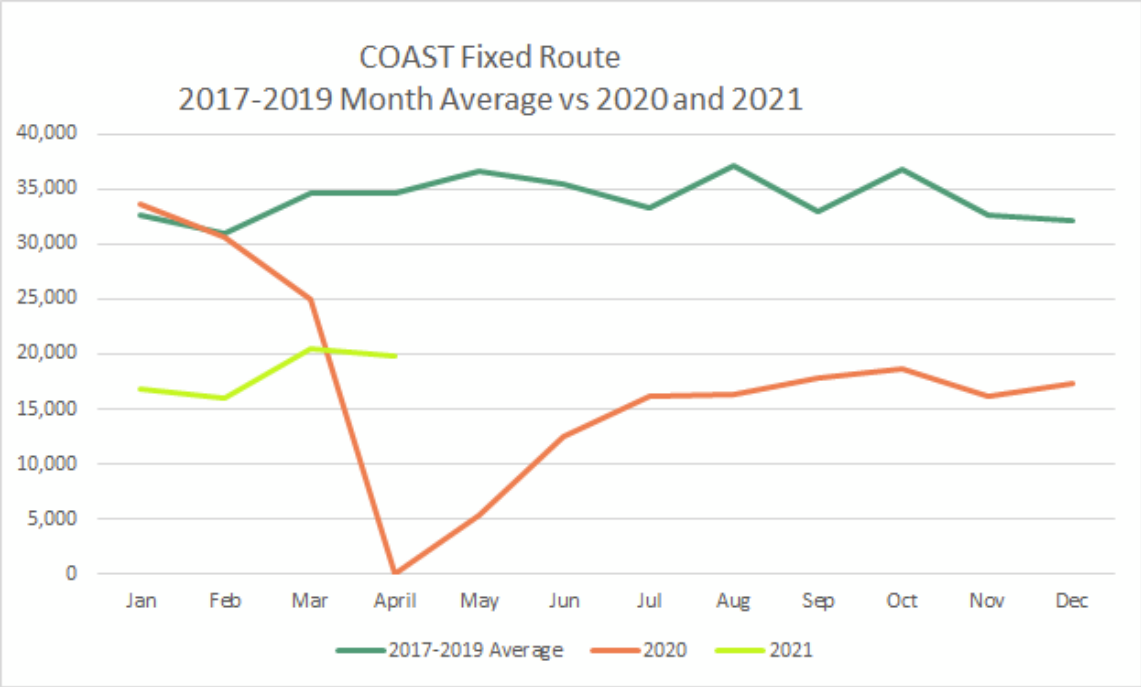
Transit Coordination – ACT and TripLink

Beyond its own fixed route and ADA paratransit service, COAST also plays a key role in delivering much of the human service transportation in the region. Better coordination of public transit and human services transportation has been a goal nationally and in New Hampshire for several decades going back to the Governor's Blue Ribbon Commission. COAST has been a leader in this work since the early 1990s. In 2006 the State of New Hampshire established a network of ten Regional Coordination Councils for Community Transportation (RCCs). COAST serves as the lead agency for the RCC covering Strafford County and Eastern Rockingham County, operating as the Alliance for Community Transportation (ACT). The RCC meets every other month and includes representatives from most of the non-profit health and human services agencies in the region that provide transportation, as well as two regional planning commissions, municipal representatives, and consumer representatives.

COAST operates TripLink, the regional mobility call center, on behalf of the RCC using FTA funding allocated to the RCC region for transit services for older adults and individuals with disabilities. TripLink coordinates ride scheduling and dispatching for five different transportation programs including COAST's ADA service, Portsmouth Senior Transportation, The Community Rides, Rockingham Nutrition Meals on Wheels transportation program, and the Ready Rides volunteer driver program. The Community Action Partnership of Strafford County will begin scheduling their transportation services through the call center in late 2021. In early 2020 prior to the COVID-19 pandemic TripLink handled approximately 5000 trips per month. While this sort of regional consolidation of trip scheduling across multiple agencies has been identified as a goal at the state level, the greater Seacoast is the only region of the state where this has been achieved. This coordination reduces costs for individual agencies that no longer need to maintain their own scheduling and dispatching capacity and creates opportunities for providers to combine multiple trips in a single vehicle, thereby increasing efficiency. This foundation of coordination is a key step in building regional capacity to respond to growing transportation need for an aging population.

Impacts of COVID-19

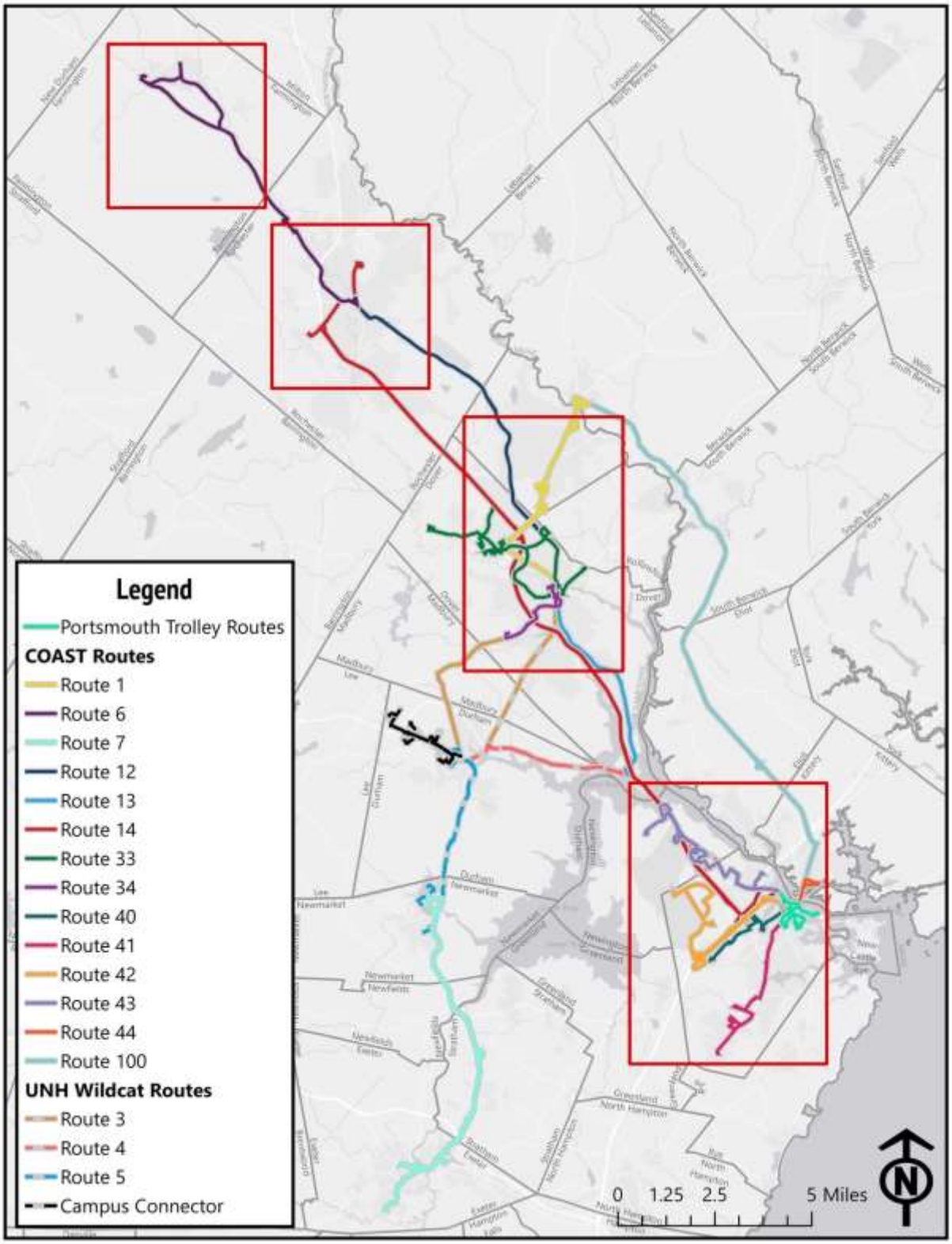
COVID-19 has had a dramatic impact on transit services nationwide. COAST, like many of the state's other public transit providers temporarily suspended their fixed-route bus service in April and part of May 2020, though continued to operate demand-response services for essential medical trips. Since resuming fixed-route services in mid-May 2020, ridership has recovered to approximately 60%-65% of normal volumes and COAST has implemented a range of safety protocols to protect riders and drivers. Long term impacts of COVID-19 on ridership patterns are still unclear. The pandemic forced a massive experiment in telecommuting that seems likely to continue at many employers even after emergency orders are lifted and most people are vaccinated. This will likely impact the total volume of commuter traffic. A significant level of continued public concern about sharing enclosed spaces (such as buses) with others seems likely to continue for a while and will tend to depress ridership. Another experiment forced by COVID has been expanded use of telemedicine, which will also likely have a long-term impact on demand for transit services by reducing the need for travel to certain medical appointments.



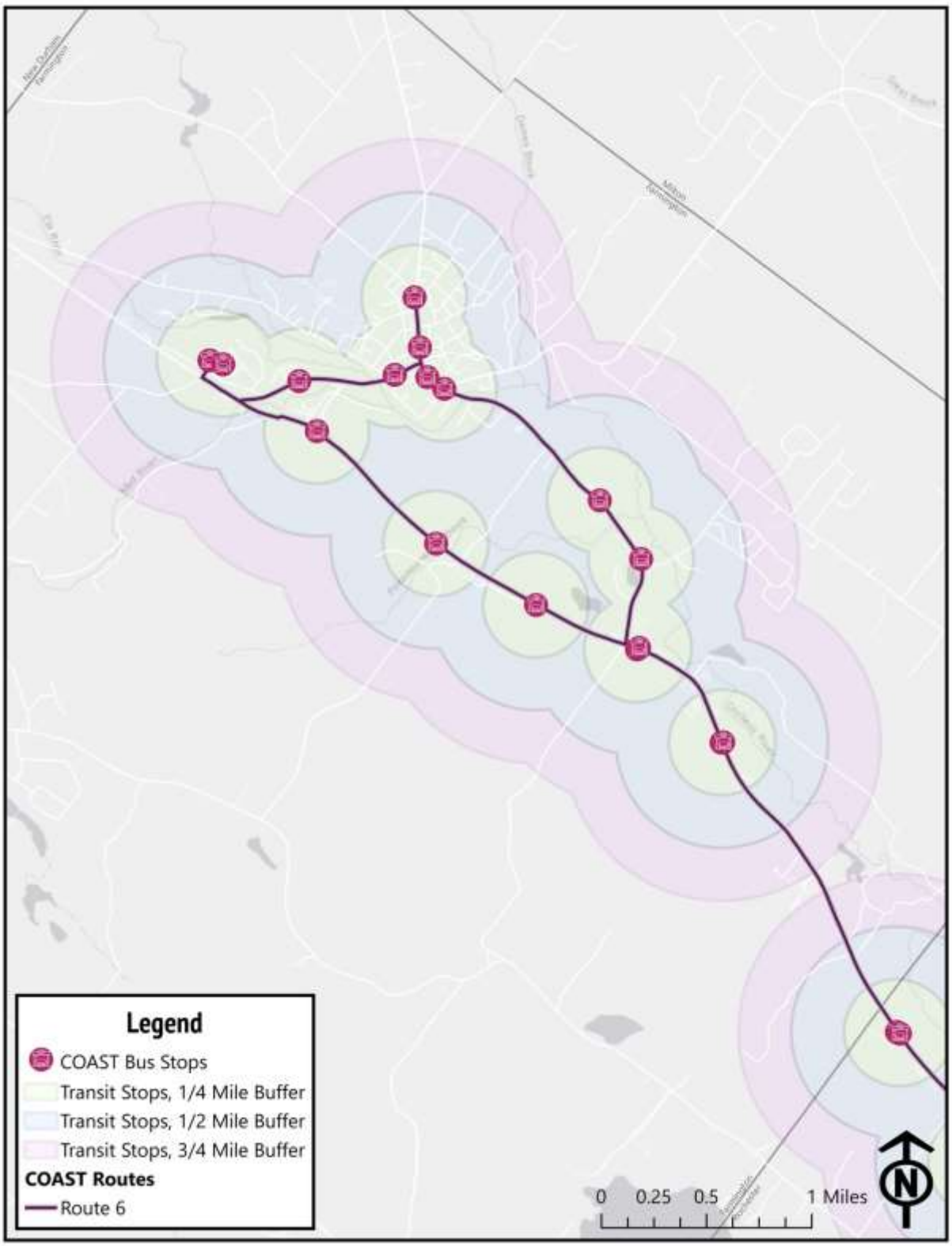
Source: FTA National Transit Database Monthly Module Adjusted Database April 20212

[2] https://www.transit.dot.gov/ntd/data-product/monthly-module-adjusted-data-release

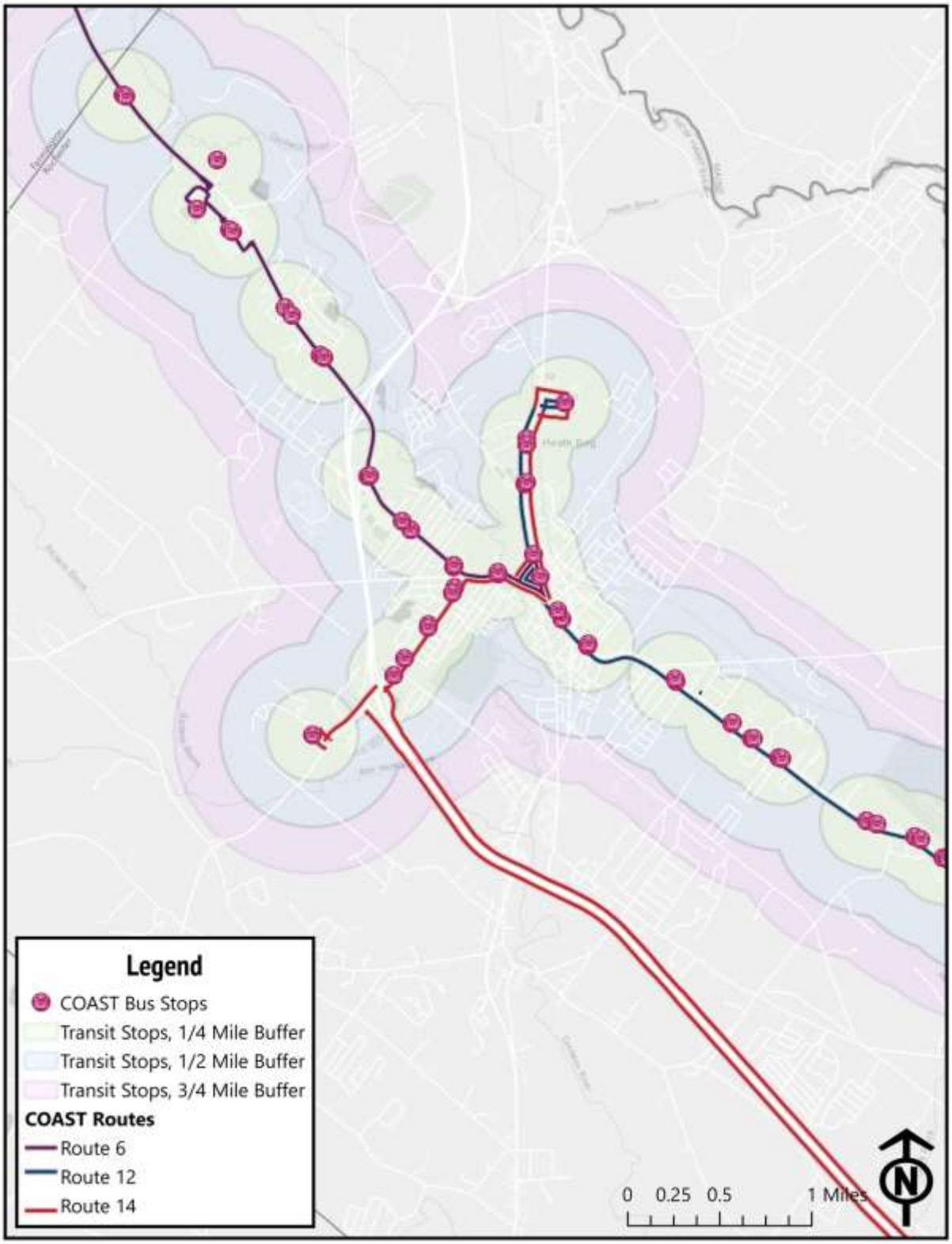
Combined COAST and Wildcat System Routes



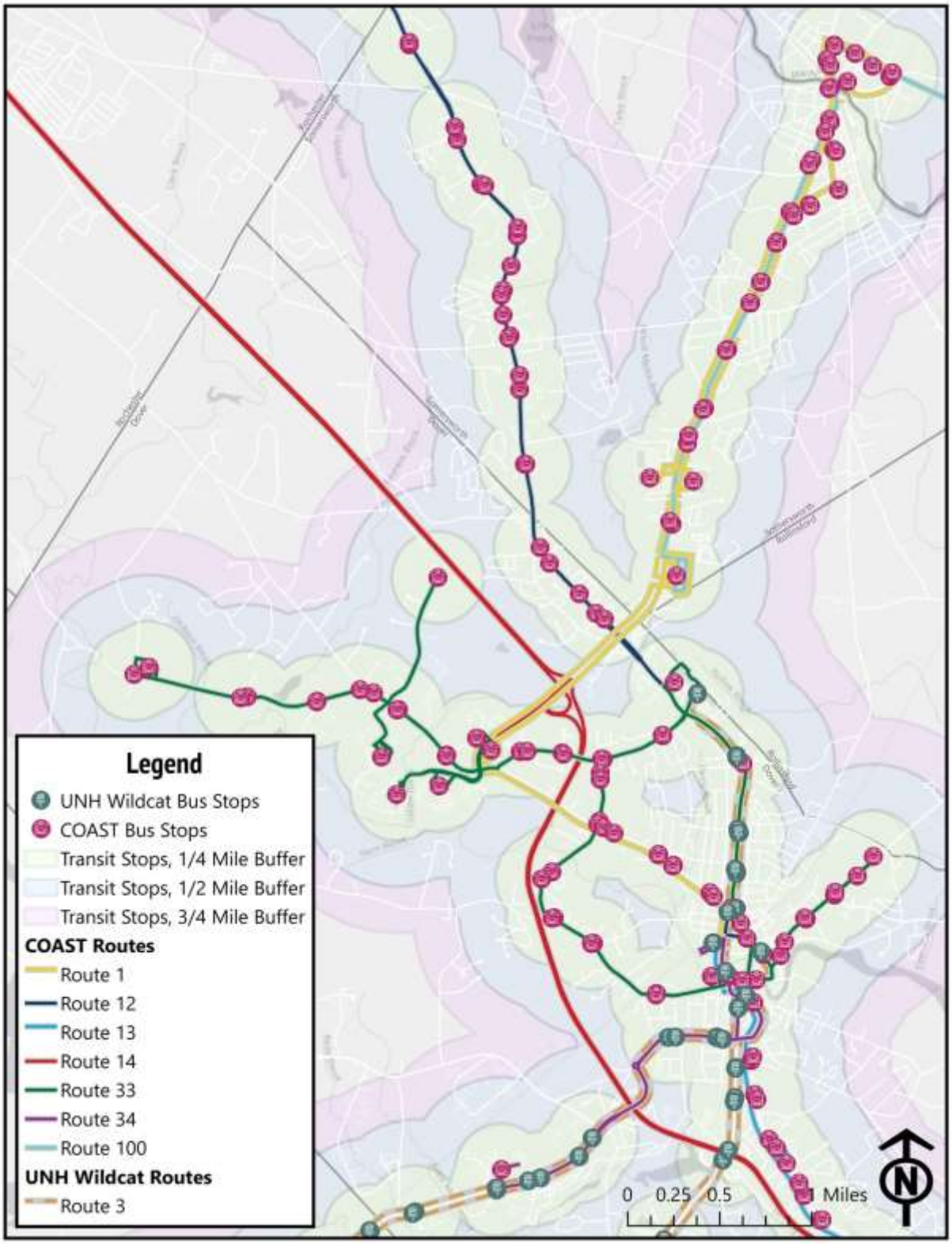
Farmington Service Area



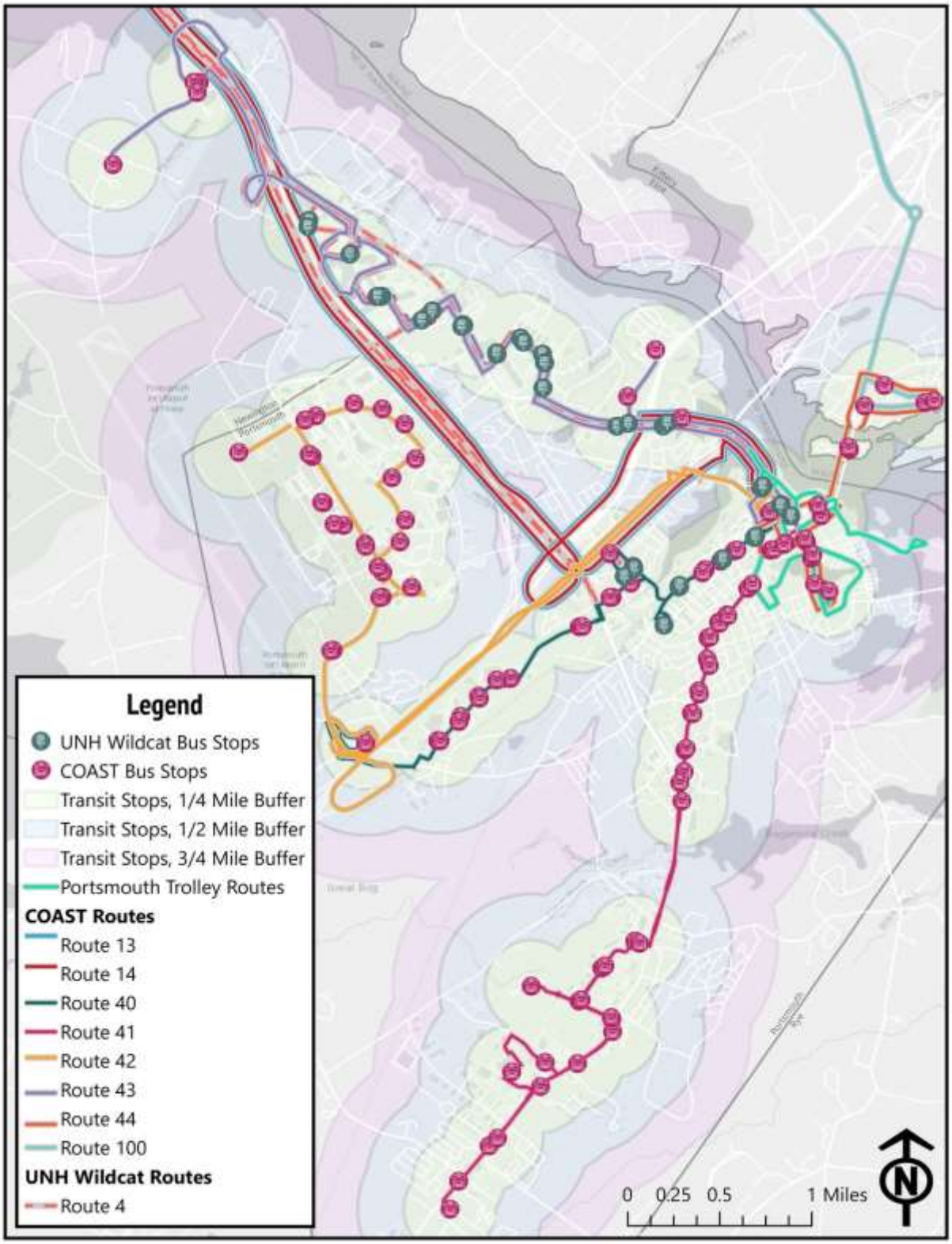
Rochester Service Area



Dover and Somersworth Service Area



Portsmouth Service Area



Qualitative Analysis

Introduction

Strafford and Rockingham RPCs conducted qualitative analysis to support the quantitative APTA model results and literature review with direct examples of public transit's role in southeast New Hampshire. We interviewed a range of people to understand how public transit serves people, businesses, and agencies in the region. They described several challenges, opportunities, and impacts that were reflected in the research cited in the literature review. We pulled major themes from what interviewees described and incorporated their responses into several case studies. We also surveyed numerous businesses about how their employees used public transit and what service improvements would encourage more employees to ride the bus.

Data related to the issues described in this section can be reviewed on the online StoryMap at https://arcg.is/1KeGze.

As part of the qualitative analysis the following interviews were conducted:

- C&J Bus Lines (Jim Jalbert, President, and Jamie Lesniak, Vice President)
- Portsmouth Naval Shipyard (Jackie Lord, Director of Stakeholder Outreach; Thomas Morley, Facilities Planner)
- Great Bay Community College (Robert Wiechert, Director of Campus Security)
- Dover Adult Learning Center (Deanna Strand, Director)
- First Seacoast Bank (Tiffany Melanson, Vice President, Marketing and Public Relations)
- Portsmouth Senior Services (Brinn Sullivan, Director)
- Castagna Development Group (Michael Castagna, Principal)
- Portsmouth Adult Education (Kristie Conrad, Director)
- Workforce Housing Coalition of the Greater Seacoast (Sarah Wrightsman, Executive Director)
- Southern NH Services (Patte Ardizzoni, Communications Director)
- Portsmouth Brewery (Patrick Patterson, General Manager)
- Sheraton Portsmouth Harborside Hotel (Dan Witham, Director of Sales)
- Portsmouth Economic Development Department (Nancy Carmer, Director)
- City of Rochester Economic Development Staff (Jennifer Marsh, Assistant Director; Julian Long, Community Development Manager; and Michael Scala, Director)
- Greater Portsmouth Chamber Collaborative (Valerie Rochon, Executive Director)
- Portsmouth Housing Authority (Tammy Joslyn, Resident Services Manager)
- Lamprey Health Care (Greg White, CEO)
- Seacoast Mental Health (Rebecca Throop, Vice President, Community Relations)
- Crossroads House (Sandra Beaudry and Case Management Staff)
- Strafford County Public Health Network (Ashley Desrochers, Public Health Program Manager)
- Somersworth Economic Development Department (Robin Comstock, Director)

Major Themes from Interviews

Transit is Important for Access to Continuing Education

From interviews with stakeholders in regional continuing education, it is clear public transit is critical for access to education for many residents in southeast NH. Aside from UNH, Great Bay Community College (GBCC) offers the largest range of degree and certificate programs in Southeast NH. Residents look to GBCC to attain additional training and certification to increase their skill and expanded employment opportunities. Public transit opens up this valuable resource to people who are unable to drive themselves to class. This may be because the student does not have a car available for them to use, either because no one in their household has a car or because multiple adults share a single car. Another barrier that may prevent a student from driving to GBCC is if they are unable to drive even if a car were available due to a disability or not having a license. Cost of housing is also a barrier for GBCC students. Housing costs near the main campus in Newington are prohibitively expensive for most people attending classes there. This forces them to live farther away from campus. COAST designs its routes to provide service for the greatest number of people over a wide, mostly rural, area. Covering a larger area means buses come less frequently. The distance and time needed to reach GBCC's Newington campus on public transit becomes a barrier for many students who live farther away in communities like Somersworth or Rochester. The trip by bus from Somersworth takes about 1 ½ hours; the trip from Rochester can take two hours.

There are three major barriers to education: Transportation, Housing, and Childcare.

Access to public transit is even more critical for students of the Dover Adult Learning Center (DALC). DALC of Strafford County helps adults enhance their life skills through basic education, job training, high school completion, and enrichment classes. DALC help their students become more effective lifelong learners, family members, workers, and citizens. DALC offers a wide range of courses that are free or affordably priced (some financial aid is available). The center served around 660 people in 2019. The COVID-19 pandemic is a huge barrier and it is difficult to engage new students; many current students have completely dropped off the radar. A number one priority for DALC is ensuring its locations are on a bus route because eliminating the transportation barrier makes a huge positive impact on students' ability to attend classes.

Deanna Strand, the director of DALC knows first-hand how transportation reliability is a major barrier for her students, and regularly hears them discussing it. Most students are low income and do not own a car, are sharing a car with other family members, or have an unreliable car. Deanna has seen a direct correlation between student attendance and changes to the transit system. For example, in 2018, the City of Somersworth was unable to fully fund COAST's local match request. In order to sustain service to the city, COAST instituted an additional $0.25 surcharge for rides starting in Somersworth. The city eventually met the match request and the surcharge was eliminated, but Deanna observed a drop in student attendance when it was in place. DALC helps people improve their quality of life and participate in the economy who might otherwise be unable to without access to public transit.

Staff from Rockingham and Strafford Regional Planning Commissions have heard from various business owners and economic development leaders about the value of public transit to the local and regional economy. These businesses recognize the interconnected relationship between transportation and economic development. First Seacoast Bank provides a very tangible example. The bank purchases bus tickets for students at the Dover Adult Learning Center. Bank staff took a tour of DALC, met with students, and learned about their challenges accessing continuing education to improve their family's lives. After learning how much of a barrier transportation is for DALC students, First Seacoast Bank has gladly donated the $1,500 per year to purchases bus tickets for students who do not have reliable transportation. Tiffany Melanson - Vice President, Marketing and Public Relations says this was an obvious opportunity to invest in the community and an easy way to have a large impact in the lives of residents building their future. She said transportation independence is easy to take for granted when you can just hop in your car, but many people don't have that option. Closing that gap is important. The economy is made stronger when more people can actively participate in it.

> "We specifically locate branches where there is a bus stop or transit nearby." Tiffany Melanson – First Seacoast Bank

Kristy Conrad directs the Adult Education Program for Southern NH Services. The program serves between 80 and 100 adult learners and people from over 25 countries, many students are English Language Learners. International companies like Lonza or Lindt have international workers come over for rotations and their family members (or sometimes the employees themselves) will take English as a second language courses. Kristy noted that she has worked in this field for 25 years and transportation independence has been a constant challenge for her students. The program's community campus is in Portsmouth, NH where the route 41 trolley helps many students access programs even if they don't have car.

Regional Impacts from COVID-19

The COVID-19 pandemic has had a disproportionate impact on the region's residents. People who were struggling to access resources and training to improve their lives were impacted the most by COVID-19.

While COAST has modified operations and made investment is new sanitization equipment and procedures on its buses, perceptions of the safety of riding transit will also play a role in the return of transit.

Transportation and Housing are Linked

Southeast New Hampshire suffers from a challenge that is pervasive in the United States: employment is concentrated in urbanized communities, but housing costs force much of the core workforce to live farther away from available jobs. A poll produced by NHPR[3] in 2019 found many examples where prospective workers were forced to choose between housing affordability, potential wages, and long commute times. This circumstance is especially difficult for minimum wage workers, for whom transportation represents a larger proportion of income. Respondents to the 2019 NHPR poll said wages in food service jobs were far below cost of living in communities like Portsmouth.

> Attracting needed workers requires both adequate housing and transit options.

[3] https://www.nhpr.org/post/we-asked-you-answered-what-are-nhs-workforce-challenges#stream/0

New Hampshire state law (RSA 674:58-61), refers to "workforce housing" as rental housing affordable to a household of three making no more than 60 percent of the area median income, and for-sale housing affordable to a household of four making no more than 100 percent of the area median income. Such housing should cost no more than 30 percent of income for renters making up to 60 percent of the area median income or homeowners making up to 100 percent of the area median income. In the Portsmouth-Rochester area (a HUD Metro Fair Market Area), in 2021 this translates to units renting for no more than $1339/month for renters making up to $57,560; or a combined monthly payment for mortgage, taxes and insurance not exceeding $2480 for homeowners making up to $106,600.[4] The people who represent the workforce are diverse. Police officers, firefighters, teachers, and nurses are obvious, but workforce housing also supports the kitchen staff at your favorite restaurant, the baristas who make your morning coffee, shop owners, hotel employees, skilled laborers, occupational therapists like Melissa, non-profit staff, and many others.

Sarah Wrightsman (Executive Director of the Workforce Housing Coalition of the Greater Seacoast) says public transportation is incredibly important for workforce mobility. Many workforce jobs are located near dense urban centers, but housing prices are also higher there so people can't afford to live close to their jobs. This effect is happening at the local and inter-regional scale. People working jobs in downtown Dover or Portsmouth may be unable to afford downtown housing costs. Similarly, housing prices in Boston have pushed people farther and farther from the urban core – all the way into southern New Hampshire. Sarah has noticed that workforce housing developers consider public transit access for new developments, but other developers generally do not here in the Seacoast. There is not currently a broad culture of public transit ridership in New Hampshire like in denser urban areas such as Boston, and consequently there is less consideration of transit access in commercial site development. Local zoning can be a tool for incentivizing housing development paired with public transit but Sarah was only aware of such instances in Manchester and Nashua. For many years it has been a challenge for families to find affordable housing in New Hampshire. Not just low-income families; even those with two earners with well-paying jobs have struggled to housing that is affordable and doesn't require long, expensive commutes for employment.

Michael Castagna owns the Castagna Development Group and has firsthand experience with trends and priorities for new housing developments across the state. Michael is on the Workforce Housing Coalition of the Greater Seacoast board and says transit is still considered an amenity for most potential development sites rather than a priority. Most new developments are placed in locations that require driving a personal car, even multi-unit developments designed for people over 55. Michael said increased state financial support was an important part of improving existing transit services and attracting more ridership but reexamining local development patterns was equally important. In his experience, communities routinely oppose dense development patterns that make transit service more viable. In the name of rural character, communities may inadvertently favor sprawling developments that erode the very thing they aim to preserve.

Dense development patterns make public transit viable and preserve rural character.

Michael Castagna suggested that successful housing developments are multi-generational and located close to jobs and other essential services. He argued that younger people entering the job market and looking for communities that will support a family prioritize places with services close together and

[4] https://www.nhhfa.org/wp-content/uploads/2020/04/Workforce_Housing_Purchase_Rent_Limits.pdf

require less driving. This is supported by research suggesting that people are choosing better work-life balance (including shorter commutes) over higher wages.[5]

Regional Impacts from COVID-19

COVID-19 has already had a significantly effect on the dynamic between home, workplace, and work-based commuting. The full effects may take years to be fully realized. Some businesses and employees may be able to shift to a remote work model part-time or permanently. It has implications for how communities and developers plan and prioritize residential and commercial space. New Hampshire's relatively low cost of living already attracts people to live New Hampshire, and commute to work in Boston. Housing availability is already critically low. If COVID-19 increases the number of people who can work from home, those people may look to relocate to rural areas outside urban centers like Boston. That will put an even greater strain on housing availability and affordability.

Regardless of permanent changes in response to COVID-19, there will be members of the workforce whose jobs are critical and cannot transition to a virtual setting. There will also be people who were already struggling to afford housing, find living-wage jobs, and access critical services, who will be impacted further by the pandemic. In either case, public transit will still be a vital resource for the mobility of the workforce in SE New Hampshire.

Transit is Important to Employers and Employees

Strafford and Rockingham counties have numerous healthcare facilities, many of which are on major bus routes. Based on recent rider surveys, employment and healthcare are the top two reasons people ride COAST. It's no wonder, considering there are two major regional hospitals, multiple healthcare facilities, and 1,977 jobs between Downtown Rochester and Weeks Crossing in Dover. Portsmouth Regional Hospital and Exeter Hospital are among the top ten largest employers in Rockingham County, while Wentworth Douglass and Frisbie Memorial Hospital are the second and fourth largest employers in Strafford County. Yet, New Hampshire is experiencing a workforce shortage. Many industries that offer well-paying jobs with competitive benefits are struggling to attract and retain employees. Healthcare is struggling in the workforce shortage, yet it's the state's 2nd largest industry in terms of employment and vital to care for the rising numbers of seniors. In July 2020, Joan Widmer, Executive Director of the New Hampshire Nurses Association said there was a shortage of nurses and nurses' aids in the state.[6] The COVID-19 pandemic made this worse as healthcare workers faced the greatest risk of exposure, especially caregivers in nursing homes and long-term care facilities where three quarters of COVID-19 deaths occurred. The shortage of health care workers is even more acute in rural areas where a greater number of people have limited transportation options.[7]

At the same time, New Hampshire is also in the middle of housing shortage that is reaching crisis proportions. The effectiveness of workforce advancement is tied to transportation access and the location and affordability of housing. Public transit is important for workforce mobility if jobs are concentrated in urbanized areas like Dover and Portsmouth, but people seeking those jobs can't afford to live near work. Dense residential development that is affordable, near public transit, and in a walkable downtown is

[5] https://www.nytimes.com/2019/09/17/style/generation-z-millennials-work-life-balance.html

[6] https://www.nhbr.com/covid-19-makes-new-hampshires-nursing-shortage-more-acute/

[7] https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3760483/

commonly called “transit-oriented development”. Transit-oriented development it can reduce housing and transportation costs for individuals and families, and it can generate more revenue for municipalities.

Economic Development staff from the City of Rochester noted that many residents commute to jobs within a 30-minute radius, especially at the Portsmouth Naval Shipyard. They said local transportation connections via transit are vital to the city and public transit plays an important role. They noted that businesses may not prioritize proximity to transit routes when they are identifying potential locations but contact city staff when their employees have difficulty getting to work. On the other hand, in their experience Rochester city staff have found that retail and grocery store developers place a high priority on locations directly on an existing transit route.

Because of the large distance between destinations in rural areas, vehicle ownership is required to reach the full range of essential services. This also means that commuting transportation costs are a larger proportion of household income in rural areas compared to dense urban centers like metro Boston. In areas where cars are essential and transit is not provided, people who cannot afford to own a vehicle or do not otherwise have access to a vehicle have extremely limited options for increasing their prosperity and quality of life. Public transit provides a viable way for them to participate in the economy and help it grow.

Public transit is vital to the service and hospitality industry in the Seacoast.

Dan Witham, Director of Sales for the Sheraton Portsmouth Harborside Hotel, has first-hand experience with the impacts of the lack of affordable housing near job centers. Hotels are a critical part of New Hampshire’s tourism and hospitality industry, which is a primary generator of state revenue through the state rooms and meals tax. Dan noted a key correlation between transit access and labor pool access. Summer is peak season and the hotel hires additional staff. In a typical year many of these additional staff are students in the area on J1 visas who live in Dover and do not own a car. Other employees live in Dover, Rochester, and Somersworth and rely on COAST. Most employees cannot afford to live in Portsmouth near their jobs. Daytime staff such as housekeeping can take COAST to and from work, but food and beverage staff have to carpool or arrange other ways to get home if their shift ends after COAST ends operations at 9:00pm.

Dan noted that this challenge is growing worse as housing prices continue to rise in outlying communities. He said employees are commuting 45-60 minutes for jobs that only pay $15.00 per hour. The Sheraton Portsmouth works with employees to identify available transportation options, purchases COAST bus passes, and coordinates employee schedules so they can carpool and use transit. The Sheraton Portsmouth is part of a hospitality group which includes four other hotels in the seacoast. Dan said that losing public transit service would be very detrimental to the hospitality industry in the seacoast. Portsmouth has developed as a major destination for dining and tourism. As of 2021 there were 21,760 restaurants seats in the city and the hotel industry has grown in tandem to meet demand. This growth in the service industry has not been confined to Portsmouth and outlying communities like Dover are joining the market (see the Service Industry case study below). Affordable housing and transportation will be critical for supporting continued growth in the service and hospitality sector in southeast New Hampshire.

Patrick Patterson has a similar experience as the General Manager of the Portsmouth Brewery: the affordability of housing and transportation are directly impacting his business. Normally, the restaurant would have around 65 full-time and part-time staff, but several factors are making it difficult to maintain adequate staffing levels. Patrick said that workers on J1 visas make up part of his workforce during the busy summer, and people under 18 are filling some of the gaps in the employment pool. However, the brewery would soon be closing on Tuesdays because of the chronic staffing shortage. Most brewery employees cannot afford to live in Portsmouth and commute from the area of Somersworth and Rochester. Many of those employees rely on COAST for transportation and Patrick works with them to flex their schedules so they can catch the last bus. He noted that most restaurant staff must work very late, especially in the busy summer months, but the last northbound bus leaves at 9:00pm. This can leave the restaurant short on staff to close for the night. A single late bus meant to support restaurant staff could attract more employees and potentially make the difference between a restaurant closing or staying open. He noted that many restaurants in downtown Portsmouth likely have a surge of employees leaving at the same time after the final shift.

Increased public transit frequency would have a measurable impact on restaurant workers.

"If I could get on a bus in Rochester and be dropped off 5 min from work in downtown Portsmouth… if I could do that and not have to pay for parking I would do it every day if there was a reliable way to get home at the end of the shift."

"If you remove transit at large I think you'll see there'll be fewer people in Portsmouth because it will impact business that people come to Portsmouth to patronize".

Patrick said the cost of housing is also a limiting factor for Portsmouth restaurants. Most of his employees who live in Portsmouth are high school students living with their parents. The restaurant scene in Dover, Rochester, and Somersworth is growing rapidly and enticing workers away from Portsmouth. Patrick acknowledged that people living in Somersworth have little incentive to commute to Portsmouth if they can get work near where they live and eliminate a long commute. Without more affordable housing in Portsmouth, the worker shortage will likely get worse for a city that is well known for restaurants. This is an example of indirect and induced effects from public transit operations. The value of public transit may not be obvious until a city starts losing workers for a key industry or someone's favorite restaurant closes because it can't hire enough employees. Patrick had a suggestion: people shouldn't only value transit based on whether they personally depend on public transit; they should be mindful of how transit supports the businesses and services that are important to them.

Public transit functions best in densely populated areas where it can serve the greatest number of people. When large employers are spread out in rural areas and people who could most benefit from transit are unable to afford housing near services, this makes it difficult for public transit to operate cost effectively. Large employers looking for prospective land are also enticed to select sites outside in rural communities where large properties are cheaper than urban communities. Large employers in Southeast NH that have three shifts have spoken to transit providers and Regional Planning Commissions about limited transportation options for their employees. They are struggling to retain employees whose families share

a single vehicle. They are among other employers who have said increased public transit service would help with workforce recruitment and retention.

The study's survey of business owners in response to the question "If few or none of your employees use transit to get to work currently, please indicate which of the following would make transit a more attractive option for your employees?" responded: 37.5% more frequent service, 25% service that runs later, and 25% service that begins earlier.

Regional Impacts from COVID-19

COVID-19 has forced a rapid acceleration of the shift to remote work for the businesses that could transition. This has drastically reduced long-distance travel from the region. Though leisure travel has resumed, C&J Buslines does not expect full ridership recovery until 2022. The value of in-person business hasn't been eliminated but remote work may remain as an option for some sectors; some office-based workers may transition to remote work full or part-time. Newer members of the workforce are prioritizing a healthier work-life balance – even valuing a range of benefits including remote work over higher pay.[8] COVID-19 may have rapidly accelerated what was a steady generational shift; many organizations were already working toward the transition to more remote work and finding benefits from it.[9]

It is unclear how extensive the shift to remote work will be; it may be that more office-based employees will simply have greater flexibility to work while managing busy personal lives (e.g. working from home to care for a sick child). Some businesses may shift completely to remote work to save on the overhead cost of a large office building. It is also unclear if the COVID-19 pandemic will result in a permanent shift in transportation demand. One thing it clearly showed is that there are plenty of workforce jobs in southeast NH and ME that cannot be continued remotely. While COAST had to suspend service between March 31st May 11th 2020, ridership rebounded to 50% of pre-pandemic ridership within four months. The rapid return in COAST's ridership is an indication of the value of fixed route as an essential service for people's mobility. COAST ridership remains above 50% of pre-pandemic levels and COAST staff expect a return to 100% of pre-pandemic levels will depend on recovery in employment. COAST is primarily used for employment trips and many job sectors are still recovering.

> Long-distance business travel saw a massive and immediate cut due to the COVID-19 pandemic. This affected inter-city services like C&J, but "people who rode COAST before the pandemic will still need to through the recovery"

COAST's fixed route service covers 10 towns over a large area. Even though routes link the large, urbanized cities in the region, they also cover the rural distances in between each city. This means the maximum service frequency COAST can provide is one bus per hour from about 6:00am to 8:00pm (depending on the route). See the COAST service profile for more details. This focuses on serving the greatest number of people during standard business hours. Many large employers in the region are in manufacturing and have shifts 24 hours per day, so transit may be unavailable to 2nd and 3rd shift workers.

There was a shortage of certified drivers before the pandemic, which has only worsened the problem. People need a Commercial Driver's License (CDL) to drive the large trucks that deliver goods to area

[8] https://www.nytimes.com/2019/09/17/style/generation-z-millennials-work-life-balance.html

[9] https://f.hubspotusercontent00.net/hubfs/5134751/assets/Employee%20Perspectives-%20Powering%20a%20Remote%20Workforce.pdf

businesses. A CDL with an additional "passenger endorsement" is required to drive public transit buses. The shortage of certified drivers is impacting COAST and local businesses alike. Patrick Patterson, who owns the Portsmouth Brewery, said food distributers do not have enough drivers which is creating a bottleneck in food delivery. Hiring enough certified drivers is also a challenge COAST. In late June 2021, COAST had to reduce service on some of their weekday and weekend routes because of a staffing shortage.

New Hampshire saw the worst employment impacts from the pandemic between April and May of 2020, but the impacts were disproportionate across wage brackets. On January 20th, the first COVID-19 case was reported in the U.S. and the immediate impacts fell hardest on those most vulnerable. By the end of April, 2020 high-wage employment (>$60,000 annual income) had dropped by almost 15 percent; mid-wage employment ($27,000 - $60,000 annual income) had dropped by almost 30 percent; and low-wage employment (<$27,000 annual income) had dropped by 50 percent.

Initial employment impacts from COVID-19 were hardest on low-wage earners, but that disparity was shown even more dramatically during the recovery period between April 2020 and January 20th 2021. By the end of May, 2020 high-wage employment rates had actually rebounded above January 2020 levels, and have stayed stable. Mid-wage employment rates returned to January 20th 2020 levels by October 2020 but by January 2021, they dropped 7.5 percent below January 2020 levels. By July 2020, low-wage employment rates only recovered to a maximum of 20 percent of January 2020 levels. Starting in the fall of 2020, low-wage employment rates dropped again and as of January 20th 2021, they were at 32 percent of January 2020 levels.

As of January 20th 2021, there were 32 percent fewer low-wage jobs in New Hampshire compared to a year ago.

For low-income households, transportation costs represent a higher proportion of household expenses. Public transit represents an opportunity to increase the economic resilience and mobility for low and mid-wage workers. Expanding public transit service could provide more employment access and reduce transportation costs for a wide range of the workforce. This should not be interpreted as "public transit is only for poor people" - this is an inaccurate stereotype. Public transit is workforce transportation, and a diverse range of people use it. It is also a vital need for many aging people in the region. A recent SRPC age-friendly communities survey showed that public transportation options were one of the main concerns respondents expressed regarding aging in their community.

Source: SRPC Communities for Healthy Aging Transitions Survey 2021

COAST conducted a survey of riders in 2019 as part of a comprehensive operations analysis and many respondents said they had a car but often took the bus to save money, avoid driving, and benefit the environment.

Case Studies

This study examines public transit and economic development in the context of southeast New Hampshire and Maine. The people, businesses, and communities of this region benefit from public transit. It is an economic driver; it contributes to the revitalization and development of storefronts, main streets, town centers, and downtowns. Across the country, investment in transit yields measurable economic benefits to the communities served. Public transit is becoming more vital to the region as the number of seniors and people with disabilities grows. However, transit service is currently limited by lack of any meaningful contribution of New Hampshire state funds.

The case studies below are provided to illustrate the role public transit plays in the larger economy, workforce transportation, and overall community benefits:

- Portsmouth Naval Shipyard
- Opportunity Zones
- Access to Healthcare
- Access to Service Industry Employment
- Regional Large Employers

Portsmouth Naval Shipyard

The Portsmouth Naval Shipyard (PNSY) is one of only four remaining U.S. Navy repair shipyards in the United States. It is responsible for the maintenance, repair, and modernization of the Navy's fleet of attack submarines. PNSY is the region's largest employer and was responsible for $882M of regional economic activity in 2018.[10]

The Shipyard employs a little over 7,000 fulltime workers in three around-the-clock shifts. During the first daytime shift, approximately 5,000 workers commute to the island. Another 1,000 contractors work on the shipyard throughout the week, depending on their contract terms and duration.

Transportation Challenges at the Shipyard

Most of these workers live in outlying communities. The majority of PNSY workers living in New Hampshire commute from Farmington, Rochester, Barrington, and Dover. The Shipyard has been growing consistently but because it is located on an island, they have a unique challenge with parking capacity. Additionally, all workers are funneled through the small Kittery downtown and over two small bridges and a security checkpoint. Southern Maine Planning and Development Commission facilitated a Joint Land Use Study (JLUS) between PNSY and the Town of Kittery to plan for continued growth of the shipyard and address local challenges that are impacting the town and base operations. Traffic congestion and parking were top issues. Simply increasing parking on the island is not an option, so several top strategies in the JLUS implementation report focus on increasing access to public transit and other alternatives to driving

[10] Town of Kittery and Portsmouth Naval Shipyard – Joint Land Use Study 2020

alone. New, expanded, or modified public transit service was one of the key factors in addressing transportation challenges identified in the study.

The Role of Public Transit

From 2012 to 2020 COAST operated a special express commuter bus service to the shipyard called the Clipper Connection. The service included three routes originating in Rochester, Dover and Somersworth, and used larger motor coaches with amenities similar to an intercity bus service such as C&J and charged a premium fare of $7.00 per boarding as opposed to the standard $1.50 fixed route fare. This was possible largely because of a federal pilot grant which covered the cost of the monthly transit pass for shipyard employees. While the service was successful from a productivity standpoint and came close to covering its costs out of the farebox, when pilot grant funding ended service was redesigned with less tailored routes but the standard system-wide fare of $1.50/boarding.

The new route system launched in June of 2020 uses the Spaulding turnpike as a central route to keep the direct connection to the shipyard and maintain travel times. This reduced the cost of the direct connection to the shipyard to the standard fixed route fare. A vestige of the original Clipper Connection remains as Route 100 connecting Somersworth, Berwick, South Berwick, Eliot and PNSY; and timed to the beginning and end of the Shipyard's first shift. The shipyard also offers a subsidy program for transit fare (the Transportation Incentive Program) that enables the shipyard to pay for monthly bus passes for employees. Despite the availability of transit service to base employees and improvements through the new route system, COAST is unable to provide service at a frequency that supports a wide range of workers.

Workforce transportation is a key benefit of public transit in a region where housing costs require workers to live far from their jobs. The Portsmouth Naval Shipyard is a source of thousands of jobs that support families and communities. Employees commute to those jobs from as far north as Milton and Farmington (30 to 40 miles) with the greatest number of NH residents coming from Rochester. In Strafford County, transportation can account for nearly 21% of the household's basic needs expenses for a family with two children and two working adults[11]. Because the base is restricted to an island with two access points and limited parking, public transit will continue to play an important role in the sustainability of the shipyard's operations. This case is described in research by Chatman and Noland (2014) who presented public transit's ability to support employment and economic development when parking and highway capacity become limiting factors in the growth of cities and regions (see the literature review). Public transit provides an opportunity to keep transportation costs low for base employees and support long-term base planning and operations. Sustainability of transit service will require investment of state funds by New Hampshire.

Impacts from COVID-19

COVID-19 had an immediate impact on base operations as workers are regularly in close quarters and small enclosed spaces. Shift schedules were modified to reduce employee contact. This affected coordination with COAST schedules. Many of the jobs at PSNY cannot be accomplished remotely so the transportation challenges will continue as the region adapts to COVID-19 and workers are vaccinated.

[11] Estimates from the MIT Living Wage Calculator (2019)

Conclusions and Recommendations

The Portsmouth Naval Shipyard is an excellent parallel of a community forced to make careful choices about land use decisions in a restricted space. Because of housing costs and lack of transportation options, shipyard workers driving alone have created unsustainable congestion. Simply adding more parking is not an option and would only aggravate the problem.

Public transit contributes to workforce transportation and economic development, but its full benefit cannot be achieved without meaningful investment of state funds to sustain transit service and help it expand. Municipalities should not have to bear the full cost of matching federal transit funds, especially when the economic benefits of regional public transportation extend beyond the municipalities where transit operates. In 2019, COAST expended $2,026,897 in funds from the Federal Transit Administration's 5307 formula program to support operations and some bus replacement. This required a total of $1,535,312 in non-federal matching funding borne largely by municipalities in the service area along with revenue from on-bus advertising[12].

Opportunity Zones

Created under the Tax Cuts and Jobs Act of 2017, opportunity zones are defined as "economically-distressed communities where new investments, under certain conditions, may be eligible for preferential tax treatment".[13] This federal program aims to encourage economic development and investment in low-income communities. Opportunity zones are designated by state governors who nominate blocks of low-income areas by census tract, which are then certified by the Secretary of the U.S. Treasury. Investments are made in opportunity zones by placing private investments into a Qualified Opportunity Fund, which must then deploy the funds into eligible business or real property investments within an opportunity zone.

> Transportation is a huge barrier if good jobs, education, and healthcare aren't near where people can afford to live. Public transit can fill this gap and improve people's quality of life.

On May 3, 2018, New Hampshire Governor Chris Sununu nominated 27 census tracts to be designated as opportunity zones. Five of these are served by fixed route public transit in the region: the downtowns of Rochester (two census tracts) and Somersworth, and portions of downtown Dover and Durham. Durham's opportunity zone overlaps entirely with the campus of the University of New Hampshire (UNH). All three of the cities' downtowns are on COAST routes; UNH has its own transit system that serves students, staff, and faculty that links with COAST routes. There are additional opportunity zones designated in Raymond, NH and Seabrook, NH but they currently do not have transit access.

While rules for Qualified Opportunity Funds will mostly result in targeted investments for residential and commercial real estate development, there are opportunities to leverage the program to make investments in infrastructure, including public buildings, transit, highways and roads.[14] This can be achieved through public/private partnerships, where governments collaborate with private sector developers to fund, build, or operate projects that they may not be able to implement on their own. For example, a transit agency may partner with a developer to lease property owned by the transit agency

[12] Data provided by COAST

[13] https://www.irs.gov/credits-deductions/opportunity-zones-frequently-asked-questions

[14] https://drexel.edu/~/media/Files/nowak-lab/Drexel_NMFL_BuildingBetter_Final.ashx?la=en

near a transit station to build office space or residential units, thereby raising revenue (via rent payments) for the transit system in the process.[15] The developer then benefits from the tax subsidy by investing in the opportunity zone through a qualified opportunity fund.

Furthermore, the opportunity zone program could be used to help spur investments near transit lines and stations, encouraging transit-oriented development (TOD). The benefits of transit-oriented development are numerous, especially in low-income communities where access to reliable transportation may be a challenge for many. Creating higher density, mixed-use development near reliable public transit reduces traffic and congestion, the need for parking spaces and facilities, lowers household spending on transportation and increases foot traffic for businesses nearby.

Additionally, public transit can create strong linkages between the opportunity zones in the region. The more linkages between designated opportunity zones, the greater their economic potential – especially if they support new employment and housing. Mathur (2014) conducted research that suggested that the presence of public transit increases property values, and that those increased revenues can be used effectively to fund public transit service (see the literature review for this study). Following a development approach focused only on personal vehicles could reduce the potential economic impact of development in opportunity zones. Like the case study of Portsmouth Naval Shipyard, parking is a limiting factor in the development of a community. Expansive parking comes with opportunity costs that can limit the potential impact. Downtown real estate is too valuable to be spent on parking, which eliminates the potential community value of a new storefront, park, or other productive use. Focusing instead on walkability and transit access contributes to a dense, vibrant downtown.

The employment tab in the story map shows that the designated opportunity zones in Dover, Somersworth and Rochester are served by COAST's fixed-route public transit.[16] In Durham, Wildcat Transit serves students, staff, and faculty at the University of New Hampshire, which links with COAST routes in some surrounding communities. The Amtrak Downeaster, which connects the region to Portland, ME and Boston also stops in Durham and Dover. Given the locations of these transit services within the OZs, there may be opportunities to position these areas for investment. Specifically, by leveraging public/private partnerships to create transit-oriented development, which may address core transit needs as well as improve the livability of these downtowns and surrounding area.

UNH is one of the largest employers in the region, it is a land, sea, and space grant university, and is a significant economic driver. The tri cities of Dover, Somersworth, and Rochester are all in the process of revitalizing their central downtown areas. Both Dover and Rochester have made zoning changes to raise limits on density of downtown development, and Rochester's revisions to allow first-floor residential development under certain circumstances are expected to make infill or redevelopment projects more viable.

Potential Value of Public Transit

Public transit is an investment that generates revenue, as demonstrated by Mathur (2014). The potential of public transit as an economic driver in southeast New Hampshire is even greater due to existing multimodal linkages. The Amtrak Downeaster connects the region to Portland, ME and Boston, MA; C&J

[15] https://www.transit.dot.gov/JointDevelopment

[16] https://srpc.maps.arcgis.com/apps/MapSeries/index.html?appid=57dbae4ddc3144acab33a72b1feb9e6c

Buslines connects to Boston, MA, and New York City. COAST has a stop at the terminal at Pease International Airport which has a growing selection of commercial and passenger flights. Strengthening the multimodal linkages in the region can only increase the mobility of people and their access to resources. Additionally, the strong correlation between opportunity zones and downtown development in the seacoast provides a unique opportunity to leverage this multimodal transportation system with further private investment in transit-oriented development in these downtowns or along key corridors.

Conclusions and Recommendations

While opportunity zones as a tool are unlikely to generate direct investment in public transit, the geographic strengths of the designated opportunity zones in our region and the focus of the opportunity zone program on real property investments present an opportunity for a symbiotic relationship centered on transit-oriented development. Public transit can be a catalyst for that development, because it is an amenity that can link people to employment, essential services, and the larger region with passenger rail and inter-city bus service. Meanwhile, investments in new real estate development or businesses, if appropriately directed, can help to generate the dense concentrations of residents and jobs that will make transit most effective. Coordinated federal, state, and local investments into opportunity zones can demonstrate commitment to this paradigm when attracting private investment; transit service is one such investment. Many federal programs have prioritized projects within opportunity zones for awards for this purpose.[17] State and local governments and transit agencies may wish to do likewise to take maximum advantage of available programs and resources. Engaging transit providers as active partners in these coordinated efforts would improve the quality and responsiveness of the transit system to changing conditions.

Access to Health Care

Access to medical care is one of the major types of travel for which riders use COAST. According to the COAST Rider Survey, 17 percent of total trips taken on COAST were for healthcare. For 2019 that equated to approximately 78,000 medical trips between COAST's fixed route and Americans with Disabilities Act paratransit services. Looking solely at paratransit and other demand response services coordinated through the TripLink call center (COAST ADA, Rockingham Nutrition Meals on Wheels, Ready Rides VDP, Portsmouth Senior Transportation, and the Community Rides van service) the share of medical trips is even higher at 41 percent.

Access to medical care is a key need for older adults to be able to age in place, which is a key part of New Hampshire's strategy to address a rapidly growing older adult population as set out in the State Plan on Aging completed in 2019.[18] Numerous community needs assessments by the region's non-profit hospitals (Wentworth Douglass, Frisbie Memorial, Exeter) have over the past decade perennially found that the region (and the state as a whole) lacks resources to adequately address this need. [19],[20]. City of Rochester staff noted that public transit access is vital for several social and human service agencies that are in town. Clients of the SHARE fund, Tri-City Co-op, homeless shelters, and the SOS Recovery Center all rely on public transit to reach those agencies. As the older adult population in the region grows over the coming two

[17] https://eda.gov/opportunity-zones/

[18] https://www.dhhs.nh.gov/dcbcs/beas/documents/spoa.pdf

[19] https://www.wdhospital.org/files/7615/6890/5432/2019_WDH_CHNA_-_FINAL.pdf

[20] https://frisbiehospital.com/util/documents/2020/2020-Community-Health-Needs-Assessment-Report.pdf

decades this need will increase significantly. The American Association of Retired Persons (AARP) estimates that one in five Americans over the age of 65 doesn't drive. The population over age 65 in Rockingham County is projected to nearly double by 2040 from 48,278 in 2015 to 93,319 in 2040. For Strafford County the population aged 65+ is projected to grow 97 percent over the same period[21].

The Role of Public Transit

The stakeholder interviews with Lamprey Health Care, Seacoast Mental Health and other medical providers highlighted the importance of transit in supporting access for patients, whether provided by COAST, volunteer driver programs or other human service agencies that work through the TripLink call center. While medical appointments accounts for approximately 17 percent of COAST fixed route trips, they represent over 41% of trips coordinated through TripLink. COAST serves as the Lead Agency for the Alliance for Community Transportation (ACT), the Regional Coordination Council for Community Transportation (RCC) for the region. In this role COAST not only hosts the TripLink call center but works with transportation providers, hospitals and other medical practices to identify access needs and better coordinate services. This coordination has yielded transportation funding from major hospitals in the region as well as efforts to coordinate appointment scheduling when transportation services are available. Healthcare providers and transportation providers recognize that current needs will only be magnified by the rapid growth in the region's older adult population.

Transportation Challenges

Supporting adequate access to healthcare poses several challenges in the region including:

Geographic Limitations. While COAST is one of the larger transit providers in the state in terms of municipalities and land area served, COAST services cover only five of 18 communities in the SRPC region and three of 27 communities in the RPC region. Human service agencies coordinated through the TripLink call center cover other parts of the two regions with volunteer driver programs and other demand response transportation, but significant gaps exist in the network.

Eligibility Limitations Within Served Communities. Much of the funding that supports volunteer driver programs and other human service agencies providing medical transportation in New Hampshire is targeted exclusively for older adults and individuals with disabilities. Lower income individuals and families that lack access to a car have few options if they are not near a COAST fixed route. This has presented a particular problem for individuals seeking medical care for substance use disorder.

Social Determinants of Health. Available transportation resources for older adults and individuals with disabilities tend to be focused on access to formal medical care. While this access is critical, other types of trips that simply reduce social isolation can be equally important to overall mental and physical health. Current resources limit the opportunities for these trips.

High Frequency Travel for Chronic Conditions. Individuals receiving kidney dialysis treatment need to travel three days per week for life critical medical care. Dialysis transportation places a significant strain on the resources of COAST's ADA service, volunteer driver programs and other providers in the TripLink system. While regional non-profit hospitals such as Exeter and Wentworth Douglass invest some funds in

[21] https://www.nh.gov/osi/data-center/documents/2016-state-county-projections-final-report.pdf

transportation access, dialysis clinics are national and international corporations that do not contribute to the agencies that carry patients to their facilities.

A final challenge discussed in greater detail in the Quantitative analysis chapter is the financial impact on medical providers of appointments missed due to lack of transportation. Nationally the cost of such missed appointments is estimated at $150 billion annually, or $150,000 for the average medical practice.

COVID-19 Implications

COVID-19 caused a dramatic disruption in transit service in spring 2020, with COAST and many other transit providers temporarily suspending fixed route service in order to redesign operations for the protection of riders and drivers. Essential trips were provided via demand response service throughout this suspension of the fixed route network. Fixed route trips in May 2020 were down approximately 84% below normal for the month, while demand response trips were down approximately 75%. This reflects both the fact that a significant number of fixed route riders in essential jobs continued to rely on the system even as most people avoided travel as much as they could; and that a higher number of demand response riders continued to rely on COAST services, especially for medical and grocery trips and other basic life needs. Demand response trips, particularly ADA paratransit, have also rebounded faster than fixed route service volume. While fixed route service volume has returned to 55-60 percent of pre-COVID levels, ADA paratransit trips are closer to 65 percent of pre-COVID levels.

The pandemic created a double challenge for access to medical care as many medical appointment trips in the region are provided by volunteer driver programs such as Ready Rides, a partner in the TripLink call center, and Transportation Assistance for Seacoast Citizens (TASC). Most volunteer drivers are themselves older adults at increased risk from exposure to COVID-19 or other viruses, and this greatly reduced the capacity of those programs to provide trips during the pandemic. Current plans for improved transportation access in the region's rural communities rely heavily on volunteer driver programs, while the pandemic highlighted a challenge to address in that planning.

One key positive trend accelerated by COVID-19 has been increased use of telemedicine. Seacoast Mental Health was forced to implement virtual appointments for counseling services in spring 2020 and has found them to be an effective alternative for some patients. Staff estimate a significant percentage of typical in-person appointments could be replaced with telemedicine appointments going forward, reducing travel costs for individuals with their own vehicles, simplifying access for those without vehicles and reducing some demands on transit service.

Conclusions and Recommendations

Providing access to medical care is one of the primary roles of COAST and the various human service agencies for which COAST coordinates transportation services through the TripLink call center. The quantitative analysis estimated the value of access to medical care provided by COAST at over $2.29 million/year to riders and $1.97 million/year to healthcare providers in the region. The need for medical transportation is anticipated to increase dramatically over the coming decade with a growing older adult population. This growth is foreshadowed by the explosion in ADA paratransit demand over the past decade. While COAST has been innovative in promoting coordination to optimize use of existing resources, addressing the challenges identified above will require additional investment from both the public sector and private sector. The State Commission on Aging has recommended to the Governor a comprehensive assessment of transportation needs for older adults in New Hampshire. Such as statewide

needs assessment will be key in building the case for additional investment, together with a statewide economic impact analysis similar to the regional analysis in this study.

Access to Service Industry Employment

Trips for employment access make up approximately 20% of all travel by COAST riders according to the 2019 rider survey completed for COAST's Comprehensive Operations Analysis. For 2019 that equated to approximately 85,200 employment trips between COAST's fixed route and Americans with Disabilities Act paratransit services. While COAST ADA service carries a small number of employment trips for individuals with disabilities, the vast bulk of Employment trips are provided on COAST's fixed route system.

According to Census's LEHD Origin-Destination Employment Statistics (LODES) data there are approximately 56,770 jobs within three quarters of a mile of COAST transit stops. The table below shows Census estimates of these jobs by major industrial groupings using North American Industrial Classification (NAICS) codes:

Jobs Along COAST Routes by Industry Sector

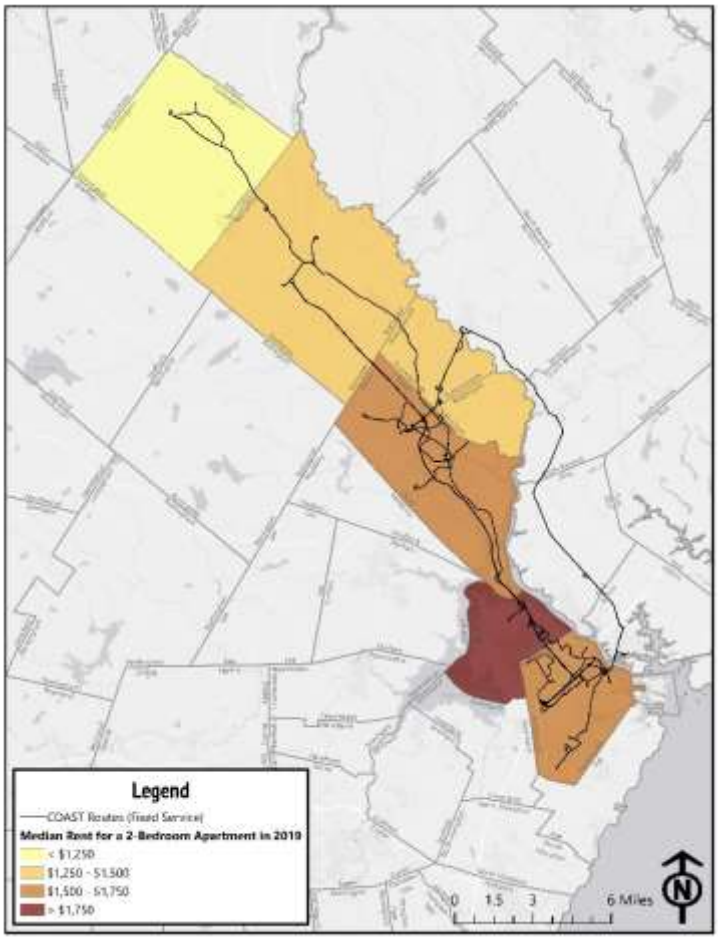
NAICS Sector	Industry Description	Percent of Jobs within 0.5 miles of COAST Route
31-33	Manufacturing	9.1%
42	Wholesale Trade	3.2%
44-45	Retail Trade	13.3%
52	Finance & Insurance	6.3%
54	Professional, Scientific & Technical Services	10.1%
62	Healthcare & Social Assistance	15.0%
61	Educational Services	8.6%
71	Arts, Entertainment & Recreation	1.1%
72	Accommodation & Food Services	11.6%
	ALL OTHERS	21.8%

Portsmouth, and to a lesser extent Dover, have seen particularly high growth in service industry jobs in the past two decades. While across COAST's route network Accommodation and Food Service jobs make up 11.2% of all employment within ¾ mile of bus routes, in downtown Portsmouth that share is 29.4%. In 2000 Census LODES data showed 1,301 such restaurant and hotel jobs in downtown Portsmouth. By 2018 downtown employment in this sector had increased 64% to 2,131 jobs. In 2012 there were 21,760 seats at restaurants and food service establishments in Portsmouth, while by 2017 that number had increased to 31,729 seats according to the City Health Department permitting data. While these data include a limited number of corporate cafeterias, they reflect mostly restaurants and permits for outdoor venues. Portsmouth has consciously marketed itself as a gastro-tourism destination and gained a national reputation for its restaurant scene. Hotels have developed in tandem. As of 2020 there were 2,165 rooms for rent in 23 lodging properties in Portsmouth including hotels, motels and inns, with two more hotels

with a combined 244 rooms in the planning department pipeline.[22] This was up from 11 hotels in 2000 according to the Portsmouth Economic Development Department.

A challenge for service industry establishments is finding adequate staffing. Labor markets have been tight nationally in the past year, but this is exacerbated in the Seacoast by the price of housing. "The cost of rent is astronomically high in Portsmouth and increasingly so in communities to the north like Dover, Rochester and Somersworth. Workers need to look at outlying areas, and many are commuting 45-60 minutes for a $15/hour job" noted Dan Witham, Director of Sales at the Sheraton Portsmouth Harborside hotel.

Median Rent Across COAST Service Area



The map above shows 2019 median rental cost for a two-bedroom apartment by municipality in the COAST service area. The gradient in decreasing cost with increasing distance from Portsmouth and Dover illustrates points made in stakeholder interviews with service sector employers. Even at a $15/hour wage a median apartment rental cost of $1750 would consume 66% of a worker's income - more than double the level at which a household is considered housing cost-burdened.

[22] https://www.seacoastonline.com/news/20200118/hotel-boom-town-portsmouth-home-to-nearly-2200-rooms

Transportation Challenges

Interviews with employers at Pease Tradeport in the manufacturing, professional services and financial and insurance sectors indicate that transportation may not be a significant challenge for most of their employees given relatively high wage jobs, recent widening of the Spaulding Turnpike eliminating traffic congestion, and virtually unlimited parking supply. Transportation challenges are more significant for service industry workers, especially in downtown areas with more expensive housing and limited and expensive parking. While housing in outlying areas can be significantly cheaper, the extended commutes this requires can create substantial transportation costs.

Patrick Patterson, General Manager at Portsmouth Brewery, noted that most of their employees live in Rochester and Somersworth due to high housing costs in Portsmouth and Dover. They typically have several employees who ride COAST, usually kitchen staff. Driving to downtown Portsmouth is not cost effective for many employees given the cost of parking. If a server or cook makes $200 on a shift but needs to pay $25 to park on top of other driving expenses that eats significantly into income. He expressed concern that as development continues in Somersworth and Rochester with more restaurants opening in those communities that it will be increasingly hard for businesses in Portsmouth to attract an adequate labor pool unless progress is made on housing affordability. He noted the Brewery is now closed on Tuesdays even during the peak summer season due lack of an adequate labor.

Another aspect of the current labor shortage is the suspension of the J1 Summer Worker Visa program in 2020 and 2021 due to COVID-19. J1 visa international students are typically a key part of increased summer staffing for hotels, restaurants, and other Seacoast attractions. These workers typically lack cars and rely on transit or bicycling/walking for commuting. In a typical year the Sheraton Harborside would house J1 visa workers in Dover and purchase COAST bus passes for them to commute to work.

Loss of transit service in the region would be pretty detrimental for our industry, not just our individual hotel. Without COAST we would have to figure out other ways to get employees to work in order to have an adequate workforce. It would be very impactful.

-- Dan Witham, Director of Sales, Sheraton Portsmouth Harborside Hotel

---

The Role of Public Transit

For service industry workers living near COAST bus routes transit can provide a critical savings on commuting costs. The viability of a transit commute can depend on work schedule, work location relative to transit routes, and whether a commuter also needs to make other stops such as a childcare drop-off on the way to/from work. The current span of COAST service is also a challenge for restaurant workers. The last bus north out of downtown Portsmouth leaves at 9:00pm, when many restaurants are still experiencing their evening peak periods. Patterson noted two of their kitchen workers need to leave early nightly to take the last bus, while being able to have those employees later into the evening would provide a significant benefit to the business and to patrons. Patterson and others suggested a late bus targeting restaurant workers would help workers and downtown businesses. While the bus would likely not be full, a dozen riders might represent 6-8 downtown restaurants that would be better able to maintain adequate staffing, stay open nightly and offer shorter wait times for patrons.

COVID-19 Implications

Long term impacts of COVID-19 on public willingness to ride transit remain to be seen. Impact to date has been greatest on providers of discretionary travel such as intercity bus companies. C&J transportation was hit particularly hard by COVID as their business relies heavily on transportation to Logan Airport where enplanements were down over 93% at the peak of the pandemic and remain down over 48% for May 2021 as compared to May 2019. Also, many of the commuters C&J carries to Boston are in the sorts of jobs that have adapted well to telework. C&J owner Jim Jalbert noted he anticipates a two-year recovery period. In COAST's case ridership has recovered to 55%-60% of pre-COVID levels in part due to the in-person nature of service industry jobs to which many COAST riders commute. The timeline to recover fully is unclear but expected to take 18-24 months.

Conclusions and Recommendations

Prohibitively high housing costs are contributing to severe labor shortages in the service sector in Portsmouth. As Dover, Rochester and Somersworth develop further with more restaurants and service industry businesses this shortage is likely to increase as most workers at Portsmouth service sector businesses already live in those communities and will have less and less incentive to commute to Portsmouth for work rather than stay in their own communities.

Transit provides an important, affordable commute option for lower and moderate-income service workers and in turn provides a significant benefit to restaurants, hotels, and other service sector businesses.

A late evening bus from Portsmouth to Dover, Rochester, and Somersworth to serve restaurant workers getting off evening shifts could help downtown service industry businesses in those communities and should be explored as a service expansion. More frequent buses would also provide a greater sense of comfort to workers in taking transit knowing that if they miss one bus another is coming in less than an hour. Both service improvements are recognized to require supplemental funding that currently isn't available.

Regional Large Employers

The history of large-scale public transit is tied to planning, housing, and employment. When the U.S. needed to mobilize large numbers of workers to accomplish ambitious projects (such as hydroelectric dams on large rivers in the west), huge numbers of workers and their families flocked to where those jobs were. As whole new communities developed around job centers, public transit was the often the only logical way to get workers between their homes and job sites. It logically expanded to within the growing communities that soon became cities. Today, public transit still has huge potential to help communities and regions prosper by making it easier and affordable for a wider range of people to fully participate in the economy through jobs, education, and other services.

Employers in manufacturing and skilled trades are struggling to find workers. Prospective workers may not be able to afford housing near their employers. These jobs may have higher wages but prospective employees may still not be able to afford housing in the vicinity. For instance, most workers at the Portsmouth Naval Shipyard may not be able to afford housing prices Kittery, Maine. Several sources in the literature review provide evidence for the generative impact public transit development could have in this case. Public transit provides mobility for a wider range of potential employees around the region.

This benefit will require additional state financial support to increase the frequency of COAST routes or expand its range.

Public Transit is Well Suited to Support Large Employers

Public transit and large employers should go together but are kept out of sync by challenges unique to New Hampshire. COAST Director of Operations, Michael Williams emphasized that public transit is most effective when it can connect the greatest number of people and destinations along a straight line; any detours away from populated areas make route inefficient and expensive.

Manufacturing and related industries are strong in the region, but many such employers operate beyond the typical 9-5 workday schedule. Given its current resources, COAST is not able to provide service for workers on second and third shifts and may not enable as many office workers to start on time at 9:00am. Working remotely from home is not an option for most of these jobs. Workforce jobs in general require at least some in-person contact and transportation options for employees and customers remains essential. Remote learning and telemedicine have been adopted during the pandemic, but the impacts of a long-term or permanent shift are still uncertain.

Large employers bring good jobs and large tax revenues to a community, but they are often incentivized to build new facilities far from populated areas where land is cheaper. This can make effective application of public transit all but impossible. With each municipality acting individually to generate tax revenue, this pattern is repeated throughout the region and dependance on personal vehicles is perpetuated. This development pattern unnecessarily leads to sprawl and regional congestion along major corridors.

Impacts from COVID-19

Many large employers in the region are in sectors like manufacturing; jobs which cannot be done remotely. The transportation challenges described above will continue as the region adapts to COVID-19 and businesses return to normal operations. COAST's role in providing mobility for workers is just as relevant in a post-COVID world.

Conclusions and Recommendations

Public transit is suited to transportation of a large regional workforce, but state investment and municipal coordination are required before the potential benefits can be achieved. Municipalities should also communicate with public transit to find optimum locations for developments that will generate transportation demand. Currently each municipality is incentivized to attract and site large developments for tax revenue. Municipalities [and the employers] would benefit from creative zoning and incentives to site large employers or employment centers closer to town centers and areas with dense residential development.

Quantitative Analysis

As the old saying goes, "if you don't count, you don't count". The central objective of this study is to quantify the economic benefits of public transportation to the Greater Seacoast region so that these can be better understood by local and statewide policymakers. The analyses on the following pages evaluate two distinct aspects of economic impact from transit:

Regional Economic Impacts from COAST Spending on Operations including calculation of direct, indirect, and induced impacts of COAST employment and contracting; and

Regional Economic Impacts of Access Provided by COAST to employment, medical care, education and training, grocery shopping and other basic life needs. These access benefits accrue to individuals, businesses, and municipalities.

Economic Impacts Resulting from COAST Employment and Spending

This element of the analysis looks at the number of people employed directly by COAST, as well as jobs at contractors and suppliers who provide goods and materials to the COAST system. For example, vendors of fuel, tires, or driver uniforms; third-party mechanics that do vehicle repairs COAST doesn't handle in-house, or contractors providing marketing, accounting, auditing, or engineering services.

Income earned by COAST employees is also re-spent in the regional economy, supporting local businesses such as grocery stores, retail stores, and restaurants. Thus, public money invested in public transit not only supports improved access for residents and visitors, it also returns to the community in the form of additional jobs and income.

The analysis is based on COAST's FY2019 annual operating budget of $6.1 million and an economic impact model for the region developed by the American Public Transportation Association (APTA). The APTA model is based on a broader regional economic modeling application known as IMPLAN. IMPLAN is an Input-Output model based on the concept that all industries, households, and governments are connected through buy-sell relationships. Therefore an initial economic activity in turn creates a ripple of additional activity throughout the economy. The underlying regional economic data that drive the IMPLAN model are drawn from the federal Bureau of Economic Analysis, Bureau of Labor Statistics, US Census Bureau and other sources and are updated annually.[23]

The starting point for using the APTA/IMPLAN model is defining a study region. This region needs to include not just communities directly served by COAST but the broader labor market within which most COAST employees live and within which most of COAST's contractors are based. With the APTA model this is defined at the county level, so the study area for the COAST analysis is defined to be Rockingham and Strafford Counties. Eighty eight percent (88%) of COAST employees live in this two-county region. The model draws on regional economic data for the two counties to translate COAST activities into supported economic activity, tracking from expenditures to direct effects, to subsequent multiplier effects within the broader economy.

[23] https://implanhelp.zendesk.com/hc/en-us/articles/360038285254-How-IMPLAN-Works

Model Inputs

Inputs to the APTA/IMPLAN model include the following types of expenses incurred by COAST.

Labor

- Staff on payroll
- Staff residing within the defined study area/labor market area
- Operator salaries and wages
- Other salaries and wages
- Fringe benefits

Purchased Services

- Vehicle Maintenance
- Non-Vehicle Maintenance
- General Administration

Non-labor Expenses

- Fuel and Lubricants
- Tires and Tubes
- Other materials and supplies

Other Administrative Costs

- Utilities
- Casualty and liability costs
- Taxes
- Services
- Other Administration

Capital Items

- Construction
- Vehicles (if purchased within region)
- Equipment (if purchased within region)
- Contracted services (legal, marketing, engineering)

Budget expenditures are adjusted within the model to account for varying second order effects of different types of spending, and the proportion of spending within the market area. For example, if COAST purchased a bus, but that bus is made in Michigan, that purchase is excluded from model calculations because the economic value of the sale accrues primarily to the communities where the bus manufacturer and its employees are located. Based on this principle the analysis here only uses the Operations component of the APTA/IMPLAN model and not the Capital component because none of COAST's vehicle fleet is manufactured in the study area.

The Operations model includes six different service mode types: regular fixed route bus, bus rapid transit (fixed guideway bus), light rail, heavy rail, paratransit, ferry and other. The model handles expenditures for each of these service types slightly differently. Of the six modal options only regular fixed route bus and paratransit apply to COAST.

Economic Value of COAST Operating Expenditures

Drawing on the inputs described above, model results for economic impacts related to COAST spending on Operations & Maintenance are shown below in Figure 1. Columns are shown for four macroeconomic indicators: 1) Direct employment shown as total jobs (not Full Time Equivalents); Labor Income (total wages plus fringe benefits; 3) Value added; and 4) Output (production). These column categories are described more fully below.

Employment: This includes a combination of the number of people employed directly by COAST, a share of the employment at COAST's vendors supported by COAST spending (indirect or supplier employment), and employment in the broader region supported by spending by COAST employees and employees of vendors supported by COAST purchasing.

Labor Income: Labor income represents the total value of all forms of employment income including employee compensation (wages, salaries and benefits). For a for-profit business (which COAST is not) this category would also include proprietor income, or net revenues flowing as income to the owners of the business. Labor income in COAST's case includes all compensation to all employees.

Value Added: Value added is the difference between an organization or industry's total output and the cost of its intermediate inputs. It is a measure of the contribution to Gross Domestic Product (GDP). This measure encompasses Labor Income, Other Property Income (for COAST as a public agency this includes only depreciation and interest income), and Taxes on Production and Imports (for COAST this includes property and other taxes, motor vehicle registration and licensing and any special assessments).

Output: Output is the total value of COAST's production and is the measure of the Value Added plus intermediate expenditures. For a business that does not hold inventory, output equals total revenues. For a business that does hold inventory, output equals revenues less any net change in inventory. In COAST's case revenues represent not just farebox and advertising income but contributions from the Federal Transit Administration (FTA), COAST member communities, and other agency partners such as the Pease Development Authority and Portsmouth Naval Shipyard.

The table below divides economic impacts into three categories: 1) direct effects, 2) indirect effects and induced effects. The 1998 national study of rural public transit impacts by Burkhardt, Hedrick, and McGavock observed these three types economic impact in cases around the country[24]. These effects are described in greater detail below:

Direct Effects: Direct effects include all direct economic impacts COAST has on the region due to the organization's operations. These include direct employees, organizational spending, employee spending, and spending by patients and visitors to the organization.

Indirect Effects: Indirect effects include the impact of local industries who have sold goods and services to COAST in turn using the revenue from those sales to buy other goods and services from other local industries.

Induced Effects: Induced effects are the values stemming from household spending of labor income, after removal of taxes, savings, and commuting expenses. The induced effects are generated by the spending

[24] See the Literature review for Jon E. Burkhardt, James L. Hedrick, Adam T. Mcgavock (1998); Transit Cooperative Research Board Report 34 - *Assessment of the Economic Impacts of Rural Public Transportation*

of the employees within the business supply chain (i.e. spending by employees of companies that sell goods and services to COAST or to COAST's other suppliers). This money is recirculated through household spending patterns causing further local economic activity.

COAST Economic Impacts Summary (APTA Model)

Impact Type	Employment (# of people)	Labor Income ($M)	Value Added ($M)	Output ($M)
Direct Effect	**75**	**4.12**	**4.12**	**7.23**
Transit Operations & Maintenance	75	4.12	4.12	7.23
Transit Capital Investment	0	0	0	0
Indirect (Supplier) Effect	**20**	**1.06**	**1.40**	**3.78**
Induced (Income Responding) Effect	**25**	**1.13**	**1.96**	**3.27**
Total Effect	**120**	**6.31**	**7.48**	**14.28**

Direct Effects

For the Operations and Maintenance line, model results reflect COAST's 75 staff members and total agency payroll of $4.12 million. The agency directly produces a total economic output of $7.23 million in the region from its transit operations, and the value added on those services is $4.12 million. No figures are shown for the Capital Investment line as there is no manufacturing of transit buses other vehicles COAST purchases in the study area, so COAST capital spending is excluded from the model. As of 2021 COAST is in the design phase for a new operations and maintenance facility with a currently estimated cost of approximately $11.9 million. Unlike vehicle manufacturing, engineering and construction services can be procured within the study area and should reflect significant in-region indirect and induced economic impacts in a future iteration of the APTA model analysis. As this construction is anticipated to be several years away it is not included in the analysis here.

Indirect Effects

The indirect effects line reflects COAST contracting adjusted for in-region procurement and other cycles of business-to-business transactions catalyzed by initial in-region purchases by COAST. This amounts to 15 jobs across multiple sectors that provide goods and services, broken out in Figure 2 below. These jobs reflect total labor income of $1.06 million. Local indirect transactions represent $3.78 in total sales output including a value added of $1.4 million.

Induced Effects

The induced effects line reflects impacts in the broader Seacoast economy related to changes in household income for COAST employees and consequent changes in household spending. When consumer spending increases, some portion of that spending is with businesses within the region, jobs are created and those jobs are paid wages and benefits. To calculate induced effects the APTA/IMPLAN model looks at COAST's direct employment and the percentage of employees that live in the region; as well as data on other analogous cycles of wage creation and consequent indirect activity in this region and other comparable ones. The increase in consumer spending that determines the induced effect is based on the share of labor income that is spent within the region. Wages paid to COAST employees living outside the region are not considered in this calculation as their consumer spending is assumed to also be primarily outside the region. The model calculates an additional 26 jobs in the region are supported by

COAST employees spending their wages (minus taxes, commuting expenses and an assumed set-aside for savings) with other area businesses. Those jobs are paid $1.13 million in wages and benefits and are associated with $3.27 million in sales including $1.96 million in value added on those sales.

Total Effects

The bottom line of the impacts summary table above aggregates direct, indirect and induced economic effects of COAST spending in the region. **All told the model calculates that COAST operations support 120 jobs in the region with combined labor income of $6.3 million and total economic output of $14.28 million.**

The jobs by sector table below breaks out the estimated number of jobs attributable to COAST spending through its annual operating budget by major industrial sector. These are categorized using North American Industrial Classification System (NAICS) codes that appear in the left-most column. Narrative descriptions of each sector group are included in the Sector column. Jobs are divided out by column based on whether they are attributable to direct, indirect, or induced effects of COAST spending on operations and maintenance. The model's output of jobs by sector draws on underlying data from the U.S. Census Bureau County Business Patterns dataset and the U.S. Bureau of Labor Statistics.

Jobs by Sector Resulting from COAST Operations & Maintenance Spending

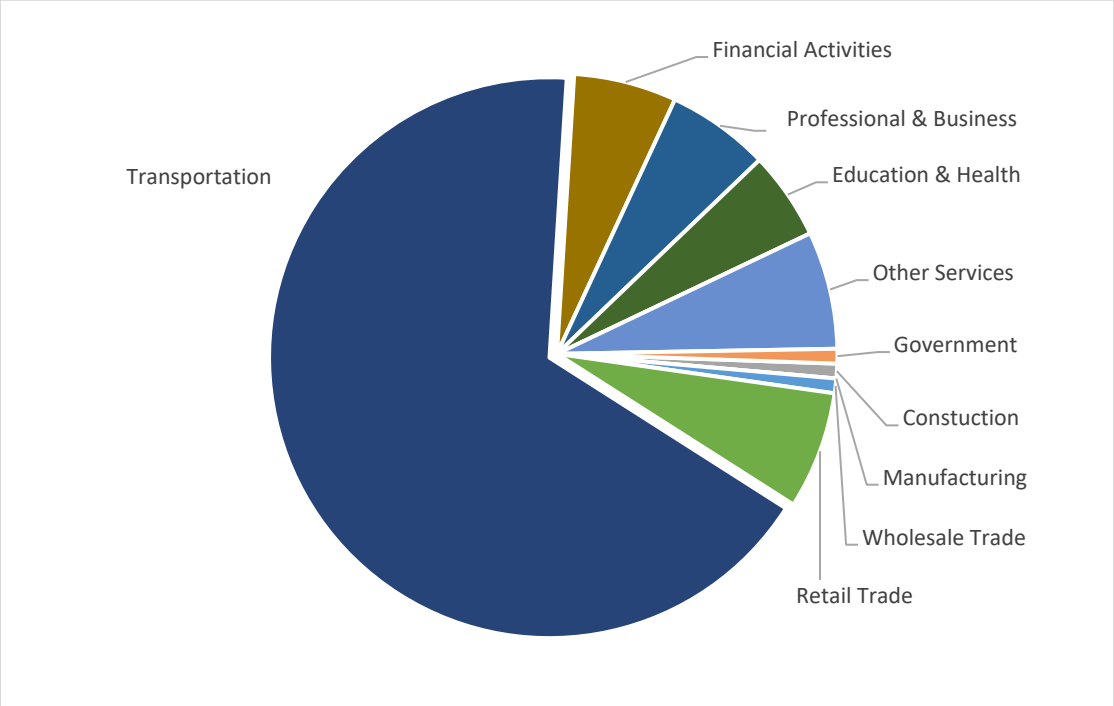
NAICS Code	Sector	Direct	Indirect	Induced	Total
111-115, 211-213	Agriculture & Extraction	0	0	0	0
221	Utilities	0	0	0	0
230	Construction	0	1	0	1
311-339	Manufacturing	0	0	0	0
420	Wholesale Trade	0	0	1	1
441-454	Retail Trade	0	4	5	9
481-488	Transportation	75	4	0	79
491-493	Postal & Warehousing	0	0	0	0
511-519	Media & Information	0	0	0	0
521-525, 531-533	Financial Activities	0	4	3	7
541, 551-562	Professional & Business	0	5	3	8
611, 621-624	Education & Health	0	0	6	6
711-713, 721-722, 811-814	Other Services	0	1	7	8
920	Government	0	1	0	1
	Total	**75**	**20**	**25**	**120**

Naturally all 75 jobs in the Direct column are identified as in the transportation sector as these represent direct employment by COAST. The Indirect column reflects employment at companies with which COAST does business and includes a total of 20 jobs in the Transportation sector but also the Retail Trade, Financial Activities, Professional and Business, Government and Other Services sectors. As described above the induced column reflects employment supported by the spending of COAST employees and the employees at companies with which COAST does business that are identified in the Indirect column. This

includes an estimated 25 jobs in Wholesale Trade, Retail Trade, Financial Activities, Professional and Business, Education and Health, and Other Services sectors.

The chart below shows this division of total direct, indirect and induced jobs attributable to COAST spending as a pie chart.

Jobs by Sector Resulting from COAST Operations & Maintenance Spending



Economic Impacts Resulting from Access Provided by COAST Services

Beyond impacts of COAST spending through its operations, maintenance and capital budgets, COAST transit services have an economic impact on the region by virtue of providing riders with access to employment, medical care and other services; and by providing businesses with access to customers and employees. The literature review for this study summarizes a number of national studies on economic impact of transit, though many of these focus on large metropolitan transportation systems in cities like Boston, New York or Los Angeles. Quantitative analyses of the economic impact of transit in rural or small urban areas are harder to find. Based on consultation with the Community Transportation Association of America (CTAA), the analyses on the following pages draw on methodologies developed for the Transit Cooperative Research Program (TCRP), a program of the Transportation Research Board and National Research Council.

TCRP Report 34: Assessment of the Economic Impacts of Rural Public Transportation was funded by the Federal Transit Administration (FTA) and published in 1999. As the report is over twenty years the actual dollar values it derives are no longer applicable, but the methodology it employs is still seen by CTAA and FTA as the standard approach for estimating economic impacts of rural and small urban transit systems so is used here.

Technically six of the ten communities in which COAST provides transit service are defined as urban by the Census Bureau. Portsmouth, Newington and Kittery are part of the Portsmouth NH-ME Urbanized Area; while Dover, Rochester, Somersworth are in the Dover-Rochester, NH-ME Urbanized area. That said these communities more closely resemble rural centers in their population density than they do large urban areas such as Boston or New York City.

The report analyzes impacts of rural transportation systems on local economies by looking at the differences in economic growth in rural counties with public transit and those counties without transit. This involved looking at over 260 rural commuting zones that included counties both with and without transit to ensure comparability. At an aggregate national level, the report estimated economic impacts of rural transit services at $1.26 billion per year in 1997 dollars. Comparing this to combined federal, state and local investment in those transit services of $375 million yielded a benefit/cost ratio of approximately 3.35 to one.

Most useful for the purposes of this study, TCRP Report 34 included a set of in-depth case studies of eight transit systems and desk audits of an additional fourteen 14 systems. Each of these systems was first classified about the economic drivers of the counties they served, and consequent emphasis of transit services they provided. All but one of the case study systems provided significant employment transportation. The other most common area of focus for the case studies in the report was providing access to medical care (including dialysis) and other basic life needs that facilitate older adults or other individuals who don't drive being able to live independently. Several of the case study systems assessed in the report had focuses on traffic reduction in the context of either university campuses or tourism destinations. Ultimately, the case study systems found to be the most successful in the TCRP analysis – those found to contribute most significantly to the economies of their respective regions – focused service on some combination of access to employment and access to medical care. These systems showed a return in economic impact of more than three dollars for every dollar invested in operations, maintenance, and capital needs.

The TCRP Report begins with a discussion of why governments get involved in funding public transit at all. According to economic theory, scarce resources are most efficiently allocated through market competition. There is a role for government investment or regulation only if the private market is not functioning properly. Examples of this include:

- Situations where buyers and sellers have imperfect knowledge of the market
- Where there is inadequate competition due to monopoly or near monopoly situations where a small group of buyers or sellers largely control the market
- Where society demands goods or services that benefit much if not all of the population but are of a scale that can't be provided by individuals, such as national defense or major infrastructure projects; or are not readily monetized, such as environmental quality.
- Where society desires, for a combination of humanitarian and/or pragmatic reasons, a different distribution of income than the private market provides.

Categories 3 and 4 both apply to public transportation services. Regarding Category 3, few if any individuals have the private means to fund the entire transportation system for a major city or a state and none have the means to do so for the nation as a whole. In some instances, governments have privatized major infrastructure, but usually with a result of increased long-term costs to system users. Regarding

Category 4, redistributive programs typically have both a humanitarian element and a pragmatic element to them. Public transportation, particularly in rural and small urban areas, is typically most heavily used by people with low/moderate incomes, physical or cognitive disabilities that prevent them from driving, limited access to private automobiles or other transportation impediments. On the humanitarian side we want to ensure that older adults, individuals with disabilities or others have an affordable way to access medical care and other basic life needs so they can live independently with dignity. On the pragmatic side we know that if an older adult lacks transportation to medical care and other basic needs they cannot live independently, and institutional care carries a higher cost to the public. Medical appointments missed due to lack of transportation carry a real cost to healthcare providers who can't bill for that lost time.

Some policymakers periodically ask, "why can't transit pay for itself?" There are several answers to this. One answer is that few if any transit systems anywhere in the world cover all of their costs through fares or user fees. Even the largest and most efficient urban transit systems in the country receive tens to hundreds of millions in federal, state, and municipal subsidies annually because governments and voters believe they provide critical access to employment, healthcare, and other travel needs, reduce pollution, and in many cases reduce traffic congestion and parking capacity constraints.

While Uber is sometimes brought up as an alternative to public transit it is worth noting that Uber lost $8.5 billion in 2019 (pre-COVID). Even our highway network doesn't pay for itself through the traditional user fees we associate with car travel like gas taxes, vehicle registration fees, and tolls. The Federal Highway Trust Fund is largely insolvent, and in 2019 was propped up with $12.4 billion in federal general funds to partially cover the gap between needs and revenues. Similarly, much local road construction and maintenance is paid for through bonding and property tax revenues rather than solely through local vehicle registration revenues.

Quantifying the economic benefits of the "humanitarian" or "public good" aspects of transit is difficult. The sorts of pragmatic benefits of transit are somewhat more practical to quantify and monetize and the TCRP report identified a series of approaches replicated here on the following pages.

Different individuals ride transit for a broad range of trip types:

- Employment – commuting to work or other work-related travel
- Education or training – completing a GED or accessing college or technical training classes
- Healthcare – accessing preventive care, treatment for chronic conditions, counseling, etc.
- Social Services – accessing a food pantry, soup kitchen, social security, or local welfare office
- Shopping – groceries, other retail
- Errands - accessing the library, post office, barber, etc.
- Entertainment/Social Contact – accessing a senior center, park, movie, or group trip

The table on the following page shows the breakdown of trips by purpose for COAST fixed route and COAST demand response services including ADA paratransit services, Route 7 On-Demand and the Portsmouth Senior Transportation Program operated by COAST for the City of Portsmouth.

COAST Transit Trips by Trip Purpose (FY2019)

Trip Purposes	Fixed Route Percent	Fixed Route Volume	Demand Response Percent	Demand Response Volume
Employment	35%	140,847	13%	3,130
Grocery Shopping	23%	92,557	19%	4,441
Medical & Social Services	17%	68,412	41%	9,916
Education & Training	4%	16,097	1%	226
Recreation	17%	68,412	20%	4,838
Other	4%	16,097	6%	1,352
	100%	402,421	100%	23,903

In the absence of a public transit system, would a rider taking the bus to work be able to hold his or her job? If that rider has access to other means of transportation the answer is likely yes. For riders who don't own a car or no longer drive the answer is likely no. For employment trips then the benefit of transit access can be estimated differently for riders who do and don't have access to alternate means of transportation. For those with access to alternate modes the benefit to the rider is the cost difference between a trip taken by transit and the analogous trip via another mode. For riders without access to other modes of travel the availability of the transit trip may mean the difference between holding or not holding a job and the implications that flow from that.

Cost of Transit Versus Other Transportation Options

The cost to ride a COAST bus is $1.50 per one way trip. If a transfer is needed to a second route to reach the final destination that one-way cost increases to $3.00, or $6.00 per round trip. For a commuter the most economical approach is to purchase a monthly pass for $52.00. If a commuter rode transit to work every day in an average 22 work-day month this would bring the cost of a round trip down to $2.36 (or $1.18 per one way trip) even if no other trips were taken during the month.

Comparable costs were derived for alternate market rate transportation modes including taxi and private wheelchair van for riders requiring a wheelchair accessible vehicle. Per ride cost estimates for each market-rate modal option were calculated using: 1) average pickup and first mile cost for Seacoast providers of each mode; plus 2) cost per incremental additional mile using COAST's average trip length figure of 8.19 miles. This yielded the modal average trip costs and cost savings to the individual rider by using COAST shown in the table below. This calculation is a key element of the TCRP methodology.

Per Trip Cost Comparison: COAST vs. Private Providers

Market Rate Mode	Avg Cost for 8.19 mile Trip	Savings/ Trip with COAST (Monthly Pass)	Savings/ Trip with COAST (Full Fare)
Taxi	$ 31.63	$ 30.45	$ 30.13
Private Wheelchair Van	$ 103.13	$ 100.13	$ 100.13

Note: Assumes cost/trip using monthly pass of $1.18 as comparison cost for COAST fixed route service. Monthly passes are not available for ADA service so cost per ADA trip is assumed as $3.00.

Employment Access Provided by COAST

Based on the division of COAST fixed route trips by travel purpose shown above, an estimated 35% of the 402,421 fixed route trips that COAST provided in 2019 were for commuting to work. This equates to 140,847 trips, which when divided by two gives 70,459 round trip commutes per year. Dividing by 210 workdays per year yields an estimated 336 regular fixed route commuters using COAST among the much larger number of non-daily riders. A total of 3,130 employment trips were provided on COAST demand response services, though all of these reflect part time rather than full time work schedules.

The COAST rider survey found that while 46% of riders live in a household that owns a car, only 15% said they had access to that car "most of the time". An additional 11% indicated they had access to a car "some of the time". Some portion of riders without access to a car would be able to get to work by walking, riding a bicycle or ridesharing as described in the interview with the Sheraton Harborside. The TCRP methodology used an assumption of 60% of riders being transit dependent based on similar survey date in their system case studies.

Applying the estimate of 60 percent of riders lacking regular, reliable transportation options other than transit to the estimated 336 regular commuters using COAST to access employment yields 202 daily commuters unable to hold their jobs in the absence of COAST service. If each of these jobs is assumed to pay minimum wage ($7.25/hour or $15,080/year) this would result in lost income of $3,040,128/year. This is a conservative estimate as COAST rider survey data indicate 60 percent of COAST riders have incomes greater than $15,000/year.

Access to Medical Care and Social Services Provided by COAST

Another critical role served by COAST is access to medical care. Of the 402,421 fixed route trips provided by COAST in 2019 an estimated 17 percent or 68,412 trips were to access medical care (14%) or social service appointments (3%). COAST demand response services provided an additional 9,916 medical trips in FY2019 for a combined total of 78,324 trips.

The value of transit access to these services is calculated below in two parts: 1) the value to individual riders of transit access vs. the cost of taking the same trip from a private provider; and 2) the value to medical providers of reliable transit that enables patients to keep scheduled appointments.

Value of Medical Access Trips via Transit Versus by Private Carrier

The TCRP methodology uses an assumption that 75% of medical trips carried by public transit would happen in the absence of public transit availability but by private carrier.

Applying the per trip costs for private carriers in the table on the previous page, 75% of fixed route medical trip volume represents 51,308 trips. If these are assumed taken by ambulatory riders able to use a non-accessible taxi, the aggregate cost to riders to take these trips by taxi would be $1,622,962 as compared to 76,963 with COAST. This represents an aggregate benefit to transit riders accessing medical care of $1,545,999. Demand Response riders, who are primarily older adults and individuals with disabilities, are assumed to require an accessible vehicle at a higher per trip cost. The aggregate cost to riders to take these 7,437 trips by private wheelchair van would be $766,978 as compared to $22,311 with COAST, representing an aggregate benefit to transit riders accessing medical care of $744,667. Taken together the benefit to fixed route riders and demand response riders equals $2,290,666.

Value of Transit to Medical Providers in Reducing Missed Appointments

Another significant benefit provided by transit is reducing the instance of missed appointments. The total cost of missed healthcare appointments in the United States annually is estimated at $150 billion according to a healthcare industry report published in 2017. A similar report by a different research group estimated the average no-show rate for medical appointments nationally at 18.8%, with transportation problems accounting for 67% of missed appointments. The report estimated the cost to the average medical practice a $150,000 annually, or approximately $200 per missed appointment.

Healthcare is a major sector of the Seacoast economy, with hospitals representing four of the top 10 employers in the region. Reliable public transportation is key to addressing this cost for hospitals and other medical practices. In 2019 COAST provided 78,328 trips to medical appointments. Applying the two factors from the national study of 18.8% of appointments being missed by patients, and 67% of those appointments missed due to lack of transportation, the result is an estimated 9,866 medical appointments likely to have been missed if not for access provided by COAST. Multiply these trips by the reported cost per missed appointment of $200 yields a benefit to medical providers of $1,973,228 from transit service that gives patients reliable access and reduces missed medical appointments.

Combining the estimated transit benefits to individual riders accessing medical care and transit benefits to medical providers from patient access and no-show reduction yields an aggregate medical care access benefit of $4,263,894.

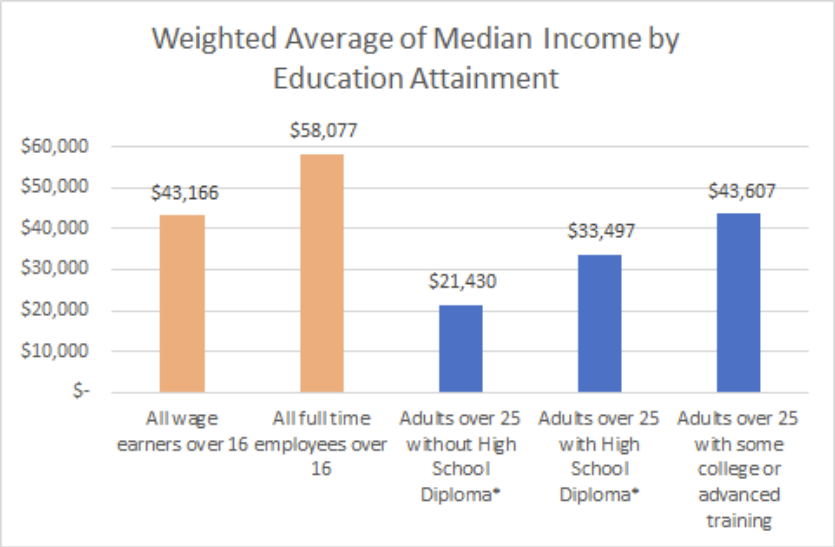
Access to Grocery Shopping Provided by COAST

COAST provides 96,998 trips for grocery shopping. The TCRP methodology identified appreciable benefits for grocery shopping trips, particularly in terms of enabling older adults to remain in their own homes rather than be institutionalized. In 2021 dollars this benefit is estimated at $41.18 per trip. Applying this estimate to the 96,998 COAST shopping trips yields an independent living benefit of $3,994,378.

Access to Education and Training Provided by COAST

COAST provides 16,323 trips/year for Education and Training, representing 8,161 round trips. These represent a mix of trips to the Dover Adult Learning Center and the Portsmouth Adult Education Program for GED classes and two of Great Bay Community College's campuses for coursework toward technical certificates or Associates Degrees.

The economic value of access to training and education was calculated using the methodology from the Pee Dee Transit case study in the TCRP study. This compared the weighted average of the median incomes for adults over 25 years old before completing a GED or equivalent program, after completing a high school diploma or equivalent, and after completing some college courses. The results of this analysis are in the chart below and showed that in the COAST service area completing a high school diploma or equivalency through a GED program such as those offered by the Dover or Portsmouth Adult Education Programs could be expected to yield an average increase of $46.41 per day. In addition, continuing education beyond a high school diploma or equivalent could result in an average increase of $38.88 per day. For comparison the original TCRP Pee Dee case study calculated a per round-trip value for adult education and technical training of $24.00, equivalent to $41.19 in 2021 dollars. Following the TCRP methodology one day of subsequent employment is credited to one day of training.



Applying the more conservative $38.88 value per day of training to the 8,161 round trips for classes provided by COAST yields an access to training benefit of $317,300.

Summary of Economic Impacts Attributable to COAST Service

The following table summarizes economic impacts of COAST transit service including results from the APTA model analysis quantifying impacts from COAST's spending on operations and maintenance (Part I) and the analysis of benefits to individuals and businesses provided by reliable transit access using the TCRP methodology (Part II).

Summary of Estimated Economic Benefits of COAST Transit Service in Seacoast Region

Part I	**Direct, Indirect & Induced Impacts of COAST Employment & Spending**		
	Direct Benefits	$	7,230,000
	Indirect Benefits	$	3,780,000
	Induced Economic Benefits	$	3,270,000
	Sub-Total of Benefits from COAST Spending	**$**	**14,280,000**

Part II	**Benefits to Riders & Businesses from Transportation Access Provided by COAST**		
	Employment Access Benefits	$	3,040,128
	Medical Access Benefits to Riders	$	2,290,666
	Medical Access Benefits to Medical Providers	$	1,973,228
	Education & Training Access Benefits	$	317,300
	Independent Living Benefits/Grocery Shopping Access	$	3,994,378
	Sub-Total of Benefits from Transit Access	$	11,615,700

COMBINED ECONOMIC BENEFITS OF COAST TRANSIT SERVICE	**$**	**25,895,700**

Summary of Study Findings

SRPC and RPC found direct evidence for the role public transit plays in the economy of Southeast New Hampshire. Some of that evidence is quantitative and some of it is qualitative. The two together speak to the value of public transit and the diverse ways it contributes to the development of communities and the wellbeing of people.

Investment in Transit Generates a Regional Return of Over 4 to 1

Using an IMPLAN-based economic impact model the project team estimates that in FY2019 COAST's spending on operations was responsible for $6.31 million in labor income and $14.28 million in total economic output in the region. COAST directly employs 75 people for their operations. COAST contracts with businesses for goods and services and in turn indirectly supports an estimated 20 additional jobs at those contractors. Support for another estimated 25 jobs is induced through spending by COAST employees and employees of COAST's contractors as their income circulates through the regional economy.

COAST also contributes to the regional economy by providing access to employment, medical care and other basic life needs essential to independent living. The project team applied methodologies from Transit Cooperative Research Program (TCRP) to quantify economic benefits of access to employment, medical care, education and training, as well as grocery shopping and other services central to supporting independent living for older adults and individuals with disabilities. These benefits accrue to individuals and businesses in the region and aggregated exceed $11.6 million.

Taken together the economic impacts from COAST spending in the region and benefits of access to employment, medical care and other services total an estimated $25.89 million as compared to an FY2019 operating budget of $5.98 million. This represents an economic return on investment of over $4.30 for every $1.00 invested.

Perspective on Transit's Impact from Stakeholders

Service Industry Employers Rely on Transit for Access to Labor

Many employers and workers in the service industry rely on public transit for access to an adequate labor pool and access to employment. Area hotels and restaurants are vital in the state and regional economy in which tourism plays a central role. The mobility of the workforce is increasingly important as more people are looking to work close to where they live and reduce the number of trips they must make in a personal vehicle.

> The total value of transit as a public service is harder to quantify. To the casual observer the impact of public transit may not be obvious if they don't ride the bus, but they would feel the effects if the service were lost.

Transit Partially Mitigates for Inadequate Workforce Housing

Housing affordability and a lack of transportation options are impacting individuals, businesses, and towns. Low- and moderate-wage workers like those in the service industry are vital to local business, especially in cities like Portsmouth and increasingly Dover where dining and tourism make up a large part of the local economy. Most workers in these jobs cannot afford to live in Portsmouth or Dover given

housing costs and are pushed further north to find affordable housing options. COAST provides critical employment transportation connecting areas of more affordable housing with job centers.

Transit is Critical in Supporting Access to Healthcare and Independent Living

Transit is vital in providing access to healthcare and other basic life needs, especially for older adults and people with disabilities. The population age 65+ is projected to double between 2015 and 2030, while an estimated 1 in 5 people in this age bracket do not drive. The State of New Hampshire's plan to manage long term care costs of a burgeoning older adult population is to encourage aging in place, but this is only viable with adequate transportation. A statewide survey of over 2300 older adults for the State Plan on Aging found lack of transportation to be a top concern for New Hampshire seniors.

Effective Land Use Planning Can Improve Transit's Efficiency

Conscientious land use planning is an important factor in the effectiveness of public transit; it can also help achieve local land use goals. Communities place a high value on preserving rural character and desire a vibrant downtown.

New Hampshire Chronically Under-Invests in Transportation

The most recent national data on state spending on public transportation from the American Association of State Highway Transportation Officials (AASHTO) show a national average per capita state investment in public transportation of $63.48, and a national median of $5.35 in 2019. New Hampshire in comparison invested $0.61 - almost a full order of magnitude below the national median. Other New England states spend between 19 and 507 times as much per capita on transit as New Hampshire.

Recommendations

Increase Investment in Transit

COAST currently makes maximum use of federal funds available to the region and has been innovative in developing advertising revenue to bolster municipal match funding. Regional coordination efforts further improve efficiency. Even so COAST struggles to maintain basic coverage services given rapid increases in costs for labor, insurance, and ADA paratransit. Preparing the system to meet the needs of a growing older adult population, let alone expanded employment transportation services, will require significant new investment at the federal, state, and local levels.

Assess New Routes Tailored to Specific Employment Needs

A key need that emerged from stakeholder interviews is late evening service to make transit a viable option for restaurant workers who currently end their shifts after service stops for the day. Such a schedule modification would support service industry businesses critical to the region, though funds are not currently available to support this. Examples of such tailored schedules on the COAST system include Route 100 serving Portsmouth Naval Shipyard and Route 33 that brings people from downtown to the Strafford County Complex. Route 33 is supported by Dover to give people greater access to the services at the county complex. A route dedicated to restaurant workers may have the greatest benefits for Portsmouth and Dover due to the concentration of restaurants and the employees who commute from Rochester, Somersworth, and Dover. Next steps in assessing the viability of later evening service include research on analogous routes operated by peer agencies, outreach to municipalities and businesses, and an assessment of long-term federal funding capacity following reauthorization of the FAST Act.

Better Coordination with Healthcare Providers

Transit and missed medical appointments are costly for healthcare providers and the lack of reliable transportation options is a primary contributing factor. Missed appointments are financially costly and an inefficient use of staff time that could have been dedicated to other patients. Of course, the people who missed the appointment likely didn't do so deliberately; they may have missed an important appointment because they didn't have access to transportation. Healthcare providers should collaborate with Regional Planning Commissions and transit providers to improve transportation access for healthcare.

Housing Should Work with Transit

Workforce and affordable housing are in short supply in the region and housing availability and transportation should be considered as a linked issue. Additional workforce housing would be valuable in like Portsmouth, Dover, Somersworth, and Rochester; new workforce housing developments should be encouraged along transit routes.

Every Trip Starts on Foot

Municipalities should consider whether local sidewalk networks provide a safe, effective link between transit stops and other local destinations, and ensure that new commercial and residential development connects to local sidewalk and transit networks.

Transit Serves Seniors

The wellbeing of seniors is a shared statewide concern as the population of people 65 and older increase. The state should conduct a comprehensive study of the transportation needs of New Hampshire's seniors. It is unclear what investments and improvements are needed to support a senior population that is on track to double in the next 10-15 years.

Next Steps for Rockingham and Strafford RPCs

- Communicate the results of this study to local and state decision-makers to advocate for greater investment in public transit.
- Work with statewide partners to support a comprehensive statewide assessment of unmet senior transportation needs.
- Work with COAST, municipalities, and other stakeholders to support increased federal and especially state investment in public transportation.
- Incorporate a public transit component into the regional travel demand model to better represent transit in regional travel analysis and support scenario planning.
- Implement the results of regional sidewalk condition assessments to identify opportunities to better link transit stops to other destinations.
- Update the Coordinated Public Transit & Human Services Transportation Plan for southeast New Hampshire. This plan contains detailed analysis and recommendations regarding improving coordination among various transit providers to increase service and efficiency.

Appendix 1: Literature Review

Strafford and Rockingham Regional Planning Commission staff reviewed a range of national scientific research and articles from transportation professionals. Below is a summary of the research and points that are relevant to considering how public transit impacts economic development in southeast New Hampshire.

Public Transit is a Remedy for Growth Limitations from Auto-Oriented Commuting

Daniel G. Chatman, Robert B. Noland suggest that reliance on personal vehicles for employment transportation limits growth in a region. Parking eventually reaches a capacity limit and highway congestion results in costly delays. Research and experience have shown that highway widening does not relieve traffic congestion; it can make it worse because it induces more drivers to use the highway. especially for locations with large employers. Public transit is perfectly suited to get more people to a specific location or along a dense corridor without clogging highways or parking lots. Chatman and Noland's research found that creation of public transportation lets people and businesses cluster together in an economically positive way because businesses and communities develop where people congregate. They found that:

> *"Every time a metro area added about 4 seats to rails and buses per 1000 residents, the central city ended up with 320 more employees per square mile – an increase of 19 percent. Adding 85 rail miles delivered a 7 percent increase. A 10 percent expansion in transit service…produced a wage increase between $53 and $194 per worker per year in the city center."*

The Take-Away

A main take-away is that public transit requires investment but is far less costly than highway capacity expansion, and it has greater long-term generative economic benefits. Public transit has a hidden economic value between $1.5 million and $1.8 billion per year, depending on the size of the area served. This research was focused on larger metropolitan areas and dense urban centers that do not reflect the rural nature of much of New Hampshire. However, their conclusions have important lessons for the development of southeast New Hampshire as a growing component of greater Boston and the I-95 corridor.

Public Transit Supports Development that Leads to Positive Economic Benefits

Investment in public transit stimulates dense development along transit lines. These development patterns can have positive public and private economic benefits including bringing customers closer to businesses, clustering employers and employees, promoting development of affordable housing, and reducing transportation costs for families. This contrasts with traditional strip mall corridor development

in areas dominated by personal vehicle use. A report from 2020 by the American Public Transit Association (APTA) discusses the positive impact of public transit on economic productivity. Public transit provides cost-effective mobility for a wider range of people, resulting in positive benefits in multiple sectors:

- It provides workers a larger job market and pairs employers with a more diverse workforce
- Businesses have more potential access to customers
- Public transit service supports (and benefits from) dense, multi-use development patterns that concentrate economic activity and growth

The Take-Away

Much of the public transit research is focused on large urban centers or metropolitan areas, where its economic impact is easier to estimate and can be more dramatically demonstrated. It is more difficult to measure the economic impacts of public transit on individual municipalities in a rural area like southeast New Hampshire. Public transit has cumulative regional benefits which make it difficult to attribute economic return in the form of dollar amounts for a single community. Because each municipality in the COAST service area is reliant on local tax revenue and there is little or no coordinated regional or state investment, this presents a unique challenge for raising funds to support public transit.

There are Consistent Benefits from Public Transit Observed in Rural Areas Around the Country

Jon E. Burkhardt, James L. Hedrick, and Adam T. McGavock conducted a comprehensive study in 1998 of the impacts of public transit in rural communities. This study was referenced widely by many other recent articles and studies. They examined rural counties in the U.S. and found that those with transit service had 11% higher net earnings on average than those without. Leveraging federal funds to invest in public transit led to a positive benefit-cost ratio that was consistent across counties examined: for every $1.00 invested and average of $3.35 was generated where transit operated. Eight in-depth case studies of rural systems looked at major benefits and found that all had positive benefit-cost ratio (from $1.67 to $4.22). All but one of the eight transit systems were focused on employment transportation.

The benefits from transit are affected by the nature of the rural economy, what type of transit service is provided, and the types of people who use transit. The areas were authors found transit benefits to be highest had consistent characteristics. Among them where:

- Transit systems which provide rural commuters with access to their jobs, either in rural areas or in town/cities,
- Communities served by transit which have a service or manufacturing base rather than an agricultural or natural resource base.

Transit service leads to direct, indirect, induced, and community benefits. Transit can create generative impacts that result in economic multipliers (ripple effects), but care needs to be taken not to double count the economic impacts of transit. The transit system itself is a direct benefit in the form of jobs the administrative staff, drivers, and mechanics who operate the system; they live and spend their wages nearby. The authors used an economic impact model that closely matches the APTA model used to calculate the economic impact of COAST in southeast NH. For example, COAST has a direct impact through the 75 people it employs with a payroll of $4.12 million. See the quantitative analysis chapter of this study for full analysis and details.

The authors also examined economic impacts by comparing the potential benefit of having a transit system with the most likely alternative if there were no system.

- Would an individual have a reasonable alternative means of transportation if the system did not exist?
- Not having transit service can result in a disbenefit because the only reasonable alternative may be relying on a family member or friend to complete critical trips such as medical appointments or shopping.

Public transit provides an "equity objective" that the private market does not have an incentive to provide. It provides mobility for people who might otherwise not be able to fully participate in, and contribute to, the regional economy.

Other indirect benefits come in the form of congestion reduction and air quality improvements. Public transit also plays a role in ensuring parking does not become a limiting factor. Parking is generally not limited in southeast New Hampshire except for densely urbanized cities, but the Portsmouth Naval Shipyard provides an important case example where parking is limited on the island base and public transit plays a role in ensuring continuity of operations.

Burkhardt, Hedrick, and McGavock focused on economic benefits at the county level. It may be difficult to quantify the financial benefits at the level of an individual municipality within the COAST service area because economic benefits accrue at the regional level. COAST provides direct economic impact through the wages it pays its employees.

The Takeaway

Burkhardt, Hedrick, and McGavock provided ample evidence for the positive impact of public transit on rural economies. The results of our outreach and case studies for southeast New Hampshire reflect many of the same circumstances and positive economic impacts. The current study also shows strong positive direct, indirect, and induced economic impacts because of the public transit service provided by COAST.

The "Value" of Public Transit can be Measured in Housing Prices

Shishir Mathur (2014) wrote a book examining how a "Value Capture" approach can be used to fund public transit systems by using revenues from the increased property values that arise from investing in the public transit system. Public infrastructure and services increase property values, which increases local revenues (which improves services…). This leads to increased desirability of the location and promotes development of businesses and other economic drivers. Mathur catalogued research of the quantitative impact of public transit on property values. They suggest that that public transit is a public service that increases the desirability and therefore the value of housing. They found a wide range of examples from empirical research that support this theory. The authors found that the proximity of public transit had direct and linear impact on housing values; many studies they cited found that housing prices increased predictably the closer they were to public transit stops. While all forms of public transit had positive impacts on housing values, they found that rail service had the greatest positive impact.

Bibliography

Daniel G. Chatman, Robert B. Noland (2013)
Transit Service, Physical Agglomeration and Productivity in US Metropolitan Areas
Volume: 51 issue: 5, page(s): 917-937 First Published August 1, 2013

American Public Transit Association (2020)
Economic Impact of Public Transit Report – 2020 update

Jon E. Burkhardt, James L. Hedrick, Adam T. McGavock (1998)
Transit Cooperative Research Board
Report 34 - *Assessment of the Economic Impacts of Rural Public Transportation*
National Academy Press

Shishir Mathur (2014)
Innovation in Public Transport Finance: Property Value Capture

Appendix 2: The Economic Benefits of Public Transit Issue Brief

Strafford Regional Planning Commission and Rockingham Planning Commission studied the relationship between public transit and the economy in Southeast New Hampshire and Southern Maine. Our research demonstrates that public transit plays an important role in the region's economy, yet its full potential is constrained by challenges that are unique to New Hampshire.

- Public transportation is underfunded in New Hampshire.
- Much of the study region's rural population does not have access to public transportation.
- The region has an aging population. The American Association of Retired People (AARP) number of people over age 65 in New Hampshire is projected to almost double in the next 20 years. There will be nearly 75,000 non-driving seniors in New Hampshire by 2030. COAST's demand for mandated ADA service grew 880% from 2008-2018, and their cost to provide those services grew 744%. Without transit options, this population is isolated from partaking in community events, healthcare visits and essential needs such as grocery shopping.
- The workforce depends upon public transportation. For those who do not own cars or rely on one vehicle in the household to share, lack of transit options prevents or limits this population from employment opportunities, education, and access to healthcare.

Why Doesn't Transit Pay for Itself?

Few transit systems worldwide cover all their costs through fares or user fees. Even the largest and most efficient urban transit systems in the country receive tens or hundreds of millions in federal, state, and municipal subsidies annually because governments and voters believe they provide critical access to employment, healthcare and other travel needs. In addition, use of transit helps to reduce pollution and reduces traffic congestion and parking capacity constraints.

Average per capita state spending on transit across the 50 states in 2019 was $63.48. The median state North Dakota (a rural state with little over half New Hampshire's population) spent $5.35/capita, much of it on senior transportation. New Hampshire in comparison spent $0.61/capita.[25]

New Hampshire's transit agencies face revenue gaps in the millions of dollars just to maintain existing services and handle growth in federally mandated services under the Americans with Disabilities Act (ADA).

COAST's Executive Director states "It is important to note that as the region grows and evolves, public transit needs far outpace the fiscal resources that are currently available through the Federal Transit Administration, State of New Hampshire, local communities, and other sources. These financial limitations are COAST's single greatest hurdle to overcome if the region's public transit system is to truly begin to address needs beyond those that are most basic."

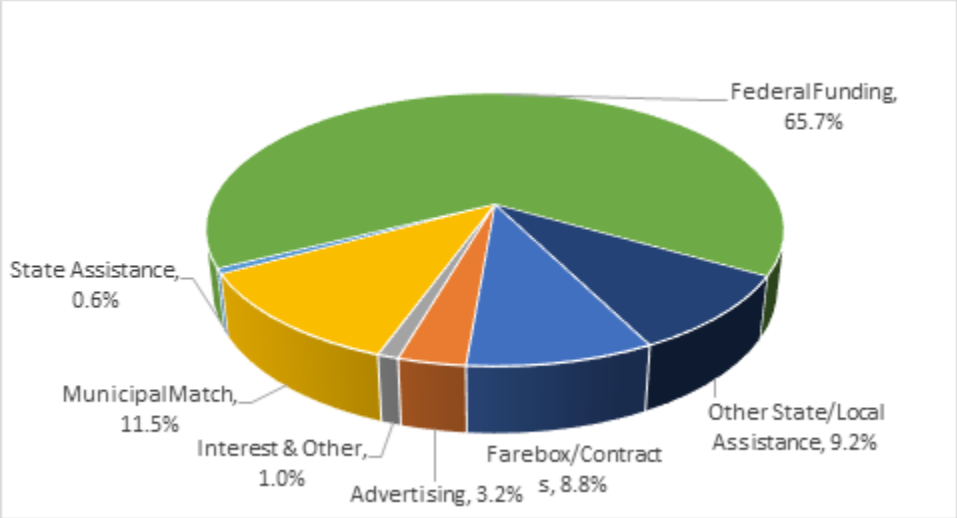
[25] The American Association of State Highway Transportation Officials (AASHTO) report on State Spending on Public Transportation

How Do Other States Invest in Public Transit?

AASHTO Annual Report on State Spending on Transportation 2021

State	2019 Population	2019 State Funding	2019 Per Capita Funding	2019 State Funding for Operating	Per Capita Funding for Operating
Massachusetts	6,892,503	2,127,867,593	$ 308.72	$ 1,523,504,835	$ 221.04
Connecticut	3,565,287	690,504,023	$ 193.67	$ 444,504,023	$ 124.68
Rhode Island	1,059,361	64,913,960	$ 61.28	$ 56,173,651	$ 53.03
Vermont	623,989	7,920,341	$ 12.69	$ 6,966,757	$ 11.16
Maine	1,344,212	15,529,422	$ 11.55	$ 3,514,267	$ 2.61
New Hampshire	1,359,711	828,059	$ 0.61	$ 257,118	$ 0.19
		National Average	$ 63.48		
		National Median	$ 5.35	(North Dakota)	

How COAST is Funded



Benefits of Public Transportation

Economic growth: According to APTA, For every dollar invested in public transportation, approximately $4 in economic returns are generated, and for every $1 billion in investments in the sector, 50,000 jobs are created and supported. Transportation options allow people access to employment, businesses, community attractions and encourage economic growth.

Equity: A developed public transportation system builds equity in communities. It gives every person the same access to employment, school, healthcare, groceries, recreation opportunities and everything that a community has to offer. People having options to get to these places without owning a car benefits everyone.

Fuel efficiency: it saves money! Taking public transportation instead of owning a vehicle can save (on average) more than $9,823 a year. It saves individuals a significant amount of money each month in avoided gas, maintenance, parking, tolls, and other expenses.

Reduces air pollution and congestion: Along with reducing air pollution, public transportation is more fuel efficient per passenger mile. APTA states that public transportation in the US is responsible for saving 4.2 billion gallons of gasoline each year. Public transportation can also move more people in much less space than individual automobiles, which helps to keep traffic congestion lower.

What Can You Do?

Legislators

- State funds should be invested to support local investment and better leverage federal transit dollars. Support bills that increase funding.
- Looking forward to SFY2024-2025 State Budget, please consider new revenue generation tools for transportation funding and please consider public transportation as an integral part of that funding.
- Public transit generates benefits that expand beyond municipal boundaries, but additional state investment is required to achieve those benefits.

Municipal Officials

- Ensure that COAST's local contributions are met by your municipality. Share information with your boards and decision makers.
- Adjust land use practices to allow for density that makes transit viable and preserves rural character.
- In development site review for new commercial and residential properties, ensure there is pedestrian infrastructure to connect to transit.
- Ensure new developments contribute to transit facilities such as bus shelters.

Appendix 3: Transit Performance Measurement

"Many of the things you can count, don't count. Many of the things you can't count, really count."

- Albert Einstein

What are appropriate performance measures for a small public transit agency in a state and region with growing transportation needs for older adults, service industry employers facing labor pool troubles due to housing affordability, and limited public investment? All recipients of Federal Transit Administration funding need to track metrics like service miles, revenue miles, passenger trips, service denials and cost data for the National Transit Database. More recent FTA rules have established requirements for Transit Asset Management (TAM) tracking condition and remaining useful life on vehicles and equipment; and Public Transit Agency Safety Plans (PTASPs) tracking incidents, injuries, fatalities and system reliability. These are all important measures, and are all relatively easily measured; though aside from safety they tend to focus largely on productivity and efficiency. While attention to efficiency is and should be a given for any public agency, the broad geographic need and limited nature of COAST's funding have always meant that COAST services emphasize coverage over productivity. Similarly goals for public transit in the Metropolitan Transportation Plans for both the RPC and SRPC MPOs emphasize the need for better coverage and accessibility for older adults, individuals with disabilities and low/moderate income workers. None of the Federally required measures have this emphasis on access – the fundamental ability to get where one needs to go for employment, medical care or other activities – or on resource investment needed to provide that access. The following pages summarize a range of transit performance measures that go beyond the basic Federal requirements and offer recommendations for a subset of potential measures corresponding to the goals of COAST and the two MPO regions.

Accessibility Measures

Transportation Access for Independent Living

This measure would track the number and percent of communities in SRPC and RPC regions with access to demand response transit service for older adults and individuals with disabilities five or more days per week. Data would need to be collected directly from transportation providers. Much of the relevant data is already collected through the two RCCs serving the two MPO regions. Additional outreach would be needed to providers not participating in the RCCS.

- Relevance to Regional Transit Goals: High
- Practicality of Measurement: Medium-High

Medical Appointments Missed due to Lack of Transportation

The value of this measure would be in showing an outcome of improved transit access rather than simply an output of funding more service. Tracking this measure would require cooperation of some portion of medical providers in the region and ideally statewide. It would be impossible to get all hospitals and associated physicians practices to track this and share data. A more feasible approach discussed with several community health centers in the Seacoast would be to get all community health centers to participate in this tracking. In the combined RPC/SRPC region this would include at a minimum Goodwin/Families First, Lamprey Healthcare, and Community Caregivers of Greater Derry which serves communities in the western part of the RPC region. Adding community mental health centers would also be valuable and for the region would involve engaging Community Partners and Seacoast Mental Health in the Seacoast region and the Center for Life Management in western Rockingham County. As the client population of community health centers skews toward Medicaid members and other low/moderate income individuals, it would be valuable to have some number of hospitals also participate for comparison.

- Relevance to Regional Transit Goals: High
- Practicality of Measurement: Medium - Requires substantial outreach and ongoing data collection by multiple partners

Service Denials

The percentage of demand response/paratransit trip requests in which service cannot be adequately provided. A service denial is specifically defined by the ADA as failure to provide a scheduled trip within an hour of either side of the requested time to travel. Should no trip be available in that 2-hour "window", the request for service is termed a "denial." Recipients of FTA funding are already required to track denials, such that data are readily available through the TripLink call center for multiple providers. Outreach would be needed to additional non-profit human services providers to organize consistent data collection. One drawback of denials as a measure of system capacity is that if a would-be new customer calls for the first time and cannot schedule a trip they are unlikely to call back, such that one denial may represent not just one trip but many potential trips.

- Relevance to Regional Transit Goals: Medium
- Practicality of Measurement: Medium/High

Local Index of Transit Availability (LITA)

A measure of "transit service intensity," based on capacity, frequency, and route coverage. The LITA score is composed of standardized measures of capacity (seat-miles divided by total residential and employment population), frequency (the average number of transit vehicles per 24-hour day, including weekends), and route coverage (transit stops per developed square mile), which are applied to zones within a metropolitan area. Values for a specific analysis zone are evaluated relative to the mean for the entire metropolitan area under study. Level of service grades can be assigned to the zone LITA score based on incremental standard deviations away from the mean score. (TCRP Report 88) This measure is best suited to a large urban area with high intensity transit service, but

- Relevance to Regional Transit Goals: Medium
- Practicality of Measurement: Medium - Requires substantial analysis

Transit Accessibility

Transit Capacity and Quality of Service Manual (TCQSM) measures public transit accessibility of a system as the percentage of the transit-supportive area covered by the service coverage area. The transit-supportive area reflects the area with a minimum household density or an employment density capable of supporting hourly transit service. A variant of this measure includes:

Relevance to Regional Transit Goals: Medium
Practicality of Measurement: Medium – Requires substantial analysis

Bike/Ped Access to Transit Stops

Using Bicycle and Pedestrian Level of Traffic Stress (LTS) analysis quantify the percent of destinations within 0.75 miles of COAST transit stops accessible by low-stress route by walking, bicycling or using a Wheelchair. Tracking this measure and focusing resources on bus stop accessibility has the potential to help bring down costs for ADA paratransit services and a substantial number of ADA riders would be capable of using a fixed route bus but lack safe routes to access bus stops.

- Relevance to Regional Transit Goals: Medium
- Practicality of Measurement: Medium – Requires substantial analysis

Job Density (Service Industry or Other Sectors)

Estimate the density of jobs within the transit service area or by corridor or route. Employees/acre. Jobs data from the Local Employment Dynamics Databases from the U.S. Census. Potentially could use Department of Employment Security Data.

- Relevance to Regional Transit Goals: Medium
- Practicality of Measurement: Medium

Health Care Opportunities

Health Care jobs density per acre. Jobs data from the Local Employment Dynamics Databases from the U.S. Census. Potentially could use Department of Employment Security Data.

- Relevance to Regional Transit Goals: Medium
- Practicality of Measurement: Medium

Housing Unaffordability

Percent of household income spent for housing. Metric was initially modeled by the Department of Housing and Urban Development using block-level aggregate income and block-level aggregate rent by apportioning from block group 5-year American Community Survey totals, using the proportion of households and the proportion of renter-occupied housing units respectively. Corridor totals are aggregated from these block-level estimates. This measure applies to both regional transportation goals and housing goals.

- Relevance to Regional Transit Goals: High
- Practicality of Measurement: High

Racial, Income, Age, and (Dis)Ability Diversity

Corridor/Neighborhood Income Diversity Metric (Coefficient of Variance). Coefficient of Variance (CV) is used to measure income diversity for transit corridors. The CV measures dispersion of how spread out the values are from the mean and serves as a standardized method for measuring and comparing income diversity between corridors. CV is defined as the ration of the standard deviation to the mean for each sample set. The larger CV value, the more dispersion and diversity in corridor incomes. Lower values indicate there is a lack of diversity. Utilized the median income from each block group to calculate the mean and standard deviation. The ratio of these two numbers aggregated at the corridor level produced the CV for the corridor. A version of this measure is already used for Title VI Non-Discrimination plans for both MPOs and COAST.

- Relevance to Regional Transit Goals: High
- Practicality of Measurement: High

Corridor Pedestrian Collision Rate

Count of number of pedestrian collisions in a corridor divide by an estimate of the walking population.

$$\frac{\left(\frac{Total\ Pedestrian\ Collisions}{Population * Pedestrian\ Mode\ Share} * 100{,}000\right)}{365} = Daily\ Pedestrian\ Collision\ Rate$$

- Relevance to Regional Transit Goals: Medium
- Practicality of Measurement: Low – crash data tend to undercount pedestrian incidents unless they result in injury requiring hospitalization or property damage to the automobile involved.

Measuring Transit Needs

CTAA Transit Needs Index

The Community Transportation Association of America has developed several sketch models for estimating Transit Dependent Trip Need and Total Transit Trip Need. These models use Census data as inputs. Model output can in turn be compared with data on trips provided through the regional TripLink call center and other major providers as a measure of transit capacity relative to need. This measure is already included in the Coordinated Public Transit/Human Services Transportation Plan for the region.

- Relevance to Regional Transit Goals: High
- Practicality of Measurement: High

Zero Car Ownership

Includes workers in low-income households that do not own a private car. This measure uses census data and is already included in the Coordinated Public Transit/Human Services Transportation Plan for the region.

- Relevance to Regional Transit Goals: Medium
- Practicality of Measurement: High

Low-Income Earners

Workers in households with annual incomes less than $25,000. This constraint of low income makes it difficult for them to have a high budget for daily transport expenses. This group is assumed to rely on low-cost public transit services more than those in higher-income households. This measure is already included in the Coordinated Public Transit/Human Services Transportation Plan for the region and is an input to the CTAA model.

- Relevance to Regional Transit Goals: Medium
- Practicality of Measurement: High

People Older than 65

Includes elderly people who cannot or do not drive (or minimize their driving). This measure is already included in the Coordinated Public Transit/Human Services Transportation Plan for the region and is an input to the CTAA model.

- Relevance to Regional Transit Goals: High
- Practicality of Measurement: High

Individuals Impacted by Disabilities

Includes workers with disabilities that limit their ability to drive. This measure is already included in the regional transit coordination plan and is an input to the CTAA model. A challenge is that while the Census identifies multiple types of disability these do not clearly line up with inability to drive.

- Relevance to Regional Transit Goals: High
- Practicality of Measurement: High

Resources

Transit Cooperative Research Program (TCRP) Report 88: A Guidebook for Developing a Transit Performance-Measurement System, Transportation Research Board, 2003. http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp_report_88/Guidebook.pdf

Transit Cooperative Research Program (TCRP) Report 165: Transit Capacity and Quality of Service Manual, Third Edition, Transportation Research Board, 2013. http://www.trb.org/Main/Blurbs/169437.aspx

Transit Cooperative Research Program (TCRP) Research Report 187 - Livable Transit Corridors: Methods, Metrics, and Strategies (2016) Appendix F: Metrics, Methods, and Data, Transportation Research Board, 2016. http://www.trb.org/Publications/Blurbs/174953.aspx

Measuring Service Gaps, Accessibility-Based Transit Need Index (Sha AL Mamun and Nicholas E. Lownes, Transportation Research Record: Journal of the Transportation Research Board, No. 2217, 2011, pages 153-161.

Appendix 4: Improving Regional Transit Modeling

The current Regional Travel Demand Model used by Rockingham Planning Commission and Strafford Regional Planning Commission does not account well for transit demand or the potential for public transportation to impact regional travel or development patterns. Part of the scope of this study has involved investigating opportunities to develop a more sophisticated transit specific component for regional travel demand modeling that might integrate findings of this economic impact study and enhance the use of the model for ongoing transit-related economic analyses. As part of this study RPC engaged the services of Edward Bromage, Manager of Travel Model Development for the Central Transportation Planning Staff (CTPS), the planning staff for the Boston Region Metropolitan Planning Organization (MPO). The recommendations in this chapter are drawn from Mr. Bromage's analysis.

Existing Transit Model

Rockingham Planning Commission and Strafford Regional Planning Commission share a Regional Travel Demand Model. This is a four-step travel demand model using TransCAD software used to simulate and model traffic flows across the RPC and SRPC regions. Using a variety of socioeconomic and demographic data, daily vehicle trip numbers can be generated based on the types of trips people take (for example, home to work). These trips are then distributed to transportation analysis zones (usually groups of census blocks or tracts) based on other data such as the locations of employers. Trips are then assigned a mode of travel: auto, walking, or transit. Lastly, the most efficient trip route is determined from the origin to destination and tallied in the road segment data. This is an iterative process that adjusts the most efficient routes based on the volume of traffic using the road network. The results of the travel demand model allow RPC and SRPC to quantify how many vehicles are on specific road segments and therefore to compare changes between different network scenarios. It is important to note that while the regional model network includes all interstates and state highways, it does not contain every local road. This means that when traffic is distributed onto the model network, it does not exactly match how people in the real world will act.

The existing transit representation in the model is not consistent with a traditional TransCAD transit network coding. In a traditional coding, the transit route system would reside atop the highway network and these two files (route systems and network links) would be inputs to the model simulation. Instead, in the SRPC and RPC model, the transit network resides as a binary input table with a list of nodes in the route path sequence with each node also being a stop. In this format, the route system is an output as it must be built atop the network links during the simulation. This configuration has the drawback that edits to the network links could impact the route system. In a more traditional route representation with the routes already built atop the network links, the user can readily see where link edits impact the route system and TransCAD has tools to facilitate the route editing process which are unavailable in the current model structure.

Additionally, the model input files and Geographic Information System Developer's Kit (GISDK) program code are generally designed to handle multiple modes. However, only one mode "buses" is in use. This GISDK program structure points to the model software having been written for another urban area and

converted for use in this region. Thus, the code is not as efficient as it could be. Also, the model is designed to only perform one transit assignment - daily.

Proposed Model Improvements

The proposed model improvements described below will support the creation of trip tables which can be used for market, economic, and environmental justice analysis related to public transportation that are not feasible with the current regional model. For each improvement, the capabilities associated with the improvement are described briefly, as well as the level of effort associated with implementing the improvement. The level of effort for each improvement estimate is qualitative rather than quantitative. That is, the level of effort is characterized in one of three ways:

- **Low-Cost** (3-10 person days)
- **Medium-Cost** (10-20 person days)
- **High-Cost** (more than 20 person days)

To translate these time-based estimates to approximate dollar values, an hourly rate of $75 is assumed such that one-person day is roughly equivalent to $600.

Suggested transit improvements to the RPC/SRPC Regional Travel Demand Model are as follows:

1. Change transit route system representation – The first improvement should be to restructure how the transit route system is represented in the model. The route system lying atop the network links is the standard format and there are tools in TransCAD to support this representation. If this change were made to the model, other TransCAD tools to support accessibility and environmental justice analysis could be implemented much more easily.

   Cost: Low (3-10 person days or approximately $1,800-$6,000)

2. Code transit assignment by time of day and develop the transit assignment to assign trips by purpose. This would allow model users to understand how the transit system is used for work and other trip purposes, providing the capability of evaluating transit usage by purpose.

   Cost: Medium (10-20 person days or approximately $6,000-$12,000)

3. TransCAD has the ability to build accessibility buffers based on the transit routes or stops. Thus, as a standard model output, TransCAD could be programmed to compute the share of the population that is within 0.5 mile, 0.75 mile or 1.0 mile of a stop. This same tool could be used to compute the share of the jobs that are within these same buffer areas. Thus, this provides for the analysis of transit accessibility measures.

   Cost: Medium (10-20 person days or approximately $6,000-$12,000)

4. Low-income and minority population shares could be appended to the Transportation Analysis Zone (TAZ) data from Census files. This would allow the population and employment data analysis in step 3 above, to also report statistics regarding income and minority groups level of accessibility to transit.

   Cost: Low (3-10 person days or approximately $1,800-$6,000)

5. Income is not used in the mode choice model thus the model is not sensitive to income or auto availability. It is suggested that these variables be brought into the mode choice model, and this would allow the model to weigh the transit benefits associated with low-income areas. The mode choice model would work better as transit riders typically come from low-income neighborhoods. However, step 4 above would need to be performed first.

   Cost: Medium (10-20 person days or approximately $6,000-$12,000)

6. Create a transit route system of a hypothetical extended transit system with much wider transit coverage. This would allow the model to weigh the benefits of extending the transit coverage area. When combined with items 4 and 5 above, a greater capability to evaluate transit improvements would be provided.

   Cost: Low (3-10 person days or approximately $1,800-$6,000)

7. Code headways into the route system and the mode choice model. This would allow the model to evaluate the effect of improved service on ridership in low income and minority areas.

   Cost: Low (3-10 person days or approximately $1,800-$6,000)