

Affordable Housing & Transit Final Report



August 2020



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List of Acronyms

ACS	American Community Survey
ALICE	Asset Limited, Income Constrained, Employed
AMI	Area Median Income
BCT	Broward County Transit
BRT	Bus Rapid Transit
CDP	Census-designated Place
CE	Consumer Unit Expenditure
CNT	Center for Neighborhood Technology
COTA	Central Ohio Transit Authority
CU	Consumer Unit
DHCD	Department of Housing and Community Development
DHHS	United States Department of Health and Human Services
DOT	Department of Transportation
ECAT	Escambia County Area Transit
ELI	Extremely Low-income
EO	Executive Order
FAR	Floor-to-Area Ratio
FDOT	Florida Department of Transportation
FTA	Federal Transit Administration
FS	Florida Statutes
GTFS	General Transit Feed Specification
HART	Hillsborough Area Regional Transit Authority
HUD	United States Department of Housing and Urban Development
JTA	Jacksonville Transportation Authority
LI	Low-income
MCAT	Manatee County Area Transit
MDT	Miami-Dade Transit
MSA	Metropolitan Statistical Area
NTD	National Transit Database
NS	New Starts
NACIS	North American Cartographic Information Society
PDR	Planning Document Review

PHA	Public Housing Authority
PSTA	Pinellas Suncoast Transit Authority
PUMA	Public Use Microdata Area
ROFR	Right of First Refusal
ROI	Route Optimization Initiative
ROS	Route Optimization Study
RMP	Route Performance Maximization
SCAT	Sarasota County Area Transit
SIC	Standard Industrial Code
SS	Small Starts
TBEST	Transit Boarding Estimation and Software Tool
TCAR	Transit Concept and Alternatives Review
TD	Transportation Disadvantaged
TDP	Transit Development Plan
TIF	Tax-Increment Financing
TOD	Transit-Oriented Development
TRB	Transportation Research Board
TSPR	Transit System Performance Review
USDA	United States Department of Agriculture
UZA	Urbanized Area
VMT	Vehicle Miles Traveled

Executive Summary

The Problem

Florida is the 2nd most unaffordable state in the United States in terms of housing costs and the 4th most unaffordable state in the United States in terms of car ownership costs¹. On average, a US household spends roughly 50 percent of their household income on housing and transportation. In Florida, the reality is 60.5 percent of household income is spent on these two expenditures alone. But what if there was a focus on connecting people with opportunities by way of public transit systems? By reducing the cost of transportation through well-connected public transit systems, there is the potential to have a larger budget for housing, thus improving affordability.

This report is the culmination of a 12-month study on the relationship between housing affordability and public transportation in the state of Florida. The focus is on how a well-planned transit system improves the affordability of a community by decreasing transportation costs. Generally, people are forced to move away from the city center, away from schools, jobs, and other essential services, to the suburbs in order to afford housing; however, this results in higher transportation costs. The idea behind the extensive research conducted over the last year is to bring to light the connection and importance of planning for transit with affordable housing and low-income communities in mind.

Phase I of the project detailed the problem of housing affordability through an extensive literature review. The lack of affordable housing has been the subject of research with various definitions and approaches. This report defines affordable housing as any housing priced under 30% of the area median income (AMI). Related metrics defined and referred to throughout include workforce housing, low-income housing, and Asset Limited, Income Constrained, Employed (ALICE) populations. While this report focuses on conditions in Florida, there is considerable applicability in the approach and findings to the national landscape, where 1 in 4 housing markets are considered unaffordable.² The effects of housing unaffordability, from household instability and gentrification to poor health outcomes, are not constrained by state boundaries.

Approach

The approach to the project was to explore how changes in accessibility to, and mobility of, public transit lead to monetary changes that can alleviate the housing and transportation cost burden for low-income and ALICE populations. A variety of qualitative and quantitative methods of analysis were used to gain a complete picture of transit's relationship with affordable housing. Phase II included a planning document review (PDR), a transit system performance review (TSPR), and a survey of transit agencies and public housing authorities (PHAs). The PDR measures the integration of affordable housing and community engagement into key planning documents. The

¹ Carter, S. "The top 10 most expensive places in America to own a car." CBNC. 2018. Accessible from: <https://www.cnn.com/2018/05/11/the-10-most-expensive-places-in-america-to-own-a-car.html>.

² Enterprise Community Partners, 2014 Annual Report. Accessible from: <https://www.enterprisecommunity.org/resources/enterprise-community-partners-2014-annual-report-13357>. See page 4.

TSPR utilizes the Transit Boardings Estimation and Simulation Tool (TBEST) to quantify the market area and compare accessibility between the service area, subsidized housing communities and premium transit. Two surveys were developed by the research team, one for PHA's and one for transit agencies. Each survey sought to gauge the relationship between these two entities.

Phase III reviewed five transit system redesign case studies. A major route redesign is a single event in a transit agency's history that occurs at specific point in time, resulting in significant changes to transit service throughout a service area. These are long, well-documented processes with significant public engagement, GIS-based analyzes, and policy development presented in a final report. Compared to a periodic route change, analyzing a major route redesign allows for more variables to be controlled and every affordable housing community to be analyzed at the same time. This makes the before and after analysis of the route redesign consistent and focused on specific measures. Evaluating redesigns is an excellent point to understand before- and after-changes in access for affordable housing.

Phase IV sought to better understand the relationship between affordable housing and premium transit, outlining the benefits of providing affordable housing near premium transit stations and identifying strategies that can be used to preserve and develop affordable housing in transit-oriented developments (TODs). Station area planning and investments in premium transit provide an opportunity for transit agencies to help contribute to affordable housing supply. The project team conducted a literature review of TOD projects that have been successful in this endeavor, a review of Capital Investment Grant (CIG) program grant applications to determine how affordable housing is evaluated in the application process, and finally the efforts the Federal Transit Administration (FTA) has made to advance TODs.

Findings

The PDR review showed that certain Transit Development Plans (TDPs) contain excellent cases of best practices, notably plotting key services in an area along with key transit routes, and assessing amenity distributions for transit disadvantaged (TD) communities. Perhaps unsurprisingly, the TSPR showed that larger systems in highly-urbanized areas with a multitude of premium transportation options tend to perform best across all metrics. This was largely confirmed through the PDR; for instance, PSTA was noted as having forward-thinking planning documents and also scored well in most TSPR metrics. This implies that stronger affordable housing, low-income (LI), and minority initiatives during the planning process can have positive effects on a transit system's ultimate accessibility performance. Subsidized housing is not well-matched to the transit system alignments for most systems, and particularly smaller systems, despite findings during the survey (in a limited sample) that PHAs tend to indicate they work with transit agencies to ensure good service.

The case studies reviewed in Phase III revealed four lessons transit agencies can use to lower overall household transportation costs. Redesigns that balanced the needs of improving coverage and ridership and planning with accessibility in mind, were able to increase service frequency and access. Key in planning for accessibility was incorporating all trip purposes, not just home-based work trips. Effective redesigns also laid the foundation for future growth and services, integrating

new premium services into existing high-frequency transit corridors. Finally, public engagement that made concerted efforts to reach out to the various key stakeholders in system redesigns, tailoring efforts to the needs of those groups, had the greatest success in meeting their stated goals.

The review of TODs suggested that there are a variety of strategies that can be used to increase the supply of affordable housing through premium transit access. The overall lesson learned revolves around the idea that increasing affordability must be a priority throughout the transit planning process. Premium transit systems are costly and it is critical to ensure funds are allocated properly and transit is available and convenient to those who use it most. Additionally, establishing partnerships with other Agencies such as housing, community development, local jurisdictions, public and private non-profit developers, etc. can lead to improved affordability. FTA has made strides in realizing the challenges associated with transit oriented development and specifically the increase in land value premium transit creates, resulting in a loss of affordable housing.

Recommendations

The report synthesizes its findings into a five recommendations to aid FDOT and transit agencies in the effort to alleviate the burden of housing and transportation costs. The first recommendation is to **Update the Transit Development Plan (TDP) Handbook** to include a more defined and specified affordable housing measures. The changes should help transit agencies identify affordable housing in the community, improve coordination with Public Housing Authorities (PHAs), and highlight the gaps in service to those living in affordable housing units. These changes could help improve accessibility, making it easier low-income individuals and affordable housing residents to access jobs and key services.

It is also recommended that the Florida Department of Transportation (FDOT) should **Develop an Affordable Housing Toolbox**. The research identified numerous strategies employed by different jurisdictions to expand or preserve the supply of affordable housing as part of premium transit projects (bus rapid transit, light rail, or streetcar). These strategies range from providing density bonuses to partnerships with developers to include affordable housing units in their projects. Developing an Affordable Housing Toolbox provides the local transit agencies a resources that defines the affordable strategy, describe the best environment where it works, highlight its pros and cons, summarize the anticipated outcomes, and give examples where the strategy was successfully applied.

The next recommendation is to **Expand Affordable Housing within the Transit Concept and Alternatives Review (TCAR) Guidance** process. The TCAR process is a streamlined planning and environmental screening process that compares transit project alternatives, potential costs, funding options, community benefits, economic development, and mobility for users of a proposed project. Completing a TCAR study prepares the project sponsor for the development of a FTA Capital Investment Grant (CIG) application for those meeting the criteria for New Starts, Small Starts, or Core Capacity grant funding. Because affordable housing is an evaluation criterion in the CIG application process, the TCAR Guidance should be expanded to include best practices for assessing the affordable housing needs in the project study area.

Additionally, it is recommended that FDOT should help **Position Florida Transit Agencies to Participate in the FTA TOD Pilot Program**. The FTA TOD Pilot Program and Technical Assistance Initiative was established to expand TOD opportunities across the country. By promoting and helping the development of TODs, FTA recognizes the benefits of TODs in increasing the supply of affordable housing. FDOT can help position transit agencies to participate in the FTA Pilot Program by developing guidance on the grant application, providing a portion of the matching dollars, and/or creating a companion program (similar to TCARS) to provide additional funding for TDO planning in the state.

Local transit agencies are a part of the solution in addressing the needs of low-income individuals and affordable housing residents in a community. The key recommendation for local transit agencies is to be involved in the conversation. Whenever there is a focus group, workshop, new affordable housing development, or other local initiative, transit agencies should be part of the conversation. Additionally, the collaboration should be expanded to include partnerships between the transit agency and PHAs. A good starting point would be to include PHA representation on the transit advisory committee (if the agency has one). Additionally, the PHAs should be notified of any transit public meetings and provided the opportunity to comment on major route changes.

As the state continues to grow, providing affordable housing will remain a challenge. This report provides the opportunity to analyze the relationship between transit and affordable housing. This relationship is built around how public transportation can make cities more affordable for its residents. By decreasing household transportation costs, more money is available for household expenses, including more expensive mortgage/rent costs. This could allow low income residents greater freedom in their choices in living in different parts of the urban area that best meet their needs.

Introduction



Introduction

Housing and transportation costs are two of the most significant, non-discretionary expenditures made by an individual or household. Individuals and households with limited income employ a variety of strategies to mitigate the impact of these expenditures: cohabitation, car sharing and taking fewer trips, working more hours, and cutting back on essential expenses such as healthcare and savings. These high costs are also barriers to intra- and inner-urban mobility, preventing people from moving to markets that pay more, or even commuting to jobs within their existing market, if they cannot afford a car and transit is insufficient. The strategy of moving out to the periphery is only a short-term solution as transportation and health costs quickly erode any cost savings realized by “driving ‘til you qualify.”

Florida is the 2nd most unaffordable state in the United States in terms of housing costs and the 4th most unaffordable state in the United States in terms of car ownership costs³. The reality of these skyrocketing prices would not be surprising to the average Floridian household, who spends **60.5 percent** of their income on these two outlays alone. Further, the cost burden is regressive: the poorer the household, the more intense the burden of transportation and housing costs.

60.5%

Average Floridian housing and transportation cost burden

From 1980 to 2000, the median rent in Florida grew from \$350 to \$641 (inflation adjusted)⁴. Although productivity doubled during that same period, wages have not kept up for 95 percent of workers, only growing by about 15 percent⁵. Nationwide, median rent alone consumes 27.9 percent of median income, only four points away from the 32 percent “tipping point” associated with dramatic increases in homelessness⁶. Transportation costs are equally as concerning; as cars grow increasingly upscale, they come with higher sticker prices and repair costs. New car costs jumped 24 percent in 2019, bringing the average cost of a new car to \$773.50 per month nationally, the highest cost since AAA began their research⁷.

Recognizing that housing and transportation are intimately linked, this project sets out to target the areas where public transportation can work alongside affordable housing in order to bring down their collective burden, primarily focusing on the public transportation side. This relationship is explored through four study areas. The study areas are:

- Defining the Problem;
- Role of Public Transportation;

³ Carter, S. “The top 10 most expensive places in America to own a car.” CBNC. 2018. Accessible from: <https://www.cnn.com/2018/05/11/the-10-most-expensive-places-in-america-to-own-a-car.html>.

⁴ United States Census Bureau. “Historical Census of Housing Tables.” Accessed 2019. Accessible from: <https://www.census.gov/hhes/www/housing/census/historic/grossrents.html>.

⁵ Mishel, Gould, Bivens.” Wage Stagnation in Nine Charts.” Economic Policy Institute. 2015. Accessible from: <https://www.epi.org/publication/charting-wage-stagnation/>.

⁶ Rao, K. “The Rent is Too Damn High.” Zillow Research. 2014. Accessible from: <https://www.epi.org/publication/charting-wage-stagnation/>.

⁷ Edmonds, E. “Spike in Finance Costs Drives Increase.” AAA. 2019. Accessible from: <https://newsroom.aaa.com/auto/your-driving-costs/>.

- Designing Routes for Low Income Residents; and
- Affordable Housing and Transit Oriented Communities.

H+T Cost Burden Realized:

Hundreds of thousands of hard working Floridians face extraordinary burdens with regards to housing and transportation costs. With a few basic assumptions, basic H+T burdens are estimated for illustrative purposes. Assuming a 40 hour workweek, and assuming the current Floridian median rent of \$789.01, and median auto ownership costs of \$713.25, cost burdens are estimated for some of the most common professions in Florida.

Median outlays from Center for Neighborhood Technology (CNT)
Wage estimates from Indeed.com

FL Cosmetologist Cost Burden:

60% \$15.65/hour

FL Public School Teacher Cost Burden:

54% \$17.34/hour

FL Retail Employee Cost Burden:

83% \$11.29/hour

FL Construction Worker Cost Burden:

64% \$14.77/hour

Phase I: Defining the Problem



Defining the Problem

The first study area begins by identifying the key problems and linkages between housing and transportation costs. From this review, a performance measure rubric is devised to assess affordable housing and transit performance in Florida. While public transportation is only one piece of the puzzle, it is a natural fit to program along with housing, and it is an essential element given the link between housing and transportation costs.

Affordable Housing: A National Crisis



While affordable housing initially appears like an easily-definable topic, housing affordability is contextual to time and place. Different organizations often mean very different things when they apply the term, and terms related to it are often used interchangeably. The definition applied in this report defines affordable housing as “affordable” when housing costs represent less than 30 percent of area median income (AMI). Housing affordability is a national crisis, with

Florida being particularly hard hit; an estimated 921,928 extremely low-income (ELI) households in Florida pay more than 50 percent of their income on housing costs alone⁸. Some of the largest urban areas in Florida are described as the most unaffordable places in the United States by various housing research organizations. The State of Florida has affordable housing initiatives in place, nevertheless the problem persists.

Defining Affordable Housing

The most common definition of affordable housing, and the one used here, defines affordable housing as any housing priced under 30 percent of AMI. However, there are many other conceptions of affordable housing worth noting. The Sadowski Coalition, a housing affordability advocate in Florida, defines affordable housing as “privately owned housing that receives a subsidy to bring its rent or purchase price down to a level affordable to a low- or moderate-income family. Except for the subsidy, affordable housing is indistinguishable from market-rate housing—it has the same architectural and landscaping styles and often has basic amenities like energy efficient appliances and community gathering spaces. *Substandard housing*, under this definition, is not *affordable housing*. This definition combined different, important aspects of affordability

⁸ Shimberg Center for Housing Studies, 2019. 2019 Rental Market Study. Accessed from: <http://flhousingdata.shimberg.ufl.edu/2019-rental-market-study.pdf>.

such as the rent / mortgage distinction, housing quality, and income. However, often housing can be considered affordable without a subsidy component.

In the 2019 Market Trends report, the Shimberg Center for Housing Studies defines housing as affordable when gross *rent and utilities* cost no more than 40 percent of household income⁹. HUD uses a variety of regionally-calibrated levels of affordability, also based on AMI but also calibrated based on the number of persons in a household¹⁰.

Other apparently synonymous terms are used in the affordability discussion, but they do not necessarily mean the same thing. “**Attainable housing**” refers to housing that does not fall within the thirty percent AMI definition, but which is still measured using an AMI threshold. The Urban Land Institute (ULI) defines attainable housing as nonsubsidized, for-sale housing affordable to households with incomes between 80 and 120 percent of AMI. Certain publications do not distinguish between attainable and affordable housing.

“**Workforce housing**” refers to housing specifically intended for workers; it is a form of affordable housing rather than a subtype in itself. There are no generally established rules regarding income levels for the term; generally, the term applies to housing for a certain class of employee that is within a reasonable proximity to job centers. The term may be considered somewhat offensive to some groups due to its connotation that other forms of affordable housing serve non-working populations, or that non-working populations are unemployed or lazy¹¹. Florida Statute § 420.5095 defines workforce as housing priced at 140 percent of AMI, and in some instances 150 percent of AMI for areas of critical state concern.

“**Low-income housing**” is otherwise identical to affordable housing, but the term is used more often to describe housing specifically-tailored to those with low income; the term may also be used to define housing with a subsidy for low-income (LI) households, such as HUD Housing Choice Voucher (Section 8) subsidies.

Housing costs may or may not include **utility costs**; they are generally considered separate, but some definitions consider them together when calculating affordability, as does the Shimberg Center. Housing costs refer to the price of a dwelling, whether calculated based on rent or mortgage values. Most LI persons are renters, but this is not necessarily the case.

The National Association of Realtors maintains a housing affordability index called the Association of Realtors Affordability Index of Existing Single-Family Homes for Metropolitan Areas. It quantifies home purchases based on mortgage values with an assumed monthly gross income affordable with a 20 percent down payment¹². The index is sometimes used in market analyses for affordability analysis.

⁹ Ibid, 2019 Rental Market Study

¹⁰ US Department of Housing and Urban Development: Accessed from <https://www.huduser.gov/portal/datasets/il/il2019/2019MedCalc.odn>

¹¹ See Shelter Force website coverage of “workforce” housing: <https://shelterforce.org/2014/10/06/workforce-housing-is-an-insulting-term/>

¹² National Association of Realtors, Housing Affordability Index. Accessible from: <https://www.nar.realtor/research-and-statistics/housing-statistics/housing-affordability-index>.

While not dealing with housing affordability directly, United Way maintains a dataset valuable in understanding the populations for whom housing affordability directly impacts. **ALICE (Asset Limited, Income Constrained, Employed)** is a measure of economic wellbeing more sophisticated than the Federal Poverty Line, based on cost of living in each state. ALICE is comprised of household-unit factors such as the costs of child care, food, transportation, health care, technology, “miscellaneous”, and taxes. ALICE data is available for state, county, congressional district, Census-designated place (CDP), public use microdata area (PUMA), sub-county, and zip code geographies. The rating can be quickly used to provide a percent-rating of those who are severely cost-burdened¹³.

This report uses the 30 percent AMI threshold to define housing affordability to analyze housing stock because of its widespread use. The ALICE metric will also be used to illustrate how reducing transportation costs affects the overall budget for struggling households. Figure 1 (page 9) is an ALICE snapshot for Florida in 2015, the most recent year for which data is available. The ALICE survival budget is defined in Figure 2 (page 10). ALICE information is located at the county level



and will be used as a proxy for household budgets at the block group level within the study areas. More information on the connection between transit service and affordability is discussed later in this report.

¹³ United Way, ALICE Methodology. Accessible from: <https://www.unitedforalice.org/methodology>.

Figure 1: ALICE At-A-Glance (Reproduced from United Way)

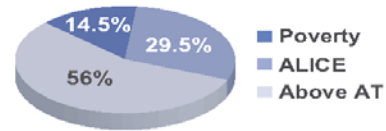
AT-A-GLANCE: FLORIDA, 2015

Point-in-Time Data

Population: 20,271,272 | Number of Counties: 67 | Number of Households: 7,458,155

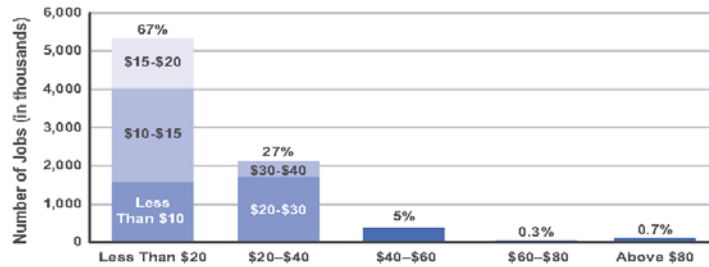
How many households are struggling?

ALICE, an acronym for **A**sset **L**imited, **I**ncome **C**onstrained, **E**mployed, are households that earn more than the Federal Poverty Level (FPL), but less than what it costs to survive (the ALICE Threshold) for the state. Of Florida's 7.5 million households, 14.5 percent earn below the FPL and another 29.5 percent are ALICE, well above the 2007 level.



How much does ALICE earn?

In Florida, 67 percent of jobs pay less than \$20 per hour, with three-quarters of those paying less than \$15 per hour. Another 27 percent of jobs pay between \$20 and \$40 per hour. Only 5 percent of jobs pay above \$40 per hour.



What does it cost to afford the basic necessities?

This bare-minimum Household Survival Budget increased by an average of 19 percent from 2007 to 2015, while the rate of inflation was 14 percent. Affording only a very modest living, this budget is still significantly more than the Federal Poverty Level of \$11,770 for a single adult and \$24,250 for a family of four.

Average Monthly Costs, Florida, 2015			
	SINGLE ADULT	2 ADULTS, 1 CHILD, 1 PRESCHOOLER	2007-2015 PERCENT INCREASE
Monthly Costs			
Housing	\$609	\$842	22%
Child Care	N/A	\$1,015	10%
Food	\$165	\$547	14%
Transportation	\$326	\$653	2%
Health Care	\$164	\$628	>48%*
Miscellaneous	\$145	\$408	19%
Taxes	\$189	\$395	20%
Monthly Total	\$1,598	\$4,488	19%
ANNUAL TOTAL	\$19,176	\$53,856	19%

*Increase in out-of-pocket health care costs from 2007 to 2015 was 48 percent; increase including ACA penalty was 74 percent.
 Note: Percent increases are an average of the percent change in each category for a single-adult and for a four-person family
 Source: American Community Survey, U.S. Department of Housing and Urban Development (HUD); U.S. Department of Agriculture (USDA); Bureau of Labor Statistics (BLS); Internal Revenue Service (IRS) and Florida Department of Education, 2015.

Figure 2: ALICE Survival Budget (Reproduced from United Way)

HOUSEHOLD SURVIVAL BUDGET COMPONENTS

Housing: U.S. Department of Housing and Urban Development (HUD)'s Fair Market Rent (FMR) for an efficiency apartment for a single adult and a two-bedroom apartment for a family. The cost includes utilities but not telephone service, and it does not include a security deposit.

Child Care: The cost of registered home-based child care for an infant and a four-year-old. Home-based child care has only voluntary licensing, so the quality of care that it provides is not regulated and may vary widely between locations (Florida Department of Education, 2015). However, licensed and accredited child care centers, which are fully regulated to meet standards of quality care, are significantly more expensive.

Food: U.S. Department of Agriculture's (USDA) Thrifty Food Plan, which is also the basis for the Supplemental Nutrition Assistance Program (SNAP) and Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) benefits.

Like the original Economy Food Plan, the Thrifty Food Plan was designed to meet the nutritional requirements of a healthy diet, but it includes foods that need a lot of home preparation time with little waste, plus skill in both buying and preparing food. The cost of the Thrifty Food Plan takes into account broad regional variation across the country but not localized variation, which can be even greater, especially for fruits and vegetables (Hanson, 2008; Leibtag & Kumcu, 2011).

Transportation: The transportation budget is calculated using average annual expenditures for transportation by car and by public transportation from the Bureau of Labor Statistics' Consumer Expenditure Survey (CES). Since the CES is reported by metropolitan statistical areas and regions, counties are matched with the most local level possible.

Health Care: The health care budget includes nominal out-of-pocket health care spending, medical services, prescription drugs, and medical supplies using the average annual health expenditure reported in the CES plus a penalty for not purchasing insurance as mandated by the Affordable Care Act (ACA). Because ALICE does not qualify for Medicaid but cannot afford even the Bronze Marketplace premiums and deductibles, we add the cost of the "shared responsibility payment" – the penalty for not having coverage – to the current out-of-pocket health care spending. The penalty for 2015 was \$325 for a single adult and \$975 for a family of four.

Miscellaneous: The miscellaneous category includes 10 percent of the budget total (including taxes) to cover cost overruns. It could be used for items many consider additional essentials, such as toiletries, diapers, cleaning supplies, or work clothes.

Taxes: The tax budget includes both federal and state income taxes where applicable, as well as Social Security and Medicare taxes. These rates include standard federal and state deductions and exemptions, as well as the federal Child Tax Credit and the Child and Dependent Care Credit as defined in the Internal Revenue Service 1040: Individual Income Tax, Forms and Instructions. They also include state tax deductions and exemptions such as the Personal Tax Credit and renter's credit as defined in each state Department of Revenue's 1040: Individual Income Tax, Forms and Instructions. In most cases, the Household Survival Budget is above the Earned Income Tax Credit (EITC) eligibility limit so these credits are not included in the budget, but they are counted in the Income Assessment, discussed below.

Affordable Housing: The National Landscape

Housing affordability is a crisis in the United States and is a problem that has worsened over the past five decades. Nearly 19 million U.S. households spend over 50 percent of their income on housing and one in four housing markets is considered unaffordable¹⁴. Nationwide, there are only 28 affordable housing units for every 100 ELI households, and making matters worse, 45 percent of ELI rental units are occupied by households with above-LI income status. While this makes financial sense for those households, it further limits housing availability, contributing to a 3.7 million unit shortage of rental homes for LI and ELI households¹⁵.

The HUD “Section 8” Housing Choice Voucher Program is a federal program to assist ELI and LI households by helping to cover the costs of rent, or in some instances, purchases of housing in the private market. Vouchers are provided through local public housing authorities (PHAs) and distributed to landlords or management companies, but vouchers “follow” individuals/households themselves. Individuals apply for housing vouchers through their local PHAs and are often subject to lengthy waiting periods.

The affordable housing discussion often centers on rent pricing because LI and ELI households often do not have the credit history, capital, or stability necessary to embark on a home mortgage. Rental units sold by the day, such as at hotel/motel, or extended-stay properties, are some of the most unaffordable places to live per square foot, but have a low point of entry. For instance, a hotel room that costs \$80 per night costs \$2,400 per month, which is often far-higher than even a median market rent in an area. Certain programs such as the Homeownership and Opportunity for People Everywhere (HOPE) program administered by HUD, organize and administer funding for LI households to prepare and fund home ownership, particularly the high upfront costs.

The affordable housing crisis is yet more damaging for groups subject to structural racism and persistent racial disparities, particularly for Native American and Black communities. Historically, exclusion of minority families from home ownership programs and from Federal mortgage underwriting hampered wealth accumulation, yet it promoted it for other families, directly leading to pressure on housing prices for Black communities. Today, Black Americans currently have a homeownership rate of roughly 40 percent, 25 percentage points lower than that of white Americans¹⁶.

¹⁴ Enterprise Community Partners, 2014 Annual Report. Accessible from: <https://www.enterprisecommunity.org/resources/enterprise-community-partners-2014-annual-report-13357>. See page 4.

¹⁵ National Low Income Housing Coalition, The GAP Report 2018, A Shortage of Affordable Homes, accessible from https://reports.nlihc.org/sites/default/files/gap/Gap-Report_2018.pdf.

¹⁶ Solomon, D., Maxwell, C., and Castro, A. “Systemic Inequality: Displacement, Exclusion, and Segregation.” Center for American Progress. <https://www.americanprogress.org/issues/race/reports/2019/08/07/472617/systemic-inequality-displacement-exclusion-segregation/>.

Implications from Lack of Affordable Housing

Lack of affordable housing creates a cost-burden because people are forced to pay more than they are capable. To pay for housing, trade-offs are made in other areas of life, not all of which are discretionary. As a result, long-term impacts on the household, their health, and on their economic capacity follow as described in this section.

Lack of affordable housing has a direct result on familial and household stability. Nearly 19 million US households are severely cost burdened, which directly increases their likelihood of homelessness. One study found that 21 percent of respondents aged 18 – 44 admitted that they delayed having children due to the lack of affordable housing and that 56 percent of young respondents living with parents due to lack of affordable housing indicated they find it more difficult to maintain romantic relationships¹⁷. The same study found that 30 percent of respondents cut down on *essential* repairs to their home, reduced food consumption, and reduced vehicle fuel costs due to high housing costs. In the long-run, these essential purchases will end up costing more due to cascading costs; for instance, not performing regular maintenance on a vehicle in order to pay for housing may result in more costly repairs in the future.

Children and young adults subject to pressures due to lack of affordable housing are less likely to be covered under health insurance, and resultantly have lower engagement levels in school and poorer health outcomes, such as low weight, asthma, delayed development, lifelong depression, and sleep problems. Additionally, adults over 50 visit the emergency rooms at four times the rate of the general population when they are severely cost burdened.

Affordable housing is also critical for survivors of domestic abuse when seeking safety and independence¹⁸. Survivors of domestic violence may feel trapped with an abuser when there is a lack of affordable housing options into which they can relocate. An affordable housing option is particularly pertinent when a survivor does not have nearby ties to family or friends, or when they feel a sense of embarrassment or shame about their situation¹⁹.

Increased housing costs often displace and *gentrify* communities and neighborhoods. While the casual factors that lead to gentrification are complicated and debated²⁰, the effects are usually the same and primarily impact LI people of color²¹. Ironically, lack of affordable housing is both a cause and an effect of lack of displacement, as middle-income people may be forced to occupy housing in lower-income neighborhoods because they cannot find affordable housing in their income range.

¹⁷ Shelter UK, "The Human Cost." 2011. Accessible from: https://england.shelter.org.uk/professional_resources/policy_and_research/policy_library/policy_library_folder/the_human_cost_-_how_the_lack_of_affordable_housing_impacts_on_all_aspects_of_life

¹⁸ Maqbool, Viveiros, Ault. Center for Housing Policy. "The Impacts of Affordable Housing on Health." 2015. Accessible from: <https://www.rupco.org/wp-content/uploads/pdfs/The-Impacts-of-Affordable-Housing-on-Health-CenterforHousingPolicy-Maqbool.etal.pdf>.

¹⁹ Menard, Anne. "Domestic violence and housing: Key policy and program challenges." *Violence Against Women* 7, no. 6 (2001): 707-720.

²⁰ Florida, R. CityLab. "The Complicated Link Between Gentrification and Displacement." 2015. Accessible from: <https://www.citylab.com/equity/2015/09/the-complicated-link-between-gentrification-and-displacement/404161/>

²¹ US Housing and Urban Development. "Displacement of Lower-Income Families in Urban Areas Report." Accessible from: <https://www.huduser.gov/portal/sites/default/files/pdf/DisplacementReport.pdf>

State of Affordable Housing in Florida

Florida is a quintessential case of a state suffering an affordable housing crisis. Florida has the highest rent-to-income ratio of any state, above Hawaii, New York, and California²². The US Consumer Expenditure Survey publishes national and regional statistics on consumer purchase behavior in the United States; Florida is included in the Southeast region. In 2018, housing costs alone constituted a 32 percent share of Consumer Unit (CU) expenditure (CE), \$18,116 for the Southeast region²³.

Florida-specific statistics are yet more troubling. From 2000 to 2017, a time when the Florida housing market added nearly 500,000 units, **all** of the growth in housing units occurred in units above \$1,000 per month (2017 dollars), and the number of units below this threshold actually **decreased**²⁴.

87 hours

Number of hours a Floridian would need to work at minimum wage to afford a FMR 1-bedroom unit.

Renters constitute a 35 percent share of Florida's housing market and most households under 34 years of age are renters. At the current Florida minimum wage of \$8.46, one would need to work 87 hours per week to afford the typical 1-bedroom rental at the state fair-market value (FMR) of \$957. For the median renter, who is estimated to make \$16.67 hourly, the FMR value

is still over the 30 percent threshold, assuming a 40-hour work week. While many renters cohabitate with partners, spouses, and other roommates, many rental applications still require at least one individual to demonstrate the financial capacity to pay for the entire monthly rent using the 30 percent threshold.

The situation becomes even more desperate when one turns to LI and ELI households. The official definition of ELI comes from the Federal Department of Health and Human Services (HHS): an ELI household is any household below the federal poverty line (FPL), presently defined at \$16,910 for a family of two, with different rankings depending on family size. **Affordable rent for these populations would be about \$422** per month. Florida ranks near the bottom in terms of affordable units available to this population —**49th of 50** in terms of housing affordable housing units available, with only 35.0 units for every 100 renter households.

Lack of affordable options has forced thousands of Floridians out of homes entirely. The United States Interagency Council on Homelessness estimated that as of 2018, roughly 30,000 Floridians were experiencing chronic homelessness. These figures are down from 2010 when the number of homeless living in Florida was 57,551, but Florida still has the third-largest population

²² National Association of Realtors. "Rent-to-income ratio." 2019. Accessible from: <https://www.nar.realtor/blogs/economists-outlook/which-states-have-affordable-housing>

²³ Southeast Region is defined by the Bureau of Labor Statistics as Alabama, Arkansas, Delaware, District of Columbia, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, and West Virginia.

²⁴ Shimberg Center for Housing Studies. "2019 Rental Market Study." 2019, Accessible from: [flhousingdata.shimberg.ufl.edu/2019-rental-market-study.pdf](http://housingdata.shimberg.ufl.edu/2019-rental-market-study.pdf). See pages 7 -8.

of people experiencing homelessness in the United States²⁵. The agency also notes that 72,042 students experienced homelessness throughout the 2016-17 school year.

Table 1 displays the affordable housing shortfall for the Top 10 metropolitan statistical areas (MSAs) in Florida by population. The MSAs have a total shortfall of 257,785 and an average shortfall of 21 units per 100 units at the 30 percent AMI affordability threshold. Figure 3 is a map displaying the affordable housing shortfalls by MSA.

Table 1: Affordable Housing Shortfall in Florida's Ten Largest MSAs

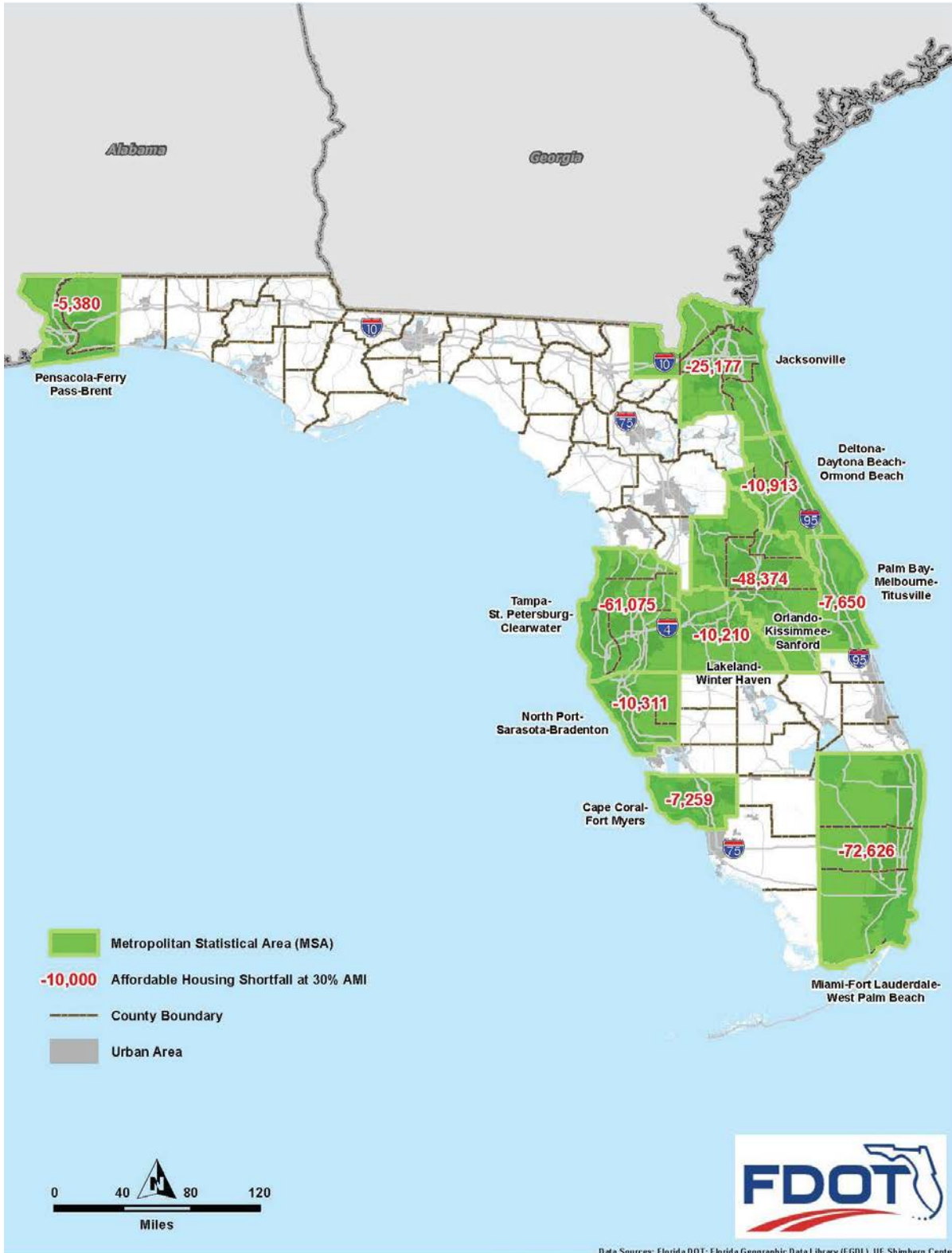
Metropolitan Statistical Area (MSA)	2018 Estimated Population	Affordable Housing Shortfall	Affordable Units per 100 Units
Miami–Fort Lauderdale–West Palm	6,198,782	-72,626	~25
Tampa–St. Petersburg–Clearwater	3,142,663	-61,075	19
Orlando–Kissimmee–Sanford	2,572,962	-48,374	12
Jacksonville	1,534,701	-25,177	34
Sarasota–Bradenton–Venice	821,573	-10,311	19
Cape Coral–Ft. Myers	754,610	-7,259	23
Lakeland–Winter Haven	708,009	-10,210	21
Palm Coast–Daytona Beach–Port Orange	659,605	-10,913	17
Pensacola–Ferry Pass	494,883	-5,380	42
Totals	17,484,637	-257,785	21 average

This report uses the ten-largest MSAs in Florida for three reasons:

- Roughly 80% of Floridians live in these 10 MSAs;
- Data on transportation costs, job distribution, service distribution, and housing is robust and available for the MSAs; and
- Looking at larger MSAs guarantees that there will be at least one fixed-route public transportation system in service.

²⁵ United States Interagency Council on Homelessness. "Florida Homelessness Statistics." 2018 data. Accessible from: <https://www.usich.gov/homelessness-statistics/fl>.

Figure 3: Map of Affordable Housing Shortfall



Affordability Regulations & Initiatives in Florida

In order to receive and distribute federal money related to affordable housing, counties and municipalities must adhere to certain federal regulations. The municipalities establish PHAs to handle most administration for affordable housing matters within their jurisdictions. PHAs and municipalities are subject to the regulations summarized below:

- Qualified PHAs are required to annually hold public meetings to discuss goals, objectives, and policies. They must also submit a Five-Year Plan and establish a Resident Advisory Board.
- Community Development Block Grant recipients, both cities and counties, are required to monitor, record, and report various aspects of their program and submit a “CAPER,” including yearly goals, affordable housing achievement, and public involvement. These funds are generally used to construct and/or rehabilitate structures for ELI and LI households.
- The HOME program contains dollars for homeowner rehabilitation assistance, homebuyer assistance, rental development assistance, and rental subsidy assistance. HOME funds are administered through PHAs which must, in turn, maintain a Consolidated Plan.
- Rental Assistance Demonstration (RAD) funding is provided to PHAs to help maintain and repair public housing in an effort to preserve it. HUD estimates that the entire stock of public housing in the US requires \$26B in repairs. This is a transitional program, currently “voluntary and limited,” and requires conversion from existing HUD funding streams.

Florida-specific funding is also available. The Sadowski Act was passed by the Florida Legislature in 1992. The act establishes and funds the “Sadowski fund” based on a 10-cent documentary stamp tax. These funds are distributed into two programs: the State Housing Initiatives Partnership (SHIP) and the State Apartment Incentive Loan (SAIL) program. SHIP funds allocate monies to local governments with established local housing assistance programs and strategies, and who take certain actions to increase housing affordability in their communities. SAIL funds provide low-interest loans for affordable housing serving the “gap” financing role. The Florida Legislature, however, regularly re-appropriates Sadowski funding to supply general-fund shortfalls²⁶.

Florida CS/CS/HB 7103 requires local governments mandating affordable housing developments to “fully offset all costs to the developer of its affordable housing contribution.” Affordable housing proponents take claim the legislation will chill affordable mandatory (as opposed to voluntary) affordable housing clauses²⁷, which are viewed as the most effective means to create new housing²⁸.

²⁶ See Sweeney, D. 2017. “Lawmakers loot trust fund for affordable housing.” Sun Sentinel. Accessible from <https://www.sun-sentinel.com/real-estate/fl-reg-sadowski-affordable-housing-20171219-story.html>.

²⁷ Korfhage, S. 2019, May 11. “HB 7301 could ‘chill’ citizen opposition but fuel affordable housing development”. St. Augustine Register. <https://www.staugustine.com/news/20190511/hb-7301-could-chill-citizen-opposition-but-fuel-affordable-housing-development>.

²⁸ Brunick, Goldberg, Levine. “Voluntary or Mandatory Inclusionary Housing? Production, Predictability, and Enforcement.” Business and Professional People for Public Interest. Accessible from: <http://www.bpichicago.org/documents/mandatoryv.voluntary5.06.pdf>.

Florida’s “Most Innovative” Affordable Housing Practices

Beyond the standard requirements that regulate counties, municipalities, and PHAs by the State and Federal government, local areas have created their own initiatives to combat the affordable housing crisis using a variety of methods. This section reviews some of those initiatives for the largest MSAs to get a better understanding of the approaches taken, most of which are fairly new in response to the growing crisis.

Miami-Fort Lauderdale MSA. Miami-Dade County offers certain programs primarily geared toward assisting residents in locating affordable housing resources elsewhere. The Housing Assistance Network of Dade (HAND) provides temporary assistance for people in danger of becoming homeless. The County recently announced its plans with RAD federal funding to further assist in covering high public assistance costs³⁰.

Broward County and the Florida Institute of Technology published an “Affordable Housing Needs Assessment” in 2018. The report emphasizes the importance of considering transportation needs along with housing costs, but it does not make a particular recommendation as part of its needs assessment. However, Broward County’s “Housing Broward: An Inclusive Plan³¹”, does consider transportation an important part of affordable housing. In their first point, they note that transportation is a key “to be more effective in producing affordable housing and workforce housing.”

The plan specifies that affordable housing should be concentrated in areas with high housing demand, job concentration, and close access to transportation (assumingly *public*).

The South Florida Regional Planning Council studied potential future Tri-Rail Coastal Link station impacts on housing affordability in 2019³² as part of the planned build out of the system. The study finds that, in the area, ELI households face a “near-universal shortage of affordable housing,” (p. 6), and that many proposed coastal stations are located in areas highly vulnerable to displacement pressures resulting from gentrification. The plan evaluates housing affordability within one mile of key transit stops throughout the proposed service area at a granule level and makes specific recommendations for each zone. The plan is noteworthy for its land use connection and should be viewed as a model for transit agencies, TPOs, MPOs, and other related organizations to target affordable housing strategies to their area.

Orlando–Kissimmee–Sanford MSA: Recently, Orange County started an initiative to combat *perceptions* regarding affordable housing, citing neighborhood resentment as a major roadblock

Janitorial Services

A 2019 UCLA report found that despite record-breaking employment for janitorial workers in Miami, their median wages are estimated at \$8.50, the lowest in the country. 69 percent of janitorial workers in Miami pay over 30 percent of their income on rent, classifying them as rent burdened²⁹.

Miami, Florida

²⁹ University of California Los Angeles Labor Center. “Justice for Janitors.” 2019. Accessible from: <https://www.labor.ucla.edu/what-we-do/research-tools/campaigns-and-research/justice-for-janitors/>.

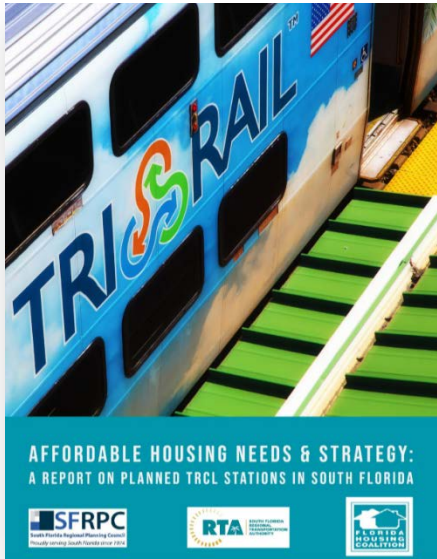
³⁰ Scheckner, Jesse. “Miami-Dade could double workforce, affordable housing,” Miami Today. 2019. Accessible from <https://www.miamitodaynews.com/2019/09/03/miami-dade-could-double-workforce-affordable-housing/>.

³¹ Housing Broward: <https://www.broward.org/Budget/Archives/Documents/HousingBrowardInclusivePlan2018.pdf>

³² South Florida Regional Planning Council. Affordable Housing Needs & Strategy.” 2019. Accessed from:

to building affordable housing³³. Metropolitan Orlando published a guidebook for the housing challenges in Florida focusing on key land use roadblocks in Florida³⁴. Orange County, Seminole County, Osceola County, and the City of Orlando conducted an affordability analysis in 2018³⁵. The area also has expedited development approval processes for the Orlando Housing and Community Development Department, Orlando Planning Division, and the Office of Permitting Services.

Figure 4: SFRPC TriRail Coastal Link & Affordable Housing Cover



Sarasota-Bradenton-Venice MSA. Sarasota County has a “rollover program” that sells reverted-ownership properties in order to fund public projects, some of which were affordable housing projects. They have also halved parking requirements for increased-density developments, and reduced impact fees for small (750sqft) developments³⁶. Despite being one of the most expensive places in Florida to drive a car, the “Sarasota Workforce Housing Action Plan” does not mention transportation costs directly³⁷.

The Sarasota County Area Transit (SCAT) most recent TDP Major Update includes the housing affordability metrics Affordability Index of Existing Single-Family Homes maintained by the National Association of Realtors and ALICE (Figure 5 - 7).

³³ Glenn, C. “Affordable Housing Perception Task Force.” Orlando Sentinel. 2019. Accessible from: <https://www.orlandosentinel.com/business/os-bz-improving-affordable-housing-stigma-20190911-bowfae5ma5bbpjx377ozas6pme-story.html>.

³⁴ Metropolitan Orlando. “A Primer for Transportation Professionals in Central Florida.” 2018. Accessible from: <https://metroplanorlando.org/wp-content/uploads/HOUSING-4-Transportation-Professionals-report-Oct-2018.pdf>

³⁵ Orange County, Florida. “State of Housing,” 2018. Accessible from: <https://ocfl.app.box.com/s/un232band4kextjfn9f6jpsz8ajqgvry>.

³⁶ Kimel, E. “Sarasota County Commission mulls affordable housing game plan,” Sarasota Herald Tribune. 2019. Accessible from: <https://www.heraldtribune.com/news/20190604/sarasota-county-commission-mulls-affordable-housing-game-plan>.

³⁷ Florida Housing Coalition. “Sarasota Workforce Housing Action Plan.” 2018. Accessible from: https://www.flhousing.org/wp-content/uploads/2018/11/Sarasota-Workforce-Housing-Presentation-December-2018_.pdf

Figure 5: SCAT Transit Development Plan (TDP) Major Update



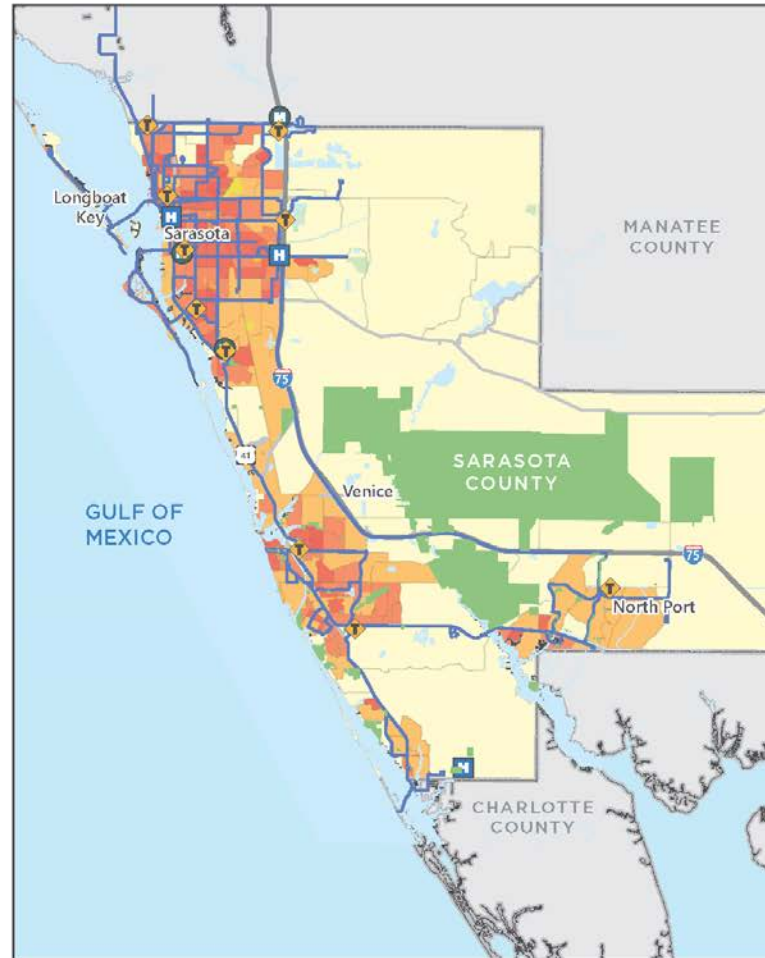
Figure 6: SCAT TDP Housing & Affordability Section

Baseline Conditions

HOUSING DENSITY & AFFORDABILITY

Housing unit density mirrors the population density spatial distribution patterns (See **Figure 2-5**). The National Association of Realtors Affordability Index of Existing Single-Family Homes for Metropolitan Areas classified the North Port-Sarasota-Bradenton Metropolitan Area as having an affordability index of 146.0 as of 2016. This measure provides a comparison of household income to the income needed to purchase a median-priced house. An index above 100 indicates that a household earning the median income has more than enough income to qualify for a mortgage loan on a median-priced home (assuming a 20 percent down payment). An index of 146.0 indicates that a household earning the median income has 146 percent of the income necessary to obtain a mortgage on a median-priced home.

FIGURE 2-5: Housing Density



Source: SCAT, Sarasota County Enterprise GIS; 2017 ACS 5-year Estimates

LEGEND

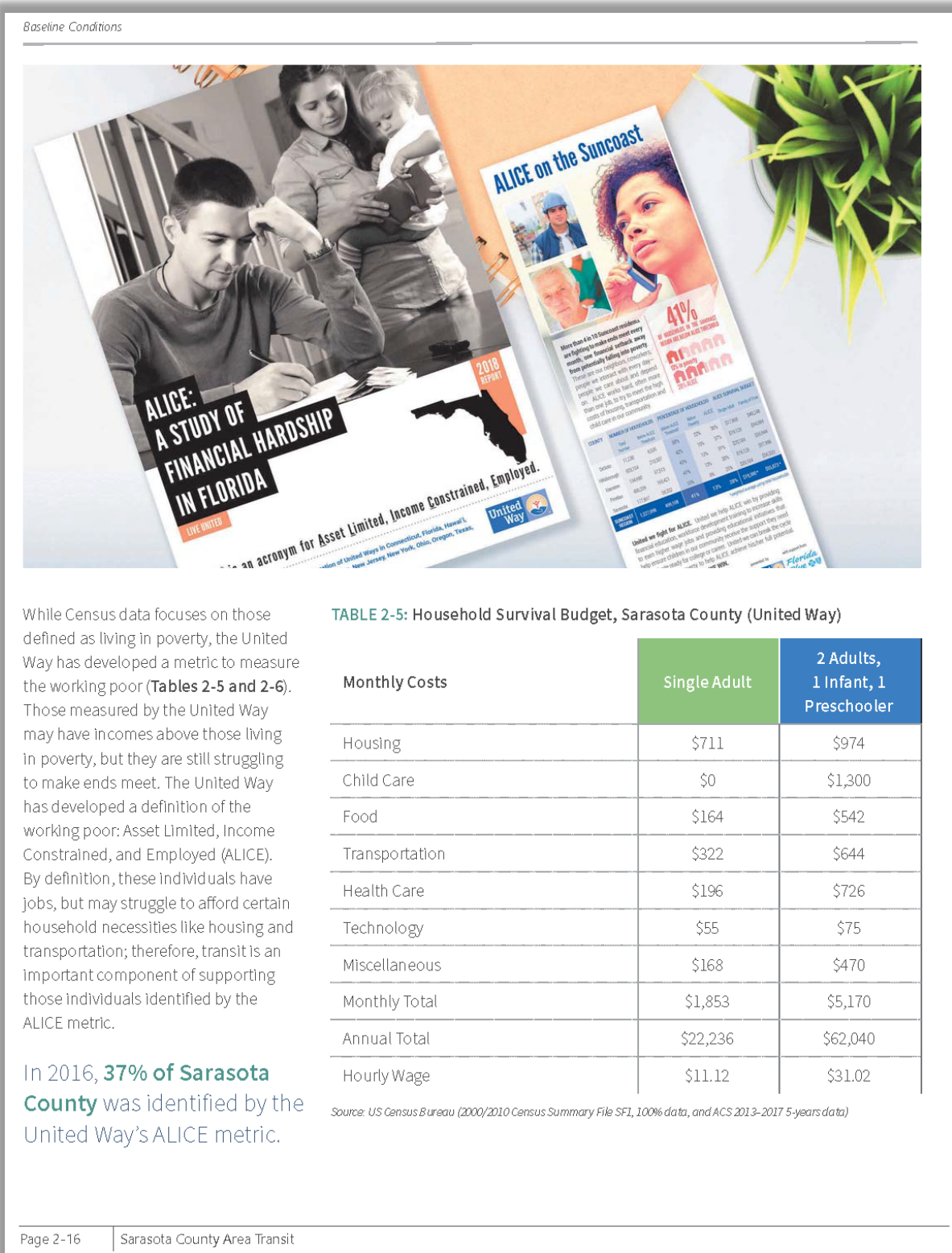
- Transfer Point
- Hospital
- Mall
- SCAT Bus Routes

- Major Roadways
- Park/Natural Areas

Households per Acre

- 0-0.7
- 0.8-1.5
- 1.6-2.3
- 2.4-3.2
- 3.3-4.5

Figure 7. SCAT TDP ALICE Countywide Analysis



While Census data focuses on those defined as living in poverty, the United Way has developed a metric to measure the working poor (Tables 2-5 and 2-6). Those measured by the United Way may have incomes above those living in poverty, but they are still struggling to make ends meet. The United Way has developed a definition of the working poor: Asset Limited, Income Constrained, and Employed (ALICE). By definition, these individuals have jobs, but may struggle to afford certain household necessities like housing and transportation; therefore, transit is an important component of supporting those individuals identified by the ALICE metric.

In 2016, **37% of Sarasota County** was identified by the United Way's ALICE metric.

TABLE 2-5: Household Survival Budget, Sarasota County (United Way)

Monthly Costs	Single Adult	2 Adults, 1 Infant, 1 Preschooler
Housing	\$711	\$974
Child Care	\$0	\$1,300
Food	\$164	\$542
Transportation	\$322	\$644
Health Care	\$196	\$726
Technology	\$55	\$75
Miscellaneous	\$168	\$470
Monthly Total	\$1,853	\$5,170
Annual Total	\$22,236	\$62,040
Hourly Wage	\$11.12	\$31.02

Source: US Census Bureau (2000/2010 Census Summary File SFI, 100% data, and ACS 2013-2017 5-years data)

Figure 8. SCAT TDP ALICE Sub Area Analysis

Baseline Conditions

TABLE 2-6: Percent ALICE & Poverty Households by Sub Area within Sarasota County

Town/Location	Total Households	% ALICE and Poverty
Bee Ridge CDP	4,415	35%
Desoto Lakes CDP	1,395	39%
Englewood CCD	5,712	45%
Englewood CDP	7,499	46%
Fruitville CDP	5,508	34%
Gulf Gate Estates CDP	5,320	49%
Gulf Gate Estates-Osprey CCD	14,293	37%
Interior County CCD	15,952	31%
Kensington Park CDP	1,481	49%
Lake Sarasota CDP	1,617	35%
Laurel CDP	4,467	44%
Longboat Key CCD	2,431	22%
Nokomis CDP	1,487	51%
North Port	22,895	38%
North Port CCD	25,160	39%
North Sarasota CDP	3,101	56%
Osprey CDP	2,869	25%
Plantation CDP	2,741	29%
Ride Wood Heights CDP	1,963	45%
Sarasota	23,482	51%
Sarasota CCD	78,955	42%
Sarasota Springs CDP	6,062	39%
Siesta Key CDP	2,896	25%
South Gate Ridge CDP	2,516	46%
South Sarasota CDP	2,386	41%
South Venice CDP	6,251	43%
Southgate CDP	3,207	51%
The Meadows CDP	2,172	32%
Vamo CDP	2,586	46%
Venice	11,711	38%
Venice CCD	33,073	40%
Venice Gardens CDP	3,372	38%
Warm Mineral Springs CDP	2,537	46%

While only 10 percent of households are identified as living in poverty within Sarasota County, a significant portion of households (37%) are identified by the ALICE metric as the working poor. Both groups have a higher likelihood of using transit. Table 2-6 provides a list of places identified by the Census and the combined level of impoverished and ALICE households.



Note: Census Designated Places (CDPs) are the statistical counterparts of incorporated places, and are delineated to provide data for settled concentrations of population that are identifiable by name but are not legally incorporated under the laws of the state in which they are located. Census county divisions (CCDs) are areas delineated by the Census Bureau in cooperation with state, tribal, and local officials for statistical purposes. CCDs have no legal function and are not governmental units.

Source: U.S. Census Bureau (2000/2010 Census Summary File SF1, 100% data, and ACS 2013-2017 5-years data)

Transportation: Costs and Choices

The United States is broadly regarded as the most auto-dependent country in the world. It has more automobiles than any other country, and has the highest passenger vehicle miles traveled (VMT) of any country with the exception of India³⁸. Transportation costs for individuals and households are very high in terms of money-cost, time-cost, and health detriments. Car reliance is often viewed as unavoidable and the best option for most Americans because of real and perceived detriments to alternative modes.

Nationwide Transportation Costs and Trends

The American “car culture” is well known; Buehler³⁹ conducted a multivariate analysis to further explain US car dependence by comparing its automotive, walking, and transit patterns with that of Germany, which has a substantial car culture as the home of the German automotive industry. He cites a variety of reasons for dependence in the United States relative to other countries: spatial development patterns and a propensity for low-density development in the US that limit public transportation options and walkability, transportation policies that underprice driving in the United States (“free” parking, low gas and car registration taxes and fees), the under-funding of public transit options, and some cultural preference for driving.

Transportation costs are generally considered affordable when they remain under 10 percent of household income. Vehicle ownership is generally the second-largest household expense, with the home being the largest. Acquisition, registration, repairs, regular maintenance, insurance, and fuel costs all factor into the cost of owning a vehicle. The high costs of car-based transportation are a contributing factor to the cycle of poverty⁴⁰.

However, Waller argues that car ownership significantly improves life outcomes for LI families, even when considering direct expenditures⁴¹. He finds that LI people spend proportionally more money on cars, just as they spend proportionally more on housing, but the additional accessibility that comes along with car access significantly improves life outcomes. This finding is seconded by Blumenberg & Pierce, who find access to a car is associated with higher access to jobs. They also find that access to transit does not have similar benefits of car ownership, nor does the receipt of housing assistance⁴².

While cars benefit LI people, they still must make strategic choices in order to afford their associated costs, and may not rely on driving exclusively. In their qualitative study of drivers in San Jose, California, Agrawal et al., find that LI individuals used cost-savings strategies such as

³⁸ Organisation for Economic Co-operation and Development. “Passenger transport.” 2018 data. Accessible from: <https://data.oecd.org/transport/passenger-transport.htm>.

³⁹ Buehler, R. “Determinants of transport mode choice: a comparison of Germany and the USA.” *Journal of transport geography* 19, no. 4 (2011): 644-657.

⁴⁰ Zhao, Fang, and Thomas Gustafson. *Transportation needs of disadvantaged populations: where, when, and how?*. No. FTA Report No. 0030. United States. Federal Transit Administration, 2013. See page 13.

⁴¹ Waller, M. *High Cost Or High Opportunity Cost: Transportation and Family Economic Success*. No. Center on Children & Families# 35. Washington, DC: Brookings Institution, Center on Children and Families, 2005.

⁴² Blumenberg, E, and Gregory P. “Automobile ownership and travel by the poor: Evidence from the 2009 National Household Travel Survey.” *Transportation Research Record* 2320, no. 1 (2012): 28-36.

trip chaining, trip avoidance, carpooling, using public transportation for certain trips, and more risky options like not performing necessary maintenance or carrying car insurance⁴³.

Hidden Cost of Poor Transit

Delay, uncertainty, low-frequency, and low-geographic reach all contribute to the “hidden costs” of public transit. The “hidden cost” of transit in Boulder, CO was estimated to be +56% the standard fare box cost, theoretically resulting in an additional \$15,626.43 of cost⁴⁴.

Besides the inherent risks of driving from collision, there are substantial risks associated with the stressors and sedentary periods associated with long driving commutes. Longer drive commutes are associated with higher instances of smoking, obesity, and worsened mental health⁴⁵. Frank, Andresen and Schmid (2004) found that every additional hour spent in a car was associated with a 6 percent increase in obesity⁴⁶. While these factors are outside the limits of this report, it is clear that the costs associated with driving and especially automotive dependence go beyond the direct, out-of-pocket costs.

Boulder, Colorado

Transit prices are almost universally lower than automotive costs, however this is not always the case. Nadeau (2016) found that public transportation to the Midway International Airport in Chicago is unaffordable for the average low-wage worker at the airport⁴⁷. The “hidden” costs of transit primarily center on unreliable transit service and the difference in travel time when compared to automotive options. This is largely applicable in areas with poor transit service that are also in automotive-dominated areas.

Floridian Transportation Costs and Trends

Car transportation is the dominant mode of travel in the United States, and Florida is not an exception. In 2017, 79.5 percent of Floridians drove to work alone, and only about 1 percent of Floridians used public transit on their commute to work in from 2013 – 2017⁴⁸. FDOT estimates daily transit ridership throughout Florida at 632,328 trips per day in 2017⁴⁹. Figure 11 displays the mean time to work for the Top 10 Florida MSAs.

1%

Estimated percentage of Floridians who use public transit for their commute.

The 2018 BLS Consumer Expenditure survey, noted earlier in this report, also aggregates transportation costs. As a whole, transportation constituted a 17.3 percent share of consumer spending, \$9,789 of CE, considerably higher than the 10 percent affordability threshold for transportation. This category aggregates *all* forms of transportation, but the majority of this share

⁴³ Agrawal, A. W., Blumenberg, E. A., Abel, S., Pierce, G., & Darrah, C. N. (2011). Getting around when you're just getting by: the travel behavior and transportation expenditures of low-income adults (No. CA-MTI-10-2806). Mineta Transportation Institute.

⁴⁴ Wilson, A. M. "Quantifying the True Cost of Transit: Case Study of Bus Routes in Boulder, Colorado." Transportation Research Record 2541, no. 1 (2016): 56-63.

⁴⁵ <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4049576/>

⁴⁶ Wener, Richard E., and Gary W. Evans. "A morning stroll: levels of physical activity in car and mass transit commuting." Environment and Behavior 39, no. 1 (2007): 62-74.

⁴⁷ Malekzadeh, Ali, and Edward Chung. "A review of transit accessibility models: Challenges in developing transit accessibility models." International Journal of Sustainable Transportation (2019): 1-16.

⁴⁸ US Census Bureau ACS Table S0802.

⁴⁹ Florida FDOT Sourcebook, 2017 https://fdotwww.blob.core.windows.net/sitefinity/docs/default-source/planning/fto/sourcebook/2018sourcebook.pdf?sfvrsn=59320405_48

comes from costs associated with owning a personal vehicle. Net outlay (purchase price after subtracting any “trade-in” value) on vehicle purchases amounts to a 7.7 percent share (\$4,376 CE). Gasoline and fuel prices amount to a 3.7 percent share (\$2,115 CE). Repairs account for a 1.5 percent share (\$854 CE), and insurance accounts for a 1.8 percent share (\$1,023 CE). Table 2 shows driving costs for the largest MSAs in Florida based on ACS Census data by MSA.

Table 2: Driving Costs for Top 10 MSAs in Florida

Metropolitan Statistical Area (MSA)	Annual Driving Costs
Miami-Dade	\$11,834
Tampa-St. Petersburg	\$12,012
Orlando-Kissimmee	\$12,927
Jacksonville	\$12,811
Sarasota-Bradenton-Venice	\$12,065
Cape Coral-Ft. Myers	\$12,996
Lakeland-Winter Haven	\$13,013
Palm Coast-Daytona Beach-Port Orange	\$13,195
Pensacola-Ferry Pass	\$13,069
Average	\$12,608
Population data from 2018 American Community Survey (ACS), Table: GCT-PEPANRES Total driving costs from htaindex.cnt.org; assuming \$2.50/gal.	

Public transportation costs are dramatically lower than automotive expenditure, altogether constituting a 1.1 percent share (\$629 CE). The majority of this cost is likely attributable to *airfare*, which is considered public transportation in the CES⁵⁰ methodology. Even factoring in airfare, it is quite clear that public transit does not represent a substantial consumer outlay for individuals living in the Southeast region, but this is partially because public transit is not frequently used.

Mode-to-work differs between the average Floridian and those classified as LI. LI households use cars less for their commute in *most* MSAs, and for these households, transit trips and walking trips tend to take the place of car trips. In more dense environments, this relationship is more evident. For instance, 87.6 percent of trips in Miami are made by car, and 3.7 percent are made by transit. For the same area, LI households make 80.1 percent of trips by car, and 10.0 percent of their trips by transit, showing a higher utilization for this group. In contrast, the Pensacola-Ferry Pass MSA, a much less dense area, LI households only utilize transit at +0.7 percent when compared to the mean, and actually utilize car traffic more than the average (+0.8%). Figure 9 and Figure 10 display mean time to work for the Top 10 Florida MSAs by total population and by LI population.

⁵⁰ Consumer Expenditure Surveys Glossary; <https://www.fdot.gov/planning/performance/default.shtm>

Figure 9: Map of Mode of Transportation to Work for Top 10 Florida MSAs (Total population)

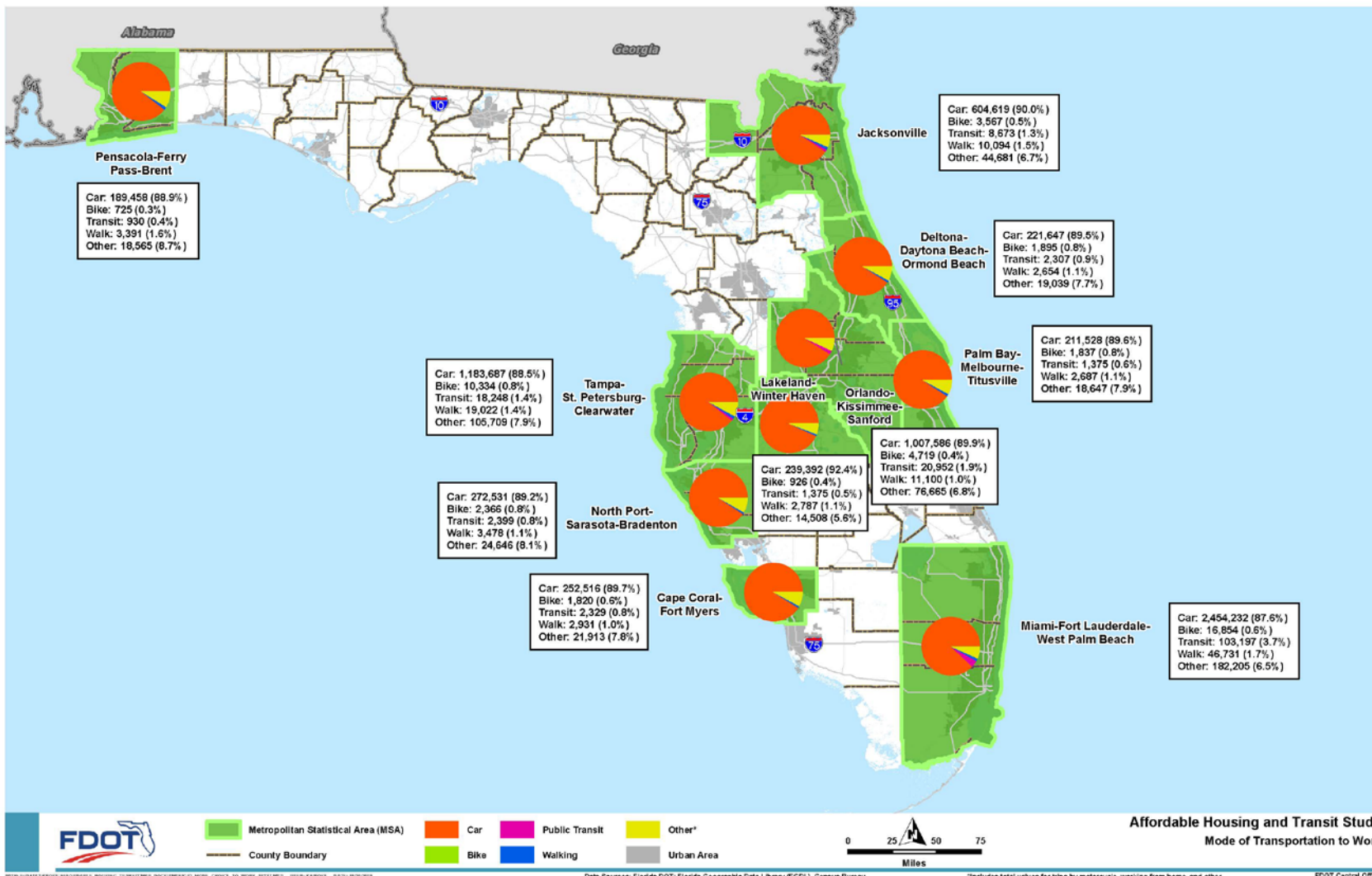


Figure 10: Map of Mode of Transportation to Work for Top 10 Florida MSAs (LI population)

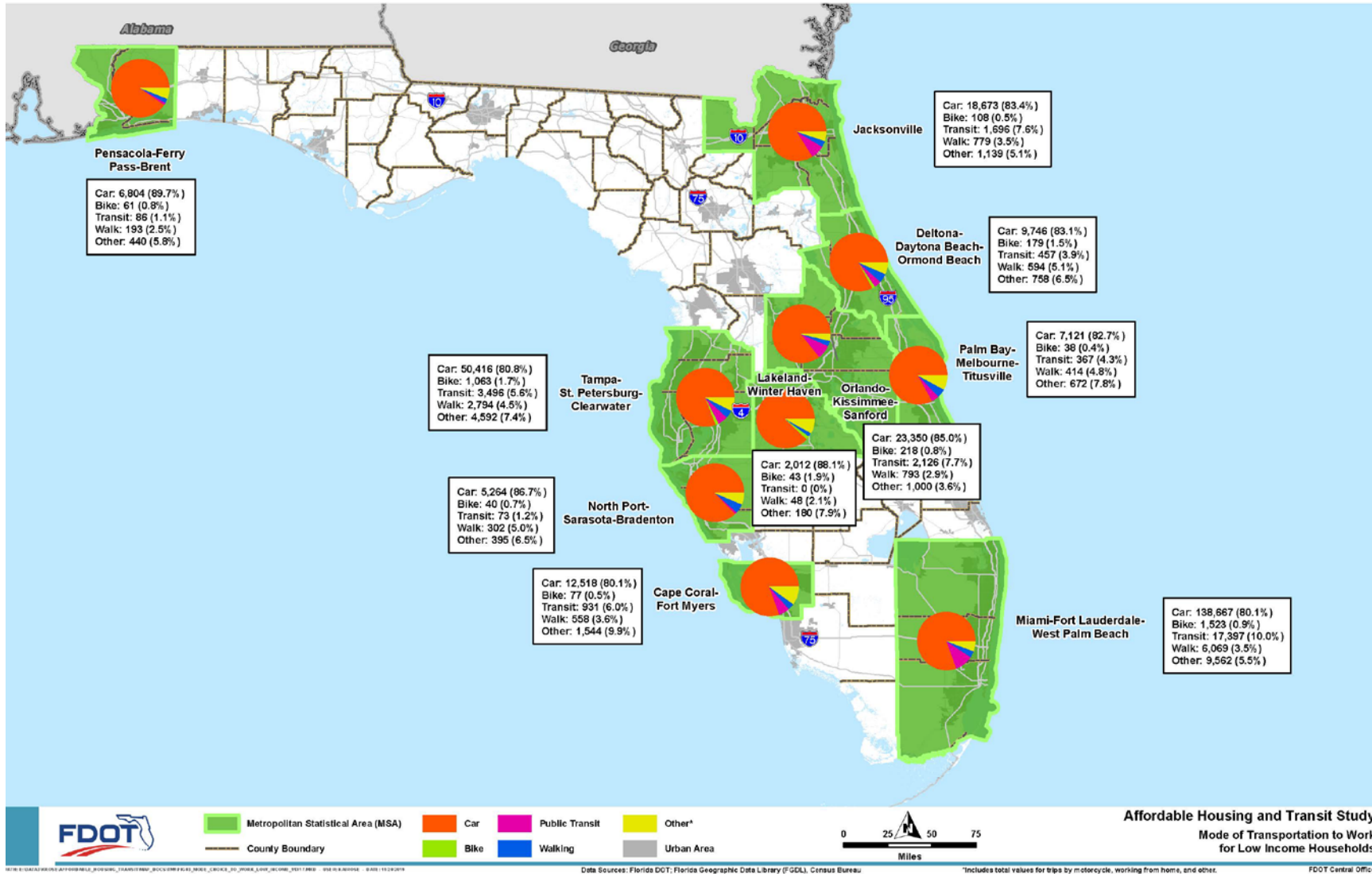
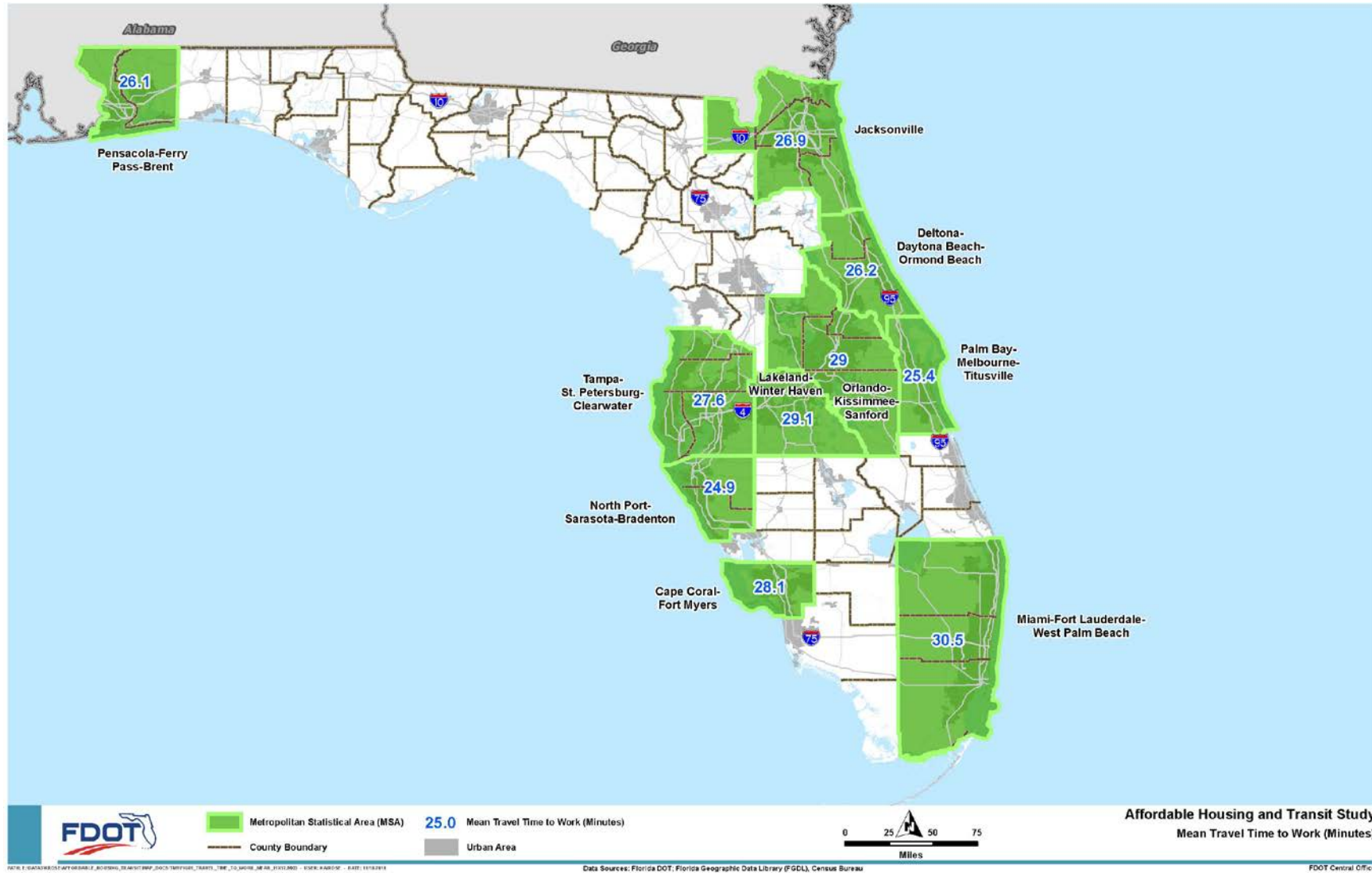


Figure 11: Mean Travel Time to Work for Top Ten FL MSAs



Benefits of Public Transportation

“Public transit” and “public transportation” refer to the modes of transportation provided within a city or community, and may include services such as bus, rail, trolleys, shuttles, ferries, and other forms of ride-sharing. There are numerous bonuses to public transit, including economic benefits, increased safety, fiscal savings, enhanced physical and mental well-being, and environmental advantages.

As previously stated, owning and operating a car is the most significant expenditure after housing costs. Automotive ownership comprises a high upfront cost (purchase price and registration), substantial regular costs like fuel and insurance, and other associated incidental costs like parking and repairs. These costs are regressive, so they place a uniquely challenging demand for low-income (LI) communities. Households with access to transit systems might save thousands of dollars per year if they opted for transit rides as opposed to owning a car. The average annual cost of owning a car in Florida is \$12,608. The average price of a regular monthly transit pass was calculated to be \$789, based on the 17 central transit agencies in the 10 largest urbanized areas in Florida.

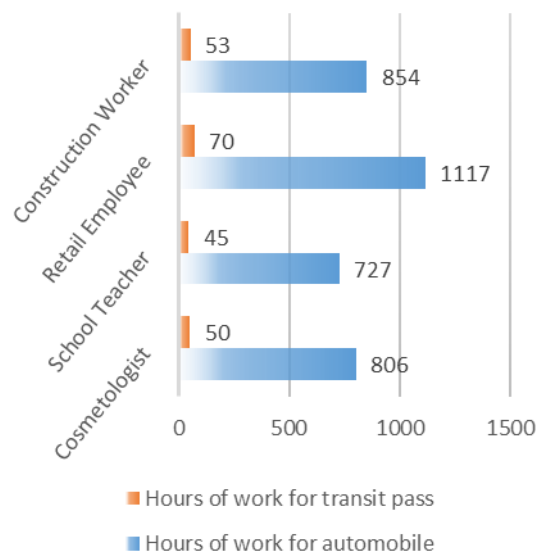
Transit systems are also more environmentally sustainable than most personal automobiles because public transportation produces less greenhouse gas emissions per passenger mile than single-occupancy vehicles. Transit modes such as heavy rail transit and subways produce 76 percent fewer emissions per passenger than a private car. Similarly, light rail systems produce 62 percent less emissions, while bus systems produce 33 percent less emissions per passenger mile. The estimated emission reductions ultimately depend on the capacity and utilization of each

Hours to Cover Transportation Costs Annually

Hundreds of thousands of hard working Floridians face extraordinary burdens with regards to housing and transportation costs. The annual cost of car ownership in Florida is \$12,608, and the annual cost of a typical transit pass is \$787.88. Based on the typical income of common careers in Florida, this chart estimates the number of hours typical professionals must work to cover the different costs of transportation, assuming they are mutually exclusive.

*Median outlays from the Center for Neighborhood Technology (CNT)
Wage estimates from Indeed*

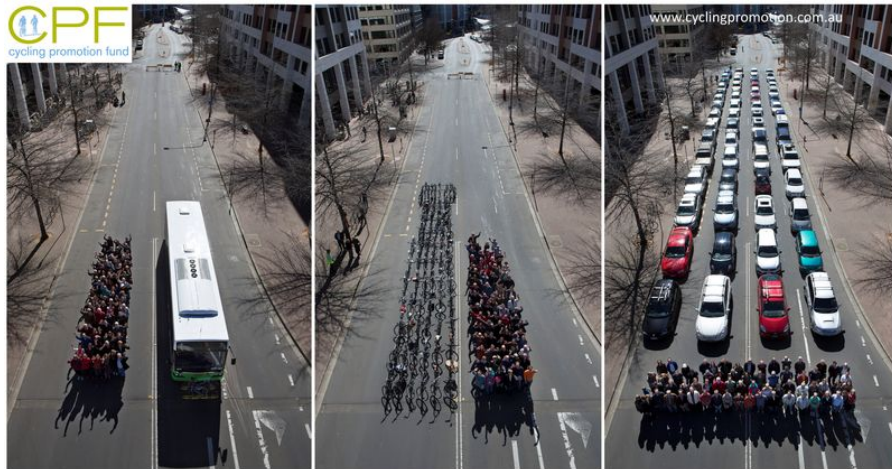
HOURS OF WORK NEEDED TO COVER ANNUAL TRANSPORTATION COSTS



transit vehicle. The Federal Department of Transportation (USDOT) estimates that the average single-occupancy vehicle produces 0.96 pounds of CO₂ per passenger mile. In comparison, transit systems, on average, produce only 0.45 pounds of CO₂ per passenger mile, showing that transit systems have the potential to reduce CO₂ emissions by over half the amount when compared to single-occupancy vehicles.⁵¹

Accessibility to transit systems may also improve physical and mental well-being. One meta-analysis found that the use of public transportation is generally associated with improved physical health. A team writing for the Institute of Transportation Engineers⁵² attributes these benefits to first-mile/last-mile trips that people take when using transit, such as walking to an origin-destination between transit trips as opposed to driving a car, which typically minimizes first-/last-mile trips. Additionally, walkable neighborhoods create a stronger sense of place where people can engage with their environment and other people in their community, which is a missed opportunity for single-occupancy vehicles. As a result, communities with various transit and mobility options improve livability and promote a better quality of life.

Image from the Cycling Promotion Fund.



There are also various economic benefits that transit systems have for surrounding communities. Investing in transit systems improves accessibility to jobs and resources, especially for LI communities or people who do not own a car. These communities depend on efficient transit systems to get around and participate in the labor market and economy. Transit systems also improve commerce within communities since many investments occur near transit routes, including commercial strips, residential communities, office buildings, and recreational facilities. In turn, transit users are likely to stop at those developments because they are located near existing transit routes, and potentially near their origin or destination. Investments made in transit systems also save money on infrastructure costs that automobile infrastructure may otherwise consume.

⁵¹ DOT, Responding to Climate Change. <https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/PublicTransportationsRoleInRespondingToClimateChange2010.pdf>.

⁵² ITE white paper, "How Transportation Choices Impact Health & Wellness." <https://www.ite.org/pub/?id=7BEFD03F-E368-AB13-FC14-D92743EBBCA1>.

Public transit systems are also a much safer mode of transportation than cars. Cities where residents use more than 50 annual transit trips have roughly half the average traffic fatality rates compared to cities with ridership below 20 annual transit trips.⁵³ There are a few reasons for this phenomenon. Communities that invest in transit also tend to invest in other mobility options, making the region generally safer for transportation. With better transportation options, people are less likely to drive under the influence. For transit-oriented communities, "eyes on the street" and other community-oriented design features lower crime rates.⁵⁴

Individuals often view cars as safer than transit because of the feeling of enclosure and separation from the built environment, despite risks associated with traffic collisions. There are also several relative advantages to driving an automobile that deter people from utilizing public transit systems, and consequently, communities from investing in public transit. Cars offer greater flexibility for two reasons. The first is the nature of the technology; most people with a car have nearly unlimited access to it any time, any day. Second, most existing infrastructure is auto-oriented: a person can access their vehicle any time they need a ride, regardless of the day, time, or destination because there will be a roadway that brings them there. For example, a person can drive their car from their driveway to their grocery store parking lot with minimal time spent walking. Compared to a person taking transit who will need to walk and possibly transfer, the auto-driver had a much more convenient trip. Those relying on public transportation for multiple trips throughout the day may end up spending several hours of their day waiting for transit connections and making first- and last-mile trips.

There are many options that transit agencies can integrate to improve transit ridership, but improvements largely depend on the community and public concern. Below are some examples of ways that transit agencies can improve ridership and experience:

- Increase Transit Service: Expand network, increase frequency, and operating hours.
- Improve Connectivity with Other Modes: Connections to buses, trains, ferries, airports, park & ride facilities, and bicycle/pedestrian facilities.
- Improve Physical Conditions: Add or improve amenities on transit services or at stops/stations (e.g., seating, protection from environmental conditions).
- Improve Transit Technology: Add or improve technological amenities, such as internet service, wayfinding technology, real-time transit updates, and security cameras.⁵⁵
- Improvements made to transit systems should be advertised to the public to encourage additional transit use.

Transit systems that have implemented some of these strategies in the form of a redesigned route network are evaluated later in this report.

⁵³ Todd Litman (2019) for Victoria Transport Policy Institute, "Safer Thank You Think!" white paper: <https://www.vtpi.org/safer.pdf>.

⁵⁴ Todd Litman (2019) for Victoria Transport Policy Institute, "Safer Thank You Think!" white paper: <https://www.vtpi.org/safer.pdf>.

⁵⁵ Victoria Transport Policy Institute: <https://www.vtpi.org/tdm/tdm47.htm>

Housing & Transportation: The Whole Picture

For every dollar working families save on housing by moving farther from the city center, they expend an additional 77 cents on transportation⁵⁶. Housing costs and transportation costs are inherently linked and it is considered a fundamental research error to not consider them together when evaluating affordability. Those that consider only one aspect of housing or transportation when evaluating affordability might be forgiven due to the immensely complex, sometimes contradictory relationship between the two.

Distance, Price, and Cost

Bid rent theory suggests that rents decrease as distance from the central business district (CBD) increases. This is the logic of the von Thünen model of agricultural production, but modified to include retail, industry, and residential areas. The model is intuitively true even when accounting for suburbanization and edge cities: just go further out, and rents will drop.

One problem with this model is that it does not account for the cost of infrastructure: water, sewer, electric, and roadway to connect those places, which end up affecting the rent. The second are the costs of transportation themselves. The saying “drive ‘til you qualify” originally described the phenomenon of individuals driving from their work until they found a housing unit meeting their standards that they could afford. This intuitive idea has been largely debunked once one considers the various costs associated with longer commutes^{57 58}.

Hamidi & Ewing⁵⁹ find that housing tends to be more expensive in compact urban areas compared to sprawling areas, but that transportation itself tends to cost less in those same areas. Overall, “H+T costs decline with an increase in a metropolitan area’s compactness score, although the relationship is only significant at the 0.10 level.” It is this relationship between transportation and housing costs that serves as the purpose of this overall project. To better display the H + T burden in Florida, Figure 12 was developed to display the H + T burden by the Top 10 Florida MSAs, displaying both the transportation and the cost burden.

Public transportation systems do not impact the quantity of affordable housing stock other than what is provided as part of a station area plan and TODs. Rather, it makes it possible to meet essential needs (access to jobs and services) without owning or using a private automobile. To assess this relationship, the next two study areas use the rubric described in the next section to analyze the public transportation system. The next study area looks at the current public transportation systems in the Top 10 MSAs in Florida and augments them with surveys to see how well they meet the needs of LI households. This analysis is also supported by surveys conducted of large and innovative public transportation systems located outside of Florida (Table 3).

⁵⁶ Lipman, B. Somethings Gotta Give, Center for Housing Policy. Volume 2. 2005. Page 8.

⁵⁷ Smith, C. “Drive ‘till You Quality Put to Rest.” Portland Transport.com. Accessible from: https://portlandtransport.com/archives/2010/03/drive_till_you.html

⁵⁸ Lewyn, M. “The Creation of a ‘Drive to Quality’ World.” Planetizen.com. 2013. Accessible from: <https://www.planetizen.com/node/66698>.

⁵⁹ Ewing, R, Gail M, Shima H, and A. C. Nelson. “Relationship between urban sprawl and physical activity, obesity, and morbidity—Update and refinement.” *Health & place* 26 (2014): 118-126.

The subsequent study areas conducts a case study analysis of five public transportation systems that have conducted a major route/system overhaul in the past ten years; those agencies are displayed in Table 3. These case studies should highlight the efforts made by the respective transit agencies to engage LI communities during the design process and whether the accessibility and mobility of the system improved after the changes were made.

Table 3: Case Studies Transit Systems

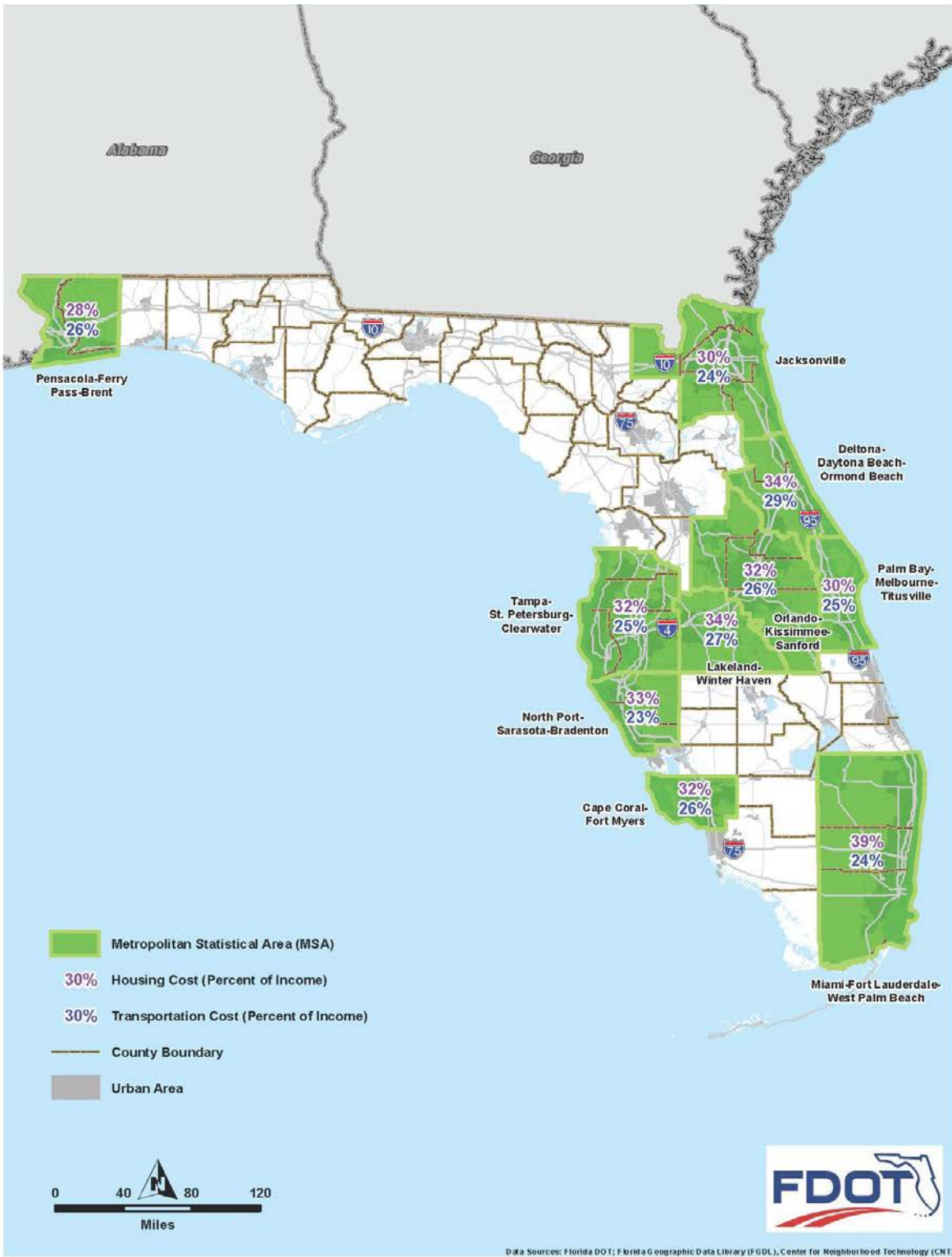
Transit Agencies in the Top 10 MSAs		Major Public Housing Authorities	
Miami-Dade Transit, Broward County Transit, PalmTran		Miami-Dade County Public Housing and Community Development, Broward County Housing Authority, Palm Beach County Housing Authority	
Hillsborough Area Regional Transit Authority (HART), Pinellas Suncoast Transit Authority (PSTA)		Tampa Housing Authority, Pinellas County Housing Authority	
LYNX (Orlando area)		Orlando Housing Authority	
Jacksonville Transit Authority		Jacksonville Housing Authority	
Sarasota County Area Transit, Manatee County Area Transit		Sarasota Housing Authority, Manatee County Housing Authority	
LeeTran (Fort Myers area)		Lee County Housing Authority	
Citrus Connections (Lakeland area)		Lakeland Housing Authority	
Votran (Daytona Beach area)		Daytona Beach Housing Authority	
ECAT (Pensacola area)		Pensacola Housing Department	
Top 10 Agencies in the US by Ridership (Unlinked Trips) ⁶⁰			
Transit Authority Name		Major City	
MTA (New York City Transit Authority)		New York City, NY	
Chicago Area Transit (CTA)		Chicago, IL	
Los Angeles County Metropolitan Transportation Authority (LACMTA)		Los Angeles, CA	
Massachusetts Bay Transportation Authority (MBTA)		Boston, MA	
Washington Metro Area Transit Authority (WMATA)		Washington, DC	
Southeastern Pennsylvania Transportation Authority (SEPTA)		Philadelphia, PA	
New Jersey Transit Corporation (NJ Transit)		Newark, Jersey City, NJ	
San Francisco Municipal Railway (MUNI)		San Francisco, CA	
San Francisco Bay Area Rapid Transit (BART)		Oakland, CA	
King County Metro - King County DOT		Seattle, WA	

⁶⁰ American Public Transportation Association (APTA). "2019 Public Transportation Fact Book." Accessible from: https://www.apta.com/wp-content/uploads/APTA_Fact-Book-2019_FINAL.pdf. Page 32.

10 “Most Innovative” Transit Agencies ⁶¹ (Excludes Duplicates from Above)	
Transit Authority Name	Major City
Port Authority of Allegheny County	Pittsburg, PA
TriMet	Portland, OR
Metro Transit	Minneapolis – St. Paul, MN
Madison Metro	Madison, WI
Regional Transportation District (RTD)	Denver, CO
The Bus	Honolulu, HI
Maryland Transit Administration (MTA)	Baltimore, MD
Utah Transit Authority Salt Lake City (UTA-SLC)	Salt Lake City, UT
Orange County Transportation Authority (OCTA)	Santa Ana, CA
Greater Richmond Transit Company (GRTC)	Richmond, VA
Five Transit Agencies with Redesign	
Transit Authority Name & County	Redesign Year
StarMetro. Leon County, Florida.	2011
Jacksonville Transit Authority (JTA). Jacksonville, Florida.	2014
Central Ohio Transit Authority (COTA). Franklin, Delaware, Fairfield, Union, and Licking Counties, Ohio.	2014
LYNX. Seminole, and Osceola Counties, Florida.	2018 - <i>a comprehensive route optimization study was completed but not implemented</i>
PalmTran. Palm Beach County, Florida.	2018

⁶¹ Wallace, N. “The Best Cities for Public Transportation in 2016.” SmartAsset. Accessible from: <https://smartasset.com/mortgage/best-cities-for-public-transportation>.

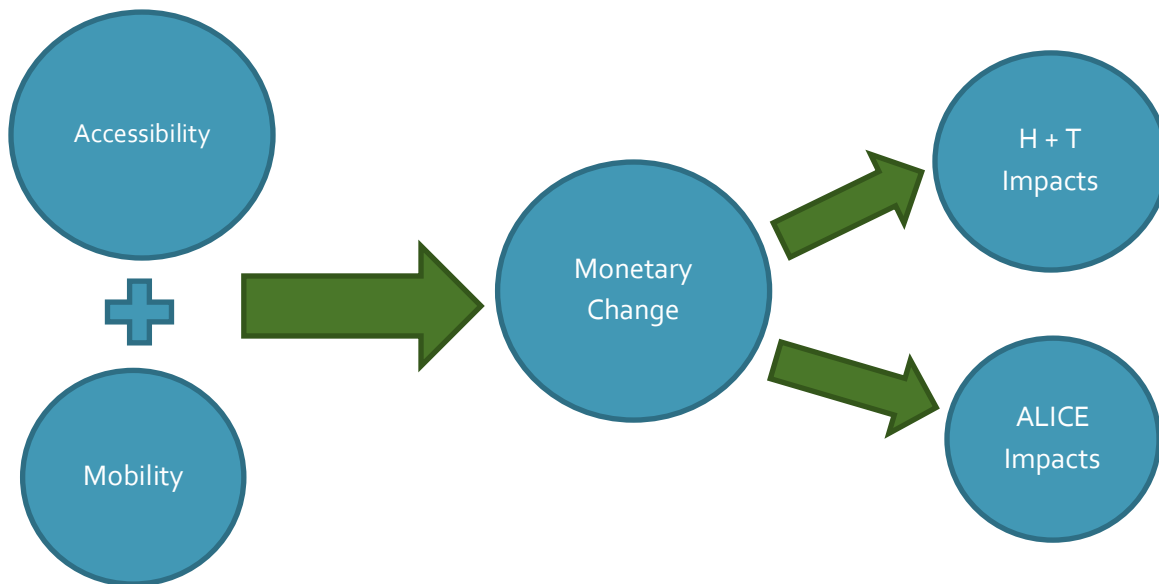
Figure 12: H + T Burden for Top Ten Florida MSAs



Affordability and Transportation Scoring Rubric

This section describes an assessment rubric developed to illustrate the impact the transit system has on transportation costs. This tool will be used to show the connection between accessibility and affordability in the subsequent study areas in this report. The assessment rubric initially identifies locations where transit upgrades can improve access and travel times enough for an individual or household to eliminate a personal vehicle, directly leading to savings in the household budget. Once these savings are identified, they augment the transportation costs component of the CNT Household and Transportation Cost Tool to provide a revised budget showing improved affordability within an urbanized area. These results are also fed into the ALICE measure to show how transit can improve the overall household budget. Figure 13 illustrates how the rubric works. The methodology sections in the next two study areas will explain how this rubric is used to assess the affordability of the transit system in the cities evaluated.

Figure 13: Affordable Housing & Transit Rubric



Summary

Florida has a serious housing affordability problem. Local efforts, such as that from Orlando and Miami, are steps in the right direction. However, with a total affordable housing unit shortfall of **257,785** for the Top MSAs, there is plenty of work left to do. The flipside of this discussion is transportation; indeed, Florida also has a transportation affordability crisis. For Floridians, the 60.5% H + T cost burden is felt daily, and they may sacrifice just to cover these expenses. These sacrifices, by definition, may lead to long-term instability.

This section has defined the bounds of affordability and explored initial efforts that seek to define the different aspects of affordability in the housing and transportation space, as well as putting a human face to those costs. However, there is scarce research and policy information on how public transportation can effectively target affordable housing in a practical sense: how public transportation and affordable housing can be shaped together. This link is illustrated through a case study methodology based on Floridian and national examples.

The ideal relationship is clear: public transit should effectively serve people living in affordable housing units so they can save on transportation costs. But whether public transportation is effectively serving that population is unclear, and it is unclear whether public transportation agencies even view that as a mandate. The following study areas will define how transit agencies and PHAs approach the intersection of affordable housing and public transportation, and evaluate which strategies are effective in helping reduce the transportation cost burden. It also considers how public transportation can be re-engineered and better integrated into existing and future affordable housing developments.



Phase II: The Role of Public Transportation



The Role of Public Transportation

Public transit is a safe, affordable, and environmentally-friendly mobility option that may be available to many communities and can include services such as bus, rail, trolleys, shuttles, ferries, and other forms of ride-sharing. But how is transit performing for affordable housing communities in Florida? To answer this question, the project team used three approaches involving different analytic methods. The first method is a document review measuring the integration of affordable housing and community engagement into Transit Development Plan (TDP) Major Updates and Federal Transit Administration (FTA) Title VI Program Statements. Second, an accessibility performance analysis captures how Florida transit agencies provide access to their community and specifically their affordable housing areas. This is called the Transit System Performance Review (TSPR). The TSPR explored the 17 transit agencies in the Top 10 Metropolitan Statistical Areas (MSAs) in Florida listed in Table 3. The TSPR provides a dataset of transit performance and provides an understanding of the range of performance statewide for key access variables. Finally, a survey tool queries transit agencies and public housing authorities (PHAs) to evaluate their relationship with one another and to define their approaches to managing transit work for affordable housing communities. The survey included some agencies outside of Florida and provided the connection between the first two approaches.

Where the previous phase laid out the affordable housing landscape in Florida and its connection to transportation costs, this phase lays out the transit landscape and its connection to affordable housing. Policymakers, planners, developers, and the general public expect public transportation to help ease the housing and transportation cost burden, and it has the capacity to do so. To assess transit performance statewide, the methodologies access, find unique practices for connecting affordable housing, and relationships with PHAs to gain a clear picture of the landscape. With a broad perspective established, the subsequent phases focus on transit system route changes and station area planning are equipped to ask better questions and better judge performance.

Image from Visit Tampa Bay.



Methodologies

Getting the whole picture of public transit’s relationship with affordable housing required different approaches that blend qualitative and quantitative methods. A document review measures the integration of affordable housing and community engagement into key planning documents, searching for innovative approaches to affordable housing access. Second, the TSPR is a heavily quantitative methodology geared toward determining the range of performance statewide for key

Situational appraisal of transit and affordability



Document Review



Performance Analysis



Survey Questionnaire

access variables. Finally, a qualitatively-based survey tool queries transit agencies and PHAs to evaluate their relationship with one another and to define their approaches to managing transit work for affordable housing communities.

After findings are summarized for each methodology, they are “triangulated” to provide more general findings and connections in the Takeaways and Conclusion sections of this report. These findings will structure research questions for more granular research methods anticipated in the subsequent study areas.

Planning Document Review (PDR)

The PDR reviews the TDP and Title IV Program Statement for the transit agencies studied as part of the Top 10 MSAs. It does not include the rail-based modes and certain transit agencies whose documents were unavailable. Of the planning documents reviewed for transit agencies, only one agency did not have their FTA Title VI Program Statement on their website. Therefore, the TDP Major Update was the only document assessed for this agency. Statutory requirements structure the PDR, but this review is focused solely on finding interesting techniques or ideas and on understanding how transit agencies integrate affordable housing and LI communities.

TDPs are statutory requirements for transit agencies in Florida in order for distribution of State Block Grant funding. Under the Florida Administrative Code Rule 14-73.001, TDPs are required to serve as any transit agency’s “strategic blueprint,” meaning they are the backbone of the planning process for any transit agency in Florida. Given their relevance for Floridian transit agencies, analyzing TDPs will reveal how well affordable housing is integrated into a transit agency’s planning effort. Florida TDP Handbook (2013) *advises*, but does not necessarily require, that affordable housing be integrated into a baseline conditions assessment for a TDP. It also advises that TDPs include population below poverty, zero-vehicle households, and affordable housing within a TDP’s Overview of Study Area.⁶² This guidance is the foundation of the TDP Major Update rubric, displayed in Table 4.

⁶² FDOT TDP Handbook (2013), pgs 13, 21.

Table 4: TDP Major Update Rubric

Transit Agency		Transit Development Plan Major Update		
Category	Requirement	Fiscal Years Covered		Notes
		Yes	No	
Baseline Conditions	Identification of Transit dependent population segments: <ul style="list-style-type: none"> Income Vehicle Ownership Areas with affordable housing units 			
Transit Demand Assessment	Market Assessment <ul style="list-style-type: none"> Low Income Vehicle Ownership 			
Alternatives Development & Evaluation	Assessment of impact to low-income communities			
Additional Information				

Title IV Program Statements are updated at least on a triennial basis to comply with Title IV of the Civil Rights Act of 1964. Satisfactory submission of a Title IV Program Statement is required for transit agencies to receive Federal financial assistance from FTA. The purpose of the FTA Title VI Program Statement is to ensure that non-discrimination is an integral part of the transit agency’s program, policies, and activities. The goal is to identify potential impacts to minority and low income population early in the development of a program, policy or activity so that positive corrective action can be taken to mitigate or avoid these impacts.

FTA Title VI Program Statements are required for every transit agency receiving federal funds. Those agencies that operate 50 or more fixed route vehicles in peak service and are located in an urbanized area of 200,000 are required to have a non-discrimination policy and process to investigate discrimination claims. Additionally, these agencies are required to include:

- A demographic analysis of the transit provider’s service area;
- Data regarding customer demographics and travel patterns, collected from passenger surveys;
- Results of the monitoring program of service standards and policies and any action taken; and
- A major service change policy.

Disproportionate Burden Policy and assessment of impact on low-income communities is not a Title VI requirement, per se. Rather, it emerged as a requirement based on Executive Order (EO) 12898, signed in 1994. The purpose of this EO is to assess the environmental and human health effects of federal actions on minority and low-income populations.⁶³ As a result of EO-12898, transit agencies should assess the impacts of major service changes on low-income populations. Additionally, demographic information should be collected on fare usage by fare type among

⁶³ <https://www.archives.gov/files/federal-register/executive-orders/pdf/12898.pdf>

minority and low income users to assist with fare equity analysis. Table 5 provides the rubric used to assess Title VI Program Statements. Once completed, the research team used the rubrics to generate conclusions about how affordable housing is, or is not, integrated into transit agency planning documents.

Table 5: Title IV Program Statement Rubric

Transit Agency				
FTA Title VI Program Statement		Fiscal Years Covered		Notes
Category	Requirement	Yes	No	
Demographic and Service Profile Maps and Charts	Maps depicting those Census tracts, blocks, block groups, TAZs, or other geographic zones where the percentage of the total low-income population residing in these areas exceeds the average percentage of low-income populations for the service area as a whole			
Demographic Ridership and Travel Patterns	Information on the race, color, national origin, English proficiency, language spoken at home, household income and travel patterns of their riders using customer surveys. Demographic information shall also be collected on fare usage by fare type amongst minority users and low-income users , in order to assist with fare equity analyses			
Major Service Change Policy	Agency must identify what constitutes a major service change			
Disproportionate burden policy (Service Changes)	Develop a policy for measuring disproportionate burdens on low-income populations; defines statistically significant disparity and may be presented as a statistical percentage of impacts borne by low-income populations as compared to impact borne by non-low-income populations			
Disproportionate Burden Policy (Fare Changes)	Develop a policy for measuring the burden of fare changes on low-income riders to determine when low-income riders are bearing a disproportionate burden of the change between the existing fare and the proposed fare.			
Additional Information				

Transit System Performance Review (TSPR)

The TSPR is a data-driven analysis that provides numerical information on transit performance concerning transit performance and accessibility. The analysis primarily employs the transit planning tool TBEST (Transit Boarding Estimation and Simulation Tool). TBEST can describe the socio-demographic makeup of various geographies, including those based on a transit system's General Transit Feed Specification (GTFS) feed. Four "goals" define the four separate analyses conducted as part of this process, each providing information about transit system performance:

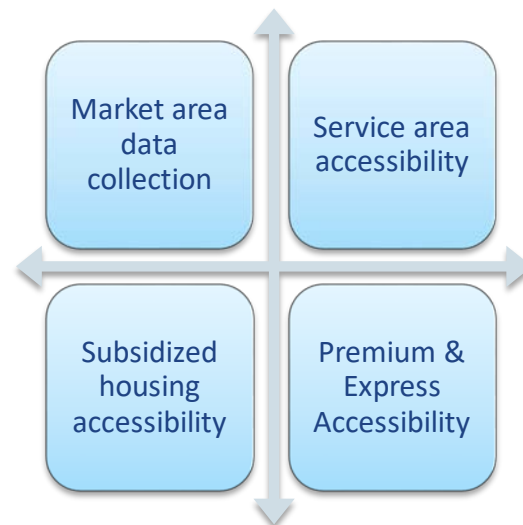
1. Quantify each transit system's market area to define the subtotals for each of the variables under study;
2. Quantify each transit system's total accessibility by socio-demographic factors;
3. Quantify each transit system's accessibility for subsidized housing by socio-demographic factors; and
4. Quantify Premium & Express Route service for the service area and for subsidized housing, by socio-demographic factors.

Data Sources

For socio-demographic data, the research team used the built-in TBEST estimations. TBEST employs US Census data for 2019 based on projections from a 2015 base year.

For GTFS feeds, the research team used feeds provided by TBEST, which are contained in TBEST "distributions." Each transit system was updated sometime in fall 2019; as this analysis occurred in early 2020, this was an up-to-date source.

For affordable housing data, the research team employed 2013-dated subsidized housing data from the Shimberg Center for Housing Studies. As established in TM1, subsidized housing is only a subset of affordable housing and does not match our ideal definition of affordable housing as defined by 30 percent of AMI. This subsidized dataset was, nevertheless, employed because it contains a record of all the subsidized housing stock in Florida, and includes data on US Department of Agriculture (USDA) Rural Development Units, US Department of Housing and Urban Development (HUD) Rental Assistance Units, units associated with the Florida Housing Finance Corporation, and units associated with the Florida Association of Local Housing Authorities.



The research team employed ArcGIS Desktop to geocode this information and created a ¼-mile buffer around each subsidized housing point. The researchers import this data into TBEST to create a subsidized housing mobility area.⁶⁴

The TSPR analysis does not estimate counts for housing stock or dwelling units (DU), nor does the analysis provide an estimation of individuals living in subsidized housing. Instead, it uses the subsidized housing origin zone to estimate the average access provided by the transit system from these areas to jobs, services, and the other variables investigated.

Variables

TBEST provides outputs for socio-demographic variables. Below is a list of variables studied in this analysis, along with their TBEST-dictionary⁶⁵ definition:

- **Total population:** total population with walk access to the subject stop.
- **Poverty population:** population living below the poverty line as defined by the US Department of Health and Human Services (DHHS) Poverty Guidelines.
- **Total households:** total households with walk access to the subject stop.
- **Zero vehicle households:** households with zero vehicles, as defined by the US Census.
- **Employment:** total employment defined by all Standard Industrial Codes (SIC).
- **Services:** service employment defined by SIC (see Appendix A).
- **Median household income:** median household income around a subject stop.

Transit System Accessibility Assumptions & Modifications

Table 6 presents the parameters used to set up the Accessibility Analyst in TBEST. Modifications from default accessibility settings appear in **bold**. Rail-based system walk buffers are expanded from bus-based system walk buffers (0.25 mi) because rail stops tend to have more attractive power than bus stops. Total travel time based is based on the MSA typical travel time to account for regional variation in congestion and preferences. A list of system-specific modifications appears in Appendix B.

Table 6: Accessibility Parameters in TBEST

Maximum Walk Distance	Walking Speed	Maximum Transfers	Walk Buffer from Stop	Transfer Penalty	Transfer Wait Time	Total Travel Time
660 feet	3 mph	5 ⁶⁶	Bus: 0.25mi Rail: 0.5	Yes, 1	10 Minutes	Defined by 2X Journey-to-Work

⁶⁴ TBEST uses mobility areas to help define origin-destination zones using special, user-defined geographies.

⁶⁵ TBEST User Guide 4.5, Appendix D, pages 485-6.

⁶⁶ Only a maximum of two transfers ever occurred in any model, due to the penalties associated with transferring and the walking distances necessary.

Model Foundations

Each Goal employed slightly different tools to garner information.

- Goal 1: Market area totals are calculated using a TBEST Mobility Area and the Socio-economic Wizard Tool. For most systems, market area *is* the county area. In cases where transit systems are inherently multi-county (LYNX, Tri-Rail, and SunRail), the market area is each county receiving service.
- Goal 2: The TBEST Network Accessibility Wizard calculates total accessibility within the market area with an origin as the market area. The model is run based on parameters in 6. This analysis tested AM Peak.
- Goal 3: The TBEST Network Accessibility Wizard calculates total accessibility within the market area with an origin zone set as the Subsidized Housing Mobility Area. The model is run based on parameters in Table 3. This analysis tested AM Peak.
- Goal 4: Goal 4 mirrors Goals 2 and 3, but delimits the transit system to only Premium and Express routes. Premium and express service includes limited-stop service, higher frequency service, any rail service, and express bus service. This analysis tested AM Peak.

Other Notes

- TBEST contains data for different service periods (AM Peak, Night, Weekend, etc.), but the team found no variation from AM Peak to Night data. This is covered more in the Results section.
- Any routes included in the TBEST Build not operated by the transit agency are removed; these are usually local, downtown circulators operated by municipalities.
- Certain routes are removed if they extend far beyond the market area. For example, Miami-Dade Transit (MDT) runs two routes largely serving the Florida Keys. For a complete list of removed routes, see Appendix B.

Transit Agency & Public Housing Authority Surveys

The project team developed two surveys, one for transit agencies, and one for PHAs, to aid in the understanding of perceptions and initiatives surrounding planning for affordable housing and transit access. The goals for the analysis were as follows:

- Determine transit agency applications of Title VI & Major Service Change thresholds;
- Measure a transit system’s community involvement and affordable housing community involvement;
- Measure a transit system’s attention to serving affordable housing during the route change process; and
- Contextualize PHA relationships with their transit agency.

The transit agency survey employed an online survey through SurveyMonkey that used a mix of question types. The research team emailed the survey link to transit agencies in the 10-largest MSAs in Florida, the 10-largest transit systems nationally, and the 10 “most innovative” transit agencies across the nation. The survey opened on January 20 and closed on February 12, 2020.

PHA surveys were open-ended and phone-based as the research questions are inherently more exploratory. The case set included only 'certified' PHAs in the 10-largest MSAs in Florida. The research team administered the survey over a three-week period from January 20 to February 7, 2020.

Transit agency survey questions are reproduced in Appendix C. PHA survey questions are reproduced in Appendix D.

Results

Planning Document Review (PDR)

The research team reviewed Title VI Program Statements and TDPs methodology described earlier. This section describes the results.

Title VI Program Statement

Title VI of the Civil Rights Act of 1964 was developed to “ensure that no person in the United States, based on race, color, or national origin, is excluded from participation in, denied the benefits of, or otherwise subjected to discrimination under any program that DOT financially assists.” This Act conceives equal access to public transportation services for all communities regardless of socio-economic characteristics.⁶⁷

Reviews of the Title VI Program Statements assessed how agencies managed requirements under each of the following categories:

- Demographic and Service Profile Maps and Charts
- Demographic Ridership and Travel Patterns
- Major Service Change Policy
- Disproportionate Burden Policy (Service Changes)
- Disproportionate Burden Policy (Fare Changes)

Each Title VI Program Statement checklist also notes whether a transit agency conducted assessments that went beyond the minimum requirements. A few transit agencies (including Miami-Dade Transit and Citrus Connection) made distinctions between routes that primarily served minorities versus impoverished communities based on census blocks, which helps the audience better understand the demographics of the neighborhoods within the service areas. Another example is Pinellas Suncoast Transit Authority (PSTA), which exceeded minimum requirements by providing an analysis of amenities within low-income block groups, percentages of LI residents within the PSTA Service Area, and provided PSTA Ridership by household income levels, as illustrated by Figure 14 and Table 7.

⁶⁷ DOT Title IV Program: <https://cms8.dot.gov/mission/departments-transportation-title-vi-program>

Table 7: PSTA Title VI Program Statement Amenities by Socio-economic Groups

Group	Shelters	% of Total	Benches	% of Total	Benches & Shelters	% of Total
Minority Block Groups	323	50.4%	894	45.2%	1,217	46.5%
Non-Minority Block Groups	318	49.6%	1082	54.8%	1,400	53.5
LI Block Groups	343	53.5%	1,021	51.7%	1,364	52.1%
Non-LI Block Groups	298	46.5%	955	48.3%	1,253	47.9%
LEP Block Groups	267	66.4%	838	42.4%	1,105	42.2%
Non-LEP Block Groups	374	33.6%	1,138	57.6%	1,512	57.7%
Total	641	100.0%	1,976	100.0%	2,617	100.0%

Figure 14: PSTA Title VI Program Statement Socio-economic Route Breakdown

Route Number	Route Name	Minority Area Served	Low Income Area Served	Peak Headway	Meets 60-minute Peak Hour Headway Goal
1	Florida Avenue Corridor	Yes	Yes	30	Yes
3	Lakeland Hills Corridor	Yes	Yes	30	Yes
4X	Lakeland Park Center Express	Yes	Yes	60	Yes
10	Circulator	Yes	Yes	60	Yes
12	Lakeland/Winter Haven	Yes	Yes	60	Yes
14	Combee / Edgewood	Yes	Yes	60	Yes
15	Kathleen / Providence / Harden	Yes	Yes	60	Yes
15	Winter Haven / Haines City	Yes	Yes	90	No
22XL	Bartow Express to Lakeland	Yes	Yes	90	No
22XW	Winter Haven / Bartow	Yes	Yes	90	No
25	Bartow / Fort Meade	Yes	Yes	90	No
27X	Dundee / Eagle Ridge Mall	Yes	No	N/A	N/A
30	Legoland	Yes	Yes	90	No
33	South Florida / Carter Rd. Flex	Yes	No	60	Yes
35	Bartow / Lake Wales / Babson Park / Frostproof	Yes	Yes	120	No
39	Bradley	Yes	No	300	No
40/44	Winter Haven Southside	Yes	Yes	90	No
45	George Jenkins / Swindell	Yes	Yes	60	Yes
46	10 th / Wabash / Ariana	Yes	Yes	60	Yes
47	Duff Rd. Shuttle	Yes	Yes	60	Yes
50	Auburndale	Yes	Yes	90	No
58	College Connector	Yes	Yes	60	Yes
58X	Airside Express	No	No	15	Yes
SS	Smart Shuttle	Yes	Yes	60	Yes
Total Routes		24	23		14
Percentage		96%	84%		
% Minority Routes Meeting Goal					57%
% Low Income Routes Meeting Goal					60%

Reproduced from PSTA TDP.

The majority of Title IV Statements acknowledged burdens associated with LI communities and encouraged transit systems to expand their services to transportation disadvantaged (TD) communities. Nonetheless, the language included in most of these statements is generalized. It typically does not provide a definitive plan for mitigating mobility burdens on LI communities because it is not listed as a requirement for Title VI Program Statements.

Transit Development Plans

TDPs are a requirement of transit agencies in Florida to receive state funding, and they also define public transit needs within a particular service area. Most TDPs also include demographic and socio-economic information related to existing transit services, which helps define transit gaps and opportunities, especially for transit-dependent populations.⁶⁸

The document reviews included assessments for the requirements under each of the following categories:

- Baseline Conditions
- Transit Demand Assessment
- Alternatives Development & Evaluation

Each TDP checklist also notes whether a transit agency conducted assessments that went beyond the minimum requirements. For example, Sarasota County Area Transit (SCAT) included United Way's Asset Limited, Income Constrained, and Employed (ALICE) metric as part of their assessment. Additionally, PSTA included information on transit services to schools, as well as medical and social services. Similarly, LYNX's TDP highlights medical facilities, government services, and social services in their assessment (Figure 15 and Figure 16). Citrus Connection provided maps showing transit access to specific land uses, and they also showed education centers, medical centers, and institutional centers. These examples help the audience understand what amenities are located near transit services as well as potential gaps in the service.

High & Middle Schools

The Pinellas County School District has over 100,000 K-12 students enrolled across 141 schools located around the County as of the 2012-13 academic year. Although the School Board provides transportation, it is limited for students enrolled in charter schools and magnet programs. PSTA offers a discounted fare to students. As such, some high school and middle school students use public transit to get to and from school.

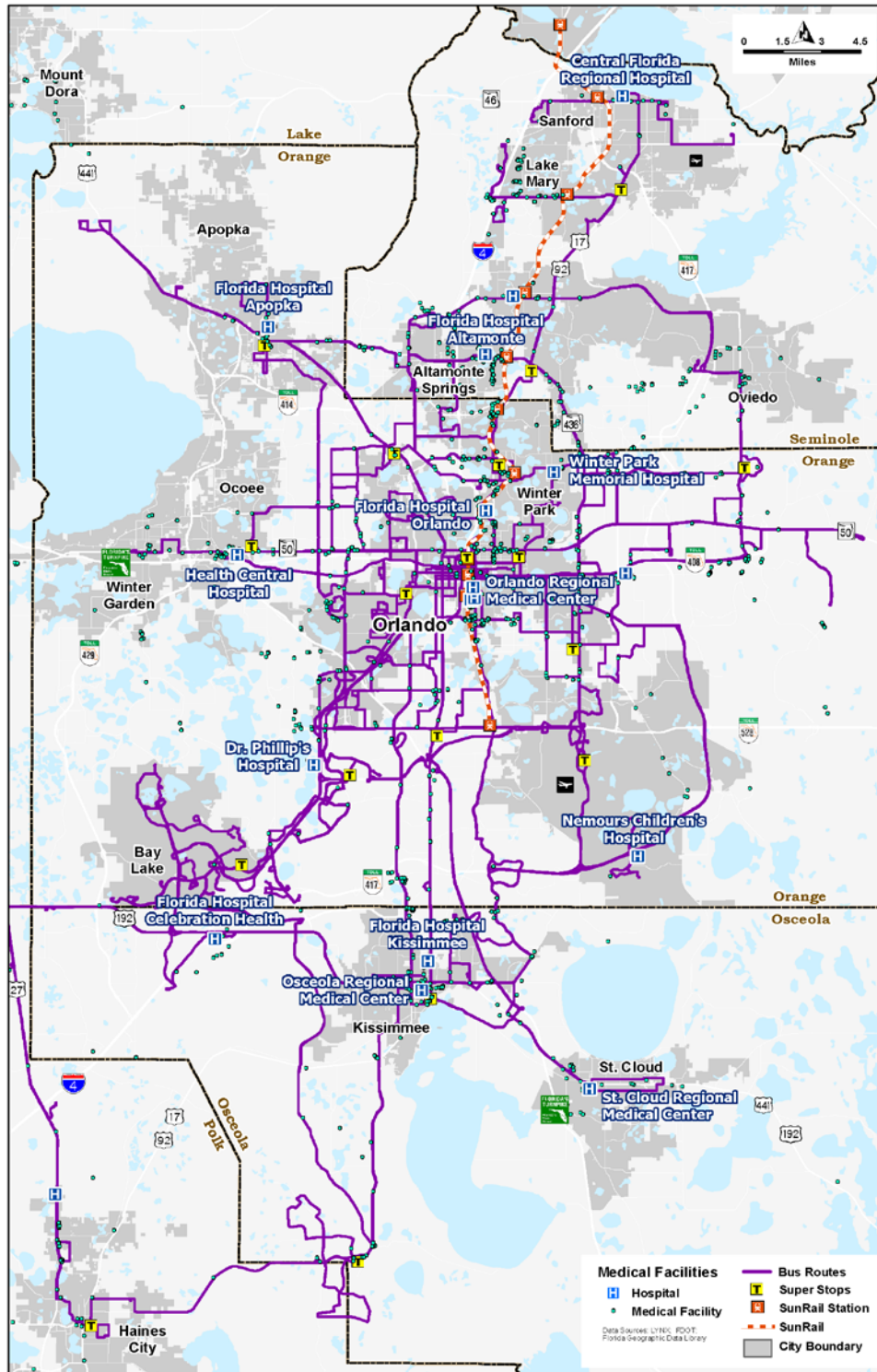
PSTA TDP Major Update

The reviewed TDPs exemplify best practices used by transit agencies, as well as many assessments summarizing observations and characteristics of the communities within service areas. Many TDPs discuss general aspects of LI areas and transportation disadvantaged communities, but the TDPs do not include specific summaries of these communities since it is not a requirement. Transit agencies might be more likely to include reviews about TD communities if it was encouraged for future assessments.

⁶⁸ https://fdotwww.blob.core.windows.net/sitefinity/docs/default-source/transit/documents/2018-tdp-handbookv2-final-final.pdf?sfvrsn=d91e1be4_2

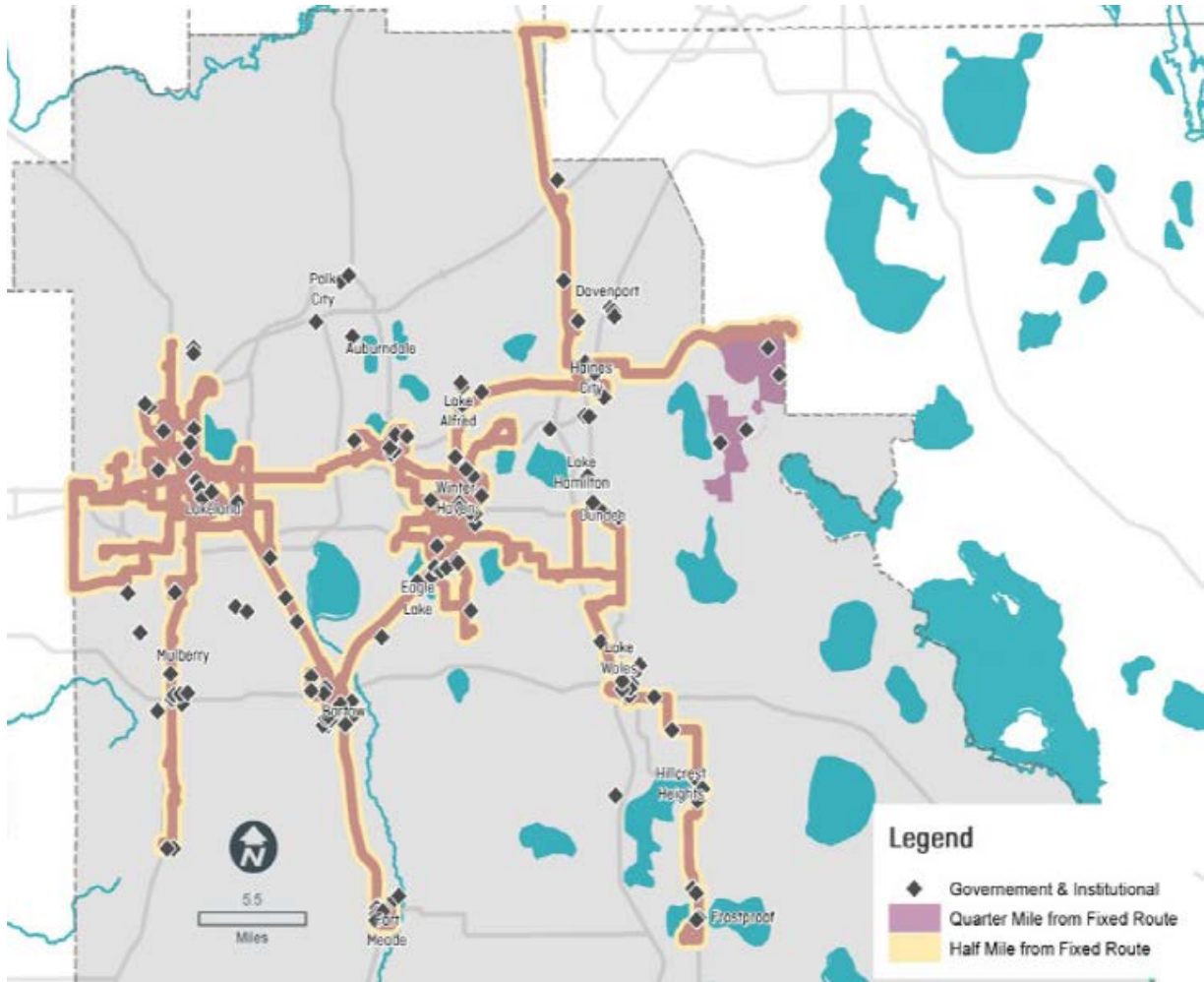
Figure 15: LYNX TDP map showing medical facilities

Figure 3-26 - Medical Facilities



Reproduced from LYNX TDP

Figure 16: LYNX TDP map showing governmental facilities



Reproduced from LYNX TDP

Transit System Performance Review (TSPR)

Goal 1: Market Area

This portion of the analysis situates each transit system in its geography by determining market area totals for each socioeconomic variable for all 17 transit systems. Table 8 displays results for each socio-economic variable, and is sorted by population size.

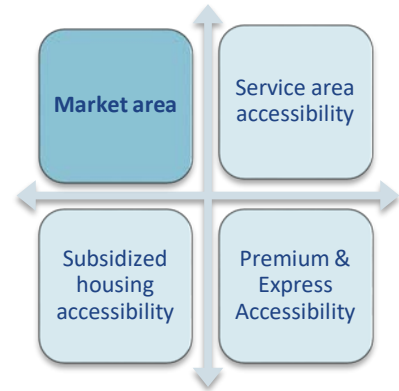
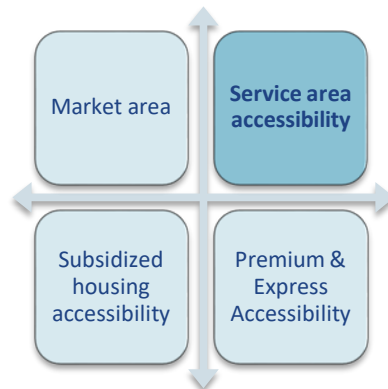


Table 8: Market Area Subtotals for Each Socio-Economic Variable, Projected 2019 Data from TBEST

MSA	Transit System	Market area totals						
		Population	Households	0-vehicle households	Poverty population	Total employment	Services	Median HH income
Miami-Dade	Tri-Rail	6,019,735	2,077,691	176,203	976,375	2,610,203	1,808,624	\$63,581.00
Miami-Dade	MDT	2,702,574	858,281	92,279	518,123	1,166,770	822,991	\$53,702.00
Orlando-Kissimmee	LYNX	2,064,622	709,574	39,726	326,972	1,087,784	794,986	\$58,487.00
Orlando-Kissimmee	Sunrail	2,064,622	709,574	39,726	326,972	1,087,784	794,986	\$58,487.00
Miami-Dade	BCT	1,890,400	675,823	49,134	265,639	823,754	534,507	\$63,581.00
Miami-Dade	PalmTran	1,426,761	543,587	34,790	192,613	619,679	451,126	\$66,600.00
Tampa-St. Petersburg	HART	1,351,076	505,841	35,267	216,354	698,338	492,283	\$61,336.00
Tampa-St. Petersburg	PSTA	949,833	406,867	33,516	130,541	435,825	292,623	\$53,784.00
Jacksonville	JTA	912,037	347,780	28,253	147,298	520,734	368,992	\$56,056.00
Cape Coral-Ft. Myers	LeeTran	700,154	264,320	12,867	104,649	256,397	173,416	\$54,858.00
Lakeland-Winter Haven	CitrusCon.	652,249	226,602	14,005	113,562	219,391	146,106	\$49,057.00
Palm Bay-Melbourne	Space-CAT	568,178	227,222	12,733	76,227	211,296	147,545	\$55,721.00
Deltona-Daytona Beach	Votran	518,655	209,883	12,635	84,058	174,115	123,808	\$46,782.00
Sarasota-Bradenton	SCAT	404,836	177,997	9,610	42,890	174,783	125,078	\$58,726.00
Sarasota-Bradenton	MCAT	363,538	140,254	6,717	48,890	120,798	74,986	\$58,528.00
Cape Coral-Ft. Myers	CAT	356,771	138,131	7,188	45,832	145,512	98,793	\$65,326.00
Pensacola	ECAT	309,922	117,836	6,932	45,352	146,678	105,031	\$50,398.00

Goal 2: Transit System Accessibility

This goal shows the accessible service area for each transit system. This is subset of the market area in which true transit access is provided; it is similar to the service area but slightly smaller because it includes walk distances. Table 9 displays the results for the second phase of the analysis.



Population

At the 50th percentile, the transit systems provide access to 41.5 percent of the market area population and 42.3 percent of households. The highest performing systems are MDT, Broward County Transit (BCT), SCAT, and PSTA, which serve urbanized areas. CitrusConnection and LeeTran, systems serving some of the most dispersed and suburbanized provide the smallest amount of accessibility to their market area, being the only two non-rail systems to fall under the 25th percentile for both households and population.

On average, the smallest bus-based systems (ECAT, MCAT, SCAT, CitrusConnection, LeeTran, and JTA) provide access to 38.7 percent of their population; the largest bus-based systems (MDT, LYNX, PalmTran, HART, and PSTA) provide, on average, access to 52.9 percent of their market

population. Rail-based systems provide very little accessibility to population and households, both falling under 2.5 percent.

Table 9: Total Accessible Service Area Totals, Projected 2019 Data from TBEST

Transit System	Market area pop.	Population	Households	0-vehicle households	Poverty population	Total employment	Services	Median Income Change
Tri-Rail	6,831,818	2.3%	2.6%	2.9%	2.6%	9.0%	9.6%	-\$2,877
MDT	2,702,574	72.7%	75.4%	88.3%	79.6%	78.0%	80.3%	-\$62
LYNX	2,064,622	35.2%	36.9%	54.7%	45.3%	61.1%	62.9%	-\$36
Sunrail	2,064,622	1.4%	1.6%	3.4%	1.6%	12.5%	15.7%	\$2,674
BCT	1,890,400	57.2%	59.5%	73.1%	69.0%	83.5%	93.7%	\$429
PalmTran	1,426,761	44.1%	43.3%	59.1%	60.4%	62.7%	64.6%	\$9
HART	1,351,076	46.5%	48.8%	76.0%	67.5%	73.8%	76.9%	-\$3,473
PSTA	949,833	61.1%	62.1%	74.6%	71.4%	84.9%	85.6%	\$34
JTA	912,037	40.9%	42.5%	61.8%	53.4%	65.9%	69.3%	-\$22
LeeTran	700,154	30.3%	30.5%	46.2%	38.4%	59.6%	62.7%	\$7
CitrusCon	652,249	27.9%	28.3%	46.0%	37.0%	58.8%	63.4%	\$10
SCAT	404,836	50.7%	51.1%	64.0%	63.2%	80.2%	81.8%	\$283
MCAT	363,538	42.1%	42.1%	66.0%	60.8%	65.0%	68.5%	\$184
ECAT	309,922	40.6%	41.7%	62.7%	53.5%	69.1%	72.9%	-\$39
25th Percentile		31.5%	32.1%	48.3%	40.1%	59.9%	63.0%	-\$227.73
50th Percentile		41.5%	42.3%	62.2%	56.9%	65.4%	68.9%	-\$29.06
75th Percentile		49.6%	50.5%	71.3%	66.4%	77.0%	79.5%	-\$9.79
Mean		39.5%	40.4%	55.6%	50.3%	61.7%	64.8%	-\$307.36
<i>*Space-CAT, Votran, and CAT models experienced problems preventing a model run.</i>								
Larger systems: PSTA, HART, PalmTran, BCT, Lynx, MDT		52.8%	54.3%	71.0%	65.5%	74.0%	77.3%	-\$659.50
Smaller systems: ECAT, MCAT, SCAT, LeeTran, JTA		38.7%	39.3%	57.8%	51.0%	66.4%	69.8%	-\$23.83
Rail: Tri-Rail, Sunrail		1.8%	2.1%	3.2%	2.1%	10.7%	12.7%	-\$101.50

Zero-Vehicle Households

Transit systems do better capturing zero-vehicle households than the overall market households. At the 50th percentile, the transit systems under study provided access to 62.22 percent of their zero-vehicle households. On average, the larger bus-based systems provide access to nearly 70 percent of their zero-vehicle households. The smaller systems, provide, on average, accessibility to 58 percent of their population. Rail-based systems provide an average accessibility of about 3 percent to zero-vehicle households.

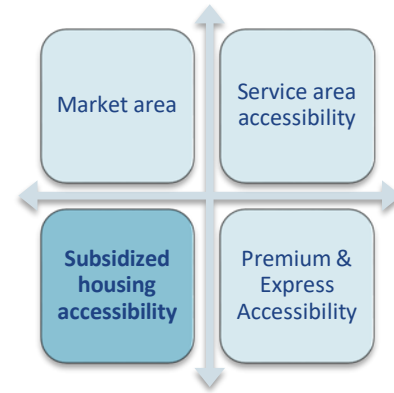
Both small and large transit systems provide better accessibility to zero-vehicle households than to households in general by nearly 20 percent.

Jobs and Services

Jobs and services are well-served by transit system wide. At the 25th percentile, transit systems provide access to 59.94 percent of service area jobs, and at the 75th percentile, they provide access to 76.96 percent of jobs. BCT and PSTA are the highest-performing systems; CitrusConnection and LeeTran are the lowest (apart from the rail-only systems). On average, the larger, bus-based systems provide access to nearly 72.8 percent of jobs. The smaller systems provide, on average, accessibility to 66.4 percent jobs. Rail-based systems provide an average of 11 percent accessibility to jobs.

Median Income and Poverty Population

Transit systems do better capturing poverty population than the overall population. The most substantial variation from the median occurs for the rail-based services, but SunRail and Tri-Rail move in opposite directions from the median by roughly the same amount. Hillsborough Area Regional Transit Authority (HART) is the only system with a four-figure change, $-\$3,473$. In terms of poverty population, most systems perform very close to the average of 61.72 percent accessible poverty population.



Goal 3: Transit System Accessibility from Subsidized Housing

The third component of the TSPR determines the accessible area of a market area via a transit system with origins from subsidized housing. Table 10 presents the summary results; it largely mirrors Table 6 in terms of proportion and distribution, necessitating Table 11, which shows the *difference* between the two and is probably the most interesting of the three because it reveals the transit systems with the largest gaps between their overall accessible performance and their performance from subsidized housing.

Table 10: Transit System Subsidized Housing Accessibility Performance, AM Peak. 2019 Data Projected from TBEST.

Transit System	Market area pop.	Population	Households	0-vehicle households	Poverty population	Total employment	Services	Median Income Change
Tri-Rail	6,831,818	2.3%	2.6%	2.9%	2.6%	9.0%	9.6%	$-\$2,877$
MDT	2,702,574	72.7%	75.4%	88.3%	79.6%	78.0%	80.3%	$-\$62$
LYNX	2,064,622	35.2%	36.9%	54.7%	45.3%	61.1%	62.9%	$-\$36$
Sunrail	2,064,622	1.4%	1.6%	3.4%	1.6%	12.5%	15.7%	$\$2,674$
BCT	1,890,400	57.2%	59.5%	73.1%	69.0%	83.5%	93.7%	$-\$429$
PalmTran	1,426,761	44.1%	43.3%	59.1%	60.4%	62.7%	64.6%	$\$9$
HART	1,351,076	46.5%	48.8%	76.0%	67.5%	73.8%	76.9%	$-\$3,473$
PSTA	949,833	61.1%	62.1%	74.6%	71.4%	84.9%	85.6%	$\$34$
JTA	912,037	40.9%	42.5%	61.8%	53.4%	65.9%	69.3%	$-\$22$
LeeTran	700,154	30.3%	30.5%	46.2%	38.4%	59.6%	62.7%	$\$7$
CitrusCon	652,249	27.9%	28.3%	46.0%	37.0%	58.8%	63.4%	$\$10$
SCAT	404,836	50.7%	51.1%	64.0%	63.2%	80.2%	81.8%	$-\$283$
MCAT	363,538	42.1%	42.1%	66.0%	60.8%	65.0%	68.5%	$\$184$
ECAT	309,922	40.6%	41.7%	62.7%	53.5%	69.1%	72.9%	$-\$39$
25th Percentile		31.5%	32.1%	48.3%	40.1%	59.9%	63.0%	$-\$227.73$
50th Percentile		41.5%	42.3%	62.2%	56.9%	65.4%	68.9%	$-\$29.00$
75th Percentile		49.6%	50.5%	71.3%	66.4%	77.0%	79.5%	$\$9.75$
Mean		39.5%	40.4%	55.6%	50.3%	61.7%	64.8%	$-\$307.36$
*Space-CAT, Votran, and CAT models experienced problems preventing a model run.								
Larger systems: PSTA, HART, PalmTran, BCT, Lynx, MDT		52.8%	54.3%	71.0%	65.5%	74.0%	77.3%	$-\$659.50$
Smaller systems: ECAT, MCAT, SCAT, LeeTran, JTA		38.7%	39.3%	57.8%	51.0%	66.4%	69.8%	$-\$23.83$
Rail: Tri-Rail, Sunrail		1.8%	2.1%	3.2%	2.1%	10.7%	12.7%	$-\$101.50$

Table 11: Difference Between Subsidized Housing Accessibility Performance and Total System Accessibility Performance, AM Peak. 2019 Data Projected from TBEST

Transit System	Market area pop.	Population	Households	0-vehicle households	Poverty population	Total employment	Services	Median Income
Tri-Rail	6,019,735	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	\$0
MDT	2,702,574	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	\$0
LYNX	2,064,622	2.8%	2.7%	2.9%	3.2%	6.4%	7.1%	\$685
Sunrail	2,064,622	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	\$17
BCT	1,890,400	0.7%	1.0%	1.8%	1.3%	1.7%	2.4%	\$327
PalmTran	1,426,761	2.1%	2.5%	2.5%	1.8%	1.1%	1.6%	\$611
HART	1,351,076	5.0%	5.2%	2.6%	2.8%	5.0%	4.5%	\$2,452
PSTA	949,833	1.1%	1.1%	1.5%	1.6%	3.1%	2.6%	\$71
JTA	912,037	1.3%	1.2%	0.8%	1.1%	1.3%	1.2%	\$366
LeeTran	700,154	6.2%	6.5%	5.9%	6.7%	11.1%	10.8%	\$1,683
SCAT	404,836	14.3%	14.6%	14.9%	16.4%	17.4%	15.6%	\$1,936
MCAT	363,538	1.6%	2.3%	2.1%	1.0%	2.5%	2.5%	\$704
ECAT	309,922	3.8%	3.8%	4.1%	3.9%	2.9%	2.7%	\$767
25th Percentile		0.7%	1.0%	0.8%	1.0%	1.1%	1.2%	\$71
50th Percentile		1.6%	2.3%	2.1%	1.6%	2.5%	2.5%	\$611
75th Percentile		3.8%	3.8%	2.9%	3.2%	5.0%	4.5%	\$767
Mean		3.0%	3.2%	3.0%	3.1%	4.0%	3.9%	\$740
Larger systems: PSTA, HART, PalmTran, BCT, Smaller systems: ECAT, MCAT, SCAT, LeeTran, JTA		1.9%	2.1%	1.9%	1.8%	2.9%	3.0%	\$691.00
Rail: Tri-Rail, Sunrail		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	\$8.50

*SpaceCat, Votran, CAT, and CitrusConnection cannot be differenced

Population & Households

Table 11 reveals that transit systems have substantial gaps between their overall performance and their performance from subsidized housing. At 50th percentile, transit systems reach 36.6 percent of the market area population with origins from subsidized housing areas. This is about 5 percent lower than the system-wide performance. This relationship is similar for households.

The systems with the most substantial subsidized housing gaps for population and household access are SCAT (~-14.4%) and LeeTran (~-6.3%). Tri-Rail and MDT achieve convergence between their subsidized housing performances and their system-wide performance for most metrics; SunRail, Jacksonville Transit Authority (JTA), and PSTA approach convergence.

The largest bus-based systems provided access to 2 percent fewer households and population share from subsidized housing areas, on average. Smaller bus-based systems provided 5.6 percent less access to population and households, on average. Rail systems displayed no difference.

Zero-Vehicle Households

Zero-vehicle households tend to follow population with regard to changes in accessibility. At the 50th percentile, transit systems reach 55.66 percent of market area zero-vehicle households with origins from subsidized housing areas, which is about 7 percent lower than system-wide performance, but still higher than the overall housing performance.

As with population, Tri-Rail and MDT do not differ between their subsidized and overall accessibility performance, and SunRail differs only slightly. Transit systems with the biggest subsidized housing gaps are SCAT (-14.93%) and LeeTran (-5.88%). The largest bus-based systems provided access to 1.8 percent fewer zero-vehicle households from subsidized housing

areas, on average. Smaller bus-based systems provided 5.8 percent less access to zero-vehicle households, on average. Rail systems displayed no difference.

Jobs and Services

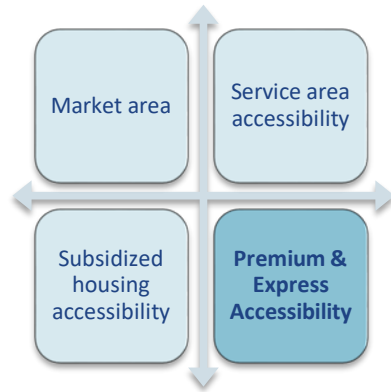
Transit systems experience more attrition among job and service accessibility than for population and households. At the 50th percentile, subsidized housing accessibility to jobs and services is about 3 percent less than that for the system-wide accessibility. The largest, bus-based systems provided access to 3 percent fewer services from subsidized housing areas. Smaller, bus-based systems provided access to 6.6 percent fewer services from subsidized housing areas. Rail systems displayed no difference.

Median Income and Poverty Population

Median income tends to be around \$1,000 lower in Goal 3. HART displays the most substantial gap, despite not being particularly varied in other metrics, which may be a future avenue of investigation.

Goal 4: Premium Transit Accessibility

The final part of the TSPR measures how premium and express transit performs system wide and how it performs from subsidized housing origins. As stated in the methodology, premium transit is defined here to encompass BRT, limited-stop, rail, and express routes. While these technologies have different intents and rarely are explicitly defined to service subsidized housing, determining their relationship to subsidized housing is nevertheless interesting because this mode is considerably more likely to draw ridership.



All of the systems analyzed for Goal 4 must have at least one premium or express route.

Overall Performance

Table 12 presents the accessible area from the system via premium routes. As reflected in the table, it is clear that MDT and PSTA are responsible for most variation.

Population

The 50th percentile statistic for population and households is about 5 percent, indicating that premium transit systems are accessible to 5 percent of population and households via premium transit. The strongest performer is MDT, which is served by its Metrorail system and a variety of express bus services. PSTA also has a variety of premium bus offerings that appear well-tailored to its geography. Smaller systems provide accessibility to about 3.4 percent of households and population (on average), whereas the larger systems are near 11 percent (on average).

Zero-Vehicle Households

As with population and households, MDT and PSTA offer the best performance to zero-vehicle households, surpassing the 75th percentile. Larger systems serve 13.7 percent of their zero-vehicle households via premium transit (on average), whereas smaller systems serve about 3.9 percent of their zero-vehicle households via premium transit.

Table 12: Premium Performance Service Area Accessibility, AM Peak. 2019 Projected Data from TBEST

Transit System	Market area pop.	Population	Households	0-vehicle households	Poverty population	Total employment	Services	Median Income
Tri-Rail	6,019,735	2.3%	2.6%	2.2%	2.6%	9.0%	9.6%	\$2,877
MDT	2,702,574	27.1%	29.8%	41.8%	29.3%	39.4%	42.5%	-\$8,680
LYNX	2,064,622	2.2%	2.1%	2.6%	3.3%	8.5%	10.4%	-\$5,647
Sunrail	2,064,622	1.4%	1.6%	3.4%	1.6%	12.5%	15.7%	-\$6,761
BCT	1,890,400	5.9%	6.2%	0.9%	8.6%	22.1%	27.8%	-\$15,629
HART	1,426,761	4.8%	5.6%	4.5%	4.4%	12.6%	15.2%	\$68
PSTA	1,351,076	12.7%	13.6%	19.0%	15.7%	28.1%	31.5%	-\$5,680
JTA	949,833	4.9%	5.3%	3.5%	5.2%	19.5%	22.8%	-\$3,712
CitrusConnec	912,037	1.1%	1.1%	1.5%	1.3%	8.0%	9.8%	-\$7,063
MCAT	700,154	5.2%	5.2%	7.5%	6.4%	14.4%	18.8%	-\$6,703
CAT	404,836	2.1%	2.3%	3.0%	3.2%	3.6%	3.8%	-\$8,355
25th Percentile		2.13%	2.16%	2.41%	2.89%	8.74%	10.06%	-\$7,709.00
50th Percentile		4.80%	5.19%	3.43%	4.35%	12.62%	15.68%	-\$6,703.00
75th Percentile		5.56%	5.87%	5.97%	7.52%	20.82%	25.27%	-\$4,679.50
Mean		6.33%	6.84%	8.17%	7.41%	16.16%	18.89%	-\$5,935.00
Larger systems: PSTA, HART, PalmTran, BCT, Lynx, MDT		10.5%	11.4%	13.7%	12.2%	22.2%	25.5%	-\$6,547
Smaller systems: ECAT, MCAT, SCAT, LeeTran,		3.3%	3.5%	3.9%	4.0%	11.4%	13.8%	-\$6,458
Rail: Tri-Rail, Sunrail		1.8%	2.1%	2.8%	2.1%	10.7%	12.7%	-\$1,942

Jobs and services

Premium offerings do much better with regard to serving jobs and services, as anticipated, with the 50th percentile of access at 11.49 percent. Services and jobs perform well with smaller systems, performing roughly half that of larger systems. As before, PSTA and MDT perform the strongest but with interesting strong performers, MCAT, JTA, and SunRail. The weakest performer is CAT, which only runs a single express route serving the beach.

Goal 4.1: Premium Transit Accessibility from Subsidized Housing

Table 13 describes the accessible area via premium routes with origin zones from subsidized housing. Table 14 presents the differences between the two to quickly reveal which have the biggest gap in performance.

*Table 13: Accessibility to Service Area via Premium Transit from Subsidized Housing, AM Peak, 2019
Projected Data from TBEST*

Transit System	Market area pop.	Population	Households	0-vehicle households	Poverty population	Total employment	Services	Median Income
Tri-Rail	6,019,735	1.6%	1.8%	2.2%	2.1%	5.6%	6.5%	-\$1,888
MDT	2,702,574	25.3%	28.1%	41.8%	29.0%	37.9%	40.8%	-\$8,833
LYNX	2,064,622	0.6%	1.0%	2.6%	1.2%	5.8%	7.4%	-\$11,092
Sunrail	2,064,622	1.3%	1.6%	3.4%	1.6%	12.5%	15.7%	-\$6,778
BCT	1,890,400	0.6%	0.7%	0.9%	0.8%	4.4%	6.2%	-\$9,044
HART	1,426,761	3.3%	3.8%	4.5%	2.8%	10.3%	12.6%	-\$2,283
PSTA	1,351,076	10.7%	11.3%	19.0%	14.4%	22.7%	25.8%	-\$5,680
JTA	949,833	1.5%	1.7%	3.5%	2.6%	8.8%	11.5%	-\$20,419
CitrusConnec	912,037	1.1%	1.1%	1.5%	1.3%	8.0%	9.8%	-\$7,063
MCAT	700,154	5.2%	5.2%	7.5%	6.4%	14.4%	18.8%	-\$6,703
CAT	404,836	2.1%	2.3%	3.0%	3.2%	3.6%	3.8%	-\$8,355
25th Percentile		1.23%	1.35%	2.41%	1.42%	5.71%	6.93%	-\$8,938.50
50th Percentile		1.59%	1.78%	3.43%	2.62%	8.80%	11.49%	-\$7,063.00
75th Percentile		4.24%	4.48%	5.97%	4.83%	13.45%	17.24%	-\$6,191.50
Mean		4.85%	5.32%	8.17%	5.94%	12.18%	14.45%	-\$8,012.55
Larger systems: PSTA, HART, PalmTran, BCT, Lynx, MDT		8.1%	9.0%	13.7%	9.6%	16.2%	18.6%	-\$9,559
Smaller systems: ECAT, MCAT, SCAT, LeeTran, JTA		2.5%	2.6%	3.9%	3.4%	8.7%	11.0%	-\$10,635
Rail: Tri-Rail, Sunrail		1.5%	1.7%	2.8%	1.8%	9.1%	11.1%	-\$4,333

Nearly all systems provide less accessibility from subsidized housing areas via premium transit, but this relationship does not seem to be related to size. Perhaps counterintuitively, larger systems perform worse than smaller systems in this regard. The most likely explanation for this neutrality is that enough subsidized housing surrounds the few routes these systems have to allow for equal accessibility. For larger systems with more dispersed premium offerings, they are more subject to subsidized housing distributions. Therefore, the larger systems category is probably more revealing in terms of route planning.

Table 14: Premium Accessibility Differences between System and Subsidized Housing Areas, AM Peak, 2019 Projected Data from TBEST

Transit System	Market area pop.	Population	Households	0-vehicle households	Poverty population	Total employment	Services	Median Income
Tri-Rail	6,019,735	-0.7%	-0.8%	0.0%	-0.5%	-3.3%	-3.2%	-\$4,765.00
MDT	2,702,574	-1.9%	-1.7%	0.0%	-0.2%	-1.6%	-1.7%	-\$153.00
LYNX	2,064,622	-1.6%	-1.1%	0.0%	-2.1%	-2.7%	-3.0%	-\$5,445.00
Sunrail	2,064,622	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-\$17.00
BCT	1,890,400	-5.4%	-5.5%	0.0%	-7.8%	-17.7%	-21.6%	\$6,585.00
HART	1,426,761	-1.5%	-1.8%	0.0%	-1.6%	-2.3%	-2.6%	-\$2,351.00
PSTA	1,351,076	-1.9%	-2.3%	0.0%	-1.3%	-5.4%	-5.7%	\$0.00
JTA	949,833	-3.3%	-3.6%	0.0%	-2.6%	-10.7%	-11.3%	-\$16,707.00
CitrusConnec	912,037	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	\$0.00
MCAT	700,154	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	\$0.00
CAT	404,836	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	\$0.00
25th Percentile		-1.91%	-2.06%	0.00%	-1.83%	-4.37%	-4.42%	-\$3,558.00
50th Percentile		-1.51%	-1.09%	0.00%	-0.52%	-2.34%	-2.60%	-\$17.00
75th Percentile		-0.02%	-0.01%	0.00%	-0.02%	-0.02%	0.00%	\$0.00
Mean		-1.48%	-1.52%	0.00%	-1.47%	-3.98%	-4.45%	-\$2,077.55
Larger systems: PSTA, HART, PalmTran, BCT, Lynx, MDT		-2.4%	-2.5%	0.0%	-2.6%	-5.9%	-6.9%	-\$3,012
Smaller systems: ECAT, MCAT, SCAT, LeeTran, JTA		-0.8%	-0.9%	0.0%	-0.7%	-2.7%	-2.8%	-\$4,177
Rail: Tri-Rail, Sunrail		-0.4%	-0.4%	0.0%	-0.3%	-1.7%	-1.6%	-\$2,391

Population and Households

On average, transit systems provide ~1.49 percent lower accessibility to jobs and households via premium transit from subsidized housing areas. Larger systems tend to far worse, on average (-2.4%) compared to small systems (-0.8%). This is due to the fact that smaller systems have no variation between analyses. The only rail-based system with reduced performance for population and households is Tri-Rail, performing ~0.75 percent lower from subsidized housing areas, on average.

Zero-Vehicle Households

One oddity of the analysis is that premium route performance with regard to zero-vehicle households is clearly inaccurate for this analysis, finding equal performance for Table 8 and Table 9. Given the variation in other categories, we are highly skeptical of this result.

Jobs and Services

While premium service works better to provide access to employment and services, gains in this regard are somewhat attenuated when originating from subsidized housing areas. BCT in particular, suffers with a reduction of ~20 percent, and JTA suffers with a reduction of nearly ~11 percent. MDT, LYNX, Tri-Rail, HART, and PSTA still provide above-average service from subsidized housing.

Post-Analysis Notes

- The researchers performed an analysis of night service and indicated results nearly without variation from AM Peak. We believe this may be a limitation of our methodology rather than an indication that night service provides equal accessibility to the AM Peak. The service period function in TBEST works to provide data on route efficiency (such as headway time, passenger miles, etc.), rather than socio-demographic service shed.
- Result oddities with zero-vehicle households make interpretation impossible for this variable in Goal 4.

Image from Visit Tampa Bay.



Transit Agency & PHA Survey

Transit Agencies

The SurveyMonkey link was transmitted via email to the transit agencies in the 10 largest MSAs in Florida, the 10 largest transit agencies in the US, and the 10 “most innovative” transit agencies across the nation (see Table 15 below). Of the 30 survey requests sent out, the team received 13 responses (43% response rate) with five responses from transit agencies in Florida, and seven from transit agencies outside of Florida. The size of the agencies were from 9 million unlinked passenger trips to 126 million unlinked passenger trips.

Table 15: Transit Agencies Surveyed

Transit Agencies in the Largest MSAs in Florida
Miami-Dade Transit (MDT), Broward County Transit (BCT), PalmTran
Hillsborough Area Regional Transit Authority (HART), Pinellas Suncoast Transit Authority (PSTA)
LYNX (Orlando area)
Jacksonville Transit Authority (JTA)
Sarasota County Area Transit (SCAT), Manatee County Area Transit (MCAT)
LeeTran (Fort Myers area)
CitrusConnection (Lakeland area)
Votran (Daytona Beach area)
ECAT (Pensacola area)
10 Largest Transit Agencies in the US
MTA (New York City Transit Authority)
Chicago Area Transit (CTA)
Los Angeles County Metropolitan Transportation Authority (LACMTA)
Massachusetts Bay Transportation Authority (MBTA)
Washington Metro Area Transit Authority (WMATA)
Southeastern Pennsylvania Transportation Authority (SEPTA)
New Jersey Transit Corporation (NJ Transit)
San Francisco Municipal Railway (MUNI)
San Francisco Bay Area Rapid Transit (BART)
King County Metro - King County DOT

10 “Most Innovative” Transit Agencies in the US
Port Authority of Allegheny County, Pittsburgh, PA
TriMet, Portland, OR
Metro Transit, Minneapolis- St. Paul, MN
Madison Metro, Madison WI
RTD - Regional Transportation District, Denver, CO
The Bus, Honolulu, HI
MTA Maryland Transit Administration, Baltimore, MD
UTA – Salt Lake City, Salt Lake City, UT
Orange County Transportation Authority, Santa Ana, CA
Greater Richmond Transit Company, Richmond, VA

The transit agency results demonstrated that transit agencies are involved with PHAs and aware of the need for transit access to low-income communities. Key takeaways include the following:

- Major Service Change thresholds are generally adding or eliminating >20 percent of daily route/system revenue miles.
- Major Service Changes warrant a wide array of public involvement tools including:
 - Presentation of route changes to a Citizens'/Transit Advisory Committee
 - Holding one or more public workshops to discuss the route changes
 - Online Polling and/or use of Social Media
 - Meeting with customers of the affected route(s)
 - Governing Board Action with a public comment period
 - Customer surveys
 - Posting information at affected stops
- Transit agencies prioritize population density and access to employment when proposing new routes or service areas; however, access to low-income communities and social services are considered by most.
- Transit agencies engage with public housing authorities during the planning process.
- When planning for capital investments such as transit stations and amenities, low income individuals are considered.
- Most agencies have free or reduced fare for members of special groups, such as homeless, veterans, or K-12 students and guaranteed ride home programs for regular riders.

Public Housing Authorities

The project team reached out to 11 certified PHAs in the largest MSAs (see Table 16) in Florida to schedule phone interviews to discuss their outreach and coordination efforts with transit agencies in the area. The phone interviews were held during the same timeframe as the transit agency SurveyMonkey window. While the team was only successful in reaching three PHAs, the

responses were consistent which led the research team to draw conclusions on the interactions with PHAs and transit agencies.

Table 16: Public Housing Authorities Surveyed

Certified Public Housing Authorities in the Largest MSAs in Florida
Miami-Dade County Public Housing and Community Development, Broward County Housing Authority, Palm Beach County Housing Authority
Tampa Housing Authority, Pinellas County Housing Authority
Orlando Housing Authority
Jacksonville Housing Authority
Sarasota Housing Authority, Manatee County Housing Authority
Lee County Housing Authority
Lakeland Housing Authority
Daytona Beach Housing Authority
Pensacola Housing Department

Key takeaways from the PHA phone-based interviews are as follows:

- PHAs are engaged with transit agencies in their corresponding service areas to ensure there is access to bus stop(s) within walking distance of low-income housing.
- Transit agencies do work with PHAs to provide a reduced fair for their residents.
- PHAs encourage use of transit through training and assistance to their residents in mapping their routes and using the transit system, as well as providing free passes when available.
- HUD documents are generally not referenced because they are not specific and PHAs are more successful conducting their own research to determine what and where the needs are in their communities.

Lessons Learned

After completing the three methodologies and reviewing the most important and intriguing results, certain items stick out as important to reiterate going forward in future research in the subsequent study areas.

The PDR review showed that certain TDPs contain excellent cases of best practices, notably plotting key services in an area along with key transit routes, and assessing amenity distributions for TD communities. Summaries of TD communities and their relationship to transit is an area that the FDOT TDP handbook can recommend statewide.

Perhaps unsurprisingly, the TSPR showed that larger systems in highly-urbanized areas with a multitude of premium transportation options tend to perform best across all metrics. This was largely confirmed through the PDR; for instance, PSTA was noted as having forward-thinking planning documents and also scored well in most TSPR metrics; this implies that stronger

affordable housing, LI, and minority initiatives during the planning process can have positive effects on a transit system's ultimate accessibility performance.

Subsidized housing is not well-matched to the transit system alignments for most systems, and particularly smaller systems, despite findings during the Survey methodology finding (in a limited sample) that PHAs tend to indicate they work with transit agencies to ensure good service.

The TSPR also revealed that Floridian transit agencies are best at providing access to jobs and services system wide (Goal 2), but given that transit systems do not perform nearly as well with regard to accessing population and households, it may be for naught in terms of reducing the need for an automobile.

The main purpose of this study area is to quantitatively and qualitatively estimate how transit operates in Florida; the three methodologies revealed current and best-practices with regard to long-range planning, typical and exceptional transit performance from subsidized housing, and transit agency dynamics with PHAs. This information serves as a foundation for the next sections, which may investigate questions relating to:

- Quantifying the number affordable housing units with access to transit;
- The effect of long-range planning engagement efforts for LI and affordable housing communities on actual transit route change updates;
- The effectiveness of transit route changes on providing better access for affordable housing;
- The effectiveness of different premium transit strategies on providing access for affordable housing;
- Clear research on solutions to the coverage versus frequency puzzle with regard to providing access for workforce housing and affordable housing communities; and
- The identification of generalizable areas where transit propensity is high, affordable housing exists or is possible, and premium transit modes can provide service to jobs and services.

Public transit is critical for promoting healthy and equitable transportation outcomes in Florida. While most people in Florida drive, better transit in Florida can improve performance for those without access to a car or who wish to forgo one.

Phase III: Transit System Redesign Case Studies



Transit System Redesign Case Studies

With increasing transit budgets, challenges in diversifying revenue sources, and changing commuter travel behavior, transit agencies are conducting major route redesigns to address system performance and to attract new riders. Thirteen agencies in the United States identified in the literature have completed a major system redesign, either implementing the change all at once or in a phased approach⁶⁹. Many of those who have completed these route redesigns have experienced varying degrees of success. Real success, however, is commonly framed by increased ridership and improved system performance measures. It does not necessarily look at the impact on specific population groups, such as affordable housing communities and low income individuals as defined by this study. Therefore, this phase specifically examines how the route redesigns affected accessibility to key destinations and services for those living in affordable housing communities or those who are rent-burdened. The goal is to establish whether these route redesigns improved access sufficiently that a personal automobile is not needed, allowing for the savings associated with not owning/operating a car to contribute towards the overall household budget.

Redesigns are a moment in time where the decision making processes are usually very well documented. Reviewing these processes will reveal how and why decisions were made with regard to the logistics of route design, frequency, and access to low-income (LI) and affordable housing. Key to this analysis is understanding if and how the system redesign actually improved access for affordable housing communities and low-income individuals; a geographic information system (GIS)-based analysis is used to quantify access for the cases before and after their redesigns.

Of the different agencies that conducted a major transit redesign, five were selected for the purposes of this phase. The five vary in size, ridership, governance, and relative success of their route redesigns. The selected transit agencies with the year of their route redesign are:

- Central Ohio Transit Agency (Columbus, Ohio) – Route redesign completed in 2017;
- PalmTran (Palm Beach County, Florida) – Route redesign completed in 2017;
- Jacksonville Transportation Authority (Jacksonville, Florida) – Route redesign completed in 2014;
- StarMetro (Tallahassee, Florida) – Route redesign completed in 2011; and
- LYNX (Orange, Osceola, and Seminole Counties, Florida) – Route redesign planning study completed in 2018.

Through studying how these different agencies undertook, implemented, and assessed their route redesigns, lessons can be gained on how an effective transit system can decrease the transportation costs of those living in these communities.

⁶⁹ TRB Report

Approach & Methodology

Approach: Why Redesigns?

A major route redesign is a single event in a transit agency's history that occurs at a specific point in time, resulting in significant changes to transit service throughout a service area. System redesigns are long, well-documented processes. They typically consist of significant public engagement, GIS-based analyses, policy development, and an implementation schedule that culminates in a final report with governing board approval. When compared to a major service change or a periodic route change, analyzing a major route redesign allows for more controlled variables and analysis of every affordable housing community at the same time. This makes the before and after analysis of the route redesign consistent and focused on specific measures. Evaluating redesigns is an excellent point to understand before- and after- changes in access for affordable housing in particular.

Before & After Access Analysis

Accessibility is the ability to get to where you want to go. Because not everyone is either coming from or going to the same place, transit networks have to distribute their origins and destinations across their geography. This GIS methodology evaluates how network changes affected access to a variety of variables pertaining to affordability through analysis of each transit system's redesign shortly before and shortly after their redesign.

But who are the *customers*? Most existing customers are likely to be "dependent" riders, but transit agencies often look to "choice" riders to bolster ridership and prestige, and tailor their redesign to have some mix of both. Choice riders are more likely to value frequency than coverage. Coverage, on the other hand, is a necessity for those who are transit dependent since they need the system to take them where they need to go. Affordable housing clearly cross-cuts both of these groups since most people already spend beyond the safe limit on housing.

Certain previous studies use point-to-shed analyses for measuring access. These work by showing whether transit access got better or got worse from one or more points within a geography. One can use any combination of qualifiers to determine *better* and *worse*: frequency, span, ease of use, etc. By measuring from one or multiple points, one can confidently say that accessibility for this neighborhood improved or declined following a network redesign.

Those designs are in contrast to a total network analysis-based assessment. In this assessment, the entire transit network (the area immediately surrounding bus stops) is contrasted with their before- and after-redesign scenarios. The **con** of this analysis is that it does not account for the multitude of variables possible with the point-to-polygon design described above, including frequency. The **pro** of this analysis is that it covers the entire network and will capture the system span which is more important for dependent / low-income riders. For the analysis to be complete, additional measures are necessary and are undertaken as part of the case-study design presented in the results section.

There are shortcomings inherent with this type of analysis and some caution should be exercised in interpretation: higher or lower results should not be considered good or bad on their face. Having a lower number of retail businesses included in the service shed may appear negative,

but the rest of the case study may show that access to key jobs and services was improved because frequency was improved to a popular shopping center or other major destination.

Tools & Steps

ArcGIS Pro and the Arc Network Analyst were employed for their general ease of use and level of mapping precision.

The first step in the analysis was to build the street network. Street centerline data were obtained from public sources and edited to be readable by ArcGIS. Once built, the street network was combined with general transit feed specifications (GTFS) that represent transit systems at any point in time. The resulting combination creates the “transit network” file from which “access rings” can be generated.

Access rings simply depict travel time, or access to the transit system via walk time for this study. Because this analysis is systemwide, the travel time variable is essentially only representing walk time⁷⁰. Cutoff travel times of 10, 15, 20, 25, and 30 minutes of travel time are used to gain a full picture of access in the before- and after-redesign scenarios.

Once constructed, the access rings were “enriched” via ArcGIS Pro with the following variables: population, zero-vehicle households, businesses, retail businesses, health care, social service locations, and finally rental households expending to up 30% of their income on rent. Most of this data is current 2019 data, which may result in some difficulty with interpretation: populations and businesses may have been redistributed since the initial redesign, and possibly *because of the redesign*. This is a potential weakness but acceptable since the data is easily comparable in either scenario.

The condensed four-step methodology below describes the typical workflow:

1. Build the underlying street network based on centerline street data;
2. Link the street network to the GTFS feed to create the transit network;
3. Use the Network Analyst to build access disks for each transit system at 10, 15, 20, 25, and 30 minute cutoffs, based on the transit network; and
4. Enrich the access disks with the variables in question using ArcPro, which can precisely capture the smallest appropriate geography to match the shape and contours of the access disk.

Once completed, the data from the access shed was exported into tabular format and analyzed for gain or loss in each variable.

Accessibility and Affordability

As previously discussed, accessibility is the ability of customers to use the transit system to travel to jobs and other desired destinations. Accessibility can be looked at from three different perspectives: *trip coverage* - the transit service is available between the origins and destinations; *spatial coverage* – the transit service is within a reasonable physical proximity to their

⁷⁰ Had this analysis been a point-to-polygon analysis, these rings would represent travel time on the transit system in addition to walk time

home/destinations; and *temporal coverage* – service is available at the time one wants to travel⁷¹. These definitions of transit accessibility are consistent with the transit decision making process described in the Transit/Quality Level of Service (TQLOS)⁷², where the availability of transit at a person's origin, destination, system information, and travel times influences whether or not someone uses transit. The transit system redesigns implemented by the different case studies and other systems across the country generally seek to improve spatial coverage and decrease travel times.

Increased accessibility is shown to increase ridership. When looking at elasticities of demand, the TQLOS documents that changing transit travel time has an elasticity of demand of approximately -0.4, where for every 10% decrease in travel time there should be a corresponding 4% increase in overall ridership. Additionally, increased spatial coverage is shown to have a 0.6 to 1.0 elasticity of demand (TQLOS). Transit models come to generally the same conclusion where transit service variables (bus stops, average headway, coverage, park-n-ride lots, etc.) are shown to predict between 24% to 46% of system ridership, and land use variables (jobs accessibility, total employment, total population, land use access, etc.) are shown to explain 4% to 17% of transit ridership⁷³. These findings establish the relationship between improving accessibility through transit system redesigns and an expected increase in ridership.

The literature also supports the relationship between increased accessibility and ridership. Beimborn et al.⁷⁴ evaluated the way transit service factors such as accessibility and connectivity relate to mode captivity and mode choice. Their analysis of the Portland, Oregon, 1994 Household Activity and Travel Diary Study found that the ability to access transit is a significant determinate in mode choice in general demand modeling, and when controlling for those who have access to other modes (transit choice users). Dill et al.⁷⁵ found a similar relationship in their review of variables used to predict ridership at the stop level. Commercial land uses within walking distance of a bus stop are shown to have a strong positive relationship in predicting ridership. In a more thorough review of transit models, the same study showed that transit service variables such as access, headways, and coverage, explain 41% of predicted ridership in the TriMet System, 46% for Lane Transit District, and 24% of Rouge Valley Transit District. Additionally, socio-economic data such as number of vehicles and percent with household income below poverty, have a significant impact on ridership across all of the tested models.

The next step is to establish the link between ridership and affordability with Affordable Housing and Transit rubric (Figure 13). The major redesigns consisted of changes to overall system accessibility and mobility through decreased travel times. It is expected that the results will show

⁷¹ A Composite Index of Public Transit Accessibility

⁷² *Transit Capacity and Quality of Service Manual*, 2013

⁷³ Predicting Transit Ridership At The Stop Level: The Role Of Service And Urban Form

⁷⁴ Beimborn, E., Greenwald, M., & Jin, X. (2003). Accessibility, Connectivity, and Captivity: Impacts on Transit Choice. *Transportation Research Record*, 1835(1), 1–9.

⁷⁵ Dill, J., Schlossberg, M., Ma, L., & Meyer, C. (2013). *Predicting Transit Ridership at the Stop Level; The Role of Service and Urban Form*. 92nd Annual Meeting of the Transportation Research Board.

increased access to jobs and key destinations for low-income individuals and affordable housing units leading to increased ridership. Those individuals who choose to ride transit rather than using a personal automobile are saving money. The savings can be illustrated through lower transportation costs as shown on the Housing + Transportation Index and the ALICE measure. Positive changes in both of these outcomes should show increased affordability in urban areas due to the provision and improvement of transit service.

Case Studies

To assess the impact of the transit system on the affordability of a given metropolitan area, a case study analysis was conducted. The following transit agencies were selected:

- Central Ohio Transit Agency (Columbus, Ohio) – Route redesign completed in 2017;
- PalmTran (Palm Beach County, Florida) – Route redesign completed in 2017;
- Jacksonville Transportation Authority (Jacksonville, Florida) – Route redesign completed in 2014;
- StarMetro (Tallahassee, Florida) – Route redesign completed in 2011; and
- LYNX (Orange, Osceola, and Seminole Counties, Florida) – Route redesign planning study completed in 2018.

These systems were selected because three of them – Central Ohio Transit Agency (COTA), Jacksonville Transportation Authority (JTA), and StarMetro – are identified in the literature as one of the seven agencies that implemented their bus redesigns in a single day⁷⁶. PalmTran also implemented theirs in a single day; however, it occurred after the data collection phase for the referenced Transportation Research Board (TRB) report. This is important for the methodology because it provides a single point in time to conduct the before-and-after analysis. Additionally, these systems are largely bus-only systems. Two of the systems offer Bus Rapid Transit (BRT) routes (COTA and JTA; the JTA people mover is not of sufficient ridership to impact the analysis). This makes the outcomes of these cases applicable to a larger number of transit agencies. Due to professional relationships with these agencies, it was also easier to get access to the necessary data. LYNX was selected to provide a ‘what if’ analysis to see if the elements of the other route redesigns were evident in the LYNX approach, and how the affordability of the region could be changed if the route redesign was implemented. The LYNX Case Study is discussed in the next section to illustrate the lessons learned from the other case studies.

Central Ohio Transit Agency (COTA)

Summary of COTA and Columbus, Ohio

The Central Ohio Transit Authority (COTA) was formed in 1974 and provides services to the cities of Columbus, Dublin, Reynoldsburg, Gahanna, Westerville, Worthington, Hilliard, Grove City, and New Albany. Most of these cities are within Franklin County, but the service area also includes parts of Delaware, Licking, Fairfield, and Union Counties. The City of Columbus has 823,000 residents, and the Columbus Census Metropolitan Area has a population of almost 2 million

⁷⁶ Byala et al., 2019

people. Due to a high projected growth rate over the next 20 to 30 years in the area, COTA has acknowledged that their system needs to be adapted in order to accommodate the anticipated future growth.⁷⁷

Historically, COTA's service area has been largely focused on downtown Columbus. Over the past 40 years, as suburban communities have begun to develop throughout the region, it has become evident that COTA has needed to expand its service area to meet the demand of communities outside downtown Columbus.⁷⁵

COTA's fixed-route system supported approximately 18.5 million customer boardings in FY 2013, reporting an average annual growth of 2.9% since FY 2004, then a decline of 1.8% annually beginning in FY 2009. During FY 2013, the average daily ridership on weekdays was 63,000 boardings, 33,000 on Saturdays and 16,500 on Sundays/Holidays.⁷⁵ It became evident that the system could implement changes to improve ridership and meet the increasing demand of a growing population.

System Changes

To accommodate increasing demand in transit services throughout the region, in October 2013 COTA initiated the Transit System Review (TSR) to develop a comprehensive assessment of the existing transit network, provide recommendations to improve system functionality, and support regional growth. As a result, four planning documents were created and serve as the final deliverables from the TSR:

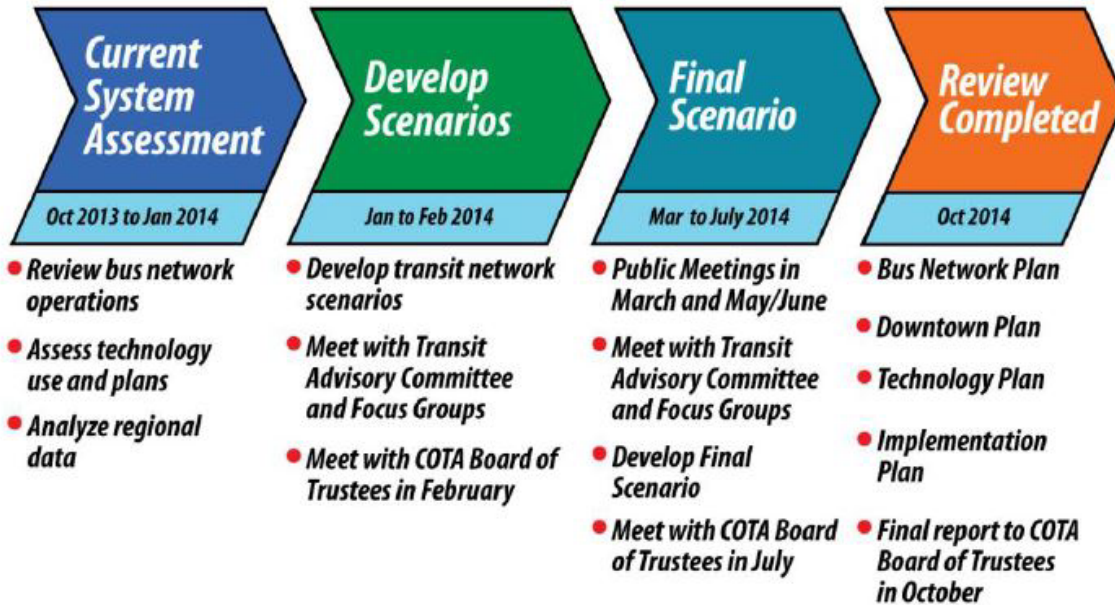
- A Bus Network Plan (Service Plan)
- A Downtown Operations Plan
- An Implementation Plan
- A Technology Investment Plan

The Bus Network Plan/Service Plan was an assessment of the existing network, completed by conducting a peer review and a line by line assessment. The peer review was conducted by comparing the COTA system to six peer transit systems serving comparable populations. The results of the peer review show that COTA ranked second in terms of level of service and overall performance. Based on NTD information, COTA ranked fifth out of seven transit systems when assessed by ridership, passengers per revenue hour, annual vehicle hours per capita, and peak vehicles per capita. Additionally, COTA ranked fourth in service productivity and sixth in fleet size. The line by line assessment showed high ridership in areas where services are more frequent, where there is a higher population density, and where there is well-established pedestrian infrastructure. Suburban areas outside the urban core offer less effective COTA services due to their lack of density.⁷⁵

⁷⁷ Central Ohio Transit Authority. (October 2014). Transit System Review Service and Bus Network Plan Final Report.

COTA has experienced several issues in Downtown Columbus along High Street where the high volume of buses has caused delays and crowding at stops. Due to the large number of buses operating on High Street, there have been issues of buses blocking each other at stops and causing congestion along the road. As a result, the Downtown Bus Operations Plan outlines how the new proposed network would reduce the number of routes and buses along High Street in order to reduce bus congestion.⁷⁵

Figure 17: COTA's Transit System Review Process



The Technology Plan was developed to continue the implementation of Intelligent Transportation Systems (ITS) and other technologies to improve system operations. The recommendations in the plan reference five different projects to improve the system, including computer-aided dispatch and automatic vehicle location (CAD/AVL) enhancements, improved communications through online portals, e-ticketing, improved reporting functionality, and security system upgrades.⁷⁵

The Implementation Plan summarizes how the proposed system could be implemented, either by deploying the changes all at once, deploying in phases, or a hybrid of the two options. Although deploying all the changes at one time would be preferred, it would also require COTA to hire and train up to an additional 90 drivers based on the proposed network. With this limitation in mind, it was recommended for COTA to implement the new system using a hybrid approach from 2015 to 2017 using two phases: Phase I would expand services using the existing process, and Phase II would incorporate the new network.⁷⁵

The new system was launched on May 1, 2017 and improved ridership in its first year of operation. In May 2018, ridership increased by 1.6 percent compared to May 2017, and ridership was 3.6 percent higher in June 2018 when compared to ridership in June 2017. Providing more frequent

service in areas with high ridership made the system more reliable and appealed to a greater population.⁷⁸

Planning Process Review

When developing goals for the new system, the Board needed to decide how COTA should allocate its resources to improve ridership versus coverage. Table 17 below shows the conflicts between ridership goals and coverage goals, which warranted discussions during their workshops to determine which goals should be prioritized.

Table 17: Ridership and Coverage Networks Compared

	<i>Ridership Goals</i>	<i>Coverage Goals</i>
Mantra	“Maximize Ridership.”	“Service for Everyone.”
Performance Measure	Productivity: Boardings or passenger-miles per unit of service cost.	Coverage: % of population and jobs that can walk to some service
Typical Objectives and Desires Served by Goal	Minimize subsidies (“Run transit like a business”).	“Meeting Needs.” Basic access for disadvantaged people, even in hard-to-serve locations.
	Vehicle trip reduction and emissions benefits.	“We pay taxes too.” Expectations of “equitable” distribution of service over the area, regardless of ridership.
	Protecting economic growth from being capped by traffic congestion.	Support for suburban-style car-oriented development.
	Support for denser and more walkable urban styles of development.	
Typical Service Meeting the Goal	Fewer but more attractive and useful transit lines, focused on areas with high ridership potential.	Many transit lines spread over the region, but less frequent and attractive than ridership service.

During their public workshops, three resource allocation alternatives were developed:

1. Focusing on increasing ridership;
2. Spreading the service to improve coverage; and
3. A combination of the first two alternatives, called the Midpoint alternative.

Ultimately, on April 30, 2014, they decided to pursue the Midpoint alternative and divide their resources by 70 percent for ridership and 30 percent for coverage to be preserved.⁷⁵

⁷⁸ Central Ohio Transit Authority. (n.d). Here’s how COTA improved its route network. Retrieved from <https://www.cota.com/initiatives/tsr/>

Analysis of System Changes

The maps on the following pages depict changes in system coverage and highlight affordable housing locations throughout the region, as well as showing changes in travel time for the previous system and new system.

The changes in the system show increased coverage in areas where routes have been added, but decreased coverage in areas where routes have been removed. Although some neighborhoods may have decreased accessibility with the new system, total ridership for the system as a whole has increased, which has led to an increase in accessibility for the population as a whole.

When the new system was launched, it provided a number of transportation improvements to the community:

- Additional Weekend Service
 - Saturday service hours increased by almost 50 percent
 - Sunday service hours increased by 120 percent
- Additional Service to More Employment Hubs
 - An additional 110,000 jobs within ¼ mile of high-frequency service (265,000 jobs in total)
 - An additional 24,000 jobs within ¼ mile of all-day service (548,000 jobs in total)
- Services to More Residents
 - An additional 103,000 residents within ¼ mile of high-frequency service (219,000 residents in total)
 - An additional 18,000 residents within ¼ mile of all-day service (529,000 in total)

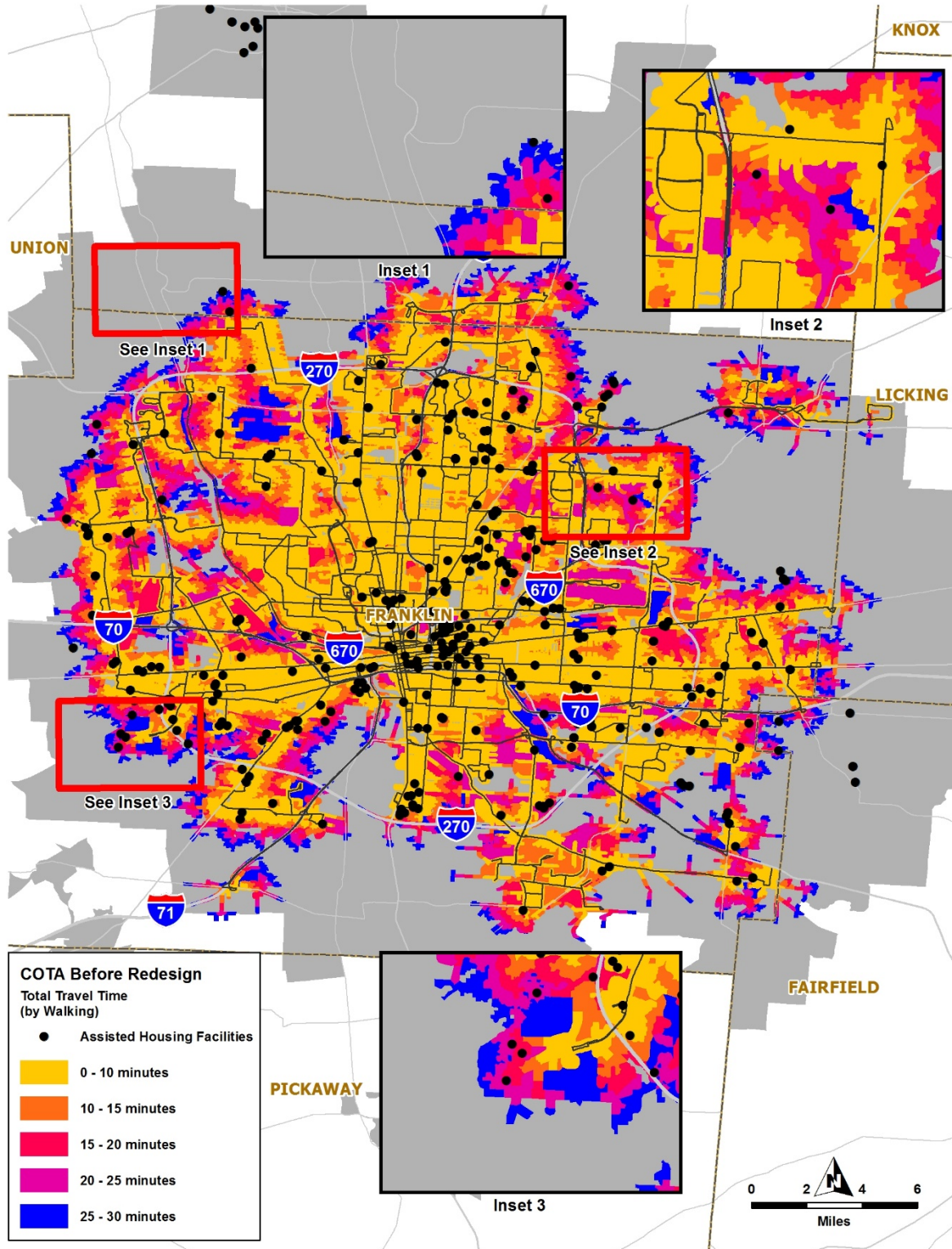
The new system has proven to be highly beneficial to many neighborhoods by supporting increasing transit demands, improving service efficiency, and effectively connecting more residents to employment hubs across the Columbus area.⁷⁹

Effects on Affordability

Table 18 on page 76 correlates to the coverage area maps and summarizes the travel times for low income groups. The percent change of low income household coverage when compared to total population in the area did not have a significant change. However, travel time improved for groups between 10 to 25 minute travel times in the lowest income group summarized in the table, which improved accessibility for those areas.

⁷⁹ Central Ohio Transit Authority. (n.d). Here's how COTA improved its route network. Retrieved from <https://www.cota.com/initiatives/tsr/>

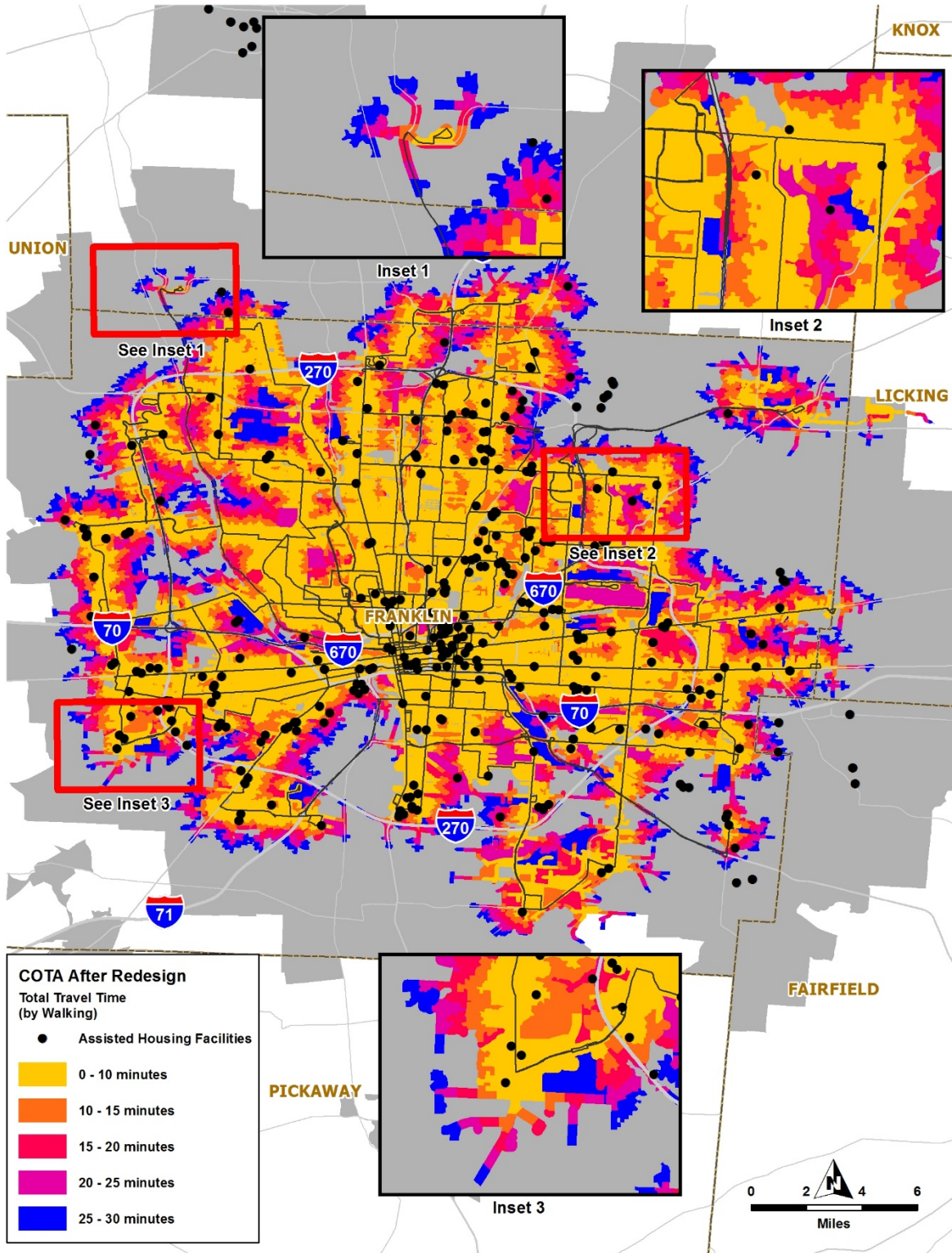
Figure 18: COTA System Accessibility Before Redesign



PATH: E:\DATA\KROSE\AFFORDABLE_HOUSING_TRANSITMAP_DOC\STM\FIG01_COTA_BEFORE_8-5X11.MXD - USER: KAIROSE - DATE: 7/20/2020

Data Sources: Ohio DOT; Data.gov; Community Research Partners.

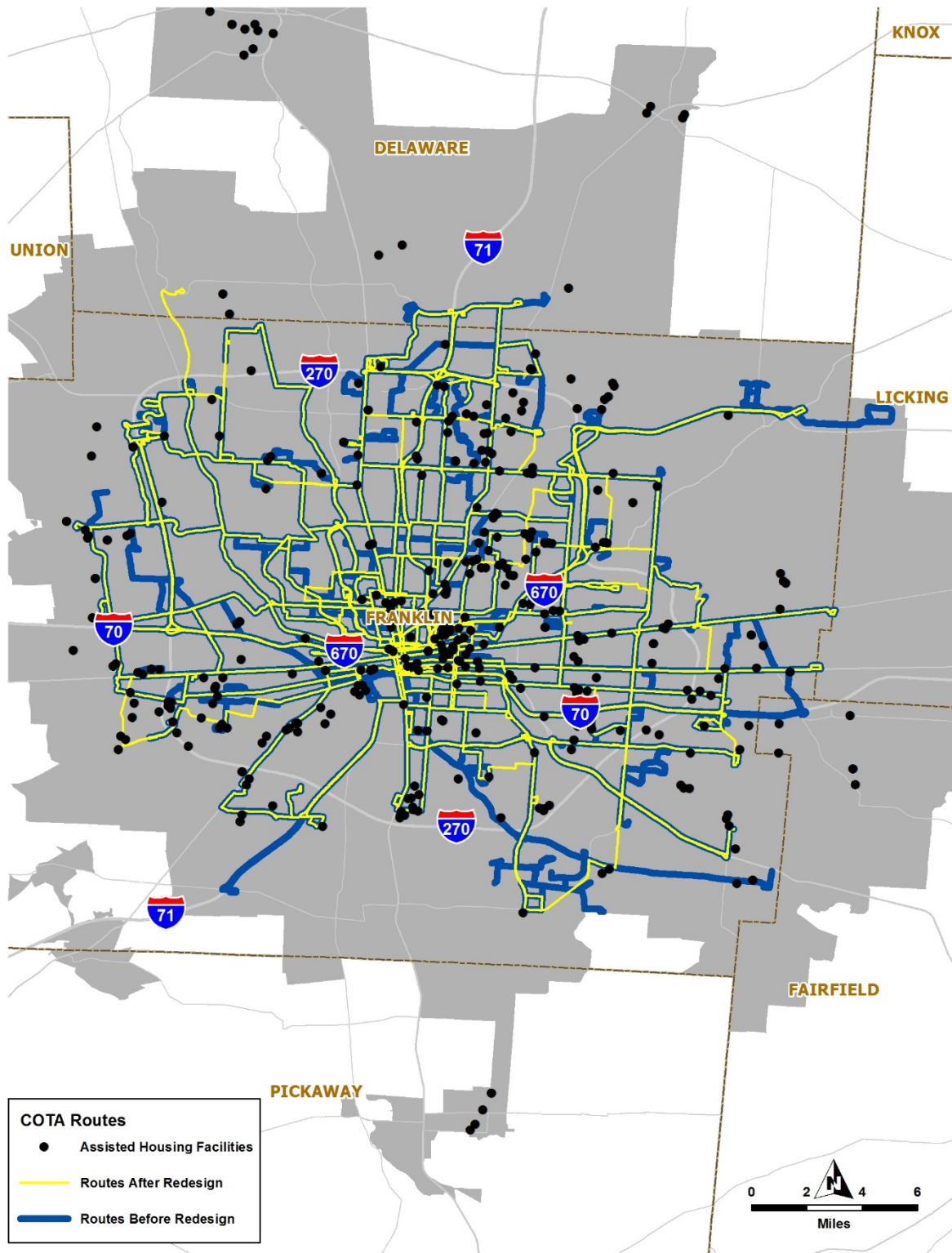
Figure 19: COTA System Accessibility After Redesign



PATH: E:\DATA\KROSE\AFFORDABLE_HOUSING_TRANSIT\MAP_DOC\STM3\FIG02_COTA_AFTER_8-5X11.MXD - USER: KAIROSE - DATE: 7/20/2020

Data Sources: Ohio DOT, Data.gov, Community Research Partners.

Figure 20: COTA Fixed-route System Before and After Redesign



PATH: E:\DATA\KAIROSE\AFFORDABLE_HOUSING_TRANSIT\MAP_DOC\STM\FIG03_COTA_ROUTES_8-5X11.MXD - USER: KAIROSE - DATE: 5/29/2020

Data Sources: Ohio DOT; Data.gov; Community Research Partners.

Table 18: COTA Changes in Accessibility

<i>Pre-Redesign Coverage and Household Rent Burden</i>				
Travel Time to Destination	2019 Total Population	2014-2018 ACS HHs/Gross Rent 15-19.9% of Income	2014-2018 ACS HHs/Gross Rent 20-24.9% of Income	2014-2018 ACS HHs/Gross Rent 25-29.9% of Income
25 – 30	59,915	1,092	1,136	923
20 – 25	76,926	1,686	1,588	1,113
15 – 20	106,422	2,893	2,515	2,021
10 – 15	149,716	3,742	3,692	3,056
0 – 10	772,464	21,707	21,397	17,652
Total	1,165,443	31,120	30,328	24,765
Percent		2.67%	2.60%	2.12%
<i>Post-Redesign Coverage and Household Rent Burden</i>				
Travel Time to Destination	2019 Total Population	2014-2018 ACS HHs/Gross Rent 15-19.9% of Income	2014-2018 ACS HHs/Gross Rent 20-24.9% of Income	2014-2018 ACS HHs/Gross Rent 25-29.9% of Income
25 – 30	63,266	1,218	1,212	824
20 – 25	83,070	1,884	1,761	1,249
15 – 20	105,120	2,953	2,361	2,024
10 – 15	172,488	4,065	4,510	3,763
0 – 10	711,824	20,353	19,828	16,310
Total	1,135,768	30,473	29,672	24,170
Percent		2.68%	2.61%	2.13%
PCT Change	-2.55%	-2.08%	-2.16%	-2.40%

Although the system overhaul did not have a significant change for low income groups, the new system increased overall ridership, which has resulted in an increased accessibility to destinations for the service area as a whole.

The impacts on accessibility after the system redesign is supported through a study performed by Lee & Miller⁸⁰ in 2018. Their study showed an improvement in accessibility for residents of the Linden Neighborhood, an underserved neighborhood in the City, especially with combined with CMAX Bus Rapid Transit (BRT) line which runs along the eastern edge of the neighborhood.

United Way produces ALICE data which establishes county-level summaries for households earning more than the Federal Poverty Level but less than the basic cost of living for that particular county. In 2016, the Federal Poverty Level was \$11,880 for a single adult, and \$24,300 for a family of four. Figure 21 shows the household survival budget for Franklin County, which is the

⁸⁰ Lee, J., & Miller, H. J. (2018). Measuring the impacts of new public transit services on space-time accessibility: An analysis of transit system redesign and new bus rapid transit in Columbus, Ohio, USA. *Applied Geography*, 93, 47–63.

minimum amount a household needs to live by expense type. Transportation costs for a single adult were \$349, and \$697 annually for a four-person family.⁸¹

Figure 21: Franklin County Household Budget

Household Survival Budget, Franklin County		
	SINGLE ADULT	2 ADULTS, 1 INFANT, 1 PRESCHOOLER
Monthly Costs		
Housing	\$532	\$831
Child Care	\$-	\$1,787
Food	\$182	\$603
Transportation	\$349	\$697
Health Care	\$214	\$800
Technology	\$55	\$75
Miscellaneous	\$157	\$552
Taxes	\$238	\$724
Monthly Total	\$1,727	\$6,069
ANNUAL TOTAL	\$20,724	\$72,828
<i>Hourly Wage</i>	<i>\$10.36</i>	<i>\$36.41</i>

According to the Center for Neighborhood Technology, housing and transportation (H+T) cost is 47 percent of total income in Franklin County and transportation costs in dispersed areas can result in \$11,702 annually as shown in Figure 22.⁸² When transit services provide greater access to more destinations across a region, transit becomes a more viable option for communities and can help households save money. As a result, annual living costs can be reduced with greater accessibility to transit.

⁸¹ United Way. (2016). ALICE in Franklin County. Retrieved from http://ouw.org/wp-content/uploads/2017/08/Franklin_18UW_ALICE_Report_COUNTY_OH_8.29.18.pdf

⁸² Center for Neighborhood Technology. (n.d). H+T Fact Sheet: Franklin, OH. Retrieved from <https://htaindex.cnt.org/fact-sheets/>

Figure 22: Transportation Costs in Franklin County

Transportation Costs

In dispersed areas, people need to own more vehicles and rely upon driving them farther distances which also drives up the cost of living.



Best Practices and Conclusion

COTA’s system overhaul increased services to the greater Columbus area and ultimately improved ridership with increased efficiency. Since ridership has improved, communities have greater accessibility to destinations throughout the service area. Although COTA’s primary goals did not include increasing services to low-income groups, the total increase of ridership shows that more people are relying on transit services and it continues to be a viable mobility option that is cost-effective and improves connectivity across communities.

Jacksonville Transportation Authority (JTA)

Summary of JTA and Jacksonville, Florida

The Jacksonville Transportation Authority provides transit services to Duval County located in Northeast Florida. Cities within the service area include Jacksonville, Jacksonville Beach, Atlantic Beach, Neptune Beach, and Baldwin. Duval County is bordered by four counties: Nassau, St. Johns, Clay, and Baker Counties.

Duval County has a number of unique characteristics which can affect transit service coverage across the county. When the City of Jacksonville was consolidated with Duval County in 1968, it became the city with the greatest land area within the contiguous United States, spanning 841 square miles, making it challenging to provide efficient transit service across the county.^{83,84} Like many other American cities, Jacksonville developed as a car-oriented city and is comprised of

⁸³ City of Jacksonville. (n.d). About Jacksonville: Geography and Demography. Retrieved from <https://www.coj.net/about-jacksonville/geography-and-demography>

⁸⁴ Jacksonville Transportation Authority. (September 2014). Transit Development Plan Major Update (2014 - 2024).

many low-density suburban developments and dispersed employment centers. As a result, it has created congested roadways and made it difficult for many residents to access jobs efficiently⁸⁵.

The St. Johns River, one of the longest rivers in Florida, bisects the county and has warranted the development of seven (7) bridges to improve mobility across the county, five of which are within downtown Jacksonville. Because the river runs through the middle of the city, it fragments transportation networks and creates a greater traffic burden along the bridges. Additionally, since Jacksonville is a major economic and freight hub, rail line junctions present another transportation challenge as they can create long wait times for traffic and increase congestion.^{86,87}

System Changes

JTA's system consisted of long routes and subsequent lengthy wait times (up to 90 minutes) which deterred many people from utilizing the transit system. It became important to create a system that would be attractive to people, especially the younger generation of potential riders (millennials). Generally, Millennials are more interested in living in denser urban areas and having multi-modal transportation options rather than living in suburban, car-dependent neighborhoods.

Investing in a more efficient system would not only benefit existing transit-dependent riders in Duval County, but also attract the younger generation of new riders. As a result, JTA implemented the Route Optimization Initiative (ROI) in December 2014 to create a more efficient system and improve total ridership.⁸⁸

JTA operates and maintains a number of transit services across the county, including:

- Local and express bus service
- The Skyway (an automated people-mover)
- Trolleys
- Community shuttles
- Ride Request
- The Connexion Paratransit service
- The Stadium Shuttle service
- Inter-county connection services

After the implementation of the ROI system in December 2014, ridership immediately began increasing. By March 2015, ridership had increased by 10.1 percent when compared to March 2014. Ridership had increased by seven percent on weekdays, 10 percent on Saturdays, and 15 percent on Sundays. Although transit system overhauls often result in initial ridership decline, the

⁸⁵ Jacksonville Transportation Authority. (n.d). Route Optimization Initiative Case Study. Retrieved from https://www.jtafla.com/media/Documents/General/Case%20Study/roi_casestudy/1022/roi_casestudy.pdf

⁸⁶ City of Jacksonville. (n.d). About Jacksonville: Geography and Demography. Retrieved from <https://www.coj.net/about-jacksonville/geography-and-demography>

⁸⁷ Jacksonville Transportation Authority. (September 2014). Transit Development Plan Major Update (2014 - 2024).

⁸⁸ Jacksonville Transportation Authority. (n.d). Route Optimization Initiative Case Study. Retrieved from https://www.jtafla.com/media/Documents/General/Case%20Study/roi_casestudy/1022/roi_casestudy.pdf

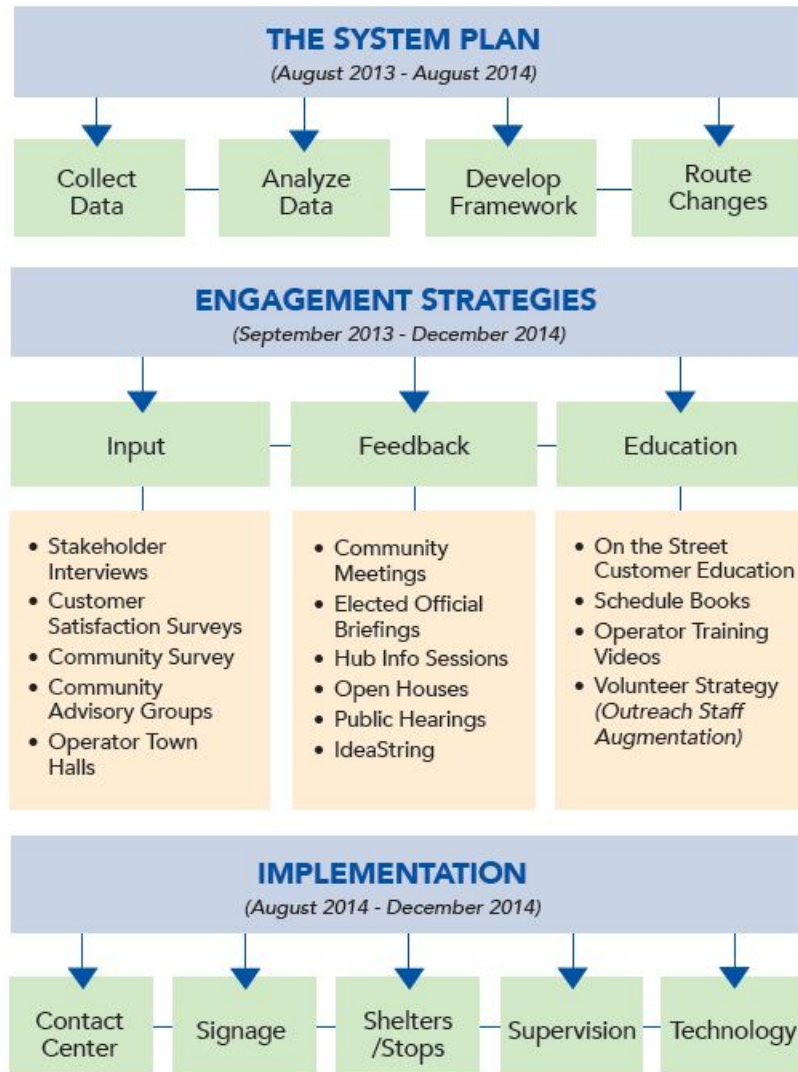
consistent increase in ridership during the months following the system’s deployment shows that the redesign was efficiently implemented and received well by the public.⁸⁹

Planning Process Review

To assess the existing system, peer reviews would be conducted to compare JTA’s system with other transit systems that had similar service areas. Transit agencies are required to report their operating and financial performance characteristics to the Federal Transit Administration (FTA), and that information is stored in a database that is updated annually called the National Transit Database (NTD). The NTD is then used by agencies across the country for transportation planning initiatives and investments, and was used to conduct the peer review for JTA’s system. For the peer evaluations, JTA’s system was compared to other transit agencies based on the following:

- Service area population
- Service area population density
- Urbanized area population
- Service area size
- Transit system size
- Geographic challenges

Figure 23: JTA Redesign Process



⁸⁹ Rassler, L.A. (April 2015). JTA Ridership Up After Major Overhaul. Retrieved from <https://www.masstransitmag.com/bus/press-release/12064549/jacksonville-transportation-authority-jta-jta-ridership-up-after-major-overhaul>

The peer reviews developed several conclusions for each of JTA's transit services. JTA's fixed route services are consistent compared to similar peer groups in terms of operating costs, but revenues (per hour and mile) are lower when compared to other groups. For JTA's demand response service, they have above average scores compared to other transit agencies; however, they have low rider per revenue mile and a high operating cost per revenue hour. Additionally, the Skyway provides less revenue miles and revenue hours when compared to similar transit agencies, yet ranks the highest for operating costs. It was suggested that JTA should consider finding ways to improve service efficiency and ridership to reduce operating costs and increase revenue.⁸⁴

After receiving feedback from the public and other transit agencies, JTA proposed two operating scenarios: the 2014 Route Optimization Initiative (ROI) System scenario and the 2020 Bus Rapid Transit (BRT) + ROI System scenario. The 2014 ROI scenario was developed with the intention of redesigning JTA's bus and Community Shuttle system to improve services and increase ridership. The 2020 BRT + ROI scenario would implement four BRT lines to increase service frequency and reduce the number of stops providing a more efficient transportation option across Jacksonville. These initiatives were planned to work in conjunction with one another, where the 2014 ROI scenario would lay the foundation for the 2020 BRT + ROI scenario and ultimately create a connected network that would increase transit demand.

Analysis of System Changes

The maps below depict changes in system coverage and highlight affordable housing locations throughout Duval County, as well as changes in travel time for the previous system and new ROI system.

Figure 24: JTA Accessibility Before Redesign

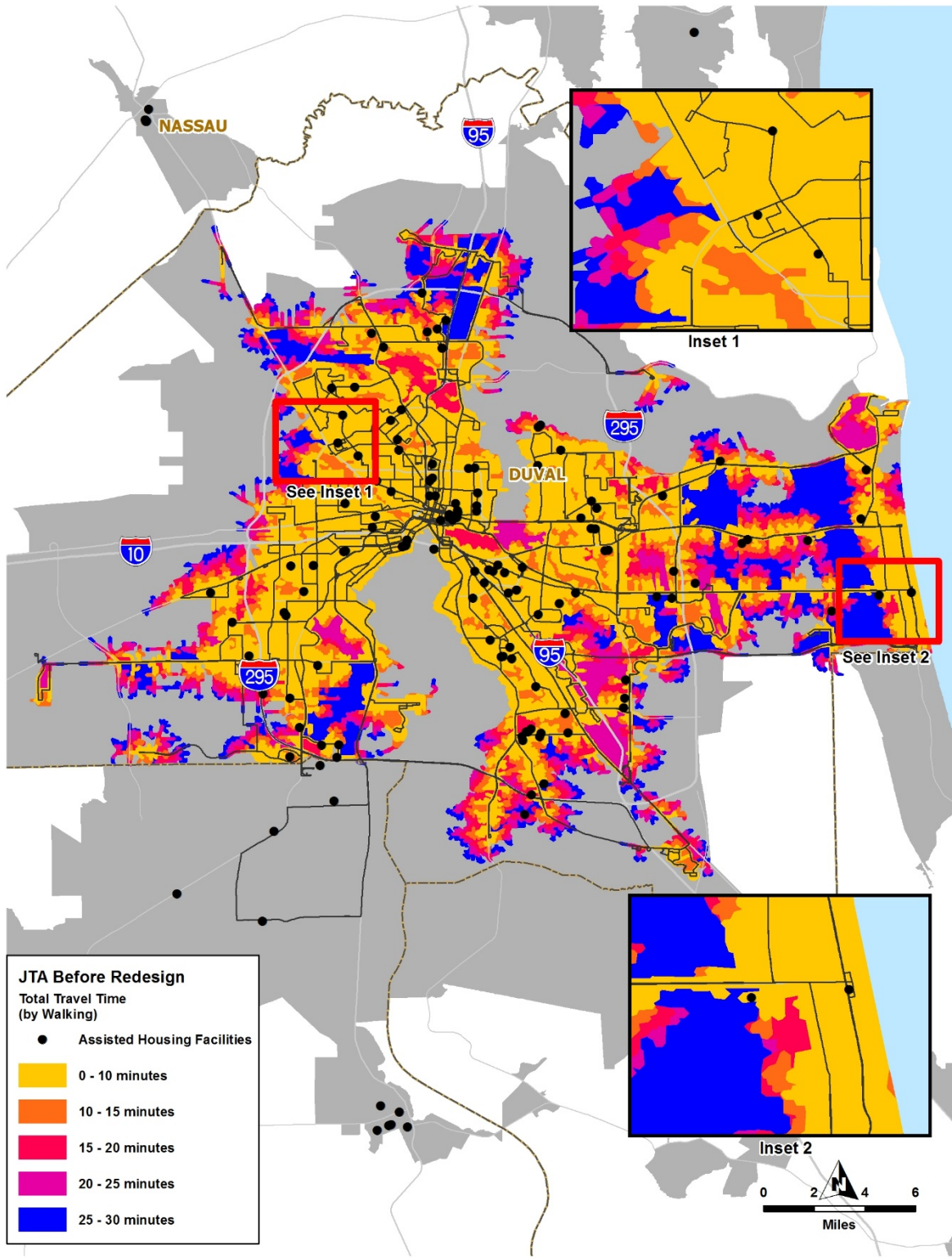
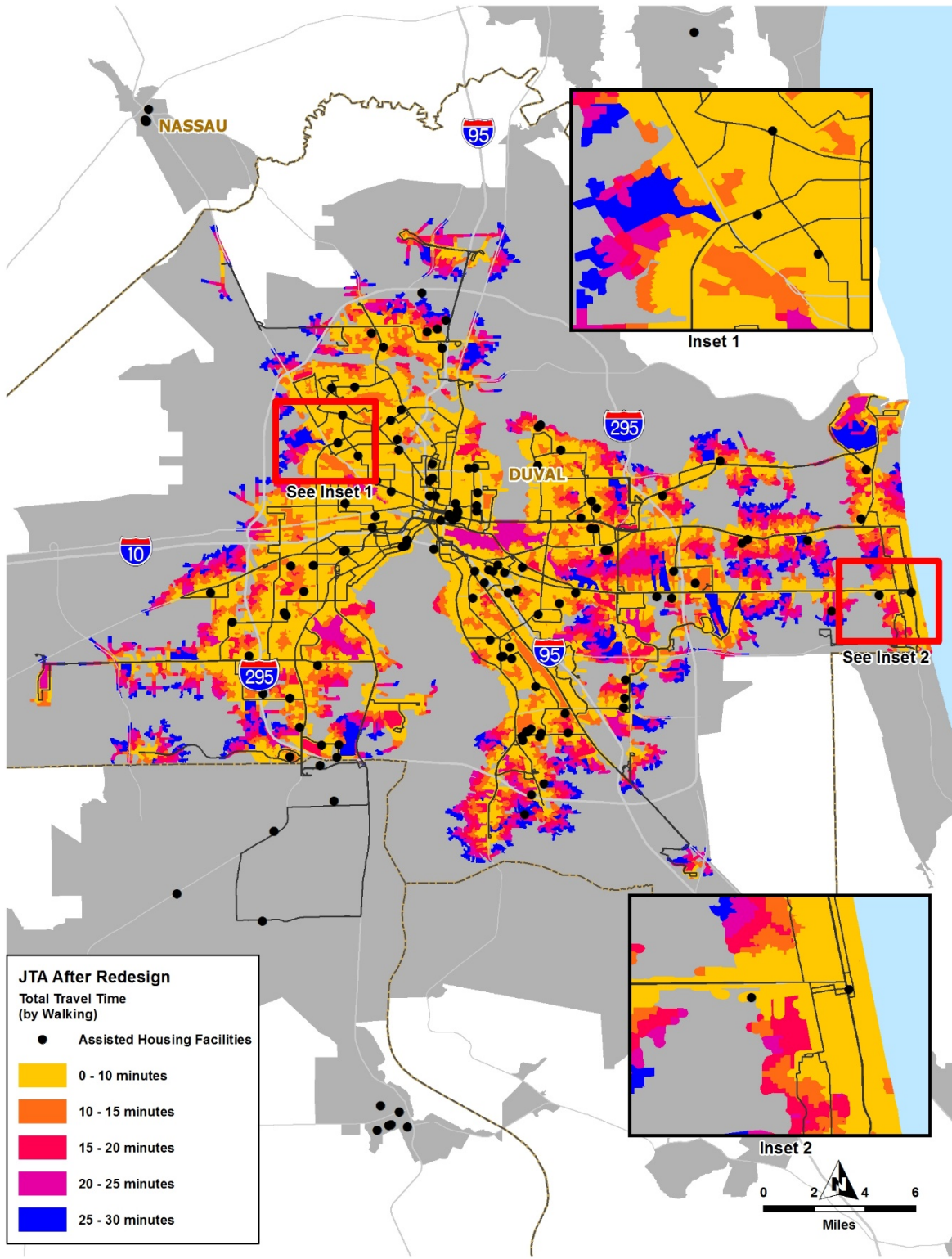


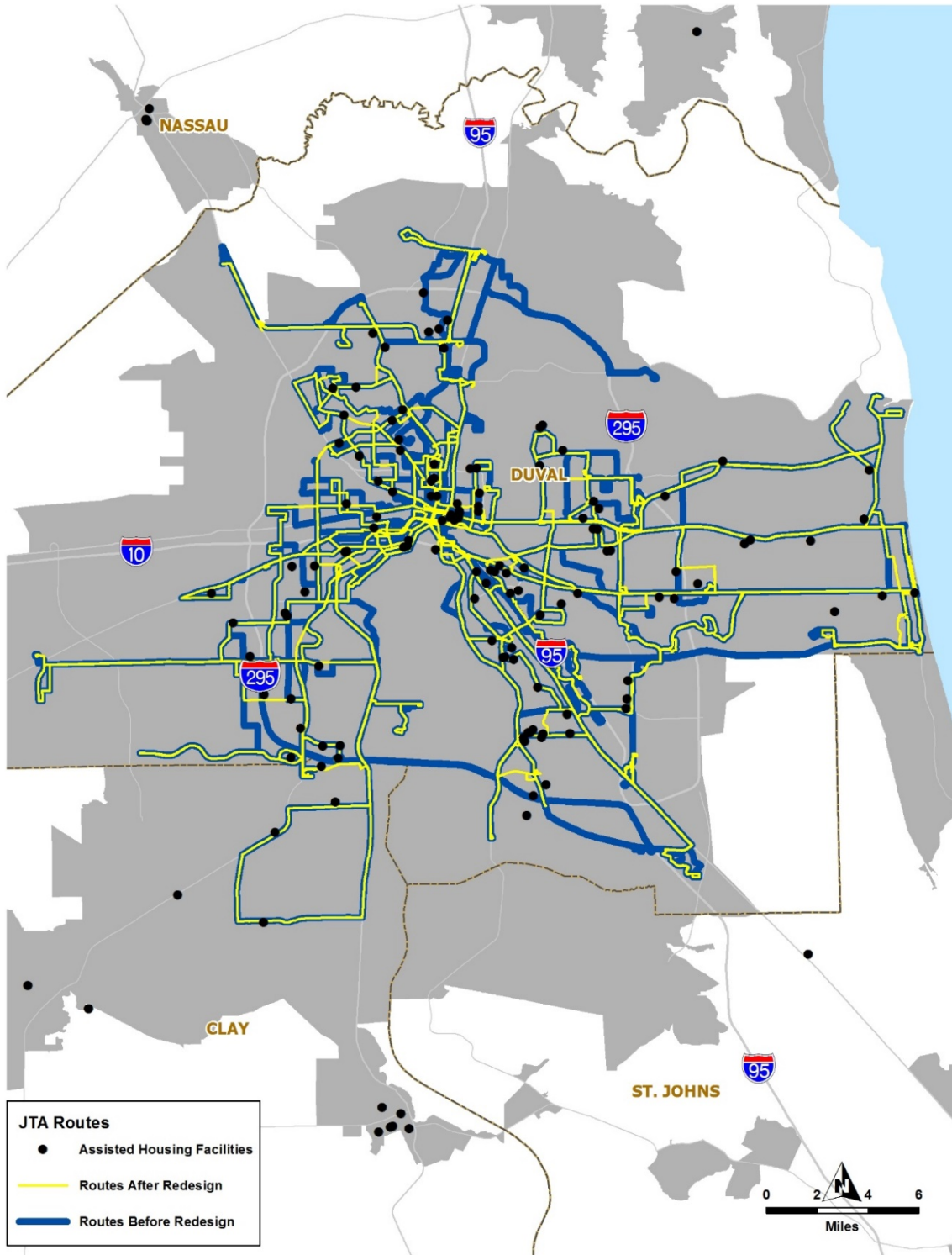
Figure 25: JTA Accessibility After Redesign



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Data Sources: Florida DOT; Florida Geographic Data Library (FGDL); UF Shimberg Center

Figure 26: JTA Fixed Route System Before and After Redesign



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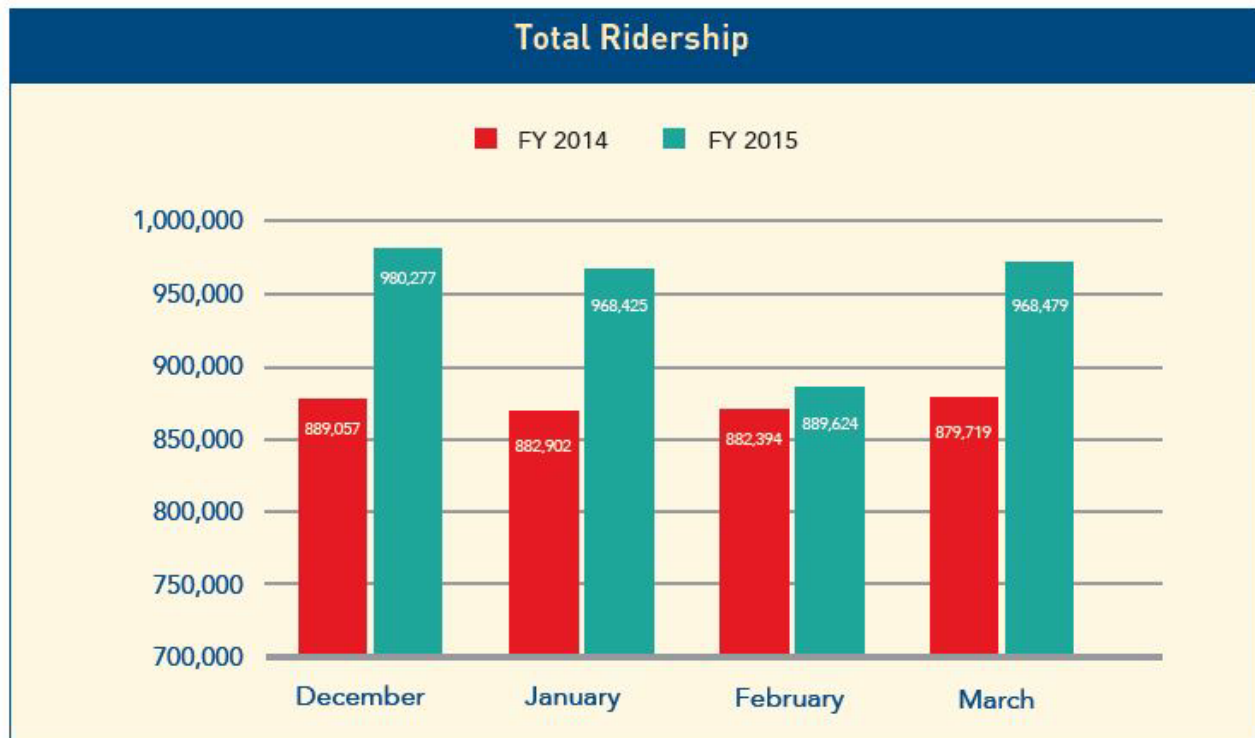
Data Sources: Florida DOT, Florida Geographic Data Library (FGDL), UF Shimberg Center

Although coverage decreased in several areas based on the travel time maps, the new system provides a number of service improvements which have ultimately increased ridership and accessibility as a whole.

Since the launch of the new ROI system in December 2014, the community has observed a number of improvements to JTA's system:

- Removing 30 percent of bus stops has increased efficiency between major stops
- Installing 128 new ADA compliant stops to provide higher quality amenities
- Increasing the number of routes with 30-minute frequency, from 2 to 20 routes
- Installing 10 routes with 15-minute frequency for the first time in JTA's history
- Increasing the number of routes operating after 11 pm, from 11 to 22
- Increasing the number of routes operating after midnight, from 3 to 16
- Improving the weekend service routes to operate more frequently
- Increasing route supervision, safety, and security
- Installing almost 2,900 new bus stop signs
- Implementing Real-Time Passenger Information for the whole system

Figure 27: JTA Ridership Before and After Redesign



Since the implementation of the system and the improved quality and efficiency, JTA has seen an increase in total transit ridership compared to previous years. These investments in the transit system will continue to increase ridership in the future and improve connectivity and accessibility for communities across Duval County.

Effects on Affordability

Table 19 correlates to the coverage area maps and summarizes the travel times for low income groups. The coverage area for low income populations did decrease after the implementation of the new system. These changes, however, were on the periphery of the service area where they may have been low ridership to begin with. The accessibility in the core of the service area remains unchanged and has improved in some instances. Overall, the new system has had a positive impact for communities overall as shown by the increase in ridership.

Table 19: JTA Travel Times for Low-Income Groups

<i>Pre-Redesign Coverage and Household Rent Burden</i>				
Travel Time to Destination	2019 Total Population	2014-2018 ACS HHs/Gross Rent 15-19.9% of Income	2014-2018 ACS HHs/Gross Rent 20-24.9% of Income	2014-2018 ACS HHs/Gross Rent 25-29.9% of Income
25 – 30	75,032	1,480	1,589	1,300
20 – 25	60,218	1,333	1,198	1,200
15 – 20	64,469	1,201	1,127	1,017
10 – 15	88,167	1,625	1,422	1,403
0 – 10	476,964	10,528	11,007	10,020
Total	764,850	16,167	16,343	14,940
Percent		2.11%	2.14%	1.95%
<i>Post-Redesign Coverage and Household Rent Burden</i>				
Travel Time to Destination	2019 Total Population	2014-2018 ACS HHs/Gross Rent 15-19.9% of Income	2014-2018 ACS HHs/Gross Rent 20-24.9% of Income	2014-2018 ACS HHs/Gross Rent 25-29.9% of Income
25 – 30	57,248	1,410	1,206	997
20 – 25	64,840	1,109	1,150	1,159
15 – 20	68,225	1,439	1,191	1,296
10 – 15	106,342	2,014	1,822	1,976
0 – 10	387,406	8,581	9,281	7,850
Total	684,061	14,553	14,650	13,278
Percent		2.13%	2.14%	1.94%
PCT Change	-10.56%	-9.98%	-10.36%	-11.12%

Figure 28 shows the household survival budget for Duval County. In 2018, the Federal Poverty Level was \$12,140 for a single adult, and \$25,100 for a family of four. Transportation costs for a single adult were \$375, and \$843 annually for a four-person family.⁹⁰

Figure 28: Duval County Household Budget

Household Survival Budget, Duval County, 2018		
	SINGLE ADULT	2 ADULTS, 1 INFANT, 1 PRESCHOOLER
Monthly Costs		
Housing	\$604	\$947
Child Care	\$-	\$1,233
Food	\$285	\$864
Transportation	\$375	\$843
Health Care	\$200	\$803
Technology	\$55	\$75
Miscellaneous	\$175	\$535
Taxes	\$231	\$588
Monthly Total	\$1,925	\$5,888
ANNUAL TOTAL	\$23,100	\$70,656
<i>Hourly Wage*</i>	<i>\$11.55</i>	<i>\$35.33</i>

The Center for Neighborhood Technology states the housing and transportation (H+T) cost is 51 percent of total income in Duval County, and transportation costs in dispersed areas can result in \$12,125 annually as shown in Figure 29.⁹¹ Increased accessibility to destinations also improves connections from origins to destinations in the region, and potentially reduces transportation costs.

⁹⁰ United Way. (2018). ALICE in Duval County. Retrieved from https://unitedwaynefl.org/wp-content/uploads/2020/05/20_ALICE_Duval-County-FL-3-31-2020.pdf

⁹¹ Center for Neighborhood Technology. (n.d). H+T Fact Sheet: Duval, FL. Retrieved from <https://htaindex.cnt.org/fact-sheets/>

Figure 29: Transportation Costs in Duval County

Transportation Costs

In dispersed areas, people need to own more vehicles and rely upon driving them farther distances which also drives up the cost of living.



Best Practices and Conclusion

JTA's ROI system has provided numerous benefits to communities around Duval County. Although coverage for low income groups decreased after the overhaul, service in the core of Jacksonville where most of the affordable housing communities are located, remained relatively the same. The focus on improving efficiency, frequency, amenities, and hours of operation to improve ridership helped to increase the transportation options for many of the communities across the county. This, in turn, led to the increased ridership and potential monetary savings for those taking advantage of the new system.

PalmTran

Summary of PalmTran and Palm Beach County

PalmTran has provided public transportation in Palm Beach County since 1971. PalmTran currently operates over 150 buses and serves over 3200 bus stops. There are 34 bus routes strategically situated within the area serving Jupiter to Boca Raton, and West Palm Beach to Belle Glade. PalmTran provides service to the Palm Beach International Airport and routes connect with service at each of the six Tri-Rail Stations within the county. This includes service at the two Amtrak stations (West Palm Beach and Delray Beach) and connections to the Greyhound Terminal at the West Palm Beach Intermodal Center.

Two constituencies are especially important among PalmTran's ridership, seniors and those without access to an automobile. Palm Beach's population over 65 is 60% greater than the US average⁹². Neighborhoods with high concentrations of seniors correlate strongly with those lacking automobile access ($r^2=0.85$).⁹³ Census blocks with high populations of both seniors and

⁹² US Census Bureau, 2011 – 2015. American Community Survey 5-Year Estimates.

⁹³ Existing System Evaluation: Summary Report, 2017. PalmTran, Jarret Walker + Associates.

zero-car households are clustered in northwest West Palm Beach, Kings Point and southwest Boca Raton. Residents living under the federal poverty line are clustered around West Palm Beach and Lake Worth. This area is denser than the service area as a whole with higher levels of walkability east of I-95. It should be noted there is also a pocket of isolated rural poverty in the central town of Belle Glade on the western edge of the service area. This population maintains access to the urbanized portions of the county through PalmTran’s route 40.

The highest residential densities within PalmTran’s service area are concentrated in Lake Worth and Boynton Beach, along the shoreline and extending west. These areas offer a traditional development pattern of small, walkable lots on a gridded street network. Since the establishment of PalmTran, low-density suburban development has spread inland as the primary form of growth. Employment density is concentrated in central areas of various jurisdictions along the shoreline. Employment centers include the Boca Raton Regional Hospital, the Boca Raton Mall and the Boca Raton FAU campus. The core of West Palm Beach hosts employment densities higher than 20,000 jobs per square mile around the convention center and the Cityplace shopping and entertainment development.

System Changes

PalmTran’s annual revenue hours have failed to keep up with the county’s growth in the 20 years leading up to its system overhaul. Unlike its peers within the state who expanded service between 1996 and 2015, PalmTran’s system remained constant. In 2018, PalmTran offered the least revenue hours per-capita in the state. Prior to its overhaul, PalmTran saw roughly 9 million unlinked passenger trips⁹⁴. These boarding’s were concentrated along corridors with high density and walkability adjacent to I-95.

In order to “increase efficiency, improve customer satisfaction of current riders and increase overall system ridership,” PalmTran launched the Route Performance Maximization, or “RPM”, initiative.

Recognizing the need to adapt to the county’s growth since its founding and prepare for the future, PalmTran began planning its first system-wide service overhaul in 2017. The initiative was titled “Route Performance Maximization” or RPM for short. Phase one commenced when the agency engaged with Jarret Walker + Associates to conduct a system evaluation. The firm offered the city two alternative service concepts, “ridership” or “coverage.”

A ridership approach concentrates services along corridors with the greatest potential ridership (dense, walkable areas, employment centers). The ridership approach is similar to a private sector service, maximizing efficiency and revenue. A “coverage” oriented approach, on the other hand, treats transit as an essential public service. It spreads the service network across a wider area at the expense of frequency and efficiency in order to provide some level of service to as many constituents as possible. All networks fall somewhere in-between each approach. In November 2017, the Palm Beach County Board of County Commissioners Directed PalmTran to move

⁹⁴ PalmTran Transit Development Plan. Annual Update (FY 2019 – 2028).

forward with a “coverage” network to minimize negative impacts and disruptions to current system riders. This decision recognized the needs of PalmTran’s senior population. These riders favor coverage with shorter first mile/last mile walks over high frequency ridership-oriented systems. Following the council decision, PalmTran staff refined the plan into the “enhanced coverage” network that streamlined circuitous routes, making improvements to both coverage and ridership.⁹⁵

RPM successfully “increased the amount of employment one can access via transit in an hour compared to the old network.” – Steve Anderson, Interim Director of Transit Planning

Ridership increased nearly 5% in the first year of RPM’s operation and on-time performance increased significantly from 73% to 82%. There was an 8% increase in the percentage of routes offering Sunday service. The initiative also implemented a time-of-day scheduling system with an enhanced

transfer system at key hubs. Additionally, WiFi was installed on all PalmTran fixed-route buses with the start of RPM service.

Planning Process Review

The planners at PalmTran sought to maximize service efficiencies to current and future customers, while minimizing impacts and disruptions to current riders. When choosing to adjust service PalmTran’s goal was to minimize route duplication. Loops and inefficient neighborhood detours on routes were streamlined to consolidate service on arterial roads. This increased frequency and on-time performance while maintaining or expanding service coverage.

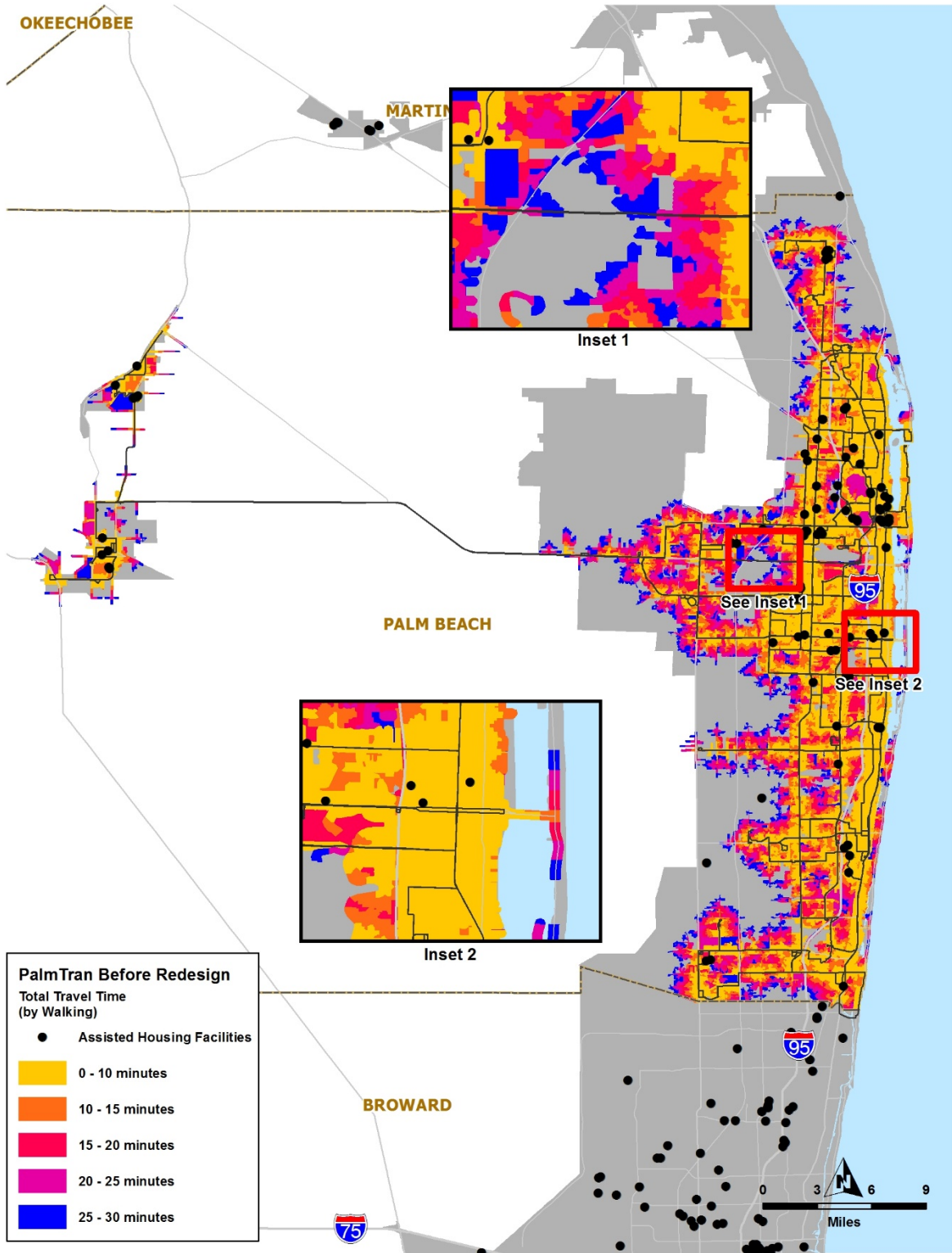
The RPM initiative took over two years to plan and implement. It was first introduced to the public in February 2017. Public engagement was conducted between April and August of 2018. RPM launched on September 30, 2018. The public engagement portion of the planning process consisted of over 40 outreach events in four months. It produced over 1,400 online and in-person survey responses, and four transit summits with the public held in Boca Raton, Belle Glade, Riviera Beach and West Palm Beach. To gather input from bus operators, five listening sessions were held. Public survey responses revealed lack of service span on nights and weekends as a top concern. RPM increased frequency of service during these times from 60 minutes to 40/45 minutes. In a post-RPM survey conducted in December 2019, 70% of actual riders were either neutral, pleased or very pleased with the service changes.

Analysis of System Changes

The maps below depict changes in system coverage and highlight affordable housing locations throughout Palm Beach County, as well as the changes in travel time for the previous system and new RPM system.

⁹⁵ PalmTran Transit Development Plan Annual Update (FY 2019 – FY 2028)

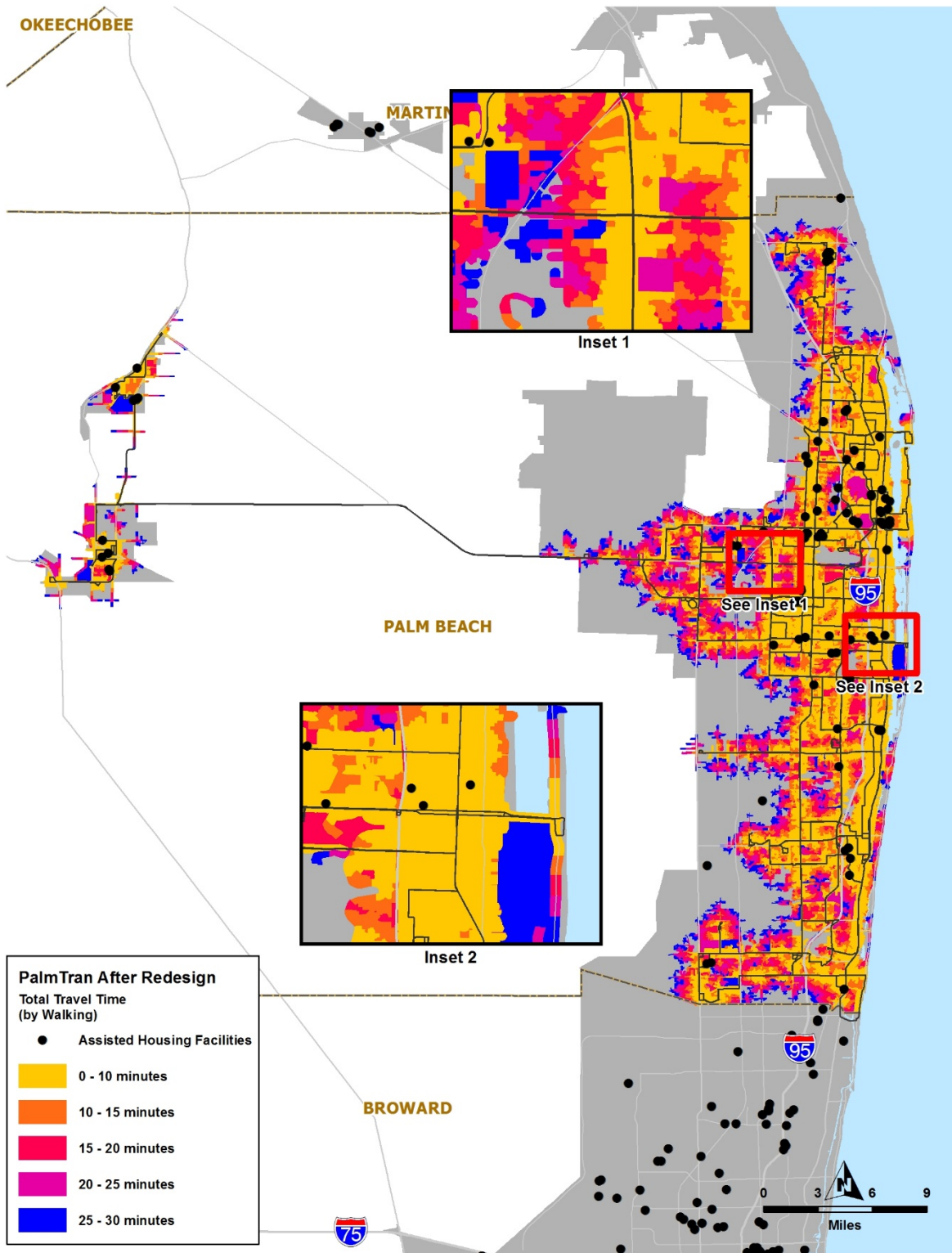
Figure 30: PalmTran System Accessibility Before Redesign



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Data Sources: Florida DOT; Florida Geographic Data Library (FGDL); UF Shimberg Center

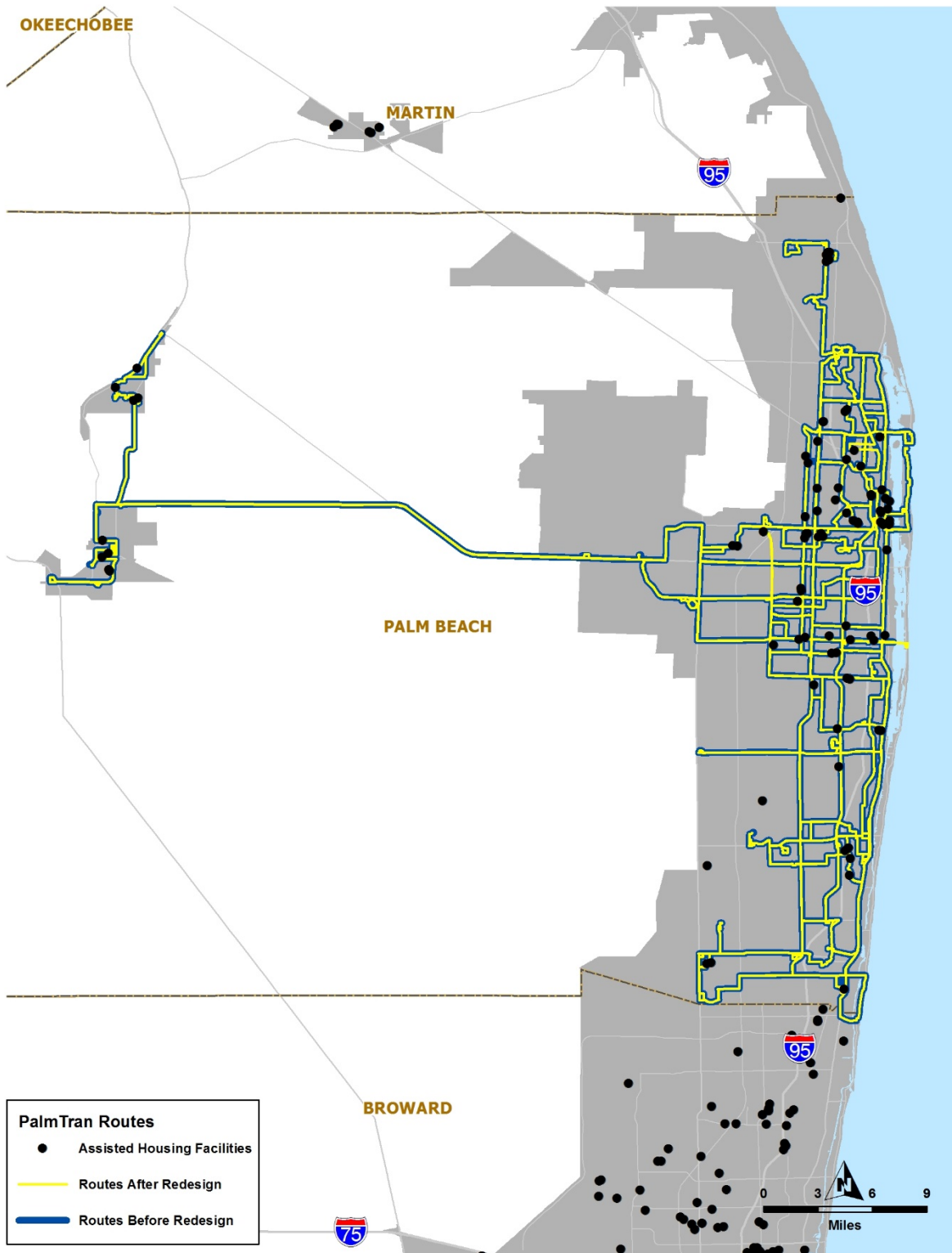
Figure 31: PalmTran System Accessibility After Redesign



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Data Sources: Florida DOT; Florida Geographic Data Library (FGDL); UF Shimer Center

Figure 32: PalmTran Fixed-route System Before and After Redesign



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Data Sources: Florida DOT; Florida Geographic Data Library (FGDL); UF Shimer Center

Table 20: PalmTran Accessibility at Major Transit Hubs

Major Hub	Time of Day/Week	Pre-RPM Within ¼ Mile		Post RPM Within ¼ Mile	
		Population	Jobs	Population	Jobs
Intermodal	7a, Weekday	240,141	171,293	286,368	177,990
Intermodal	11a, Weekday	174,667	129,014	305,112	187,773
Intermodal	5p, Weekday	196,365	151,016	286,771	182,615
Intermodal	10p, Weekday	138,352	111,709	294,791	178,729
Intermodal	530p, Sunday	133,831	99,181	219,880	150,208
Gardens Mall	7a, Weekday	92,235	58,091	143,212	94,832
Gardens Mall	11a, Weekday	115,237	68,205	147,338	91,778
Gardens Mall	5p, Weekday	111,042	65,811	151,759	96,574
Gardens Mall	10p, Weekday	142,443	93,922	204,534	117,655
Gardens Mall	530p, Sunday	92,150	64,307	84,991	55,021
Wellington Mall	7a, Weekday	136,308	33,624	274,955	123,373
Wellington Mall	11a, Weekday	156,718	47,678	256,640	89,002
Wellington Mall	5p, Weekday	157,306	48,422	249,189	85,268
Wellington Mall	10p, Weekday	78,340	29,456	301,593	101,592
Wellington Mall	530p, Sunday	47,820	14,542	92,101	24,372

Table 21: Palm Tran Mobility Pre and Post RPM Redesign

Frequency in Minutes	Previous Network		RPM Network	
>60	4	12%	2	6%
60	21	62%	14	44%
31 – 59	2	6%	8	25%
30	5	15%	5	16%
16 – 29	2	6%	3	9%
	34 Routes		32 Routes	

Table 20 above depicts significant improvements to accessibility at three major transit hubs.⁹⁶ Accessibility (measured as the total number of jobs and people within ¼ mile of each hub for each time measured) improved 113% at the Wellington Mall, 47% at the Intermodal Hub, and 31% at the Gardens Mall. RPM clearly expanded opportunity for transit riders when measured as accessible employment. From the maps provided in Figures 30 and 31, we see the greatest accessibility improvements in downtown Lake Worth and inland West Palm Beach. Both of these areas contain significant populations of seniors, zero-car households and households living under the poverty line. RPM's improvements to on-time-performance (73% to 82%) point to parallel

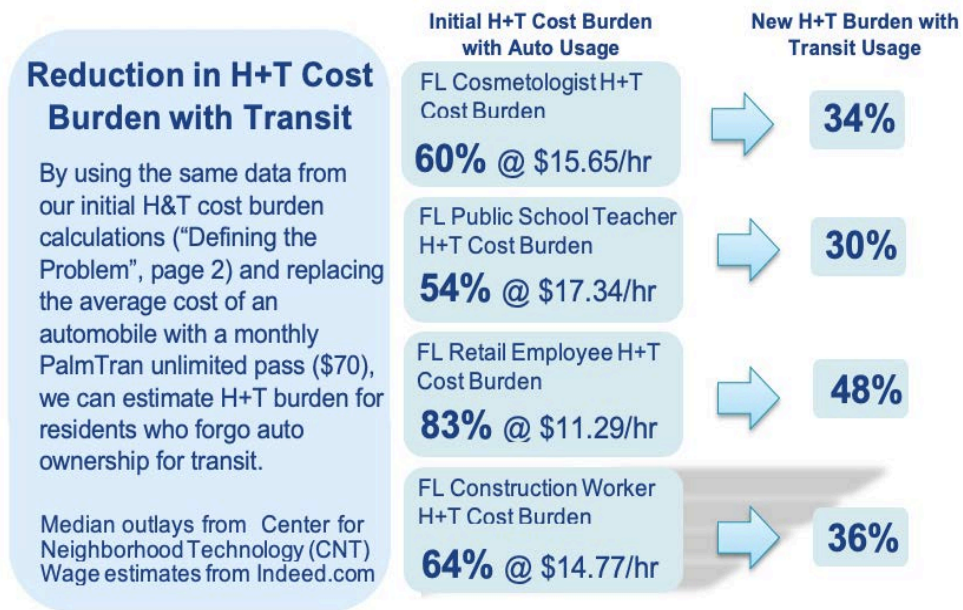
⁹⁶ PalmTran Transit Development Plan Annual Update (FY 2019 – FY 2028)

improvements to mobility throughout the fixed-route system. Table 21 depicts the improvements to frequency (mobility) at the system level. Seven routes improved frequency from 60 minutes or more to under one hour. PalmTran reports a ridership increase of nearly 5% for the first full year of RPM operation. The most recent NTD data available show an increase from 8.9 million passenger trips in 2017 to 9.1 million in 2018 (a 2.23% increase)⁹⁷. This increase in ridership breaks a 4-year trend of decreasing ridership.

Effects on Affordability

Figure 33 illustrates the reduction in H+T costs as a percentage of total income if the average commuter were to substitute auto ownership for a monthly transit pass for PalmTran.

Figure 33: Estimated Palm Beach County Housing & Transportation Burden Post Route Redesign



⁹⁷ iNTD Urban Transit Reports. Board of County Commissioners, Palm Beach County, PalmTran, Inc. (PalmTran). Directly Operated Motorbus.

Table 22: Coverage and Rent Burden Pre and Post Redesign

<i>Pre-RPM Redesign Coverage and Household Rent Burden</i>				
Travel Time to Destination	2019 Total Population	2014-2018 ACS HHs/Gross Rent 15-19.9% of Income	2014-2018 ACS HHs/Gross Rent 20-24.9% of Income	2014-2018 ACS HHs/Gross Rent 25-29.9% of Income
25 – 30	67,636	553	665	776
20 – 25	79,283	694	688	708
15 – 20	116,321	1,151	1,479	1,128
10 – 15	170,078	1,905	2,270	2,039
0 – 10	674,734	9,164	10,773	11,566
Total	1,108,052	13,467	15,875	16,217
Percent		1.22%	1.43%	1.46%
<i>Post-RPM Redesign Coverage and Household Rent Burden</i>				
Travel Time to Destination	2019 Total Population	2014-2018 ACS HHs/Gross Rent 15-19.9% of Income	2014-2018 ACS HHs/Gross Rent 20-24.9% of Income	2014-2018 ACS HHs/Gross Rent 25-29.9% of Income
25 – 30	65,515	581	658	774
20 – 25	74,629	568	633	598
15 – 20	114,714	1,134	1,433	1,067
10 – 15	170,809	1,865	2,276	2,028
0 – 10	681,421	9,218	10,904	11,694
Total	1,107,088	13,366	15,904	16,161
Percent		1.21%	1.44%	1.46%
PCT Change		-0.01%	0.00%	0.00%

Table 22 measures impacts on affordability through household rent burden, measured before and after the RPM system changes. Rent burden changes slowly over time. Palm Beach officials note in their most recent annual TDP update, the full effect of RPM on measures like this have yet to reveal itself in the data. Even so, we can see slight improvements to rent burden for households closest to transit stops (0 – 15 minutes to destinations). For those households further from destinations that have not seen a commensurate drop in gross rents, money saved on transportation costs as a result of using more transit can be reallocated to housing costs, effectively lowering rents. This effect may be playing a part in the decline of Palm Beach County’s ALICE population between 2016 and 2018.⁹⁸ ALICE – “asset limited, income constrained, employed” – workers earn more than the federal poverty level, but less than the basic cost of living for their area. Between 2012 and 2016, the Palm Beach County ALICE population rose from 174,000 to 192,000, a 10% rise over a period when county population only grew by 2.7%. By 2018, the first year of RPM’s operation, ALICE fell by 1.5% to 189,000. The continuing service impacts of the COVID-19 pandemic will undoubtedly obscure the effects of RPM going forward,

⁹⁸ Florida, 2018 County Profiles. <https://www.unitedforalice.org/county-profiles/florida>

but from the data currently available, it is clear the RPM initiative improved accessibility and mobility with some slight, but perhaps not-yet-significant, impacts to affordability.

Best Practices and Conclusion

The RPM system redesign provides three best-practices for considering the effects of transit on housing affordability. First, PalmTran clearly articulated their vision for the RPM initiative through the use of the coverage/ridership dichotomy. Although no system is simple enough to fit perfectly within one of the two approaches, this framing of the choices inherent to the planning process facilitates a dialogue that is understandable and meaningful for non-subject-matter-experts. The coverage/ridership frame appears in documents and publications throughout the planning process. Second, not only did PalmTran actively engage the public through a variety of forums and mediums during the planning process, they clearly incorporated public sentiment into the final RPM system. One of the central concerns of the public raised through the 1,400 survey responses was a lack of service at night and on weekends. This is especially important for low-income workers whose schedules often require commuting during these times. The RPM redesign offered increased service and frequency for both times. Lastly, the planners designing the RPM initiative understood and tailored the system to the demographics of their constituents. Recognizing the needs of their senior population, PalmTran's new system didn't compromise coverage for ridership. Where circuitous routes were identified, streamlined redesigns maintained coverage. This balancing act required a careful evaluation of both service gaps and duplication.

StarMetro

System Summary

StarMetro is the public transportation agency for Tallahassee, Florida. Tallahassee is the capital of Florida and has an urbanized area population of at least 251,045 (2017)⁹⁹. The urbanized area includes all of the City of Tallahassee and extends into portions of unincorporated Leon County and adjacent Gadsden County. The system is currently comprised of 22 routes of which 7 routes are dedicated to serve Florida State University. 55 buses are assigned to these routes, attracting an annual ridership of 3,289,053 in 2018.

Transit service in Tallahassee began in the late 1920s as Cities Transit, a for-profit transportation company that provided transit service in different cities in the southeastern United States. The system was purchased by the City of Tallahassee in 1973 and renamed 'TalTran'. For the next 38 years the system, renamed StarMetro in 2005, operated a hub-and-spoke system with all routes meeting at the central terminal, C.K. Steele Plaza. Prior to the change, the system had 26 routes meeting at C.K. Steele Plaza with the routes operating on a 20, 30, or 60-minute frequency. Every route was at the main terminal at the same time once an hour to facilitate transfers.

Nova2010

With only 26 gates at the main terminal, the system in 2009 was at capacity and any additional expansion (new service, higher frequency, etc.) would significantly stress the system. In addition, a 2009 survey of transit riders found that only 6.8% had a downtown destination while every bus

⁹⁹ <https://www.fdot.gov/planning/demographic/>

did. This information showed that the transit system was not meeting the needs of the customers and it was time to rethink how transit could be delivered in the community. These findings were presented to the City Commission in late spring as part of a periodic update. Staff was given the go ahead to reach out to the public and design a new transit system for the capital city.

The initial planning process for the new route structure focused on looking at areas with high employment density (Figure 34)¹⁰⁰. From there, it expanded to include a comprehensive origin and destination survey of both current riders and state government employees (the largest employer). Figures 35 – 38 highlight this analysis and confirm the findings that a relatively small percentage of total possible trips end downtown where the terminal is located. The goal of the new system was to increase ridership by targeting commuter trips and providing direct access to job centers. Once this initial analysis was completed, the new route concepts were shared with the public (Figure 39) for feedback.

¹⁰⁰ Nova2010 Final Report – March 10, 2010 City Commission Meeting

Figure 34: Nova2010 Concept Map - Employment Density Focus

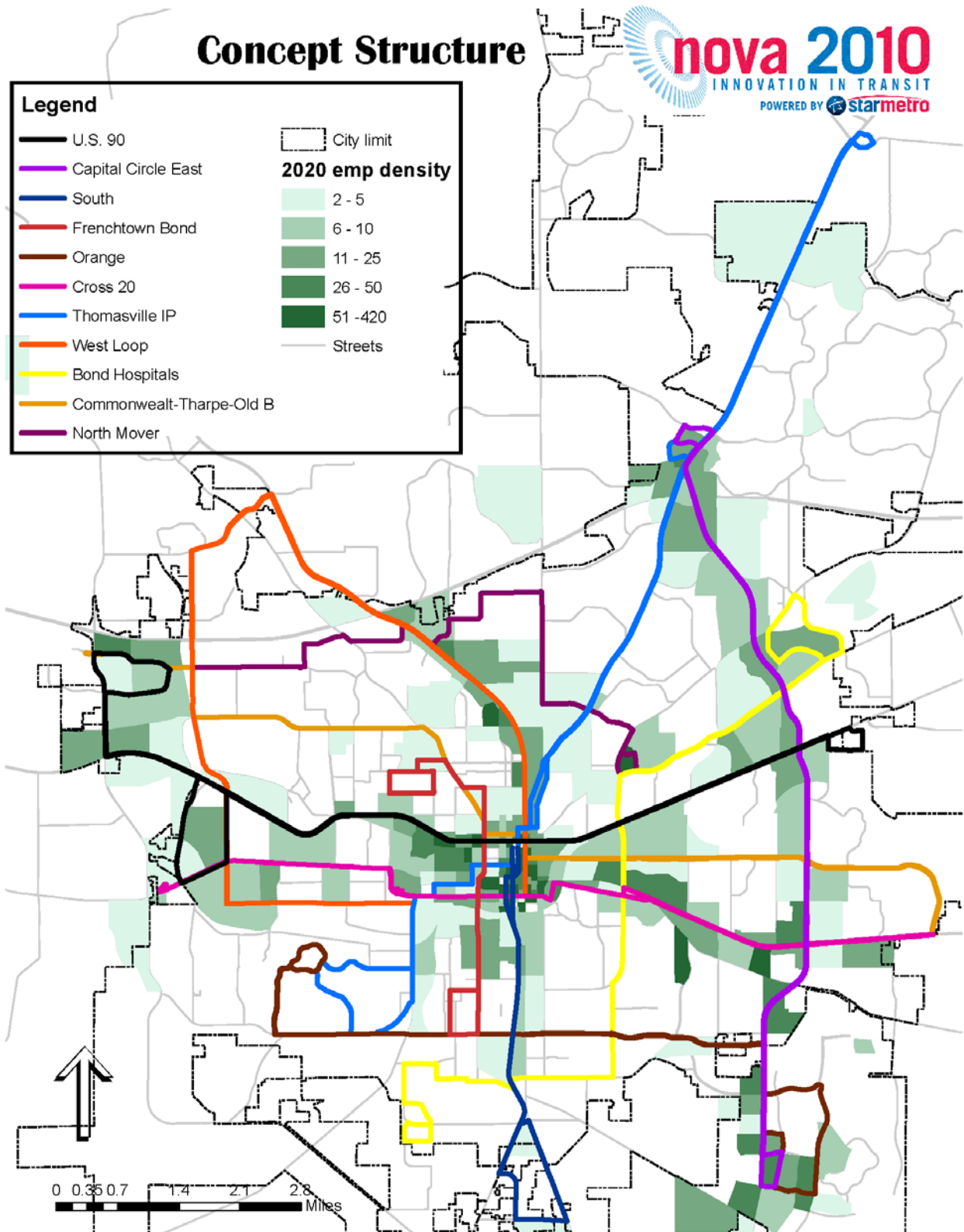


Figure 35: StarMetro Origin & Destination Study Results for Downtown Tallahassee

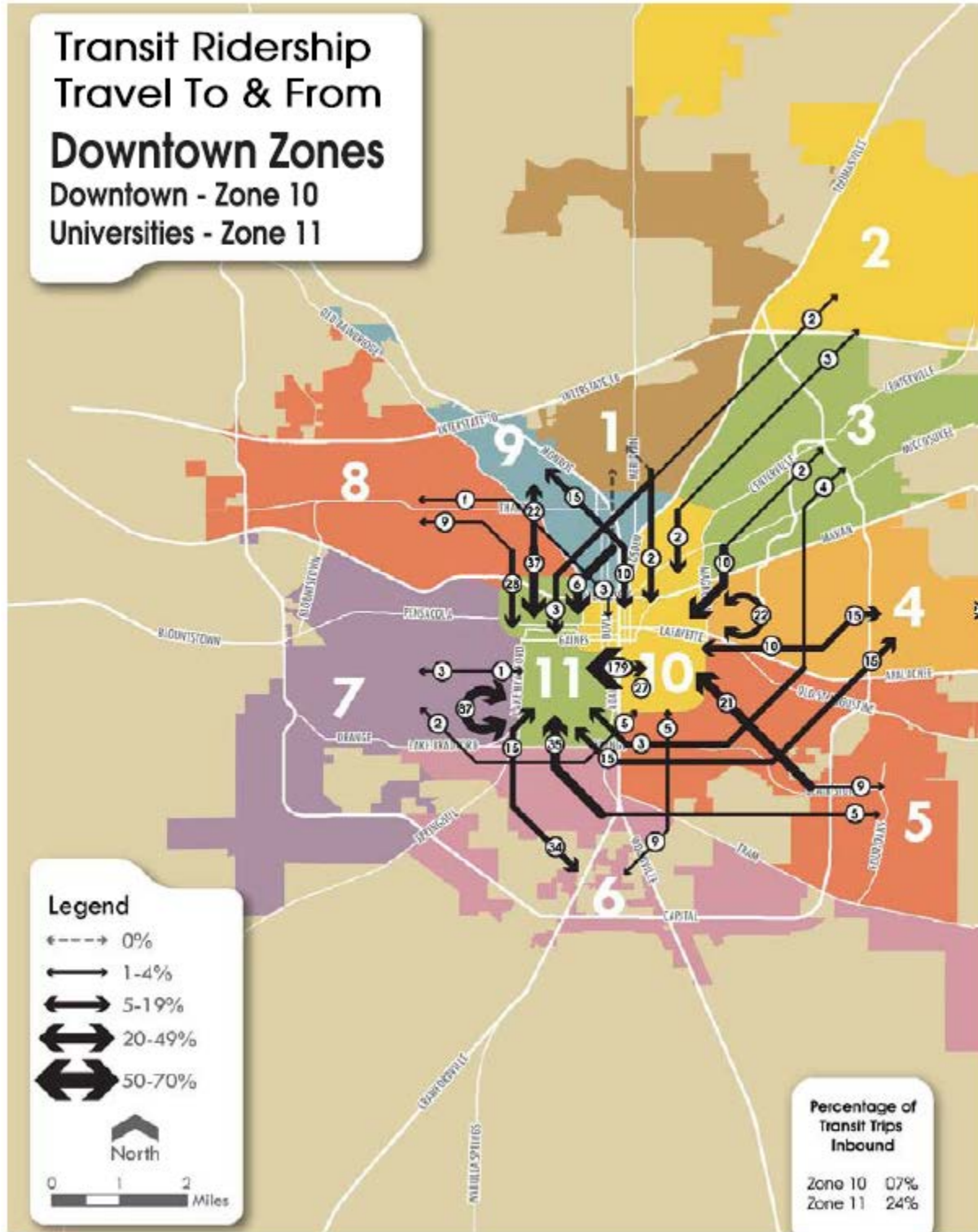


Figure 36: StarMetro Origin-Destination Study Results for Suburban Tallahassee

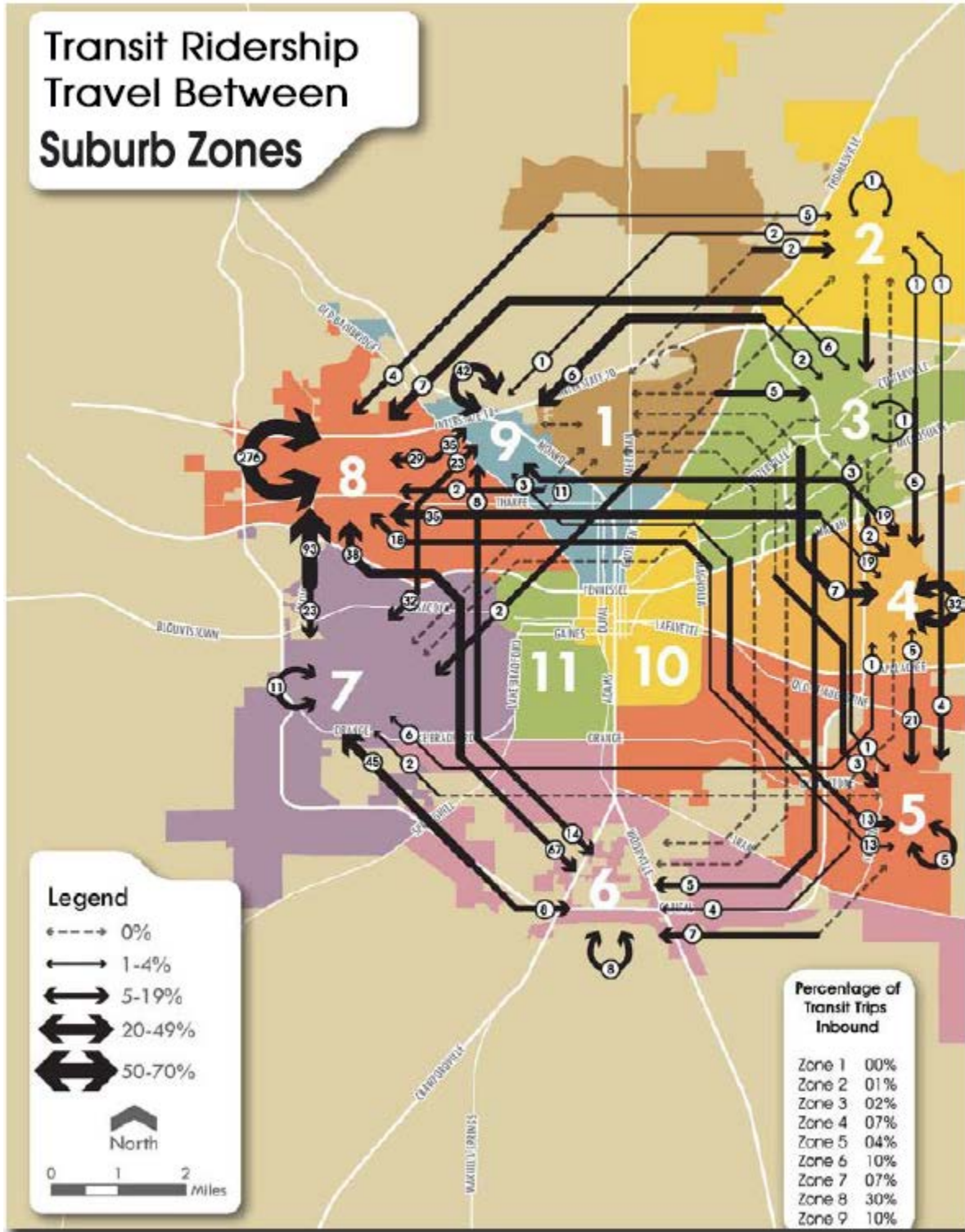


Figure 37: StarMetro Origin-Destination Study Results for State Workers in Downtown Tallahassee

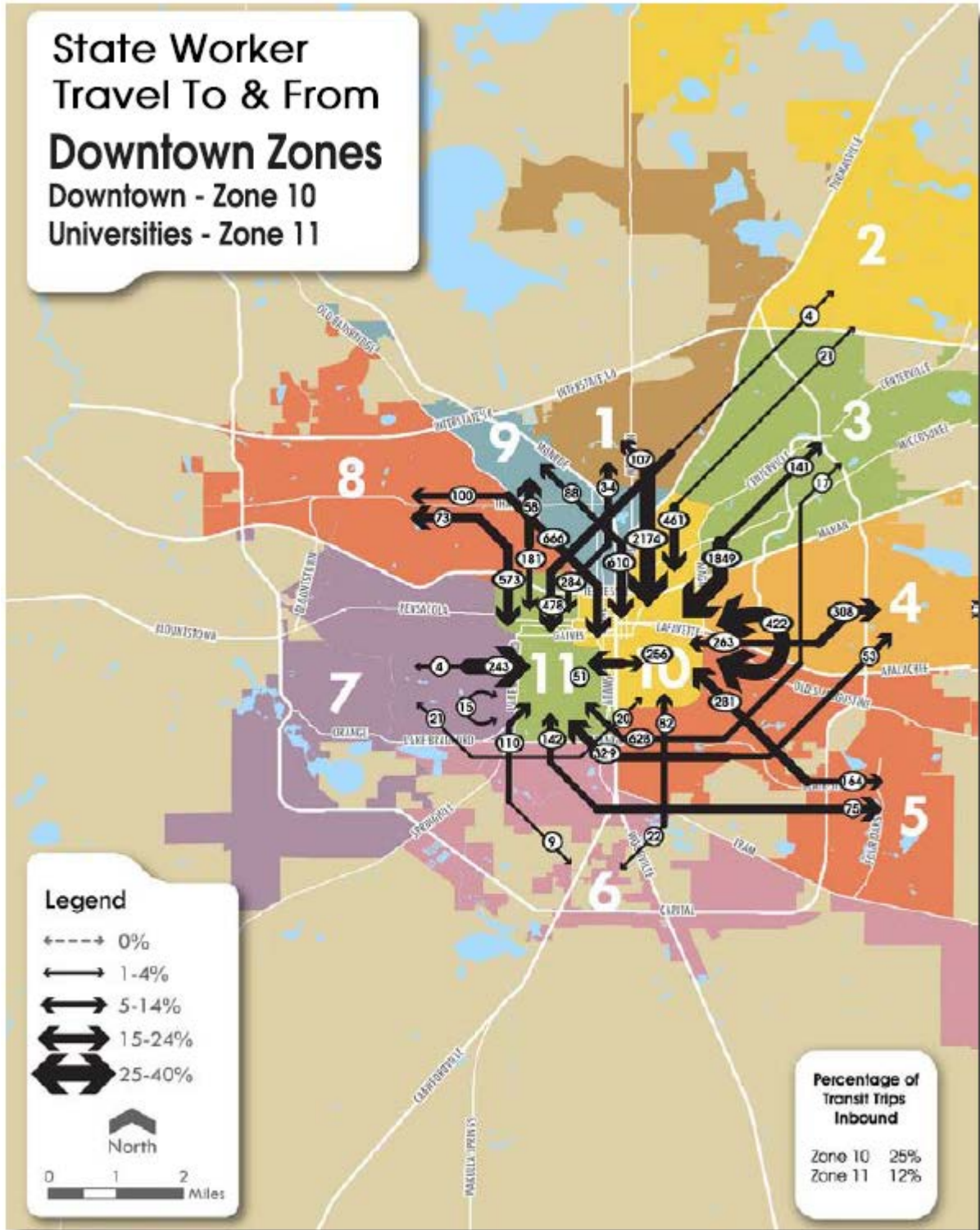


Figure 38: StarMetro Origin-Destination Study Results for State Workers in Suburban Tallahassee

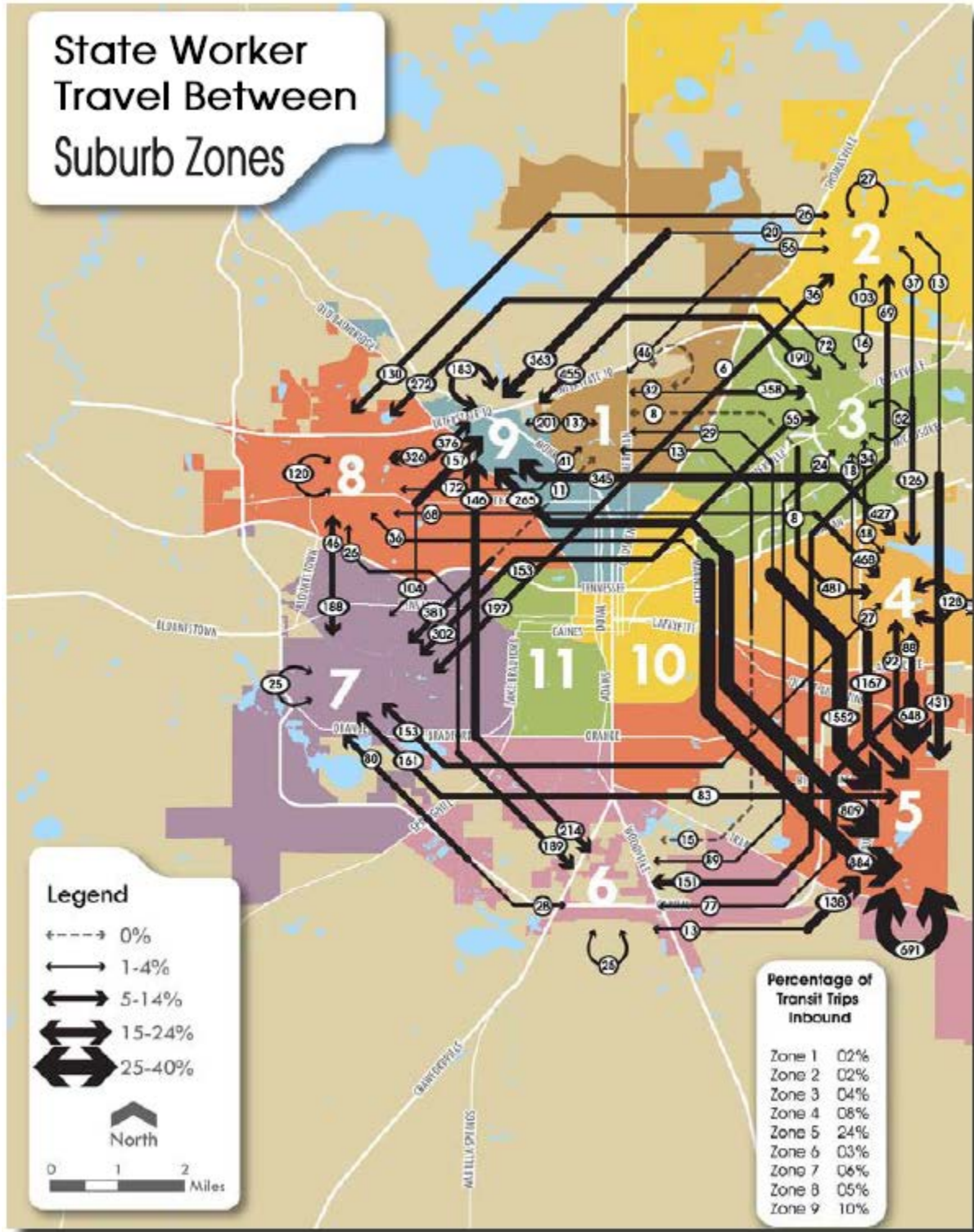
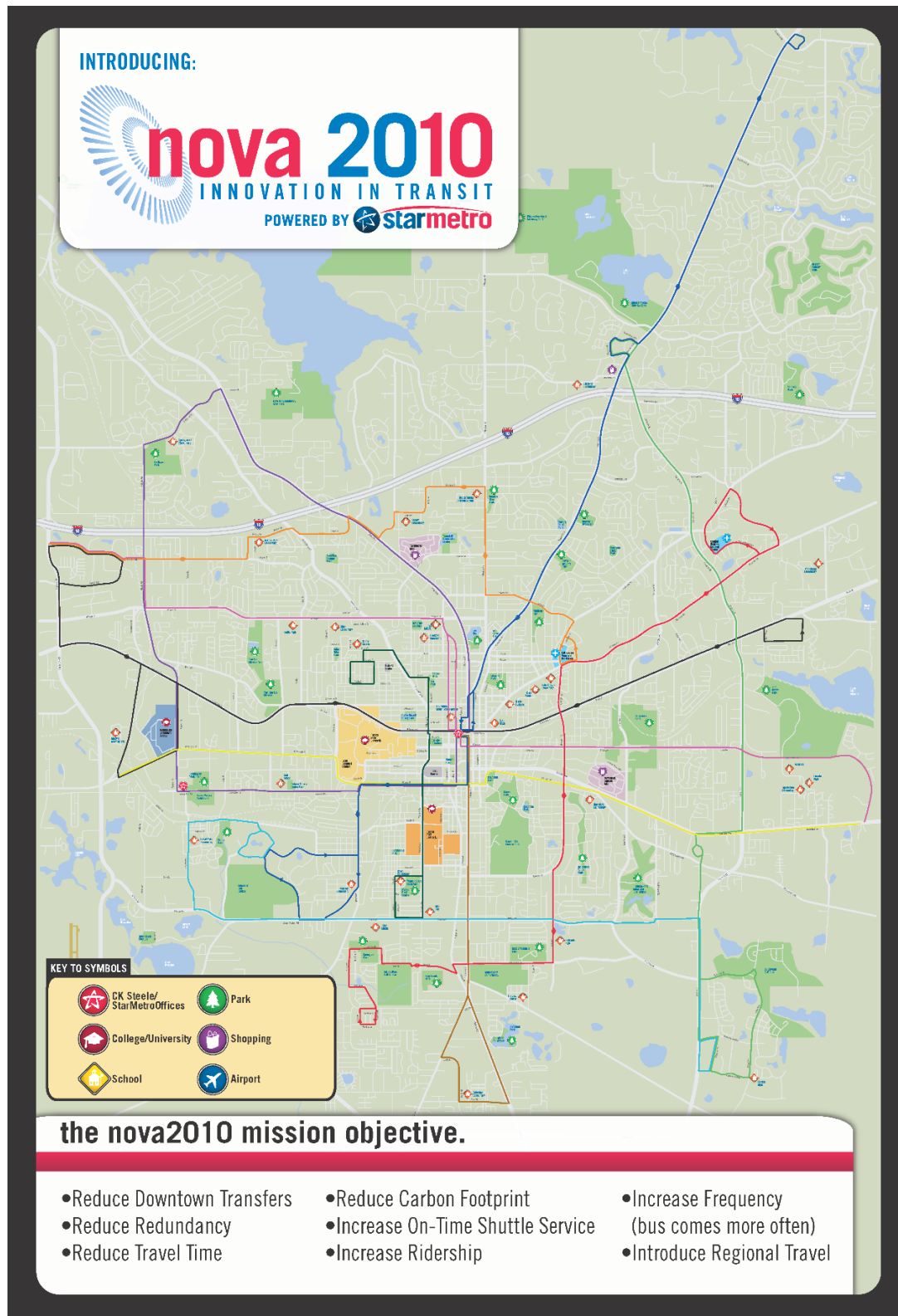


Figure 39: StarMetro Redesigned Fixed-Route System Map Version One



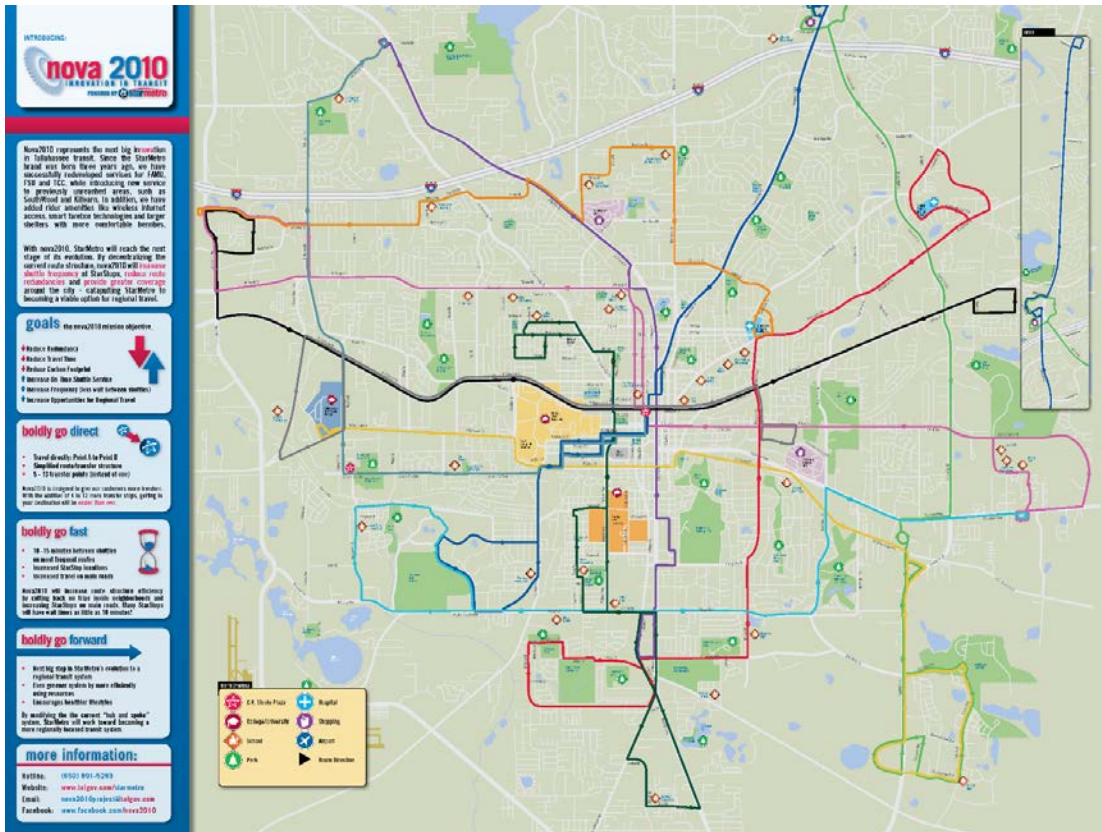
Through a series of public meetings, the routes and frequencies were refined to meet the needs of the community and to stay within the FY2010 operating budget. Over the course of three months, StarMetro staff held approximately 15 public meetings and attended 88 special interest group meetings. The special interest group meetings included Ability1st, SustainableTallahassee, Tallahassee Council for the Blind, and Council for Neighborhood Affairs. Utility inserts (Figure 40) were also distributed to 95,000 homes within the City of Tallahassee.

Figure 40: Example StarMetro Public Engagement Materials



*Front and Back display of Utility Bill Insert, which was distributed to 95,000 homes.

Figure 41: Final Nova2010 Route Design



“This is great! Nova2010 should have happened years ago!” – Public Comment received supporting the project.

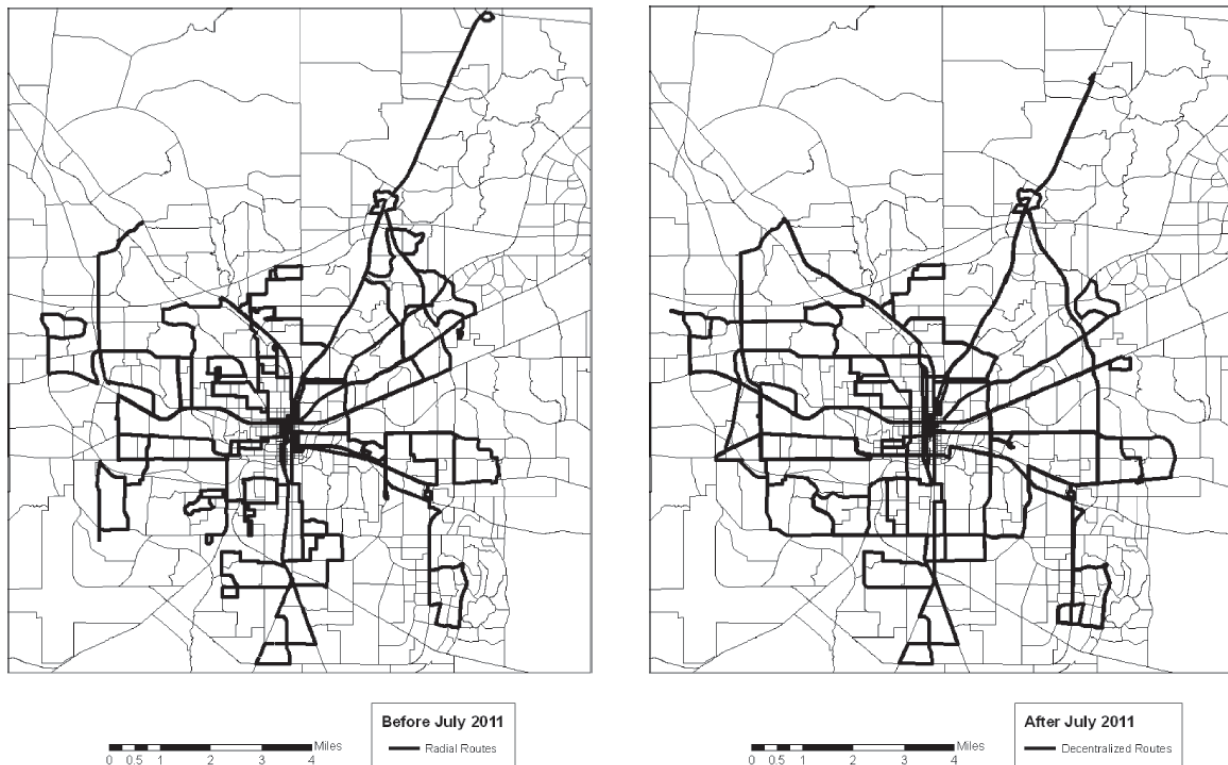
StarMetro staff spoke directly to over 1,500 residents of the City about this project. Of all of the different comments received, the majority were general comments about the nature of the project, with a third supportive. About 10% were against the proposed change. Each of the negative comments stemmed from a lack of service to a certain area. In response, staff would make changes to the map. Eight different route concepts were developed prior to finalization.

This final route structure (shown in Figure 41 above) was approved by the City Commission in March 2010, and the new system was implemented on July 11, 2011.

Analysis of System Change

Figure 42 shows the old StarMetro network and the new Nova2010 system. The Nova2010 Decentralization took place nine years ago. As a result, the project team was unable to get historic, pre-route change GTFS information. This lack of information meant that the team was unable to complete the desired ArcPro analysis of the networks to assess changes in accessibility. However, two research studies were done shortly after the implementation of the new route system that looked at changes in accessibility to minorities and low income population groups. The results of these studies are summarized on the following page.

Figure 42: Side by Side Comparison of Old and New System



Bhattacharya et al.¹⁰¹ sought to understand consequences of system restructuring, especially to those who are transit-dependent and legally protected groups under Title VI, through an accessibility analysis. Accessibility was defined as the number of destination opportunities accessible by transit, discounted by the total travel time it takes to reach them. This definition and approach is similar to the methodology used in this report.

The accessibility analysis consisted of two separate approaches: a review of survey data provided by StarMetro and a more analytical analysis on a Travel Analysis Zone (TAZ) basis. The survey analysis showed a decline in the number of riders who used the system more than five times per week (69% to 57%). The results suggest a modest increase in the use of the system by infrequent riders. Other findings from the survey showed an increase in the proportion of medical and other trips compared to work and school trips, indicating greater opportunities to reach these services. When looking at the TAZ analysis, the results showed a general increase in overall accessibility as indicated by an eight minute shorter travel time. The study concluded that the decentralized system can provide higher accessibility than a radial system for a typical resident of the service area.

The second study, Jaroszynski et al.¹⁰², looked more explicitly at the changes in travel time at the TAZ level and the impact of the route changes for socially or economically disadvantaged groups. The authors examined changes in origin–destination TAZ travel times, as summed by origin zone, and the change in accessibility by TAZ before and after restructuring. Figure 43 shows the spatial representation of these results. The upper map shows changes in total travel times for locations that were served by both networks. Darker colors represent reduced travel times and light colors indicate increased travel times. The map shows changes in travel time were unequally distributed across the community. Travel time reductions were observed primarily in outlying areas, while travel times for trips originating in many inner-city zones increased.

The lower map in Figure 43 illustrates the change in accessibility. The accessibility measure assigns more importance to origin–destination pairs that have a higher number of jobs at the destination end, and therefore are supposed to attract more transit trips. Darker colors show increased accessibility and lighter colors represent lower accessibility. On an average basis, accessibility was reduced by 1.18%. The changes were generally more positive in the outer areas. Accessibility in many core areas decreased because of lower service levels and increased travel times. Reduced accessibility also affected TAZs located at some distance from the major arterial roads.

¹⁰¹ Bhattacharya, T., Brown, J. R., Jaroszynski, M., & Batuhan, T. (2013). Restructuring from a Central Business District–Focused to a Decentralized Transit System: Case Study of StarMetro in Tallahassee, Florida, to Determine Restructuring Effects on Riders and Accessibility to Destinations. *Transportation Research Record*, 2350(1), 17–25. <https://doi.org/10.3141/2350-03>

¹⁰² Jaroszynski, M., Brown, J., & Bhattacharya, T. (2017). An examination of the relationship between urban decentralisation and transit decentralisation in a small-sized US metropolitan area. *Urban Studies*, 54(6), 1500–1518. <https://doi.org/10.1177/0042098015626687>

Figure 43: Spatial Representation of Travel Times by TAZ

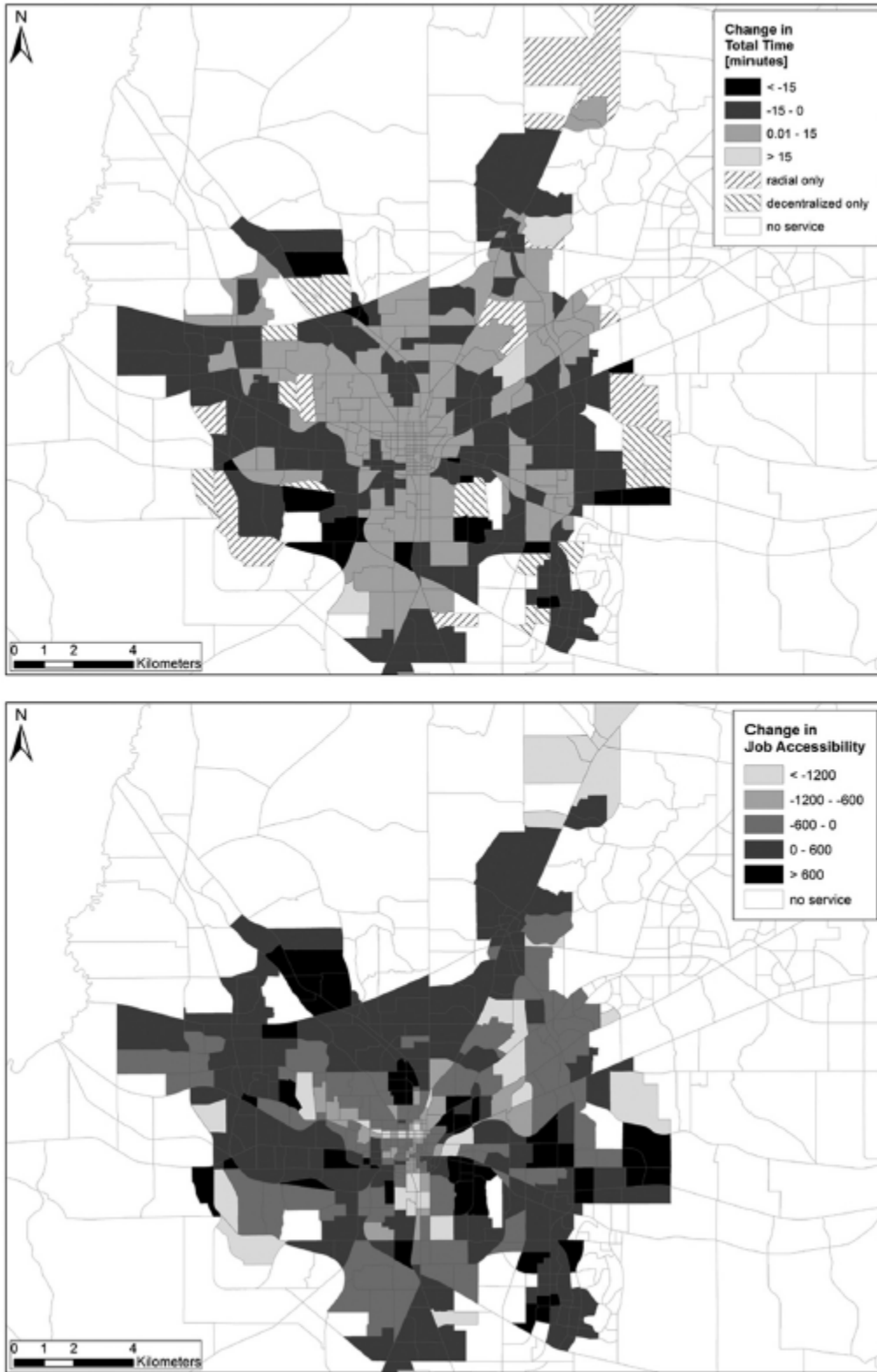


Table 23 presents the results for the effects of Nova2010 on the accessibility of socially or economically disadvantaged groups. The analysis looked at those TAZs with a higher than average share for these groups and compares it to other TAZs. The results indicate that network decentralization negatively influenced job access opportunities for riders originating from zones with higher shares of low-income residents, zero-vehicle households and populations between the ages of 18 and 24, a categorical proxy for college students.

Table 23: Accessibility Results of Nova2010 Among Disadvantaged Groups

Trip Origin TAZ Characteristics	Trip Destination Job Characteristics	Accessibility Change
All Zones		-5.1%
18-24 years share above average		-11.9%
African American share above average		-0.7%
Below poverty line share above average		-10.6%
Zero-vehicle households share above average	All Jobs	-13.2%
18-24 years old share below average		3.5%
African-American share below average		-7.9%
Below poverty line share below average		3.6%
Zero-vehicle households share below average		7.5%
All Zones	Jobs held by employees under 29 years	-4.3%
18-24 years old share above average		-10.6%
All Zones	Jobs held by African-Americans	-4.6%
African-American share above average		-0.1%
All Zones	Jobs with monthly wage under \$1250	-4.0%
Below poverty line share above average		-8.0%
Zero-vehicle share above average		-10.6%
Below poverty line share below average		2.4%
Zero-vehicle households share below average		6.6%
All Zones	Jobs with monthly wage above \$3333	-7.3%
Below poverty line share above average		-14.0%
Zero-vehicle households share above average		-16.7%
Below poverty line share below average		2.8%
Zero-vehicle households share below average		6.8%

Effects on Affordability

Since the launch of the Nova2010, StarMetro's ridership has steadily decreased from a high of 4.9 million in 2011 to 3.3 million in 2018, a 33 percent decrease. Some of the decline can be attributed to the loss of ridership agreements with Tallahassee Community College in 2014¹⁰³ and Florida Agricultural & Mechanical University in 2016¹⁰⁴. These contracts accounted for approximately 1.2 million trips annually. The loss of these contracts does not negate the impact of the system redesign. As shown by the research, there was a negative impact on accessibility

¹⁰³ <https://www.tallahassee.com/story/news/2014/05/12/tcc-unable-renew-bus-contract-students/9003629/>

¹⁰⁴ <https://www.tallahassee.com/story/news/2016/06/08/famu-starmetro-service-set-expire/85598988/>

for the low income individuals, potentially moving them away from transit to other modes of transportation. Therefore, the conclusion may be drawn that Nova2010 either did not change or increased the overall transportation costs within the community.

Nova2010 is the oldest route redesign assessed as part of this case study analysis. Therefore, the changes to the system did not end with the launch of the new system. Shortly after the launch, adjustments were made to the system in order to improve connectivity and to minimize the occurrence of missed trips. Additional changes to the system were made over the years to rebalance the resources and to address the accessibility issues raised by the aforementioned study. The most recent round of route changes, made in August 2019, addressed connectivity issues by improving on-time performance from an average of 79 percent to 82 percent with a high of 85 percent in February 2020¹⁰⁵.

Lesson Learned

Although there was a decrease in ridership and potential increase in overall transportation costs in the community, two lessons can be learned from the planning process to help illustrate the connection between affordable housing and transit system design. The first lesson learned is the focus on employment density instead of population density. Planners at the time argued that employment density is a stronger determinant of transit ridership than population density. This is not entirely a correct conclusion. Research shows total employment in a TAZ is a significant destination zone variable with zones with more jobs and smaller areas generating more trips (Thompson et al., 2012). Employment density is not shown to have a significant impact on predicting ridership. At the origin zone, population and median income are shown to be significant determinants. This does not mean there was no value in using employment density in the route design. StarMetro did meet the goal of providing direct service to major employers in the community; it just contributed to resources being moved away from the core, where more of the low income residents reside, in favor of connecting people to jobs.

The second lesson builds upon the previous. The planning process placed an emphasis on the housing-job connection, primarily for peak hour trips. However, work trips are not the most common trip made by households¹⁰⁶. Shopping, followed by social/recreational trips are the most common. When looking at low-income individuals, access to services is also important¹⁰⁷. Other than access to middle and high schools, the Nova2010 effort did not look at access to other destinations. It is important when designing routes to look at multiple trip purposes. This preserves accessibility for all individuals, especially those needing affordable housing.

¹⁰⁵ Email received from Andrea Rosser, Transit Planning Manager, received on 5/29/2020.

¹⁰⁶ 2009 National Household Travel Survey Florida Sample Analysis

¹⁰⁷ Transportation needs of low income population: a policy analysis for the Washington D.C. metropolitan region

Discussion

These case studies demonstrate transit’s influence on accessibility to jobs and services for low income households and affordable housing communities. As shown from the literature review, accessibility is shown to be a factor in overall transit ridership. Households that experience an increase in overall accessibility through the route changes would be more likely to use transit, which then in turn, lowers overall household transportation costs. The approaches and results from each of the case study redesigns provide valuable lessons on this relationship and how it impacts these households. These lessons learned are best illustrated in the context of the LYNX Route Optimization Study (ROS). This major system redesign was studied and proposed in 2018.

LYNX Overview

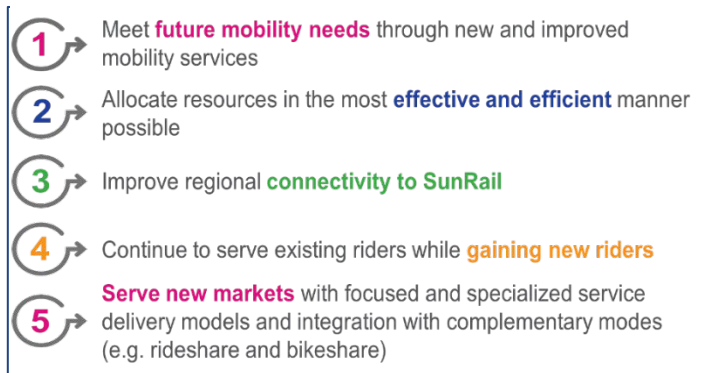
The Central Florida Regional Transportation Authority, or LYNX, serves the Orlando Metropolitan Statistical Area, providing transit service to Orange, Osceola, and Seminole Counties. The service began in 1972 and has grown to cover a service area of approximately 2,540 square miles. This main service area includes 22 incorporated cities ranging in size, density, and intensity. As of 2018, the service area population is 2.13 million residents.

LYNX mainly operates two types of transit service: general motorbus service and a vanpool program. The motorbus services consists of 76 bus routes operating 365 days a year. The motorbus services include local bus service, express bus service, commuter services, and bus rapid transit (BRT) in downtown Orlando. In FY2018, the fixed route service carried 24.6 million trips. The vanpool program offered by LYNX as an alternative to public transportation to individuals in the service area, relies on a large pool of sub-recipients to help offset the costs of owning a paratransit vehicle or van. The program transported 360,474 individuals in FY2018.

The ROS was initiated after the completion of the FY2018 – 2027 TDP Major Update. The purpose of the redesign was to create a long-term vision for the future that provided transit service more aligned to the needs of the areas it was serving, and to integrate the system with other travel modes, especially SunRail Commuter Rail, and emerging transportation technologies/services. Specifically the guiding principles of the ROS were:

- Improve service frequency;
- Match service levels and delivery methods to demand;
- Improve service reliability and travel time competitiveness;
- Streamline route structure;
- Enhance regional connectivity and travel speeds;
- Enhance system design clarity and usability; and

Figure 44. LYNX ROS Goals



- Apply alternative service delivery methods such as shared use mobility (e.g. Transportation Network Companies) and contracted mobility service¹⁰⁸

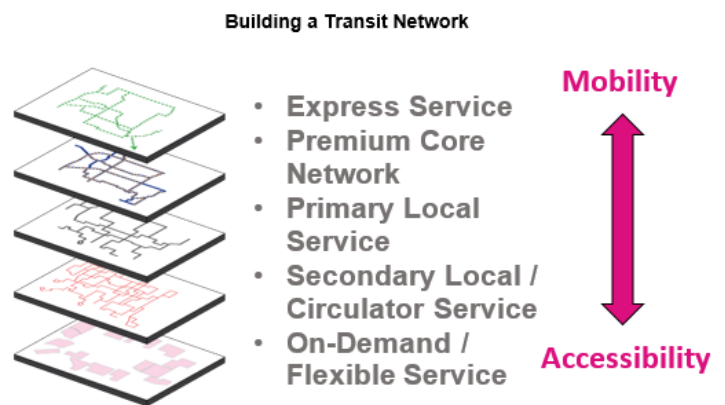
While the ROS has not been implemented as of writing this report, it is expected that the plan will lay the foundation for the future growth and development of the LYNX system. The ROS planning process provides a mechanism to illustrate the lessons learned from the previous case studies on the relationship between transit and accessibility for low income populations.

Lesson #1 – Planning with Accessibility in Mind

While none of the case studies explicitly established improving access/affordability for low income groups as a primary goal, at least two of the case studies factored in preserving access in the decision making process. This is evidenced by the ridership vs. coverage discussion present in the COTA and PalmTran examples. As previously stated, a ridership-based system values improving overall ridership by concentrating services along corridors and in dense areas where there is the greatest potential for ridership. A “coverage” oriented approach treats transit as an essential public service and focuses on providing equal levels of transit to all areas in the community. Focusing exclusively on one or the other either limits ridership growth or disenfranchises population groups. Both COTA and PalmTran recognized the need to balance these two approaches to route design. While they favored a ridership based system, coverage routes were included in the system design to preserve access and to feed riders into the higher frequency routes (Figure 45).

This lesson is present in the LYNX ROS with three route concepts considered with varying level of high frequency and flexible on-demand services (Figure 46). These concepts were discussed in greater detail at a subsequent workshop where the new network was finalized. The new network (Figure 46) is projected to increase access of low income populations by 121 percent, with 22 percent more low income individuals within ¼ mile of a frequent (15 minute or less) route.

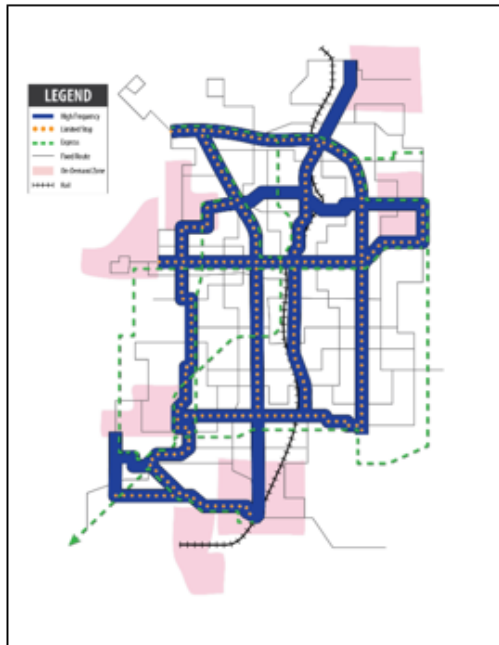
Figure 45: LYNX Proposed System Hierarchy



¹⁰⁸ Central Florida Regional Transportation Authority Forward – Route Optimization Study Long Term Plan, September 2018

Figure 46: LYNX Proposed System Redesign Alternative Scenarios

Concept 1 - High Frequency Core Local Route Network



Emphasis: High Frequency Local Corridor and Commuter Express Services

Travel Market: Short Corridor Trips and Work Commute Market

Advantages:

- Reduced wait and transfer times on major corridors
- High frequency on highest ridership corridors
- High frequency on commuter services

Disadvantages:

- Lower emphasis on regional trips and travel speeds
- Less frequent Limited stop and express services
- Does not reduce transfers or wait times outside major corridors

Concept 2 - High Frequency Limited Stop/BRT Service w/Regional Express



Emphasis: High Frequency Limited Stop and Regional Express Services

Travel Market: Moderate-Long Trips and Regional Travel

Advantages:

- Fast travel times across region
- Faster corridor travel times with Limited Stop Service
- Reduced wait and transfer times
- Increased On-Demand Service

Disadvantages:

- Lower emphasis on local bus frequency on major corridors
- Lower emphasis on short corridor trips

Concept 3 - High Frequency Limited Stop/BRT, Regional Express & On-Demand Services



Emphasis: High Frequency Limited Stop/BRT, Regional Express and On-Demand Services

Travel Market: Moderate-Long Trips and Regional Travel, neighborhood level

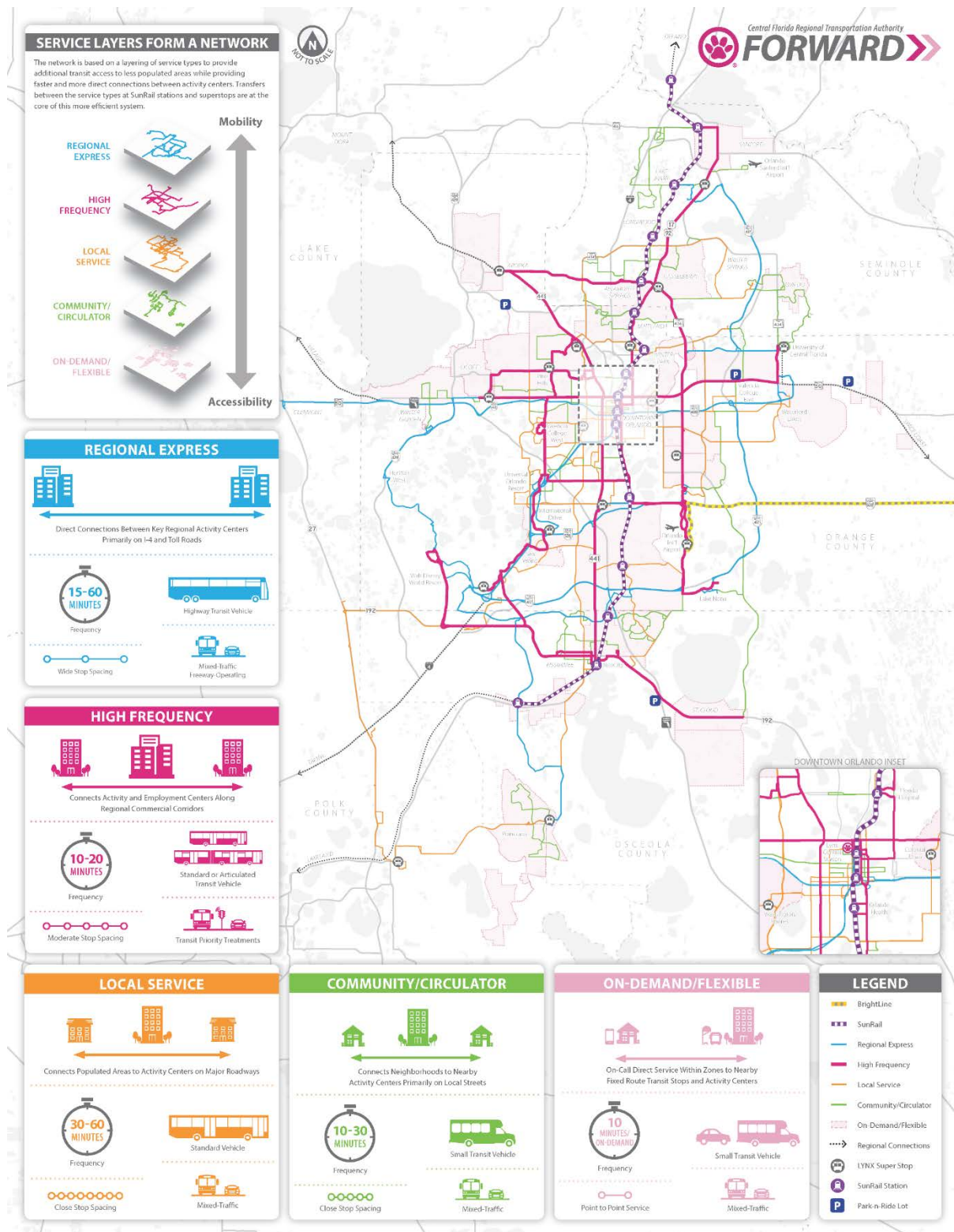
Advantages:

- Fast travel times across region
- Reduced wait and transfer times
- Greater coverage with increased On-Demand Service

Disadvantages:

- Lower emphasis on local bus frequency on major corridors
- Lower emphasis on short corridor trips
- Less robust local bus network (replaced with On-Demand Services)

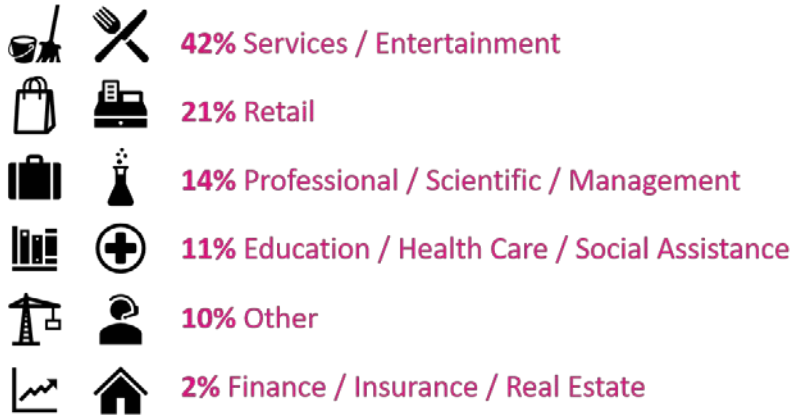
Figure 47: LYNX Proposed System Map



Lesson #2 – Considering All Trips

As evidenced by the StarMetro case study, planning for accessibility means planning for all trips, not just the work trip. This does not mean that StarMetro’s approach was incorrect. The initial focus on employment density, however, moved resources away from the central core to the suburbs. Low income residents have different needs with work outside of the traditional 9 to 5 hours and a greater need for access to services. Subsequent changes to the StarMetro system made after the implementation of the redesign sought to address this and to improve on-time performance. As for the other case studies, they took advantage of the redesign to expand night and weekend service to improve access to jobs and services during these off-hours. The expansion of transit services at night and on weekends helped to contribute towards the increased ridership reported by COTA, JTA, and PalmTran.

Figure 48: LYNX Rider Occupations



The LYNX ROS evaluated multiple trip types in the design of the recommended system. This started with an extensive on-board survey, conducted in 2017, to get an understanding of ridership demographics, where they work (Figure 48), and trip purpose (Figure 49). The surveys found nearly a third of the trips are between home and destinations other than the workplace,

Figure 49: LYNX Rider Trip Purposes



such as shopping, medical, or entertainment. The on-board survey along with a subsequent analysis of trip patterns to major activity centers provided the foundation for the concepts and final network design.

Lesson #3 – Integration of Other Transportation Modes

Transit planning is not done in a vacuum. It recognizes that changes made to the routes and the system lay the foundation for future growth and new services. The integration of premium transit or even enhanced bus, such as express bus or limited stop service, into the overall transit system requires a seamless transition from one mode to the next. This lesson is evident in the JTA Case Study. Their ROI is built around BRT corridors with high frequency, direct service that local routes and other services would feed into. The BRT corridors were identified early and had frequent traditional bus service on them that would be replaced with corridor based BRT service operating in mixed traffic. This approach allowed for low income populations to retain, and in some instances

increase, access to jobs and services. Even though some areas lost service, the increased mobility gained in denser areas increased access system-wide.

For systems that do not have plans for premium transit, this lesson still applies to make sure that there are as few barriers as possible between a person and the transit trip. Part of the implementation plan for Nova2010 was an emphasis on providing new amenities like sidewalk access along every route. While some customers had to walk further to their stop, the goal was having a safe path to the stop and a safe place to wait for the bus.

The LYNX ROS illustrates this lesson by planning the network around a high frequency route network. The high frequency route network serves as the skeleton of the transit system and operates on all primary regional corridors that serve the major travel movements across the region. As the system grows, these routes would either be replaced or augmented by premium transit service, such as BRT or rail. Additionally, the LYNX ROS recognizes the importance of the SunRail system in providing regional express service in Central Florida. The regional express routes were designed to provide the connections to and from the SunRail stations so customers could access major activity centers.

Lesson #4 – Public Engagement

All of the case studies had an extensive public engagement effort. Every organization studied reported numerous meetings, workshops, surveys, or other techniques to get feedback on what the new system was going to look like. These were not just standalone meetings. As part of their efforts, StarMetro held pop-up events at bus stops and the downtown terminal to make sure that there was significant public participation in the process. Input gained from these outreach events was incorporated directly into numerous route redesigns. Meeting with operators, as reported in PalmTran's RPM redesign, is equally important. Operators are on the front line and are able to explain the challenges some people may face when using the system. All of this engagement is needed in order to ensure that the new transit service meets the needs and addresses the concerns of as many stakeholders as possible.

Lastly, the LYNX ROS placed an emphasis on public engagement. This started with a comprehensive survey of existing riders to get an understanding of the needs of the current rider. Later in the process, public meetings, outreach events, ride-alongs, and other techniques were used to get feedback on the proposed system. Operator and staff meetings were also held twice to receive internal feedback. The first meeting in August 2017 was designed to collect information on service performance, challenges regarding provision of quality services, operational issues influencing service effectiveness and efficiency, customer comments and requests, system connectivity, service coverage and frequency, connectivity to SunRail, safety and security issues, and potential new service areas. The purpose of the second meeting, held in November 2017, was to collect specific information regarding routes and existing operations. A third meeting was held with Customer Service staff in December 2017 to get an idea of what customers need, the issues they face, and potential areas for improvement. All of the information gathered during these events helped to design the proposed system.

Summary of Case Studies

The case studies provide an opportunity to look at the planning process and see how the decision made affects accessibility for low income individuals and residents of affordable housing communities. By analyzing how accessibility changes, it is possible to assess the value of transit in helping a housing burdened individual to meet their transportation needs. If accessibility increases, then less of a burden should be placed on transportation costs leading to more money for household expenses. Conversely, if accessibility decreases, reliance on other transportation modes increases leading to higher transportation costs. The planning process associated with the route redesigns provide valuable lessons that can be used by other agencies on how they can preserve or even enhance accessibility for these residents. These lessons will be used to develop recommendations to improve the connection between transit and affordable housing in Florida.



Phase IV: Affordable Housing and Transit-Oriented Development



Affordable Housing and Transit Oriented Development

The presence of affordable housing near transit improves access for low-income residents and families to employment, health care, and educational opportunities while reducing their commuting costs. Access to **premium public transportation** (BRT, limited-stop, rail, and express routes) has the potential to decrease transportation costs by as much as 50% for households within a ½ mile of a premium transit station. While these transit-oriented communities (TOCs) are ideal for low-income individuals and families, increased access may come at a higher price than those in less accessible areas.

This phase seeks to better understand the relationship between affordable housing and premium transit, outlining the benefits of providing affordable housing near premium transit stations, and identifying strategies that can be used to preserve and develop affordable housing in transit-oriented developments (TODs). The project team conducted a literature review of TOD projects that have been successful in this endeavor, Capital Investment Grant (CIG) program grant applications to determine how affordable housing is evaluated in the application process, and finally the efforts FTA has made to advance TODs.

The Relationship between Affordable Housing and Premium Transit

The first phase of this report makes the case that affordability is a combination of transportation and housing costs. The average household spends roughly 19 percent of their income on transportation, with families living in auto-centered households spending as much as 25 percent on transportation costs. However, households in walkable neighborhoods with convenient access to premium transit such as TODs, spend only 9 percent of their income on transportation¹⁰⁹. These transportation savings can then be reallocated to housing, expanding affordability.

TODs create an ideal environment to manifest this relationship between premium transit and affordable housing. TODs also provide convenient access to jobs, schools, healthcare, shopping, etc. without the need for a car. Affordable housing and premium transit have clear benefits for society, the economy, and the environment. Unfortunately, providing premium transit increases land and housing costs. It is important for government to have policies in place to preserve affordability and encourage mixed-income development within transit station areas. The following section explains the benefits of providing premium transit access with affordable housing.

Benefits of Providing Affordable Housing with Premium Transit

Premium transit access eliminates the high costs of car ownership – which can be upward of \$8,000 per year according to AAA – providing households with increased wealth to spend on housing. Reducing transportation costs creates a domino effect, producing many more benefits. For example, improving affordability through premium transit access creates connections to better jobs and schools leading to more opportunities for upward mobility in society. Upward mobility

¹⁰⁹ Center for Transit Oriented Development, “Realizing the Potential: Expanding Housing Opportunities Near Transit”

prevents poverty, improves quality of life, increases spending in the economy, etc. Refer to Table 24 below for additional benefits realized through premium transit access.

Table 24. Benefits of Providing Affordable Housing with Premium Transit

BENEFITS OF PREMIUM TRANSIT ACCESS	
SOCIAL	
•	Reduced transportation costs
•	Increased household wealth
•	Increased mobility options (walk, bike, car share, transit)
•	Improved health and wellness
•	Improved quality of life
•	Prevent poverty pockets
•	Increased traffic safety
ECONOMY	
•	Increased local spending
•	Connect workers with jobs and vice versa
•	Cheaper land development
•	Infrastructure savings
•	Economic resiliency
ENVIRONMENT	
•	Reduced greenhouse gas emissions
•	Increase in green space

Best Practices and Strategies to Preserving and Developing Affordable Housing through Premium Transit

Transportation planning is a comprehensive process, impacting nearly all aspects of our daily lives. In order to prosper, there must be access to jobs, schools, goods and services, healthcare and entertainment whether it be by foot, bike, personal vehicle, public transit, etc. Reducing the cost of commuting to these activities puts money back into our pockets especially for the number one expense, housing. Specifically, premium transit access and TOD significantly decrease the cost of housing by reducing transportation costs. Transit planners and agencies have the ability to contribute to the supply of affordable housing through the development of partnerships, plans, policies, and strategies that support preservation and development of affordable housing around

transit. In an effort to establish best practices, the project team conducted a literature review to understand what policies/plans/strategies transit agencies have successfully deployed to increase the supply of affordable housing. Below are some examples of what agencies have done to improve affordability.

Plans, Policies, and Strategies to Increase the Supply of Affordable Housing

Sound Transit - Seattle, Washington

Sound Transit has established policies, dedicated funding sources, and partnerships with the community and stakeholders to preserve affordability near station areas. Below are examples of successful strategies Sound Transit has utilized to address the affordability crisis in their region.

Surplus Property Policy

As part of the Equitable Transit Oriented Development Policy, legislation was enacted relating to disposal of surplus properties that are suitable for the development of housing. The statute reads “unless certain exceptions apply, a minimum of eighty percent of [Sound Transit’s] surplus property to be disposed or transferred, including air rights, that is suitable for development as housing, must be offered for either transfer at no cost, sale, or long-term lease first to qualified entities that agree to develop affordable housing on the property, consistent with local land use and zoning laws¹¹⁰.” The statute defines qualified entities as local governments, housing authorities, and non-profit developers. So far, over 1,300 housing units have been built or are planned for Sound Transit surplus property, with over 80 percent of them affordable to those earning 80 percent of area median income or below.

Revolving Loan Fund

Sound Transit will contribute \$4 million a year for five years to create affordable housing near high-capacity transit stations. To ensure the loan funds are used effectively, Sound Transit retained Local Initiatives Support Corporation (LISC) in July 2019 to help develop a business plan for implementing the program. LISC initiated a needs assessment in conjunction with Sound Transit to identify notable gaps in affordable housing finance that the Revolving Loan Fund may fill. Extensive public engagement activities continue to ensure the funds are allocated appropriately.

Integrated Project Delivery

Sound Transit facilitates TOD through all phases of its transit projects including early system planning, design, construction, and transit system operations. The agency documents evaluations and decisions to ensure continuity throughout project delivery. Sound Transit utilizes TOD, urban design best practices and engagement with local communities to plan and design station areas that integrate with the surrounding community and promote agency and community TOD opportunities.

¹¹⁰ Sound Transit, RESOLUTION NO. R2018-10 Adopting an Equitable Transit Oriented Development Policy

Partnerships

Sound Transit continues to build partnerships with cities, transit agencies, housing departments, developers and other entities to advance their mission to increase the supply of affordable housing. Examples of partnerships include:

- Exploring a potential agreement with the City of Seattle’s Office of Housing on an affordable housing program, focused on homeownership.
- Formed an interagency team with the City of Seattle (Office of Housing, Department of Transportation, Office of Planning and Community Development, Parks and Recreation), King County Metro, and King County Wastewater Treatment on an effort to implement a town center vision at a specific station area.
- Working with local jurisdictions, affordable housing funders, community members, and development partners on the development approach and on specific development opportunities, as well as exploring how resources may be strategically aligned to streamline the development pipeline and support affordable housing outcomes throughout the region.

Prince George’s County, Maryland

Prince George County¹¹¹ initiated a study looking at ways to attract development and maintain affordability around station areas. The study examined the market, policy and political barriers to integrating affordable housing around the county’s Metro stations.

Reducing the Cost of Development

Prince George’s County identified that the county’s development fees, especially those levied at the start of the project, represent a key barrier to engaging in development projects. The County has proposed some proactive measures to reduce development impact fees, especially around mixed-use zones.

- Partial refund for developer application fee if the developer chooses to withdraw, or if the application is rejected.
- Reduce, eliminate, or subsidize parking requirements- Parking is costly for developers and has the potential to reduce developable land for affordable housing.

Simplifying the Approval Process

The application process is time consuming and therefore costly for developers. Expediting the approval process and outlining a more transparent timeline can save developers millions.

Risk Sharing Mechanisms

These measures show developers that the county and its staff are invested and can instill confidence when developers are sensing uncertainty. Minimum revenue guarantees would reduce the risk for the developer.

¹¹¹ Transit-Oriented Development and Affordable Housing in Prince George’s County: A Case Study Approach

Courting Developers with Greater Capacity

Discourage preferential treatment for county-based/regional developers. National and publically traded developers have easier and cheaper access to equity and debt financing. They also generally have increased staff capacity allowing them to take on more complex projects such as TODs.

Capitalizing the Housing Trust Fund

Housing Trust Funds have demonstrated positive contributions to preserving and promoting affordable housing around the country, including at TODs. These funds help preserve or produce affordable housing by providing grants or issuing loans that nonprofits or market rate developers could use to close a financing gap or use as leverage to attract additional funding.

Funding Preservation Efforts

Provide preservation tax credits for multifamily development owners who maintain affordable units. The revenues generated by the sale of these tax credits could be used to help capitalize the Housing Trust Fund.

Expanding Preservation Opportunities

Expand the Conversion to Rental Housing Act to require owners who wish to sell any multifamily unit located in a transit-oriented zone or Regional Transit District to give the Department of Housing and Community Development (DHCD) the right of first refusal (ROFR) to purchase the property. If the county decides not to purchase the property or lacks the funding, a condominium conversion tax could be levied at the time of sale to help capitalize the Housing Trust Fund.

Development of Air Rights

An often-overlooked space to build affordable housing is on top of existing publicly-owned buildings. Public facilities are not usually built to their allowable height limit. Transferring development rights to build workforce housing provides housing for the agencies' employees and increases the available affordable housing stock in the area.

Interim Land Uses and Zoning Ordinances

Interim land uses and zoning ordinances allow for a short-term use of land until a certain threshold is reached for development of affordable housing. They can be used to deter uses that the market may demand at the moment but that would interfere with long-term goals for the properties.

Linkage Fees and Density Bonuses

Linkage fees require the developer to pay a fee toward the housing trust fund in lieu of providing affordable units. Bonus densities allow for additional units beyond the permitted density if they are affordable.

Inclusionary Zoning (IZ)

Inclusionary zoning requires a percentage of housing be affordable in areas around transit stations.

Accessory Dwelling Units (ADUs)

Accessory dwelling units allow for developing affordable housing units within a single family home. This could be an excellent way to preserve existing affordable housing by helping to keep lower

income households in their current homes if market pressures would otherwise result in displacement.

Partnership with Washington Metropolitan Area Transit Authority (WMATA)

WMATA owns a significant amount of property directly adjacent to the five Metro stations in the Prince George study area which could be used to develop TOD affordable housing. Since WMATA lacks a dedicated funding source, it makes sense that it would prefer to engage in market-rate joint development projects in which they can maximize their value capture for the ongoing benefits of their investment in the Metro system.

LA Metro

The Los Angeles Metro developed a Transit Supportive Planning Toolkit which details specific policies and programs that can be used by local governments, stakeholders, and developers to promote TOCs. The policies and programs related to preserving and increasing affordable housing are described below.

Joint Development Policy

- 35% of all housing units in Metro joint developments, portfolio wide, will be affordable housing
- Metro may discount the land value of its joint development sites to up to 30% of the fair market value on sites accommodating affordable housing
- The proportional discount of the ground lease may not be greater than the proportion of affordable units to the total number of housing units in the project, with a maximum discount of 30%. For example, land value for a project that has 20% affordable units could be discounted up to 20%. Land value for a project with 100% affordable housing could be discounted up to 30%¹¹².

Metro Affordable Transit Connected Housing (MATCH) Program

The MATCH¹¹³ program will assist in increasing the affordable housing supply by creating new affordable housing projects and preserving existing, naturally occurring lower-rent housing threatened by increasing land values and rents. The LA Metro will contribute \$9,000,000 over 3 years.

Density Bonus

To encourage private developers to design and build transit-supportive projects, jurisdictions can provide incentives and/or bonuses to projects that are located in transit zones, and/or provide benefits to the community, such as affordable housing. Depending on the percentage of affordable units, developers can earn up to a 35 percent density bonus.

Parking Requirements

Reducing the number of parking spots required results in additional space for affordable housing and encourages walking and transit usage.

¹¹² https://www.metro.net/projects/joint_dev_pgm/affordable-housing/

¹¹³

http://media.metro.net/projects_studies/joint_development/images/jdp_housing_board_report_20160816.pdf

Inclusionary Zoning

Inclusionary zoning encourages developers to reserve a portion of housing units for low-income residents as a condition of permitting approval. Possible incentives include density bonuses, expedited permits and approvals, relaxed design standards, or and/fee waivers¹¹⁴. Effective IZ policies include:

- Restricting off-site compliance to sites located within ½ mile of a transit station
- Discouraging use of in-lieu fees and focusing efforts on building affordable units as part of the proposed development project
- Allowing developers to meet inclusionary requirements through 100% affordable buildings, instead of requiring buildings to feature a mix of market-rate and affordable units. This allows market-rate developers to contract with nonprofit developers to produce and manage affordable housing more efficiently.

Linkage Fees

Linkage fees¹¹⁵ are a type of development impact fee charged to developers in order to preserve affordable housing and are designed to address the financing gap associated with building affordable housing. The City of Los Angeles is currently developing an Affordable Housing Linkage Fee program to establish a permanent source of local funding for affordable housing and to keep developers accountable for contributing to the affordable housing stock.

Community Land Trusts (CLTs)

Community Land Trusts (CLTs)¹¹⁶ purchase and retain ownership of land to ensure ongoing use for community purposes and are often established to promote long-term affordability for renters and homeowners. CLTs retain ownership of the land beneath homes and multi-family buildings, even after these buildings are sold to income-qualifying households or other nonprofits. By doing this, CLTs permanently remove the price of land from the home's cost, reducing the degree to which rising land values inflate the cost of the home when property changes hands.

Applications to Transportation Planning Process

The Capital Investment Grant (CIG) Program and Affordable Housing

The Federal Transit Administration's (FTA) discretionary CIG program provides funding for fixed guideway investments such as new and expanded rapid rail, commuter rail, light rail, streetcars, bus rapid transit, and ferries, as well as corridor-based bus rapid transit investments that emulate the features of rail. There are four categories of eligible projects under the CIG program: New Starts (NS), Small Starts (SS), and Core Capacity. Each project must meet certain criteria and receive an overall medium rating on a scale from low to high in order to be eligible for funding. Affordable housing is included in the land use and economic development criteria. Appendix E provides the questions and example answers as well as the basis for each rating, low to high as assigned by the FTA. Additionally, the research team reviewed one CIG NS applications and two

¹¹⁴ <https://www.metro.net/projects/tod-toolkit/inclusionary-zoning/>

¹¹⁵ <https://www.metro.net/projects/tod-toolkit/linkage-fees/>

¹¹⁶ <https://www.metro.net/projects/tod-toolkit/community-land-trusts/>

CIG SS applications (case studies) and analyzed the rating assigned by FTA. The case studies are documenting in the following section.

Case Study 1: Kansas City Streetcar- Main Street Extension, New Starts Project Development

Project Description:

The Kansas City Downtown Streetcar went into operation in May 2016. The 2.2-mile line has provided more than 4.9 million trips since opening day (over twice the projections). Due to overwhelming support and enthusiastic public interest in extending the streetcar, Kansas City submitted a NS grant application in 2019 to extend the streetcar 3.5 miles south from its current terminus. The 3.5-mile-long Streetcar extension route has nine planned stations, including Union Station, 27th Street Station, 31st Street Station, Armour Boulevard Station, 39th Street Station, 43rd Street Station, 45th Street Station, Plaza Station and UMKC Station. The corridor touches five residential neighborhoods, two mixed-use neighborhoods, one museum district, and one educational district.

Tools to Maintain or Increase the Share of Affordable Housing:

- i. The evaluation of corridor-specific affordable housing needs
 - a. The evaluation was primarily based on a survey of Kansas City residents to determine their housing needs and preferences. The survey showed support for plans and policies to support housing affordability which aligns with the goals of the City in developing and establishing a housing policy.
 - b. The city developed an analysis tool to compare the number of households in various income bands against the number of housing units in various rent and home value ranges.
- ii. Plans and Policies to preserve and increase affordable housing in region and corridor
 - a. The city began undertaking efforts to develop and adopt a housing policy in 2017.
 - b. To date the city has passed several ordinances to preserve affordability. The creation of a new housing trust fund was established to preserve existing housing for use as affordable units and provide funding to encourage home ownership. The City removed regulatory barriers for construction of new affordable housing units and established “safe harbor” provisions allowing for waiver of fines/liens and reprieve for code violations on residential properties newly acquired by redevelopers for its rehabilitation and reoccupation.
- iii. Adopted financing tools and strategies targeted to preserving and increasing affordable housing in the region and corridor
 - a. The city offers 100 percent tax abatement for up to 25 years as well as exemption on sales taxes on construction materials through redevelopment programs.
 - b. Tax Increment Financing:
 - i. The Midtown RAMP (Rehabilitation Assistance for Midtown Properties) Program is in the Streetcar Corridor and has provided matching grant funds to single-family residential property owners and small-scale multi-family developments within a mile of the redevelopment site and preserved 409 units

- of single-family housing, 20 units of rental conversions and 96 units of multi-family.
- ii. Midtown Business Interruption Fund (MBIF): \$11M in MBIF funds was used to rehabilitate three historic multi-family properties and strategic land assembly along the Armour Boulevard corridor, which bisects the proposed streetcar extension route. This resulted in the rehabilitation of almost 1,700 residential units, including 120 affordable units.
 - c. Midtown Proactive Affordable Housing Abatement Program: This plan is being designed specifically to address gentrification pressures ahead of the streetcar extension. The focus is on housing that would be affordable to residents at 70 percent of AMI or below. The program will offer up to 25 years of tax abatement (100 percent for the first 10 years and 50 percent for the following 15 years) to developers who would incorporate at least 15 percent affordable units.
- iv. Evidence of Developer Activity to preserve and increase affordable housing in the corridor
- a. The City has aggressively utilized tax abatement and tax increment financing to redevelop residential corridors in proximity to the proposed Streetcar Corridor, including partnerships to redevelop over 24 historic buildings along the Armour Boulevard Corridor, multiple redevelopment projects along Broadway with other national developers, and investments through its RAMP program in the vicinity of the Midtown Marketplace.
- v. Extent to which plans and policies account for long-term affordability and needs of very & extremely low-income households
- a. The city will support policies/partners, and provide federal/state/local funding for developments that provide preservation efforts for Low Income Housing developments and HUD subsidized development housing units for the most vulnerable residents.
 - b. Support leveraged financing and recommend allocating federal funding for mixed income projects that are consistent with redevelopment plans such as transit lines that remove the mobility and accessibility barrier.
 - c. Partnership with the Housing Authority of Kansas City to increase and preserve the number of publicly owned affordable housing units for very low and low income residents.

FTA Rating Analysis

The NS application received a **medium-low** score from FTA for the AH criteria. From the team's analysis provided in the section above, it can be assumed that the medium-low ranking was the outcome for the following reasons:

- The City does not have a fully developed and adopted AH plan and policies to preserve and develop AH in the Streetcar corridor; however, they have developed a housing trust fund and removed some regulatory barriers.
- There are dedicated funding sources including tax increment financing and tax abatement.
- Established partnerships to redevelop over 24 historic buildings along the streetcar corridor.

- The proportion of AH units developed and preserved through the tools and strategies presented do not meet the needs of the area.
- The plans and policies for long-term preservation are not fully developed.

Case Study 2: Pinellas Suncoast Transit Authority (PSTA) - Central Ave BRT, Small Starts Project Development

Project Description:

The Central Avenue corridor serves multiple travel markets, including work, healthcare, education, community access, entertainment, and tourism. The project is expected to improve transit accessibility within downtown St. Petersburg and provide more frequent mobility options between downtown St. Petersburg and the Gulf Beaches area. The corridor currently has five local bus routes, but no direct transit service linking central St. Petersburg with attractions to the west. Additionally, bus travel times are slowed by automobile congestion and the absence of transit signal priority or any other preferential treatments. PSTA expects the project to enhance the corridor's economic development.

Tools to Maintain or Increase the Share of Affordable Housing:

- i. Evaluation of Corridor-Specific Affordable Housing Needs and Supply
 - a. The Agency reviewed the number of cars per household for the corridor and determined that 45 percent have less than two vehicles per household. Having a regional employment base is cause for premium transit for long commutes, especially for those lower income families that live in South St. Petersburg. Currently, there are 1,610 units of affordable housing in the corridor.
- ii. Plans and Policies to preserve and increase affordable housing in region and corridor
 - a. Housing Consolidated Plan: The Housing and Community Development Department (HCD) receives federal funding to manage housing and community development initiatives, with the goal of revitalizing the city's low to moderate-income communities and integrating economic, community development, physical, and environmental development needs.
 - b. Housing Capital Improvement Program: General revenue funds from the city for affordable housing
 - c. The City and HUD have conducted a comprehensive review of administrative policies and zoning ordinances to ensure they do not interfere with affordable housing efforts. The City's Housing Services Committee will recommend innovative policies to preserve and develop affordable housing.
- iii. Adopted financing tools and strategies targeted to preserving and increasing affordable housing in the region and corridor
 - a. Provide financial assistance for first-time home buyers.
 - b. Second mortgage loans are available to assist the home buyer with closing costs, down payment, and to reduce or "buy-down" the first mortgage interest rate.
 - c. Down payment and closing cost assistance loans are provided to income eligible applicants at a zero percent interest rate.

- d. Intown West Residential Program: Designed to address City housing needs by providing incentives to encourage residential development in the Intown West area. The current zoning regulations are intended to provide floor-to-area ratio (FAR) bonuses and/or exemptions for developers who pursue residential development within the Intown West redevelopment area. The City may use tax increment financing (TIF) to assist in implementing the program
- e. South St. Petersburg Community Redevelopment Area (CRA):
 - i. The City provides TIFs and grant programs.
 - ii. The City envisions providing funding assistance to governmental and non-profit entities that provide an array of services supporting the intent of the redevelopment plan, including marketing and promotion, business assistance and loans, workforce development and job readiness.
 - iii. The City's redevelopment program is based on an initial formula that allocates 50 percent to business development and job creation, 40 percent to the development of affordable and market-rate housing in the CRA, and 10 percent for workforce training.
- iv. Evidence of Developer Activity to preserve and increase affordable housing in the corridor
 - a. St. Petersburg Housing Authority (SPHA):
 - i. SPHA offers rental vouchers for approximately one hundred units in the South St. Petersburg CRA.
 - ii. The PHA expends approximately \$1.2 million per month on the program.
 - b. Habitat for Humanity of Pinellas County (Habitat Pinellas):
 - i. Habitat Pinellas invested more than \$2.9 million in the South St. Petersburg CRA, building 43 new single-family homes and rehabilitating six others.
 - ii. Habitat Pinellas builds homes in partnership with the community and with low-income, qualified applicants. Homes are sold to the applicants with zero interest financing.
 - iii. Home repair program: Home repairs are completed using donated labor. Zero interest, affordable mortgages are provided to cover the cost of building materials.
- v. Extent to which plans and policies account for long-term affordability and needs of very & extremely low-income households
 - a. Community Development Block Grant (CDBG): utilized to address housing, community and economic development issues, public service needs, and capital needs that will serve the city's low and moderate-income persons.
 - b. HOME Investment Partnership (HOME): strictly for the development of affordable housing that serves households with incomes at or below 80 percent of area median income (AMI), and to assist Community Housing Development Organizations (CHDOs) in their development of affordable housing.
 - c. Emergency Solutions Grant (ESG) program: Allocated to provide rental assistance to households whose income is at or below 30 percent of AMI, and to assist public service agencies with operations to serve low and moderate-income clients.
 - d. State Housing Initiatives Partnership Program (SHIP)

Response and Rating from FTA:

Score: Medium-Low

The NS application received a **medium-low** score from FTA for the AH criteria. From the team’s analysis provided in the section above, it can be assumed that the medium-low ranking was the outcome for the following reasons:

- The application mentions several funding sources for affordable housing; however, the application did not directly show how the funds have improved the share of affordable housing.
- The plans and policies to preserve and increase affordable housing are not fully developed at this time.
- Developer activity to increase the supply of affordable housing is minimal.
- There is no evidence of plans and policies supporting extremely low-income households, with the exception of the emergency solutions grant.

Case Study 3: Wave Streetcar, Fort Lauderdale, Florida, Small Starts Project Development

Project Description:

The Wave Streetcar would connect major employment and primary activity centers in Fort Lauderdale and serve the areas of densest development including Flagler Village, the Downtown Core, South Side Neighborhood, and the Hospital District. Current bus service in the corridor operates every 15 to 60 minutes, with between 40 and 50 percent of trips made by riders who do not own a car. The Wave Streetcar would provide more frequent service and direct access to currently under-served areas in the project corridor.

Tools to Maintain or Increase the Share of Affordable Housing:

- i. Evaluation of Corridor-Specific Affordable Housing Needs and Supply
 - a. The City of Fort Lauderdale’s Affordable Housing Advisory Committee and the Broward County Housing Council both performed housing needs assessments between 2009 and 2012, both of which revealed an affordability gap due to high rent and home ownership costs as well as a lack of for-sale housing.
- ii. Plans and Policies to preserve and increase affordable housing in region and corridor
 - a. In 2005, the City of Fort Lauderdale adopted a policy of 15% affordable housing required for the Downtown Regional Activity Center (DRAC) area.
 - b. The Housing Authority uses a variety of voucher and credit programs to ensure the continued expansion and maintenance of affordable housing.
 - c. The City currently has a number of provisions to benefit affordable housing developments, including expedited processing, development fee rebates, density bonuses within designated flexibility zones, homestead exemptions for low-income elderly, and accessory dwelling units on parcels meeting minimum requirements.
- iii. Adopted financing tools and strategies targeted to preserving and increasing affordable housing in the Region and Corridor
 - a. Tax credits and housing choice vouchers for low-income residents

- b. The Housing Authority has developed 945 affordable housing units since 2008.
- c. Mortgage Credit Certificate Program: Provides direct Federal tax assistance for low-income residents.
- d. The Housing Authority of Broward County additionally maintains its own portfolio of rental units for low-income households, as well as provides counseling and educational opportunities for low-income home-buyers or prospective home-buyers.
- iv. Evidence of Developer Activity to preserve and increase affordable housing in the corridor
 - a. 892 affordable units have been allocated to development projects in the study area since 2005.
 - b. Since 2008, an additional 1800 units have been allocated to the study area.
 - c. In 2013, the City initiated a comprehensive plan amendment to increase the total housing allowed in the DRAC by 5,000 units, maintaining the 15% affordable housing requirement, and thus increasing the affordable housing target.
 - d. The Housing Authority of Ft. Lauderdale is planning on constructing an additional 300 units within the City.
- v. Extent to which plans and policies account for long-term affordability and needs of very & extremely low-income households
 - a. Assistance to low income residents including educational programs focused on improving on marketable employment skills, financial understanding, and housing option awareness to support very-low and extremely-low income households.
 - b. Housing Choice Voucher Program
 - c. Veterans Affairs Supportive Housing Program
 - d. Low-Income Housing Tax Credits
 - e. State Housing Initiatives Partnership: raises its funds at the State level through the collection of stamp tax revenues and is a dependable, long-term, source of revenues for the community-level initiatives.

Response and Rating from FTA:

Score: Medium-High

The SS application received a **medium-high** score from FTA for the AH criteria. From the team's analysis provided in the section above, it can be assumed that the medium-high ranking was the outcome for the following reasons:

- There were two studies done to determine the specific housing supply and needs in the study area.
- The City of Fort Lauderdale has adopted a policy requiring 15% of units must be affordable housing.
- There are provisions in place to benefit affordable housing such as expedited processing, density bonuses, accessory dwellings, etc.
- There is significant evidence of developers preserving and adding to the affordable housing supply.

Federal Transit Administration's Efforts to Advance TOD

FTA understands the importance of connecting people to opportunities and creating connected communities. Beginning in 2012 with the establishment of the TOD Pilot Program, FTA has taken strides to provide states, cities, and municipalities with guidance, technical assistance, and funding opportunities to bring TODs to fruition. The pilot program has provided nearly \$75 million in funding since the first year and funded projects in many states. In 2015, the Administration launched the Transit Oriented Development Technical Assistance Initiative to help elected leaders, municipal and transit agency staff, developers, and community members work together to maximize the economic return on public transit investments by advancing TOD. The following sections describe the TOD Pilot Program and the TOD Technical Assistance Initiative.

FTA's TOD Pilot Program

The Federal Transit Administration's Pilot Program for TOD Planning provides funding to local communities to integrate land use and transportation planning in new fixed guideway and core capacity transit project corridors. Projects funded through the pilot program must examine ways to improve economic development and ridership, foster multimodal connectivity and accessibility, improve transit access for pedestrian and bicycle traffic, engage the private sector, identify infrastructure needs, and enable mixed-use development near transit stations. The primary goal of the TOD pilot program is to encourage comprehensive TOD planning at transit station areas in corridors containing eligible projects that go beyond what local agencies would fund alone. Florida has received a significant amount of the funding as a top grantee along with California and Michigan.

FTA's TOD Technical Assistance Initiative

The four-year TOD Technical Assistance Initiative launched in October 2015 in an effort to provide technical assistance and online resources to local stakeholders to advance TOD within transportation corridors and around public transportation stations, with a focus on supporting economically-distressed communities. The resources provided through the initiative included on-site technical assistance, an online TOD resources database and peer network, and the TOD demonstration program. During the first year, one of the overall themes across the various communities was TOD and affordable housing. FTA suggested the following in their first summary report:

“Successful TOD can result in circumstances in which the costs of living become more than affordable. Therefore, it is important to include affordable housing strategies in all discussions related to TOD, as low-income families and individuals are more likely to use public transportation to get to their destinations. Several communities that received technical assistance had a limited perspective on incorporating housing affordability into their TOD projects¹¹⁷.”

Outcomes of the technical assistance in relation to preserving affordable housing are discussed below.

¹¹⁷ https://cms7.fta.dot.gov/sites/fta.dot.gov/files/docs/FTA_Report_No._0101.pdf

Lynwood, Washington

In the case of Lynwood, Washington, the team found a lack of strategies to maintain affordable housing stating, “Lynwood does not have strategies or tools in place to target existing low- and moderate-income residents and business owners who could be adversely affected by higher rental costs as a result of light rail investment and the development of City Center¹¹⁸.” Through the technical assistance program, Lynwood was able to build stronger partnerships, improve the capacity to create a regulatory, design, and financing environment to spur private investment, and built wider support for this project.

San Antonio, Texas

San Antonio wanted expertise in affordable housing, which was a key focus for the City as it thinks about initiating TOD around the new Centro Plaza transit station. The project team suggested updating zoning and housing policies to better support equitable TOD. Current zoning in the area has made it very challenging and provides minimal incentive for TOD.

Kansas City, Missouri

During the planning of the third BRT line in Kansas City “Prospect MAX BRT”, the Community members expressed hope that the project would attract economic development but were concerned that it could create affordability problems and would not connect to an employment center a few miles south of the project terminus. The outcome of the technical assistance regarding affordability revolved around using TIF to support development of affordable housing, which is not currently a common funding source in Kansas City.

The Technical Assistance teams leveraged the use of charrettes and heavy public engagement during their site visits in all case studies. While there is an understanding that real-estate value goes up within close proximity to premium transit, it is extremely important to connect people to opportunities and critical resources without the need for a car. The initiative provided FTA with a better understanding of what cities and transit agencies are battling when it comes to implementing TOD and the takeaways are invaluable to future planning.

Findings and Best Practices

There are a variety of strategies that can be used to increase the supply of affordable housing through premium transit access as seen in the case studies above. The overall lesson learned revolves around the idea that increasing affordability must be a priority throughout the transit planning process. Premium transit systems are costly and it is critical to ensure funds are allocated properly and transit is available and convenient to those who use it most. Additionally, establishing partnerships with other Agencies such as housing, community development, local jurisdictions, public and private non-profit developers, etc. can lead to improved affordability. Table 25 lists the strategies, plans, and policies that have been used across the country to preserve and increase the affordable housing stock.

¹¹⁸ https://cms7.fta.dot.gov/sites/fta.dot.gov/files/docs/FTA_Report_No._0101.pdf

Table 25: Toolbox of Plans, Policies, and Strategies to Preserve and Increase the Affordable Housing Supply

Toolbox of Plans and Policies and Strategies to Preserve and Increase the Affordable Housing Supply	
Plans	<ul style="list-style-type: none"> - Include affordable housing in comprehensive plans and transportation development plans - Include affordable housing during station area planning - Develop public involvement plans that reach extremely low-income populations
Policies	<ul style="list-style-type: none"> - Designate surplus property for affordable housing around premium transit - Reduce parking requirements - Allow for accessory dwelling units - Minimum percentage of affordable units - Joint Development Policy - Development of air rights - Zoning ordinances
Incentives	<ul style="list-style-type: none"> - Density bonuses - Linkage fees - Inclusionary zoning - Expedited processing - Tax credits
Partnerships	<ul style="list-style-type: none"> - Local Jurisdictions - Private Non-Profit Developers - Public Developers - Department of Housing and Community Development - PHAs - Regional transit agencies/transit authorities - Community Members
Funding	<ul style="list-style-type: none"> - Designated funding sources through tax revenue and partnerships - Community Land trusts - Housing trust funds

Premium transit and affordable housing go hand in hand and must be planned for accordingly. Transit access is critical for low-income households since owning a car is a major expense. TODs represent the ideal situation for low-income households because they have access to employment, schools, healthcare, and entertainment without a personal vehicle, providing

increased opportunities for upward mobility in the community. Premium transit access provides social, economic, and environmental benefits beyond the benefits experienced by the transit user. The reduction in vehicle miles traveled (VMT) results in fewer greenhouse gas emissions, fewer crashes, and less congestion on the roadways. The social benefits include improved quality of life and health, social equity, and reduced transportation costs, among others.

While premium transit access is beneficial, it can result in higher housing and land values; therefore, it is imperative that plans and policies are in place to preserve affordability. Through the case studies, the research team compiled an extensive list of strategies to improve affordability. Among the best practices and strategies used to preserve and increase the supply of affordable housing are the establishment of dedicated funding sources, partnerships with various entities, incentives for developers to build more affordable housing units, and policies requiring a percentage of affordable housing units. Transit agencies should consider affordability when planning for premium transit and designing station areas. The low-income population is the most likely to utilize transit resulting in increased ridership and greater return on investment when planned for accordingly. Transportation planners have the ability to preserve and increase the affordable housing supply by addressing the affordability crisis from the beginning. This includes stakeholder outreach, analysis of the population demographics, and establishment of partnerships between transit agencies, local housing authorities, and public and private non-profit developers. When affordable housing is planned for in conjunction with premium transit and not after the fact, resources are allocated more efficiently, and benefits are maximized for all partners.

Phase V: Recommendations



Recommendations

The central premise of this report is the connection between transit and affordability. Outside of investments in premium transit, TODs, and station area plans, public transportation does not add to the supply of affordable housing. Rather, it provides a mechanism to lower transportation costs for a household, allowing for more funds available to purchase a house or contribute towards household expenses. Therefore, the recommendations developed for this report are built around supporting affordable housing goals, improving public engagement, and designing routes/transit systems that help meet the needs of affordable housing residents.

The recommendations below identify potential changes to the TDP Handbook, encourage greater cooperation between local PHAs and transit agencies, and list affordable housing best practices for TOD and premium transit projects. These recommendations seek to improve the access to, and mobility of, public transit in affordable housing communities. They are drawn from lessons learned from the previous phases of this report. Through improvements in transit service attributable to the recommendations below, households can save money and enjoy greater opportunity.

Updating the TDP Handbook

Updating the TDP Handbook to include more defined and specified affordable housing measures is recommended because this document provides the guidance for the vision and the growth of transit agencies in Florida. These changes should help to locate affordable housing in a community, improve coordination with PHAs, and illustrate potential gaps in service for those living in affordable housing units. The goal of these changes to the TDP is to improve accessibility, making it easier to use transit to access jobs and key services.

Defining Affordable Housing (TDP Handbook, section 3.1)

While this report has demonstrated the value of providing high-quality transit service and access to affordable housing communities, most transit agencies lack a specific, localized definition of what qualifies as affordable housing and workforce housing. Without such a definition, planners and policymakers cannot define, measure and direct resources where they will have the greatest impact. To achieve a greater level of specificity and visibility for affordable and workforce housing, the TDP's guidance on affordable housing should be re-written to include the development of a local definition as a best practice. The definition should be based on the area median-income (AMI) to account for the local cost-of-living. A re-written guidance should resemble the following:

Affordable Housing

Areas with affordable housing units where occupants are enrolled in a housing voucher program or receive federal housing assistance may indicate an area that may have a comparably higher transit orientation. Unlike populations below poverty or in zero-vehicle households, the locations of affordable housing units may be more static over time. Collaborating with local public housing authorities to develop a definition of affordable housing & workforce housing in the community is a

best practice in TDP development. This definition should consider any housing priced under 30% of the area median income affordable housing. Using area median income differentiates local context from state and national definitions. Developing such a definition increases the visibility of these communities and ensures continuity throughout the planning process.

Phase I of this report, “Defining the Problem”, examined a number of approaches used to define affordable housing, workforce housing, attainable housing, etc. The research found the most common definition of affordable housing as any housing priced under 30% of AMI. Workforce housing is defined under Florida Statute as housing priced at 140% of AMI, and 150% for areas of critical concern. These are the definitions used throughout this study. As stated in Phase I, because there are so many different conceptions of affordable housing it is important to settle on a single, measureable definition early in the planning process to minimize inconsistencies later on.

Adding Consideration of Essential Services (TDP Handbook, section 3.1)

Within the baseline conditions assessment, land use and growth characteristics guidance, the Handbook currently recommends identifying activity centers and major hubs. Essential services (healthcare, government services, etc.) currently fall under the definition of activity hubs, along with recreational facilities, shopping centers and other common destinations. As noted in the handbook, some activity centers may attract more transit users than others. Our research in Phase II, “The Role of Public Transportation”, has shown those activity centers are often essential government, medical and educational facilities. ALICE residents of affordable and workplace housing often depend upon transit for access to these services. Differentiating between essential services and recreational/commercial activity hubs is an important step towards meeting the needs of affordable housing communities. The Handbook should add a subsection under Land Use/Growth Characteristics, advising planners to identify gaps in accessibility to these services.

Phase III of this report highlights the LYNX system redesign for its potential to increase both accessibility and mobility. An important element of the plan was mapping the system’s access to medical, governmental, and social services (Figure 16). Additionally, in recent TDPs, PSTA included information on transit services to schools, as well as medical and social services. CitrusConnection provided maps showing transit access to specific land uses, and they also showed education centers, medical centers, and institutional centers. These examples help the audience understand what amenities are located near transit services and they highlight potential service gaps for planners.

TDP Public Involvement Plans (TDP Handbook, section 3.3)

FDOT currently requires solicitation of comments from regional workforce boards in the public involvement process of TDP preparation. In a similar fashion, soliciting comments from local PHAs should be included as a best practice. This best practice would include notification of all public meetings regarding TDP development, and providing PHAs the opportunity to review and comment during the development of the mission, goals, objectives, and 10-year implementation program. In addition, the TDP Handbook provides guidance on the establishment of a technical review team (TRT) to guide the TDP process. The handbook recommends a TRT composition of: “representatives from the transit agency, the local MPO, FDOT District Office, the regional

workforce board, city/county officials, and/or community stakeholders.” This recommendation should be expanded to include a representative of the local PHA(s). If the jurisdiction contains multiple PHAs (as is the case in larger cities and counties), local PHAs should nominate one member to serve on the TRT who will represent the interests of all PHAs in the jurisdiction.

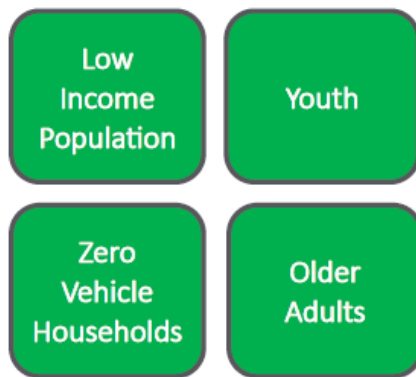
Phase III discusses StarMetro’s Nova2010 system redesign. Over the course of the project StarMetro held 15 public meetings and attended 88 special interest group meetings, but throughout their outreach process they neglected to meet with the Tallahassee Housing Authority. Had StarMetro targeted their engagement with a PIP like COTA and PalmTran, the final system design may have better served affordable housing communities. PalmTran and COTA’s use of the ridership/coverage discussion framing with the public revealed the community’s priorities, primarily, improving mobility through creative interventions that do not sacrifice coverage.

Differentiating between Low-Income and Affordable Housing Populations (TDP Handbook, sections 3.6)

Within the transit demand assessment, three markets are defined for individual evaluation: traditional, discretionary, and travel. The traditional market is defined as the population segment with a higher propensity and dependence on transit use. Planners should formally incorporate

Traditional Markets

The traditional transit market refers to population segments that historically have a higher propensity to use or depend on transit for their transportation needs.



populations currently living in affordable housing into this market, and differentiate this population from the low-income demographic. This is an important distinction for a number of reasons. Low-income populations can be defined in a number of ways, not necessary with a localized measure like the AMI-based definition for affordable and workforce housing proposed above. Low-income measures often include students, which can obfuscate data in areas with large student populations. Most importantly, low-income areas are most often mapped at the census-block level. Many affordable housing communities are located in census blocks with relatively-high median income. This means they are often “hidden”

from view in a typical low-income map. Using data from the [University of Florida Shimberg center](#) for housing studies, Phase III of this report was able to map affordable housing communities as point-level layers, revealing many important traditional transit markets that would not have appeared using census or ACS data. This mapping method was used to evaluate changes in accessibility and affordability for residents of affordable housing communities. The guidance on transit demand assessments recommends Census and ACS data for the study of its four current population segments. It should expand those segments to include affordable and workforce housing, and provide guidance on how to accurately map this segment with readily available data from the Shimberg Center.

Develop an Affordable Housing Strategy Toolbox

When planning for TOD, it is critical to assess the affordability of housing in the corridor and strategize ways in which the affordability can be maintained or improved. The research conducted as part of the project revealed many strategies, plans, and policies used to preserve and increase the affordable housing supply within TODs, many of which may be applicable to Florida. Many of these strategies, however, are best practices employed by local governments to sufficiently address the affordable housing questions in the FTA Small Starts/New Starts program and the related FDOT TCAR process. State of Florida involvement is generally limited to guiding the process for premium transit projects along state corridors. FDOT should encourage the use of one or more of these best practices to preserve and/or expand affordable housing options within the communities who are pursuing premium transit investments.

Given the complexity of this topic and the variety of options available to communities, it is recommended that FDOT develop toolbox of affordable housing strategies, providing information in what environment the strategy is best applied, the pros/cons of each strategy, anticipated outcomes, and examples of where it was applied. Some of the suggested strategies identified in the research are described below.

Linkage Fees and Density Bonuses

Linkage fees require the developer to pay a fee toward the housing trust fund in lieu of providing affordable units. Bonus densities allow for additional units beyond the permitted density if they are affordable.

Inclusionary Zoning

Inclusionary zoning (IZ) encourages developers to reserve a portion of housing units for low-income residents as a condition of permitting approval. Possible incentives include density bonuses, expedited permits and approvals, relaxed design standards, or and/fee waivers. Effective IZ policies include:

- Restricting off-site compliance to sites located within ½ mile of a transit station
- Discouraging use of in-lieu fees and focusing efforts on building affordable units as part of the proposed development project
- Allowing developers to meet inclusionary requirements through 100% affordable buildings, instead of requiring buildings to feature a mix of market-rate and affordable units. This allows market-rate developers to contract with nonprofit developers to produce and manage affordable housing more efficiently.

Accessory Dwelling Units

Allows for developing affordable housing units within a single family home. This could be an excellent way to preserve existing affordable housing by helping to keep low-income households in their current homes if market pressures would otherwise result in displacement.

Parking Requirements

Reducing the number of parking spots required results in additional space for affordable housing and encourages walking and transit usage.

Joint Development Policy

Joint Development (JD) is a real estate development program through which transit agencies collaborate with qualified developers to build transit-oriented developments on agency-owned properties.

Partnerships

Partnering with various agencies such as local jurisdictions, private non-profit developers, public developers, departments of housing and community development, PHAs, regional transit agencies/transit authorities, and community members to establish plans and policies to ensure affordable housing is a priority when planning for premium transit projects.

Designated Funding Sources

Creating designated funding sources through tax revenue and partnerships can close the funding gap experienced when developing affordable housing. The establishment of community land trusts and housing trust funds also provide a funding source for affordable housing needs.

Development of Air Rights

An often-overlooked space to build affordable housing is that on top of existing publicly-owned buildings. Public facilities are not usually built to their allowable height limit. Transferring development rights to build workforce housing provides housing for the agencies' employees and increases the available affordable housing stock in the area.

Interim Land Uses and Zoning Ordinances

Allows for a short-term use until a certain threshold is reached or to deter uses that the market may demand at the moment but that would interfere with long-term goals for the properties.

Expand Affordable Housing within the Transit Concept and Alternatives Review (TCAR) Guidance

The FDOT TCAR process is a streamlined planning and environmental screening process that compares transit project alternatives, potential costs, funding options, community benefits, economic development, and mobility for users of a proposed project. Conducting a TCAR study prepares the project sponsor for the development of a CIG application for those projects meeting the criteria for New Starts, Small Starts, or Core Capacity grant funding. Because affordable housing is a part of the CIG application process, it is recommended that the TCAR Guidance include best practices for assessing the affordable housing needs in the study area.

Affordable housing is most applicable to the following steps of the TCAR process:

1. **Identify Roles and Responsibilities:** Participating agencies should include Public Housing Authorities (PHAs).
2. **Initiate Public Involvement:** Outreach to PHAs and their residents to determine the needs of these transit dependent populations.
3. **Define Purpose and Need:** When conducting a travel market assessment, consider relationship to affordable housing developments and critical services needed by the transit dependent population.
4. **Conduct Existing and Future Needs Assessment:** Coordination with PHAs may reveal specific needs such as a transit stop or station near a new affordable housing development.

5. Develop Project Evaluation Plan: As described in the FTA CIG Application Criteria, the plans and policies to maintain and/or increase affordable housing should be identified. Affordable housing locations in relation to the premium transit project should be included as an evaluation measure.

Position Florida Transit Agencies to Participate in FTA TOD Pilot Program

As presented in Phase IV, FTA has established a TOD Pilot Program and Technical Assistance Initiative to expand TOD opportunities in municipalities across the country. By focusing growth around transit stations, TODs provide the opportunity to:

- Increase ridership and associated revenue gains for transit systems;
- Incorporate public and private sector engagement and investment;
- Revitalize neighborhoods;
- Increase supply of **affordable housing**;
- Improve economic returns to surrounding landowners and businesses;
- Relieve congestion; and
- Improve safety for pedestrians and cyclists through non-motorized infrastructure.

When the TOD is part of a federally funded transit project, FTA may provide financial assistance, technical assistance, training, and other resources to complement the regional or local TODs.

With a renewed commitment to transit investments in urban areas across the state, such as the Miami-Dade SMART Program, innovative corridors in Central Florida, and Central Avenue BRT in Pinellas County, FDOT is in strong position to support investments in TODs and expand affordable housing in many urban areas by providing assistance to those agencies that want to participate in the FTA TOD Pilot Program. This assistance can be provided through developing guidance on completing the grant application, providing a portion of the matching dollars, and/or creating a companion program (similar to TCARS) to provide additional funding for TOD planning in the state. In addition, developing the previously discussed affordable housing toolbox could provide strategies for interested municipalities to highlight in their respective applications. Participation in this program would allow for Florida to remain on the cutting edge of planning for and providing affordable housing as part of premium transit projects.

Recommendations for Transit Agencies

City and/or county transit advisory committees should include a member-representative from the local public housing authority. These standing committees provide the forum necessary to realize the potential benefits of partnerships between PHAs, transit agencies, and related civil organizations revealed through this report. Implementation would require an amendment of each jurisdiction's transit advisory committee by-laws. The transit advisory committee is a body independent of the transit agency. To foster best-practices collaboration more directly between transit agencies and PHAs, it is recommended that transit agencies approach collaboration with PHAs in a similar fashion to the partnership with regional workforce boards during the TDP process. This would include: notification of all public meetings, and providing PHAs the

opportunity to review and comment during all major service changes, in addition to the work done during TDP development.

In the surveys conducted in Phase II, transit agencies and PHAs reported having worked together on a regular basis. Despite these reports, analysis of fixed-route systems revealed persistent mismatches and services gaps for subsidized housing. These service gaps, together with the survey's small sample size, point to the potential for a more productive working relationship between transit agencies and PHAs.

The key recommendation for local transit agencies is to just be involved in the conversation. Whenever there is focus group, workshop, new affordable housing development, or other local initiative, the transit agency should be involved in the conversation. These discussions should revolve around placement of the affordable housing developments, placement of necessary amenities, and the ability of the transit agency to meet the transportation issues of the residents of the community.

Conclusion

The role of transit agencies in the relationship between affordable housing and transit is found in how they plan the transit system and engage with the community. The TDP and Title VI Plan provide an opportunity to assess the system in how well it is meeting the needs of low-income residents and affordable housing communities and see where the gaps in service are located. Once the gaps are identified, it is possible to propose new service or changes to existing service to provide improved accessibility to jobs and key services in these areas. This improved accessibility, in turn, leads to increased ridership benefitting both the transit agency and those who use the system.

However, just analyzing the system is not sufficient to improve the connection between transit and affordable housing. There must also be greater involvement and engagement with low-income individuals and residents of affordable housing communities. Due to their disparate needs, it may be difficult to engage with them through traditional means. Transit agencies, rather, should use other tools such as stratified origin and destination surveys and partnering with PHAs to get a better understanding as to how these residents are using the system and where changes need to be made.

As the transit system grows and corridors upgrade in service levels, opportunities exist for the transit agency to affect the supply of affordable housing. Through inclusionary zoning, partnerships, and other strategies, additional affordable housing units can be built as part of station area plans or within the catchment area of the premium transit mode. This along with effective planning of the supporting transit routes allow for everyone to reap the mobility benefits afforded by premium transit modes.

As the state continues to grow, providing affordable housing will remain a challenge. This report provided the opportunity to analyze the relationship between transit and affordable housing. This relationship is built around the premise that public transportation makes cities more affordable for its residents. By decreasing household transportation costs, more money is available for household expenses, including more expensive mortgage/rent costs. This allows low income residents greater freedom in their choices in living in different parts of the urban area that best meet their needs.

Appendices



Appendix A: SIC Translation Table

Standard industrial classifications system codes

40	Transportation, Communications, Electric, Gas, And Sanitary Services	70	Service employment (hotels, info-sec, legal, educational, health, entertainment, business, etc.)
41		72	
42		73	
43		75	
44		76	
45		78	
46		79	
47		80	
48		81	
49		82	
60	Finance, Insurance, And Real Estate	83	
61		84	
62		85	
63		86	
64		88	
65		88	
66		91	
67		92	
<i>Data dictionary from TBEST</i>		93	Public Administration
		94	
		95	
<i>Category descriptions from OSHA¹¹⁹</i>		96	
		97	
		97	

¹¹⁹ OSHA SIC Translation Manual: https://www.osha.gov/pls/imis/sic_manual.html.

Appendix B: TSPR Distribution Modifications & Premium Service Definitions

Transit system	Description of change
Tri-Rail	Tri-Rail analysis does not us AM Peak / Night distinctions
MDT	Miami-Dade removed 301, 302, serving Card Sound & The Florida Keys.
HART	The HART system had a very minor portion of routes 20 and 275 that loops into Pasco County. They are retained.
PSTA	PSTA includes three routes entering Hillsborough County: 300, 100, and 183. They are minor and retained.
LYNX	LYNX routes with service to Polk County, which is not in the Orlando MSA, are removed: 416, 427. Routes 55 and 426 have very small portations that enter Polk and are retained.
Transit system	Premium routes included
PalmTran	N/A
Miami-Dade Transit	All Express, Max, Limited Service routes
BCT	101, 102, 106, 108, 109, 110, 114, 122, 441
Tri-Rail	Entire system.
HART	20, 24, 25, 60, 275, 360, 800
PSTA	20, 32, 52LX, 60, CAT, LOOP, SBT
LYNX	LYMMO, KnightLynx, FastLinks
Sunrail	Entire system.
JTA	The First Coast Flyer: Mandarin, Clay Regional, Mayport, Beaches, Nassau, FCF Blue, FCF Green, and FCF Red.
SCAT	N/A
MCAT	Beach Express
LeeTran	N/A
CAT	Express Immokalee Marco
CitrusConnection	33 SunRail Dupont Lakes Express
Votran	N/A
Space Coast Area Transit	N/A
ECAT	While the team attempted to use 59X, but the model route did not run.

Appendix C: Transit Agency Survey Questions

Transit Service to Low Income Communities

Title VI and Major Service Change Process

1. What is your threshold for a Major Service Change?

- Addition or elimination of 10% of daily route/system revenue miles
 Addition or elimination of 25% of daily route/system revenue miles
 Addition or elimination of 15% of daily route/system revenue miles
 Do not have a definition/threshold for a Major Service Change
 Addition or elimination of 20% of daily route/system revenue miles
 Other (please specify)

2. During a Major Service Change, what public involvement tools do you employ? Select all that apply.

- Presentation of Route Changes to a Citizens/Transit Advisory Committee
 Meeting with customers of the affected route(s)
 Holding one or more public workshops to discuss the route changes
 Governing Board Action with a public comment period
 Online Polling and/or use of Social Media
 None of these
 Other (please specify)

3. Have you implemented a Major Service Change in the last three years?

- Yes
 No

4. What strategies were used to address a disproportionate burden to low income residents? Select all that apply.

- Major service change(s) did not have a disproportionate burden Met with the affected residents to discuss the changes and other options.
- Made additional changes to the route/system mitigate the impact Did not implement the change(s).
- Provided alternative services, such as flex routes, vanpooling, partnerships, etc., to meet the needs of the affected residents.
- Other (please specify)

Transit Service to Low Income Communities

Long Term Planning

5. Does your organization create a long term (5+ years) planning document to guide system investments, new routes, or other opportunities for expansion?

Yes

No

6. What factors do you look for when proposing a new route/service area? Select all that apply.

Providing access to low income residents

Providing access to a new employment center(s) Providing

Providing access to affordable housing communities

access to government/non-profit social services

Population density

Other (please specify)

7. Since low income populations and/or affordable housing communities factor in the planning process, do you engage with public housing authorities or related organizations?

Yes

No

8. Describe your engagement with these organizations.

Transit Service to Low Income Communities

Long Term Planning

9. When planning for capital investments, such as transit amenities or stations, do you consider the proximity of or ability to provide for low income individuals?

Yes

No

10. Please describe this process:

11. Have you considered using agency owned land or advocating for land near a transit station for affordable housing?

Yes

No

12. Please describe the situation.

Transit Service to Low Income Communities

Assisting Low-Income Communities

13. Do public housing authorities or related organizations have representation on a Citizen's or Transit Advisory Committee for your agency?

- Yes
- No
- Our agency does not have a Citizen's or Transit Advisory Committee

14. How has their involvement affected services provided to low-income individuals and/or affordable housing communities?

15. What programs do you have in place to assist low-income riders? Select all that apply.

- Guaranteed Ride Home Program for regular riders
- Free or Reduced fare for residents of affordable housing communities
- Free or Reduced fare for members of special groups, such as homeless, veterans, or K-12 students
- Other (please specify)
- Emergency travel vouchers for people in difficult situations, such as lost job, medical emergency, or other dire scenarios
- We do not offer a program

16. Do you highlight these programs in your agency promotional materials or marketing campaigns?

- Yes
- No

17. Which programs?

Transit Service to Low Income Communities

18. Thank you for your time. May we follow up with you if we have any questions on your responses? If so, please provide your email address below. Your contact information will not be shared.

Appendix D: Public Housing Authority Surveys

Affordable Housing & Transit - Florida Public Housing Authorities

1. Please provide the name of your organization and how many residents do you support.

2. Do you engage with transit agencies to provide affordable housing communities to encourage them to provide or improve transit access?

Yes

No

3. Please explain your efforts.

Affordable Housing & Transit - Florida Public Housing Authorities

4. Do transit agencies in your community provide your agency pamphlets/brochures/other documents for distribution to the residents with information about the system or programs available to them through the transit agency?

- Yes
 No

5. Please describe the information the transit agencies provide.

Affordable Housing & Transit - Florida Public Housing Authorities

6. When planning for new affordable housing units or communities, does your agency consider transit access to the site?

Yes

No

7. Please explain.

Appendix E: CIG Application, Tools to Maintain or Increase Share of Affordable Housing

I. Tools to Maintain or Increase Share of Affordable Housing: Questions and Example Answers/Guidance

QUESTIONS	Example Answers/Guidance
<p>Proportion of existing legally binding affordability restricted housing in the corridor compared to the proportion of legally binding affordability restricted housing in the counties in which the project travel provides</p>	<p>Calculate the affordable housing in the affected counties</p> <p>Assessment ratings: High: Ratio >2.50 Medium-High: Ratio 2.25 to 2.49 Medium: Ratio 1.5 to 2.24 Medium-Low: Ratio 1.10 to 1.49 Low: Ratio less than 1.10</p>
<p>Evaluation of corridor-specific affordable housing needs and supply</p>	<p>Affordable housing needs assessment</p>
<p>Plans and policies to preserve and increase affordable housing in region and/or corridor</p>	<ul style="list-style-type: none"> a. Inclusionary zoning or housing programs, which require or provide incentives for developers to set aside a certain percentage of units (typically 10 to 25 percent) for income-qualified buyers or renters; b. Density bonuses or reduction of parking requirements for the provision of units made available for income-qualified buyers or renters; c. Employer assisted housing policies, using tax credits, partnerships, matching funds, and/or other mechanisms to encourage employers to help employees to buy or rent homes close to work or transit; d. Rent controls or condominium conversion controls on existing units to maintain affordability for renters; e. Zoning to promote housing diversity, such as zoning that permits accessory or “in-law” units, and residential zoning based on floor area ratio rather than dwelling units to reduce the disincentive to build smaller units; f. Tenant “right of first refusal” laws, which require that an owner provide the tenants with an opportunity to purchase the

	<p>property at the same price as a third-party buyer; and</p> <p>g. Affordability covenants, which limit appreciation of rents and/or sales values for units rented or sold to income-qualified tenants for a given length of time.</p>
<p>Adopted financing tools and strategies targeted to preserving and increasing affordable housing in the region and/or corridor</p>	<p>a. Funding for targeted property acquisition, rehabilitation, and development of low-income housing, including direct funding for public and nonprofit development authorities, Low Income Housing Tax Credits (including criteria that favor application of credits in transit station areas), and local tax abatements for low-income or senior housing;</p> <p>b. Land banking programs to support the assembly of land for new affordable housing development by public, private, or nonprofit developers;</p> <p>c. Financial assistance to housing owners and/or tenants through mechanisms, including affordable housing operating subsidies, weatherization and utilities support programs, tax abatements or mortgage or other home ownership assistance for lower-income and senior households;</p> <p>d. Local or regional affordable housing trust funds to provide a source of low-interest loans for affordable housing developers; and</p> <p>e. Targeted tax increment financing, other value-capture strategies, or transfer tax programs to generate revenue that can be directed towards low-income housing programs</p>
<p>Evidence of developer activity to preserve and increase affordable housing in the corridor</p>	<p>Demonstrated through actual provision of housing by private and public developers</p>
<p>The extent to which the plans and policies account for long-term affordability and the needs of very- and extremely-low income households in the corridor.</p>	<p>Evidence of continuance of legally binding affordability restriction in the transit corridor over the long-term following the project's opening</p>

II. Tools to Maintain or Increase Share of Affordable Housing: Ratings

Decision/Approval Phase	Rating	
<p>Engineering</p>	<p>HIGH</p>	<p>Plans and policies are in place in most of the jurisdictions covered by the project corridor that identify and address the current and prospective housing affordability needs along the corridor. The plans outline a strategy to preserve existing affordable housing (both legally binding affordability restricted housing and market-rate affordable housing.) The plans also explicitly address the housing affordability and quality needs of very- and extremely-low income households.</p> <p>Financing commitments and/or sources of funding and robust financial incentives are identified and secured to support affordable housing acquisition (including acquisition of land and/or properties intended to be converted to affordable housing), development and/or preservation consistent with adopted plans and policies. These commitments may include early phase or acquisition financing as well as permanent financing.</p> <p>A strategy is in place to encourage jurisdictions to adopt local policies and zoning codes that support and encourage affordable housing development in transit corridors.</p> <p>Developers are actively working in the corridor to secure priority development sites and/or maintain affordability levels in existing housing units.</p>
		<p>MEDIUM</p>

		<p>These commitments may include early phase or acquisition financing as well as permanent financing.</p> <p>A strategy is in place to encourage jurisdictions to adopt local policies and zoning codes that support and encourage affordable housing development in transit corridors.</p> <p>Developers are starting to work in the corridor to secure priority development sites and/or maintain affordability levels in existing housing units.</p>
	LOW	<p>Plans and policies are not in place or being prepared that identify and address the specific housing affordability needs along the corridor.</p> <p>Financing commitments and/or sources of funding have not been identified and secured to preserve and/or build new affordable housing consistent with adopted plans.</p> <p>There is no strategy to encourage jurisdictions to adopt local policies and zoning codes that support and encourage affordable housing development in transit corridors.</p> <p>There is little or no affordable housing development/preservation activity in the corridor.</p>
FFGA/SSGA	HIGH	<p>Comprehensive affordable housing plans have been developed and are being implemented that identify and address the current and prospective housing affordability needs along the corridor. The plans include efforts to preserve existing affordable housing (both legally binding affordability restricted housing and market-rate affordable housing.) The plans also explicitly address the housing affordability and quality needs of very- and extremely-low income households.</p> <p>Financing commitments and/or sources of funding and robust financial incentives are secured and available at the local and/or regional level and along the proposed corridor to support affordable housing acquisition (including acquisition of land and/or properties intended to be converted to affordable housing), development and/or preservation consistent with adopted plans and policies. These commitments may include early phase or acquisition financing as well as permanent financing.</p> <p>Local policies and zoning codes support and encourage affordable housing development in transit corridors.</p>

		<p>Developers are actively working in the corridor to secure priority development sites and/or maintain affordability levels in existing housing units.</p>
	MEDIUM	<p>Affordable housing plans have been developed and are being implemented that identify and address the current and prospective housing affordability needs along the corridor. The plans include efforts to preserve existing subsidized housing. The plans also explicitly address the needs of very- and extremely-low income households.</p> <p>Some financial incentives are available along the proposed corridor to support affordable housing acquisition (including acquisition of land and/or properties intended to be converted to affordable housing), development and/or preservation consistent with adopted plans and policies. These commitments may include early phase or acquisition financing as well as permanent financing.</p> <p>Local policies and zoning codes support affordable housing development in and near transit corridors to a moderate extent.</p> <p>Developers are starting to work in the corridor to secure priority development sites and/or maintain affordability levels in existing housing units.</p>
	LOW	<p>Affordable housing plans and policies are in development or non-existent, or fail to address key elements such as length of affordability, preservation of existing affordable housing, and the needs of very- and extremely-low income households.</p> <p>Little or no financial incentives are available to support affordable housing development and preservation.</p> <p>Local policies and zoning codes support affordable housing development in and near transit corridors to a lesser extent.</p> <p>There is little or no affordable housing development/preservation activity in the corridor.</p>



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