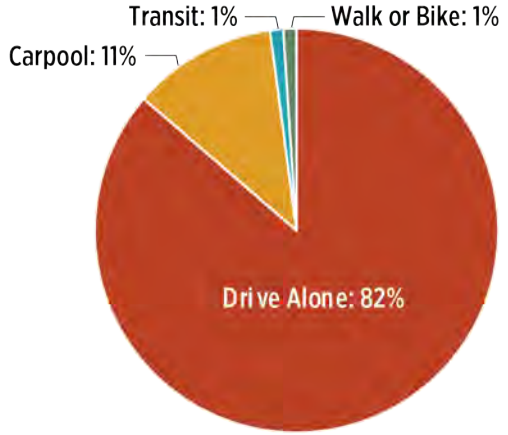
The Market for Transit in Fort Worth

Transit Use in Fort Worth

In character with most of the country, traveling alone in a personal vehicle is the dominant way people move in Fort Worth. Overall, 82% of Fort Worth residents drive alone to work, 11% carpool, 1% walk or bike, and 1% take transit. In dispersed areas, people are more likely to own more vehicles and rely upon driving them farther distances. Making transit an attractive, reliable, and convenient way to travel relies on concentrating viable and high-quality transit service where there is appropriate demand for service. This market analysis focuses on understanding where there exists demand for transit, so that transit improvements can be implemented where they will be most successful.

How Fort Worth Residents Commute to Work

Source: 2013-2017 American Community Survey 5-Year Estimates



Underlying transit demand is strongly related to six factors:

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

Socioeconomic Characteristics: Different people have different likelihood to use transit, with differences related to socioeconomic characteristics. For example, households with low incomes are much more likely to use transit.

Employment and Employment Density: The location and density of jobs is also a strong indicator of transit demand, as traveling to and from work often accounts for the most frequent type of transit trip.

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

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

Travel Flows: Travel flows provide information on the trips that people make along with the mode of travel, allowing for broad conclusions of where people from certain locations need to travel inside and outside an area on various travel modes.

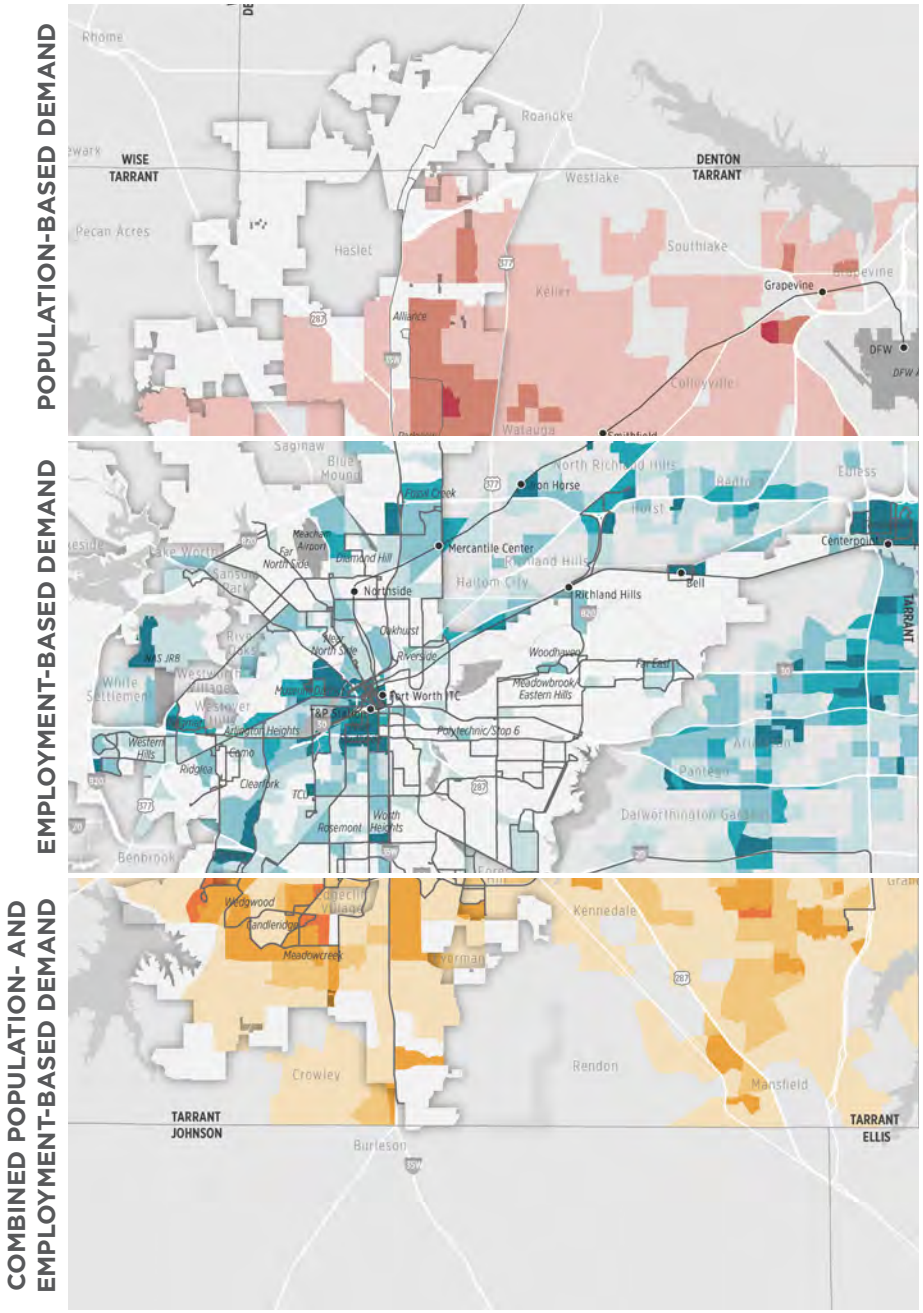
Overview of Transit Demand

More than any other factor, **population and employment density** will determine the underlying demand for transit. This is because:

- The reach of transit is generally limited to within one-quarter mile of the bus stop or station. As a result, the size of the travel market is directly related to the density of development in that area.
- Transit service frequencies, in turn, are closely related to market size. Bigger markets support more frequent service. Conversely, smaller markets can only support less frequent service.
- To attract travelers who have other transportation options, such as private automobiles, transit service must be relatively frequent and get riders to their destination in a time and at a cost competitive with a private vehicle. Infrequent service is inconvenient, and thus will largely serve residents and workers who cannot drive.

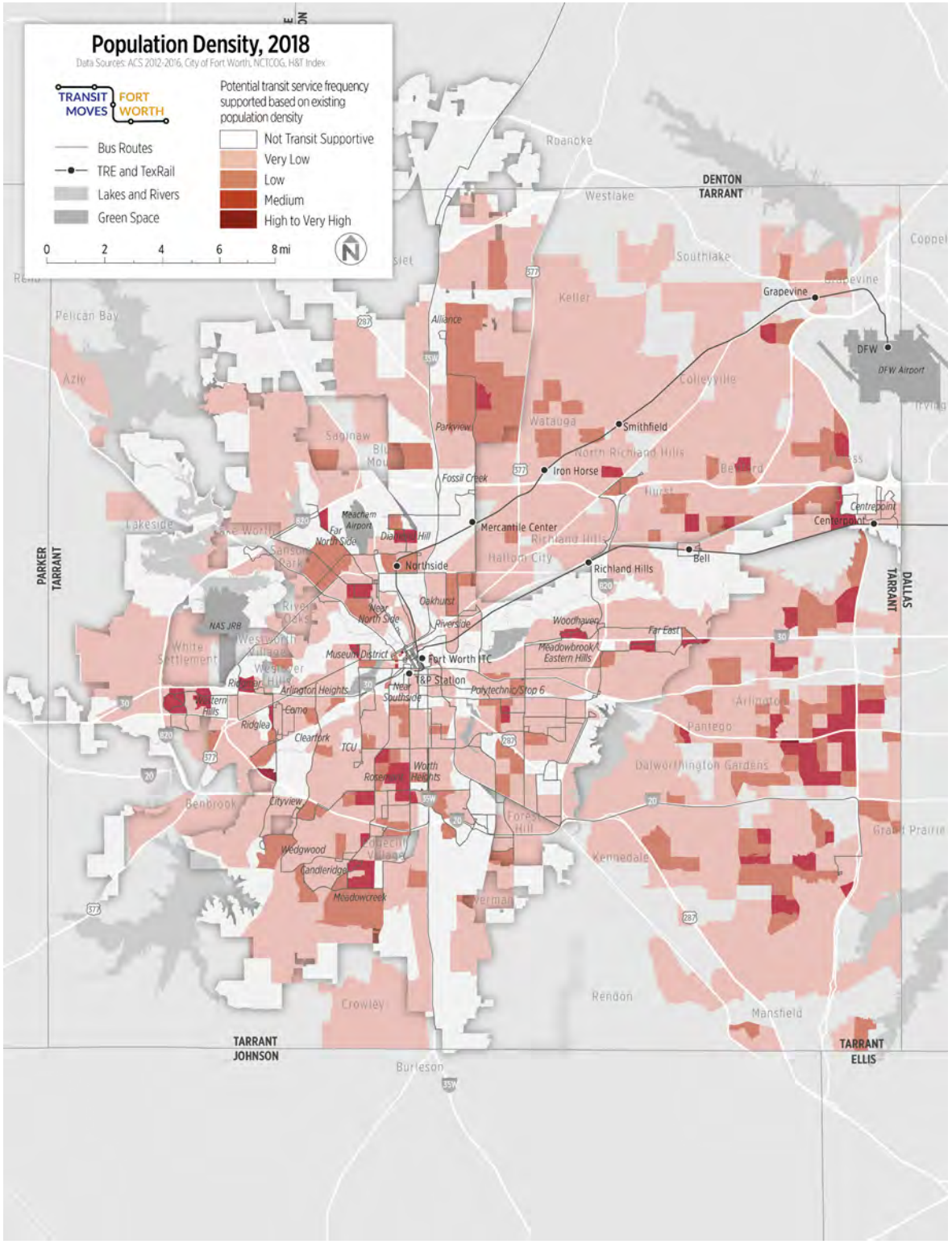
Frequent service is clearly desirable, but because of the operating costs involved, and to avoid empty buses, travel service levels must be matched to demand. For example, an area with 15 households per acre and/or more than 15 jobs per acre can support transit service operating every 30 minutes. Demand can accumulate along corridors to produce demand for more frequent service than the densities alone would indicate, while isolated clusters of demand will not produce sufficient demand for transit alone.

It is important to recognize that areas that do not have at least ten residents and/or five jobs per acre or a combination thereof—generally lower density communities made up of single-family neighborhoods—do not provide an environment where fixed-route transit can generate enough ridership to succeed. At these low densities, only infrequent transit service can be sustained. Service that runs less often than every 30 minutes is generally so uncompetitive with other forms of transportation that it is not practical to operate. In these instances, this plan calls for alternative types of transit—specifically microtransit, ridesharing, and shared mobility solutions—to connect low density areas to the core transit network.



Transit-Supportive Land Use and Density

LAND USE				TRANSIT	
Land Use Type	Example	Residents per Acre	Jobs per Acre	Appropriate Types of Transit	Frequency of Service
Downtowns & High Density Corridors		>45	>25	Rail, BRT, Rapid Bus, Local Bus	10 mins or better
Urban Mixed-Use		30-45	15-25	BRT, Rapid Bus, Local Bus	10-15 minutes
Neighborhood & Suburban Mixed-Use		15-30	10-15	Local Bus	15-30 minutes
Mixed Neighborhoods		10-15	5-10	Local Bus, Micro-transit	30-60 minutes
Single Family Neighborhoods		<10	<5	Micro-transit, Ride-share	On-demand to infrequent



Population-Based Demand

Population Density

Population density is one of the most important factors in determining underlying demand for transit. Density indicates both where there are many people in close proximity, as well as land use types best suited for transit. Denser areas tend to be more walkable and less automobile-oriented, with limited access to parking and less reason and incentive to own a private automobile.

The City of Fort Worth, as of 2017, is home to 875,000 people, composing a large portion of Tarrant County's total population of just over 2 million. Where and how these residents concentrate throughout the city vary widely. Areas shown with medium or higher population densities can support some level of fixed-route transit, ranging from peak-only service to frequent service operating every 15 minutes or better.

Areas with the highest population concentrations within the City of Fort Worth are:

- Rosemont and Worth Heights in South Fort Worth
- Meadowcreek and adjacent neighborhoods in far south Fort Worth
- Ridgmar
- Western Hills
- Near North Side and Diamond Hill in northern Fort Worth
- Parkview in far north Fort Worth
- CentrePort in far east Fort Worth
- Polytechnic
- Downtown, Upper West SIde, and Museum District

Residents with a High Propensity for Transit Use

In addition to population density, socioeconomic characteristics influence an individual's propensity toward transit use. National research shows that many population groups often have a higher propensity for transit use than the overall population. These include:

Zero Vehicle Households: People with limited or no access to a personal vehicle, either by choice or by necessity, are more likely to rely on transit. In some large cities, many residents choose to not have an automobile because transit is available, car ownership is a hassle, and there are plentiful options such as taxis, car sharing, and car rentals for the times when a car is desired or needed. In Fort Worth, an urban area largely oriented toward automobile travel, people without automobiles largely consist of those with lower incomes or those who do not drive. According to the US Census Bureau, 6% of Fort Worth city households (about 17,100 households) do not have access to a vehicle. In Fort Worth, residents living in zero-vehicle households are 11 times more likely to take transit.

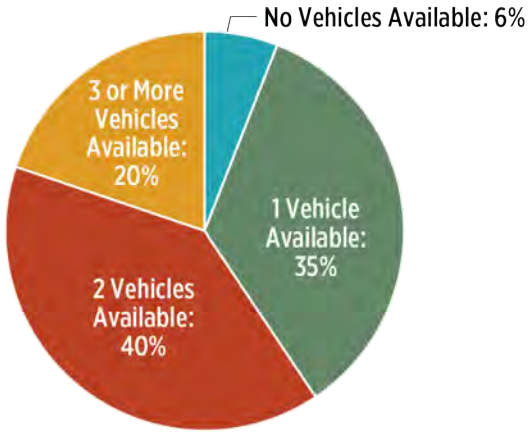
Low Income Residents: Residents with lower incomes tend to use transit to a greater extent because it is less expensive than owning and operating a personal vehicle; they may rely on transit as their primary mode of transportation. In Fort Worth, the median household income is $57,309. About 12% of households earn less than $15,000 per year, 9% of households earn between $15,000 and $25,000 per year, and 23% earn between $25,000 and $50,000 per year. Residents of city households earning less than $25,000 are slightly more than 2 times as likely to take transit. Those earning between $25,000 and $50,000 are 1.8 times as likely to take transit. Residents earning more than $50,000 are only 0.27 times as likely to take transit as the typical Fort Worth resident.

Minorities: Black residents of Fort Worth use transit more often than white non-Hispanic residents because they tend to have more limited resources for transportation and locate in denser neighborhoods closer to the city center. The provision of effective transit service to minority populations is particularly important to the Federal Transit Administration and is a requirement under Title VI of the Civil Rights Act of 1964. In Fort Worth, 40% of residents are white non-Hispanic, 25% are Hispanic or Latino, 18% are black, and 4% are Asian. Black residents of Fort Worth are 3.4 times more likely to use transit. White non-Hispanics and Hispanics are 0.6 times as likely to take transit, and Asians are 0.4 times as likely.

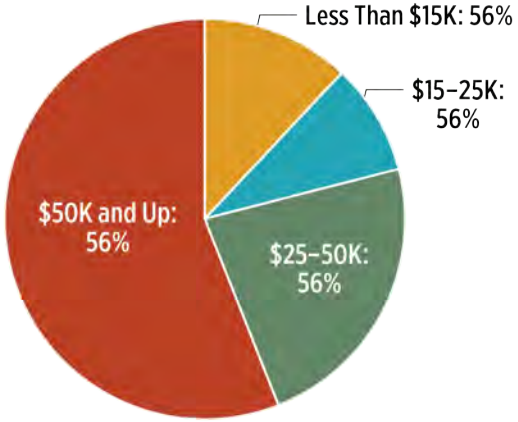
Residential Demographics in Fort Worth

Source: 2013-2017 American Community Survey 5-Year Estimates

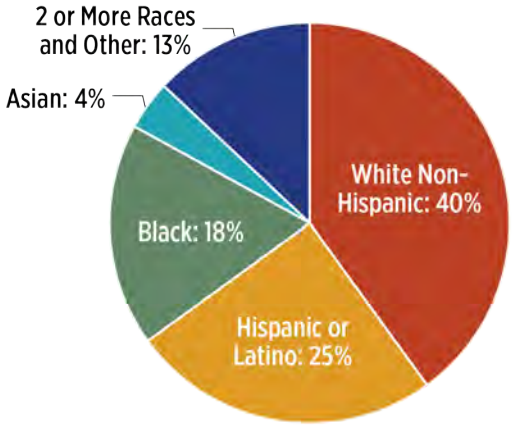
Vehicle Ownership



Household Income



Race and Ethnicity



Demographics and Resident-Based Transit Propensity

When significant numbers of individuals and households from these high-transit propensity groups cluster together, they can influence the underlying demand for transit to an extent that is not captured when only considering total population. In a given location, groups of people from transit-supportive demographic groups may be too small individually to indicate significant demand for transit service, but their clustering may result in potentially high levels of transit use. Similarly, in a location where transit-supportive demographic groups have low representation, the level of potential transit demand may actually be lower than total population density alone would indicate.

To take this into account, a measure called the **transit propensity adjustment factor** was developed in order to measure relative demand for transit in different areas as compared to the region. This factor takes into account demographic characteristics for the population aged 16 and over who are employed. These factors measure the likelihood of certain demographic groups to use transit to commute to work relative to the study area's general population. Any demographic group with a transit propensity adjustment factor greater than 1 is more likely than the general population to use transit. Differences in transit propensity are based on vehicle ownership, race and ethnicity, and annual income.

Transit Propensity Adjustment Factors

Demographic Group	Transit Propensity
Race and Ethnicity	
White non-hispanic	0.60
Black	3.43
Asian	0.42
Hispanic	0.59
Other Race	0.04
Income	
Under $25,000	2.08
$25,0000-50,000	1.80
$50,000 or more	0.27
Vehicle Ownership	
0 vehicles	11.40
1 vehicle	1.10
2+ vehicles	0.32

Demographics and Resident-Based Transit Propensity

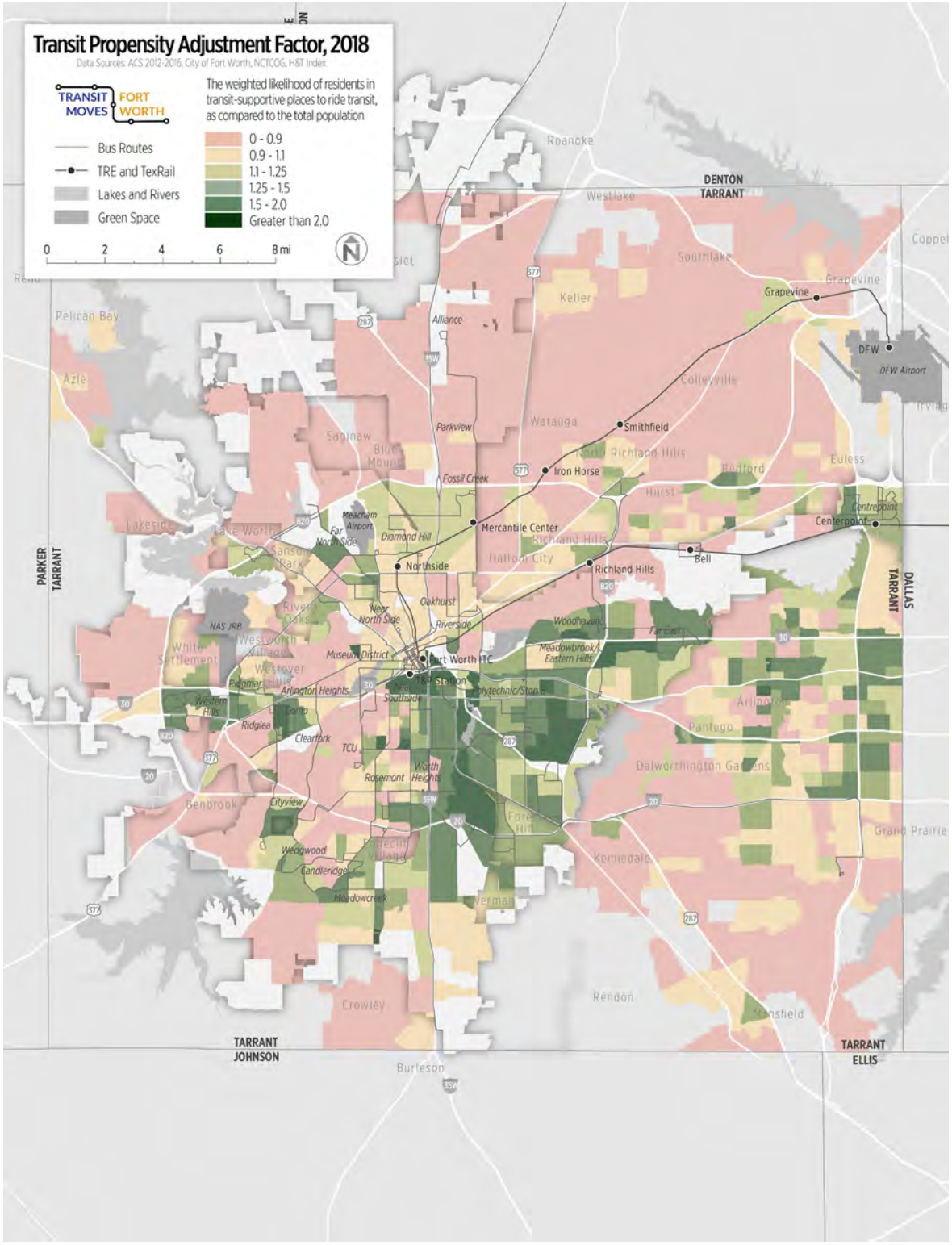
When considering the concentration and distribution of the different transit propensity-related demographic groups in Tarrant County, it becomes clear that residents of the urban core in general have a higher propensity to use transit (shades of green) and most residents Tarrant County north of the loop have a lower propensity to use transit (red) as compared to the county average. In Fort Worth, high transit-propensity groups tend to live in the southeastern quadrant of the city, with some isolated groups of high transit propensity to the west and northwest. Residents in most of Arlington have a higher than average propensity to use transit as well.

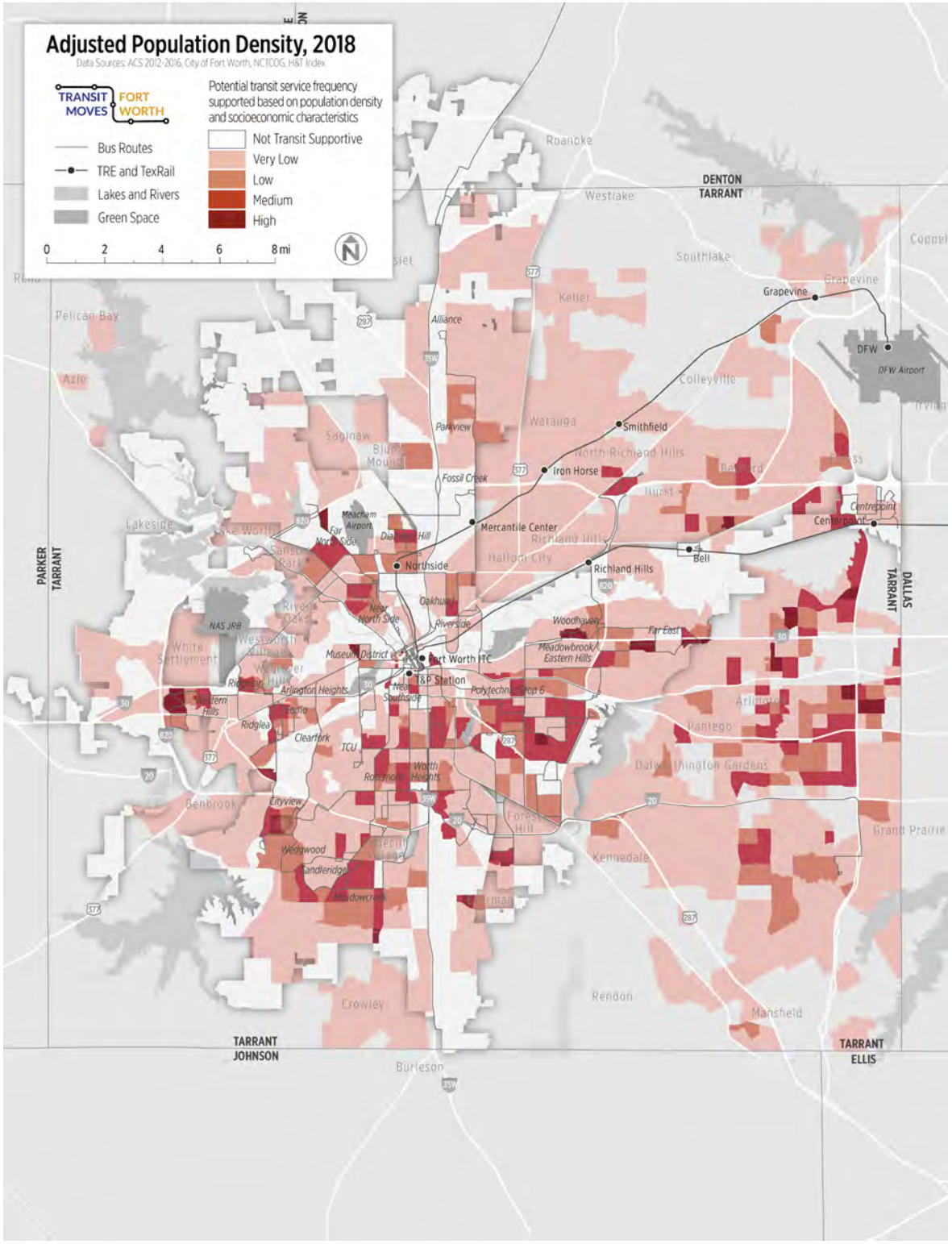
Residential areas with high transit propensity include:

- Near Southside
- Polytechnic/Stop 6
- Most of southeastern Fort Worth
- Como
- Woodhaven
- Far North Side

Residential areas with low transit propensity include:

- Neighborhoods west of TCU
- Ridglea
- Arlington Heights
- Oakhurst
- Far southwestern, western, northwestern, and far north Fort Worth





Adjusted Population-Based Demand

In general, when socioeconomic characteristics are considered with density, it tends to intensify the demand in urban areas and diminish the demand in more outlying areas. Areas that, when demographic characteristics are factored, have a very high underlying demand for transit within the City of Fort Worth are:

- Rosemont and Worth Heights in south Fort Worth
- Candleridge-adjacent areas along Hulen St, Sycamore School Rd and McCart Ave in Far South Fort Worth
- Cityview and River Park in Southwest Fort Worth
- Western Hills, Rigmar, Ridglea Village, and Como in West Fort Worth
- Near Northside, Far Northside, and Diamond Hill in North Fort Worth
- Woodhaven in eastern Fort Worth
- CentrePort in far east Fort Worth
- Morningside, Polytechnic Heights, and Stop Six in southeastern Fort Worth

Just as important as recognizing which areas show strong demand for transit is the understanding that **a large swath of Tarrant County and the City of Fort Worth do not show population-based demand for transit service.** Areas shown without any shades of red will not support any kind of transit or microtransit. Areas shown with very low or low demand will support microtransit, ridesharing, or peak-only service at best.

Matching Population-Based Demand to Transit Service Types and Frequencies

Population densities alone provide an indication of the underlying population-based demand for transit in terms of the type and frequency of service that would be appropriate. As densities grow, the demand for transit grows, particularly with respect to more frequent service. There must be 10 to 15 residents per acre to produce demand for hourly service, which is the lowest level of service that is considered to be acceptable to support fixed-route service. Population densities higher than 30 residents per acre generate demand for frequent services (every 15 minutes or less) and premium services like bus rapid transit.

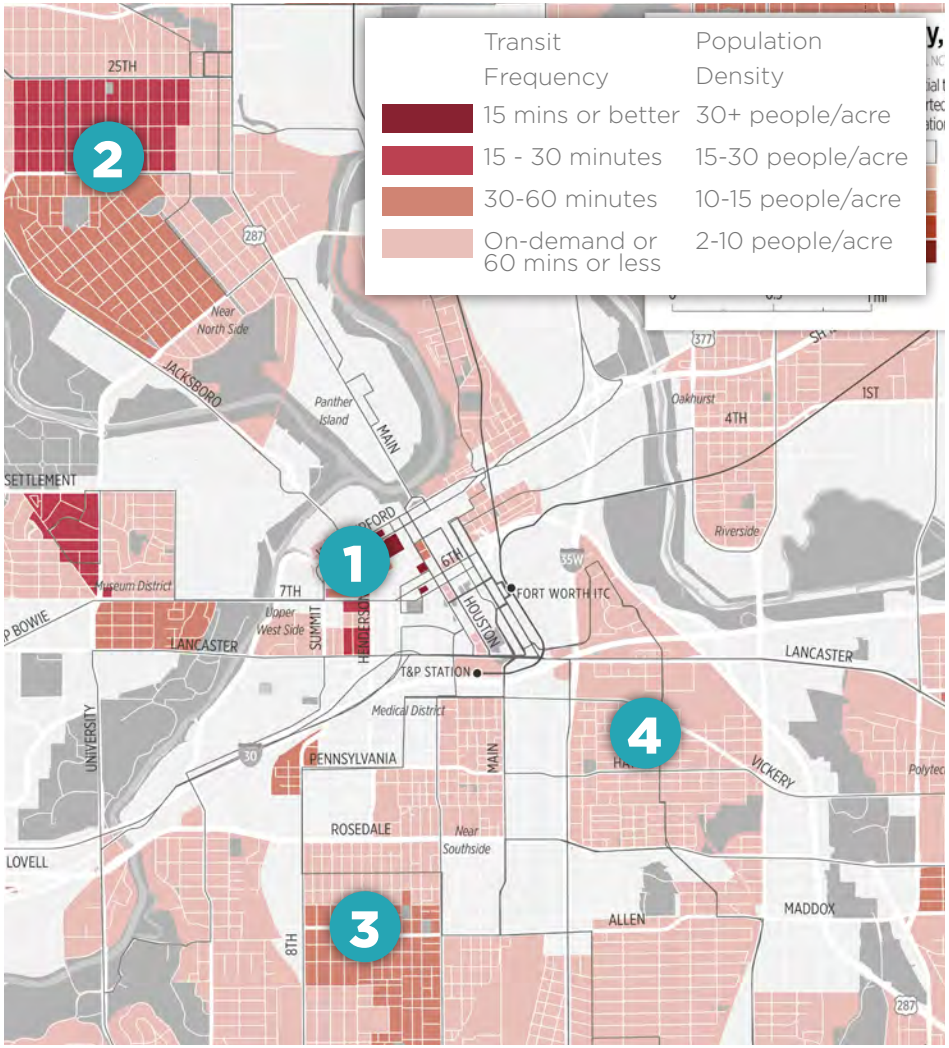
Transit Supportive Population Densities

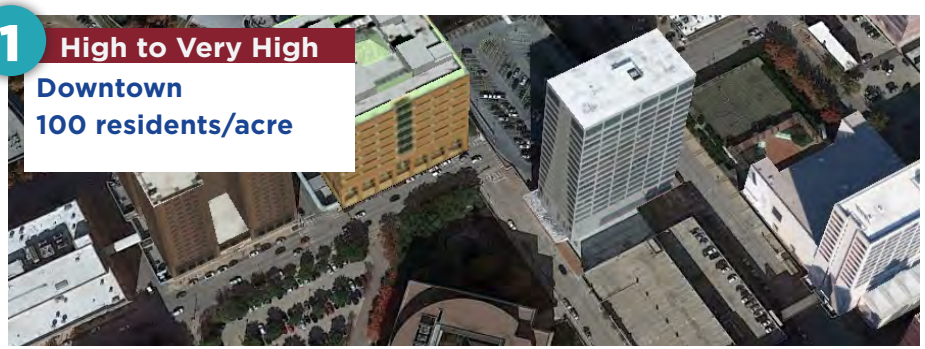
Transit Mode/ Service Frequencies	Population per Acre
Flex Bus	0.5
Community Circulator	2
Local Bus	
60 minutes	10-15
30 minutes	15-30
15 minutes	30-45
10 minutes	45-90
≤ 5 minutes	>90
Bus Rapid Transit	25-50
Light Rail Transit	30-80

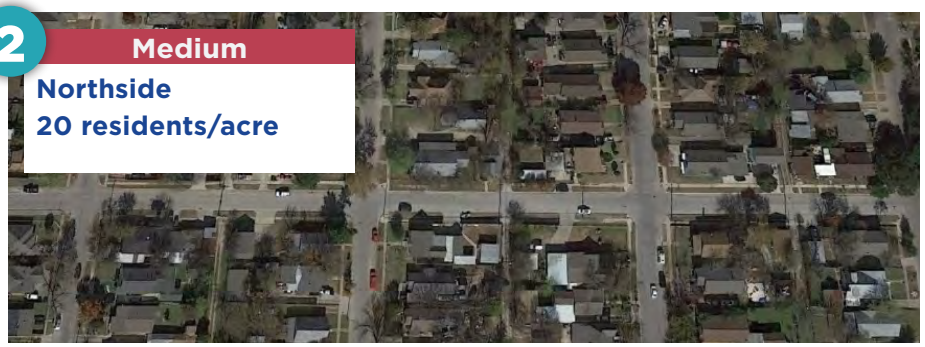
The above table does not consider factors other than population density, so to get a more complete understanding of population-based demand for transit, the baseline population density of Tarrant County was adjusted by the transit propensity adjustment factor. The adjusted population demand map provides an understanding of population-based demand for transit adjusted by the likelihood of different demographic groups to take transit. For example, an area with a transit propensity factor of 1.5 effectively has a population density 1.5 times higher than it actually does, based on its demographic composition and the level of transit service it may support.

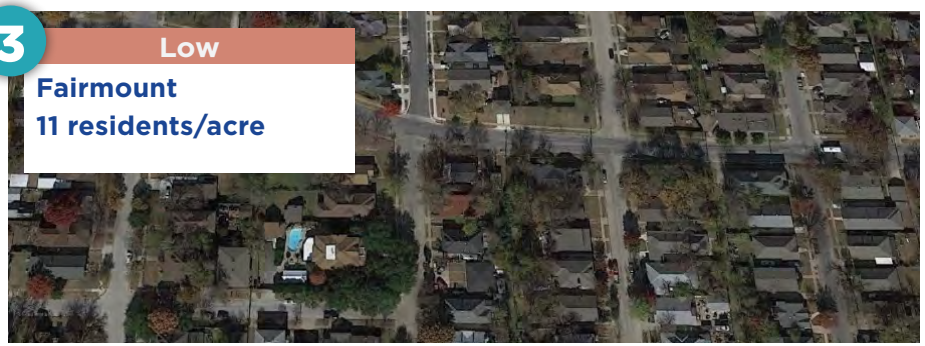
Visualizing Population Density

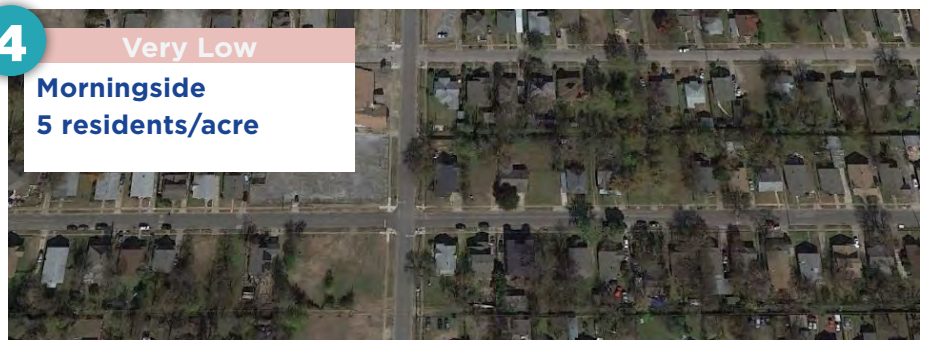
Visualizing density can be a helpful way to understand what different land uses look like as they relate to potential transit demand. More people in an area often means taller buildings or closely-spaced homes. The population density of Downtown's high-rise residential towers and the residential area of the North Side north of 21st Street can support more frequent transit service than that of Fairmount and Morningside, where dispersed, single-family homes dominate.











Employment-Based Demand

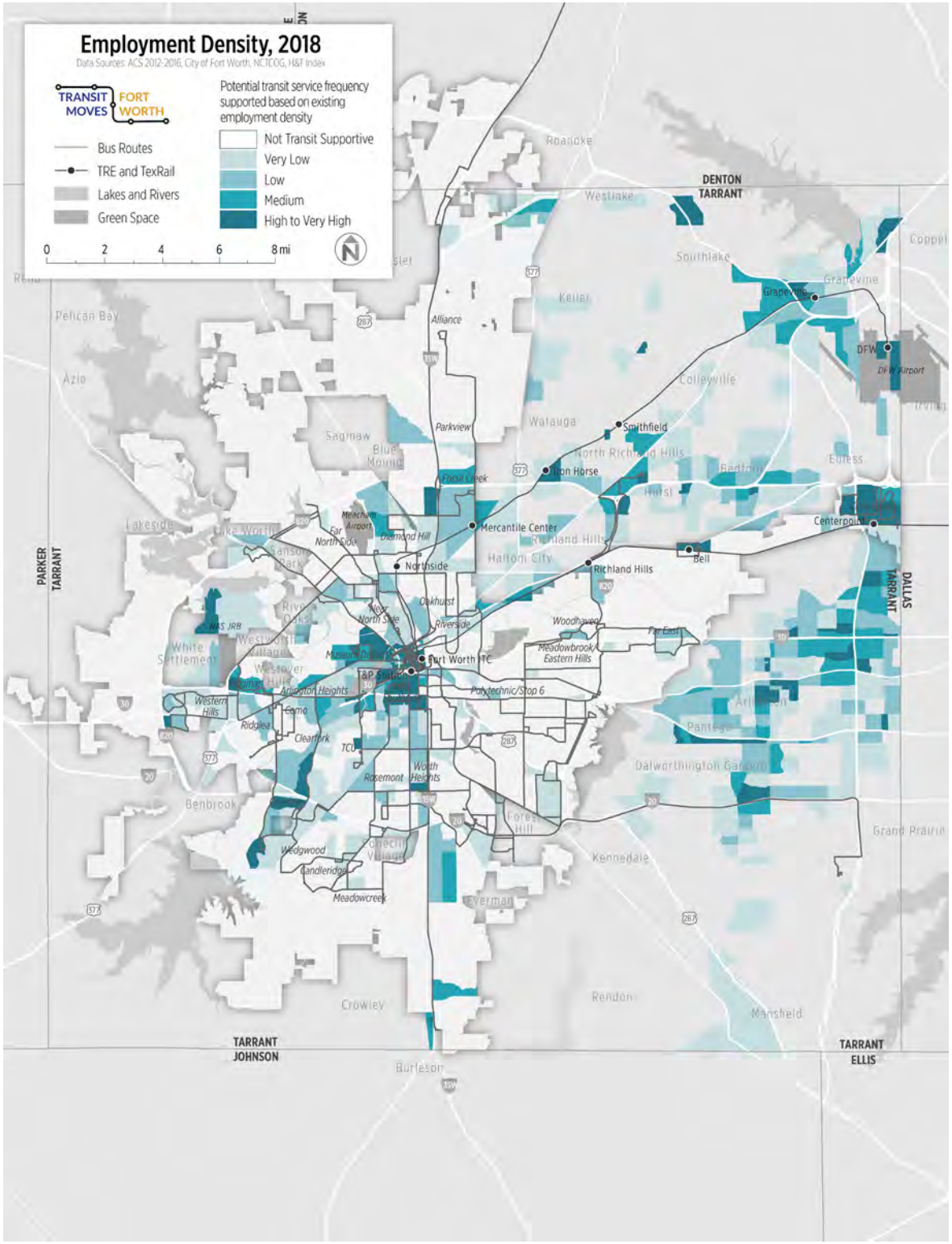
Employment Density

In the same manner as population densities, employment densities provide a strong indication of underlying employment based demand for transit. Commutes are the most common and consistent reason for people to take transit. Employment density is another major source of transit demand. Job density also indicates demand for travel activity unrelated to commutes. For example, where restaurant and retail employees need to travel are also where customers are traveling; the same goes for hospital employees and patients.

As of 2018, there are about 1.28 million jobs in Tarrant County. Where and how much these jobs concentrate throughout the region vary widely. As job densities increase, the demands for transit service grow, particularly in terms of service frequency. A density of two to five jobs per acre is typically produce enough demand for hourly bus service. Employment densities higher than around 15 jobs per acre produce demand for frequent service (every 15 minutes or better) and premium services like bus rapid transit

Areas with the highest job concentrations within the City of Fort Worth are:

- Downtown
- Museum/Cultural District
- Cityview/Hulen Mall
- Near Southside
- Texas Christian University
- Ridgmar
- Lockheed Martin
- CentrePort
- Around Bell Station



Jobs with a High Propensity for Transit Use

In addition to job density, socioeconomic characteristics of employed people influence an individual's propensity toward transit use to travel to work. These socioeconomic characteristics are strongly related to an individual's likelihood to use transit to travel to work:

Low Salary Workers: Jobs paying less money are more likely to be reached by workers taking transit. In Fort Worth, jobs paying less than $15,000 per year are 2.3 times more likely to be reached by transit. Jobs paying between $15,000 and $40,000 are 1.2 times more likely to be reached by transit. Relatively higher paid jobs (paying more than $40,000) are only 0.4 percent as likely as a typical job to be reached by transit.

Minorities: Jobs worked by certain racial and ethnic minorities are more likely to be reached by transit, because some minorites tend to have more limited resources for transportation. In Fort Worth, jobs worked by black residents are 3.7 times more likely to be reached by transit. Jobs worked by Asian residents are 1.5 times more likely to be reached by transit, and jobs worked by Hispanic or latino residents are 0.7 times less likely to be reached by transit. Jobs held by whites are only 0.6 times as likely to be reached by transit.

Demographics and Jobs-Based Transit Propensity

To take socioeconomic factors into account, an employee transit adjustment factor was applied to adjust employment-based demand by the likelihood of those jobs to be reached by transit. This factor is similar to the resident-based transit adjustment factor except applied to job sites rather than homes. Any employee demographic group with an employment transit index factor greater than 1 is more likely than the typical worker to use transit to reach their job.

As the table to the right shows, differences in employment transit propensity are based on race and ethnicity and annual income.

Employee Transit Adjustment Factors

Demographic Group	Transit Propensity
Race and Ethnicity	
White non-hispanic	0.60
Black	2.72
Asian	1.53
Hispanic	0.72
Other Race	0.98
Income	
Under $25,000	2.33
$25,0000-50,000	1.20
$50,000 or more	0.43

Employee Transit Propensity Adjustment

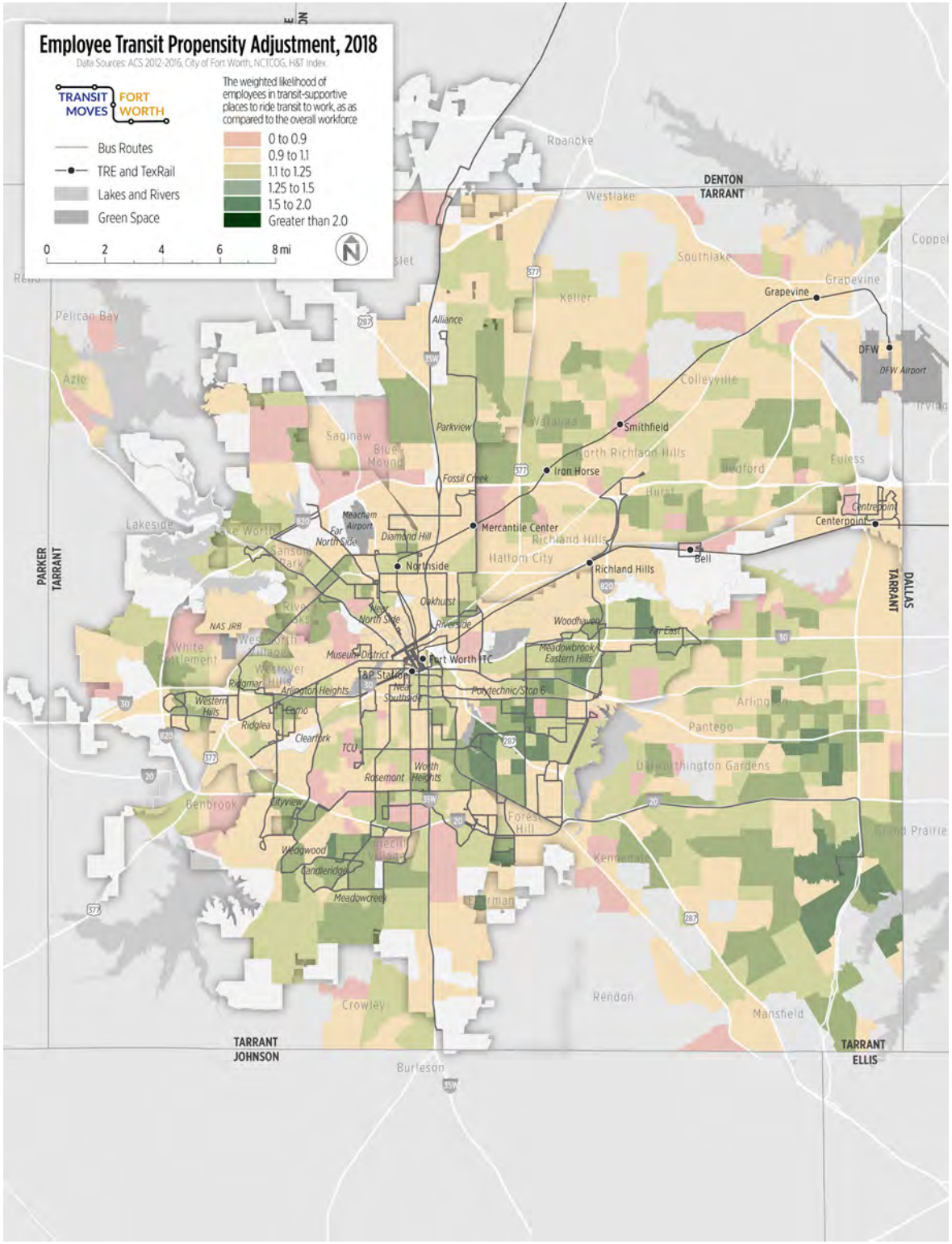
When considering the concentration and distribution of the different jobs worked by people more likely to take transit to reach those jobs, it becomes clear that jobs located in the urban core in general have a higher adjustment factor (shades of green) and those in Tarrant County north of the loop have a lower factor (red) as compared to the county average. In Fort Worth, high transit propensity jobs tend to be located just outside of the urban core, with a particularly prominent pocket of high transit propensity jobs in the southeast quadrant of the city (surrounding Renaissance Square shopping center). Arlington and Grand Prairie also tend to have jobs held by people who are more likely to take transit to get to work.

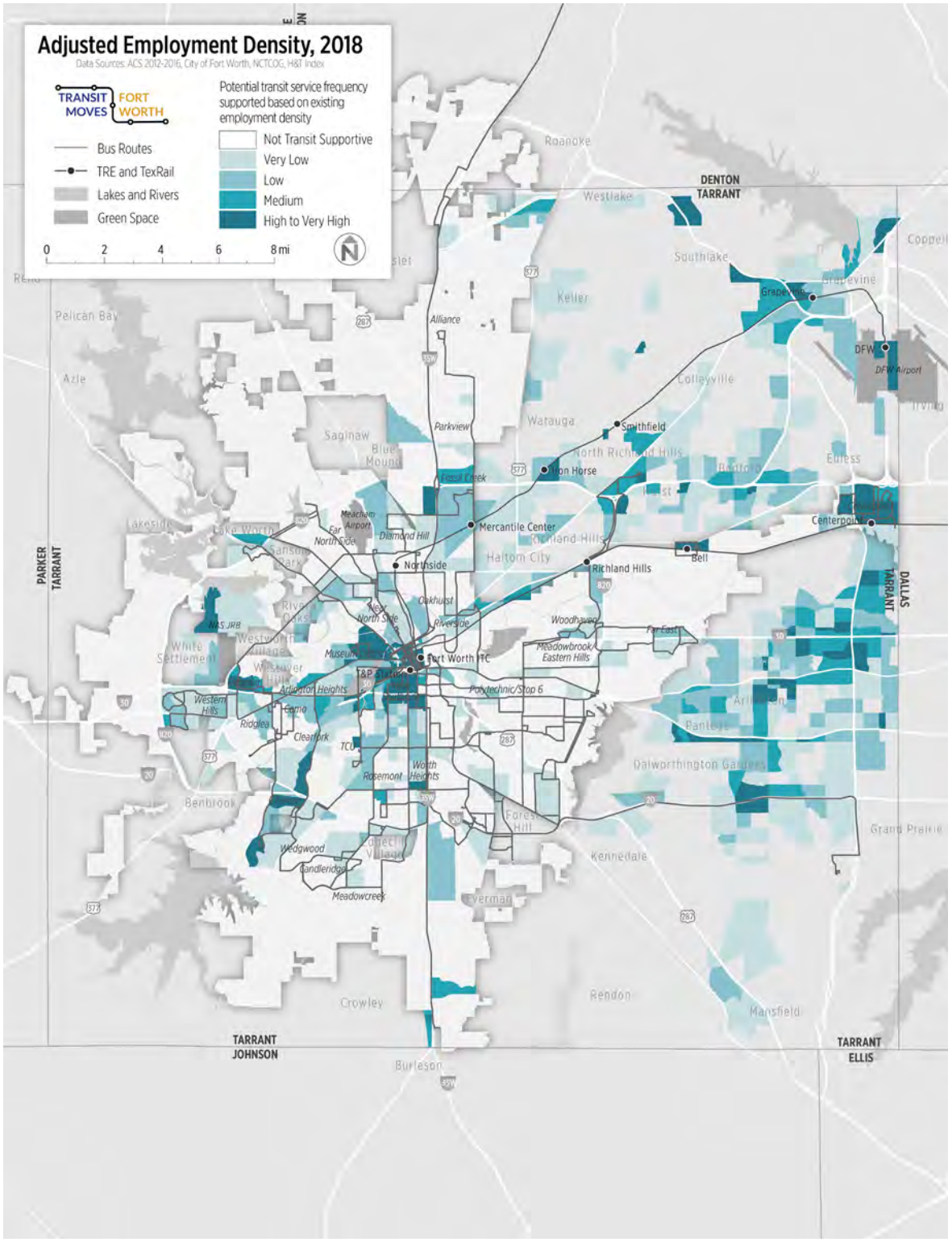
In addition to Arlington and Grand Prairie, areas with high employee transit index factors are:

- Wedgwood
- Renaissance Square in southwestern Fort Worth (south of Polytechnic/Stop 6
- Polytechnic and Stop Six
- Meadowbrook/Eastern Hills
- Far East Fort Wort

Areas with low employee transit index factors are:

- Alliance Airport
- South industrial center southeast of I-35 and I-20
- Crestwood/Monticello northwest of Museum/Cultural District





Adjusted Employment-Based Demand

When employment density is adjusted by the likelihood of those jobs to be reached by transit, a fuller picture of employment-based transit demand emerges, although the shifts in density are not as significant as with the adjusted population-based demand.

Areas with a high level of employment-based transit demand within the City of Fort Worth are:

- Downtown
- Cultural/MuseumDistrict
- Cityview/Hulen Mall
- Near Southside
- Ridgmar
- Lockheed Martin
- CentrePort

As with population densities, some areas have such low job density that transit will never be successful or cost-effective to provide there. Areas shown with without any shades of blue will not support any kind of transit or microtransit. Areas shown with very low or low job-based demand will support microtransit, ridesharing, and/or peak-only service.

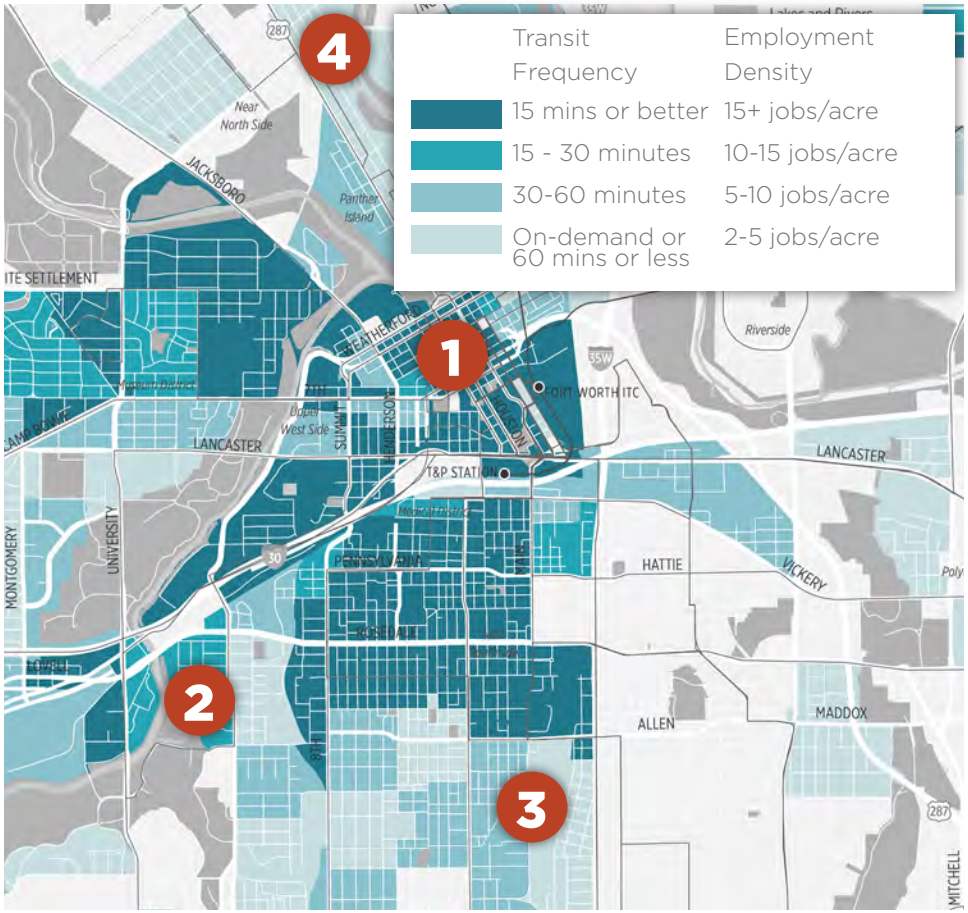
Transit Supportive Employment Densities

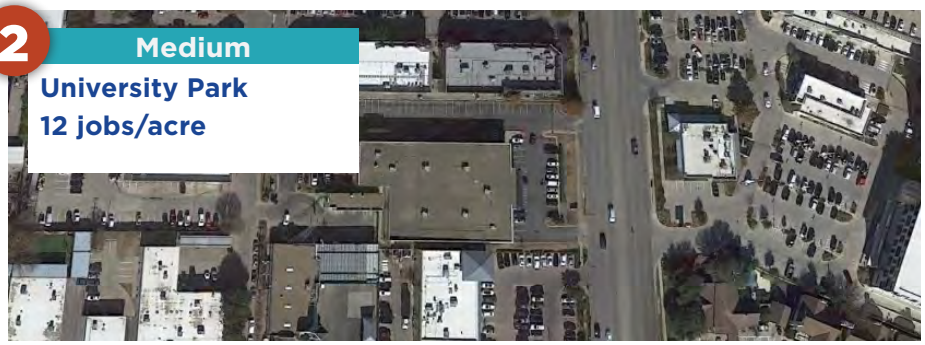
Transit Mode/ Service Frequencies	Jobs per Acre
Local Bus	
60 minutes	5-10
30 minutes	10-15
15 minutes	15-25
10 minutes	25-45
≤ 5 minutes	>45
Bus Rapid Transit	>13
Light Rail Transit	>15

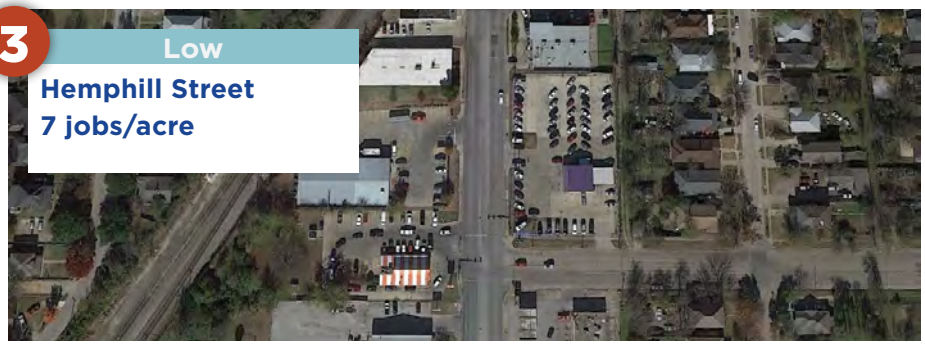
Visualizing Employment Density

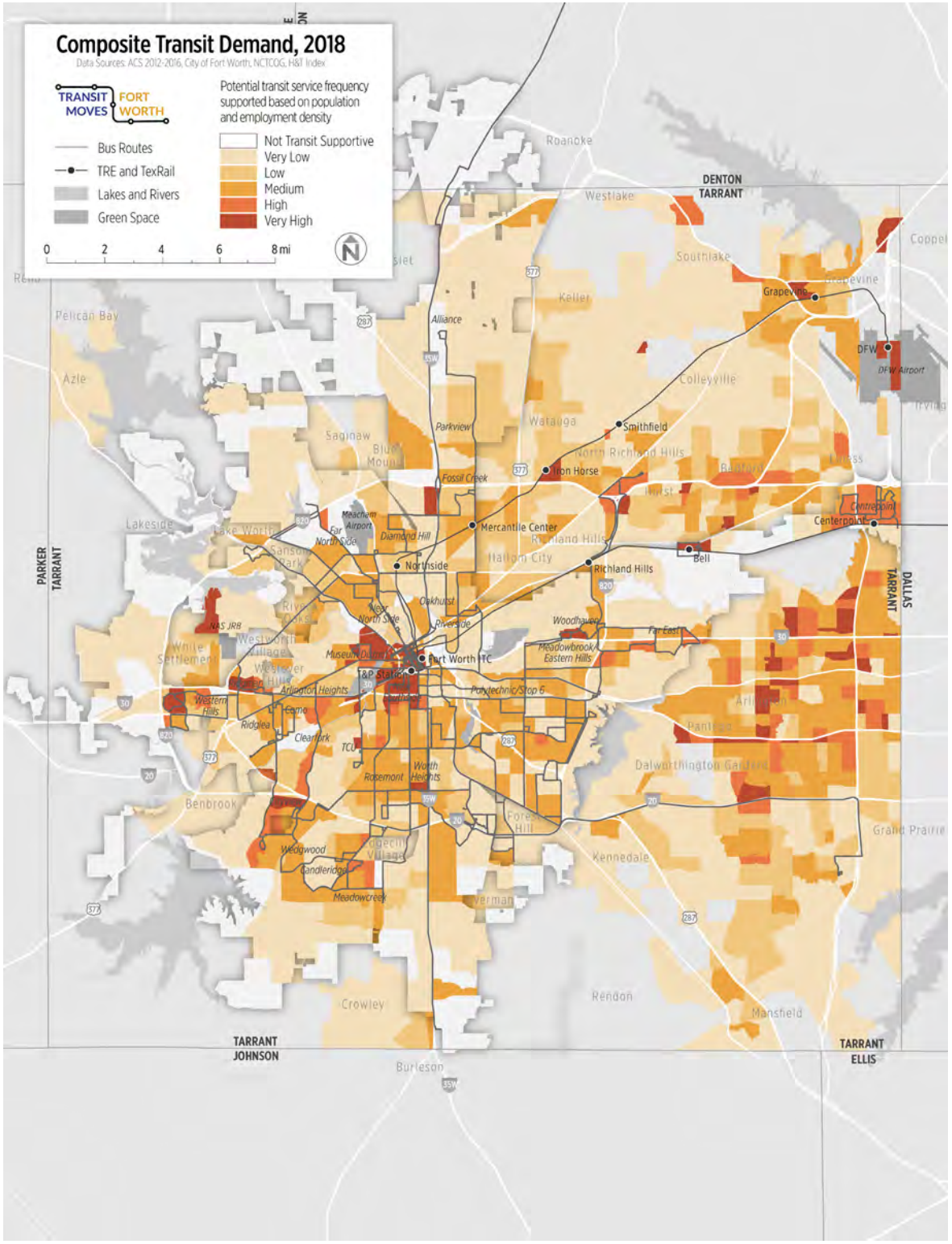
Just as with residents, density is the most important component when serving jobs with the appropriate level of fixed-route transit service. Jobs tend to be more concentrated than residents.

Sometimes, one employer like a large hospital in the Medical District can produce enough job density in a small area to warrant more frequent levels of service. Areas like downtown (aerial image 1 to the right) or the Medical District with many office buildings, stores, and other diverse forms of employment spaced closely together are the strongest producers of demand for frequent transit service. Shopping areas with large surface parking lots (aerial 2), strip development (aerial 3), and warehouses or distribution centers are examples of progressively less dense employment areas.









Composite Demand

The previous sections have described how population density, socioeconomic characteristics, and employment density separately produce demand for transit. Looking at them combined is the best way to get a complete understanding of the underlying demand as none of these three aspects of demand exist in isolation from one another.

Combined Population, Demographic, and Employment-Based Demand

When considered together, it is clear that the underlying demand for transit is very high in the urban core of Fort Worth, west along I-30, and in parts of CentrePort, Arlington, and Grapevine. However, currently much of the county, and almost the entirety of the extreme north and northwest parts of Fort Worth, show virtually no demand for fixed route transit service.

In Fort Worth, transit service is concentrated where composite demand for transit is highest. In adjacent regions of Tarrant County, notably Arlington, Pantego, Hurst, Bedford, and Grapevine, Trinity Metro currently does not provide service. Transit can play a more significant role in getting people from where they live to jobs located outside of Fort Worth city limits.

Composite demand for transit is highest in the following areas within the City of Fort Worth:

- Urban Core
- Cityview/Hulen Mall
- Ridgmar
- Lockheed Martin
- Western Hills
- Woodhaven and Far East Fort Worth

Nearly all of the urban core shows high demand for transit: Downtown corridors where demand is high enough to merit frequent service include:

- Downtown
- Upper West Side
- West 7th Street
- Bailey Avenue
- Camp Bowie Boulevard
- University Drive
- Medical District
- TCU
- Rosedale Street
- Hemphill Street
- Pennsylvania Avenue

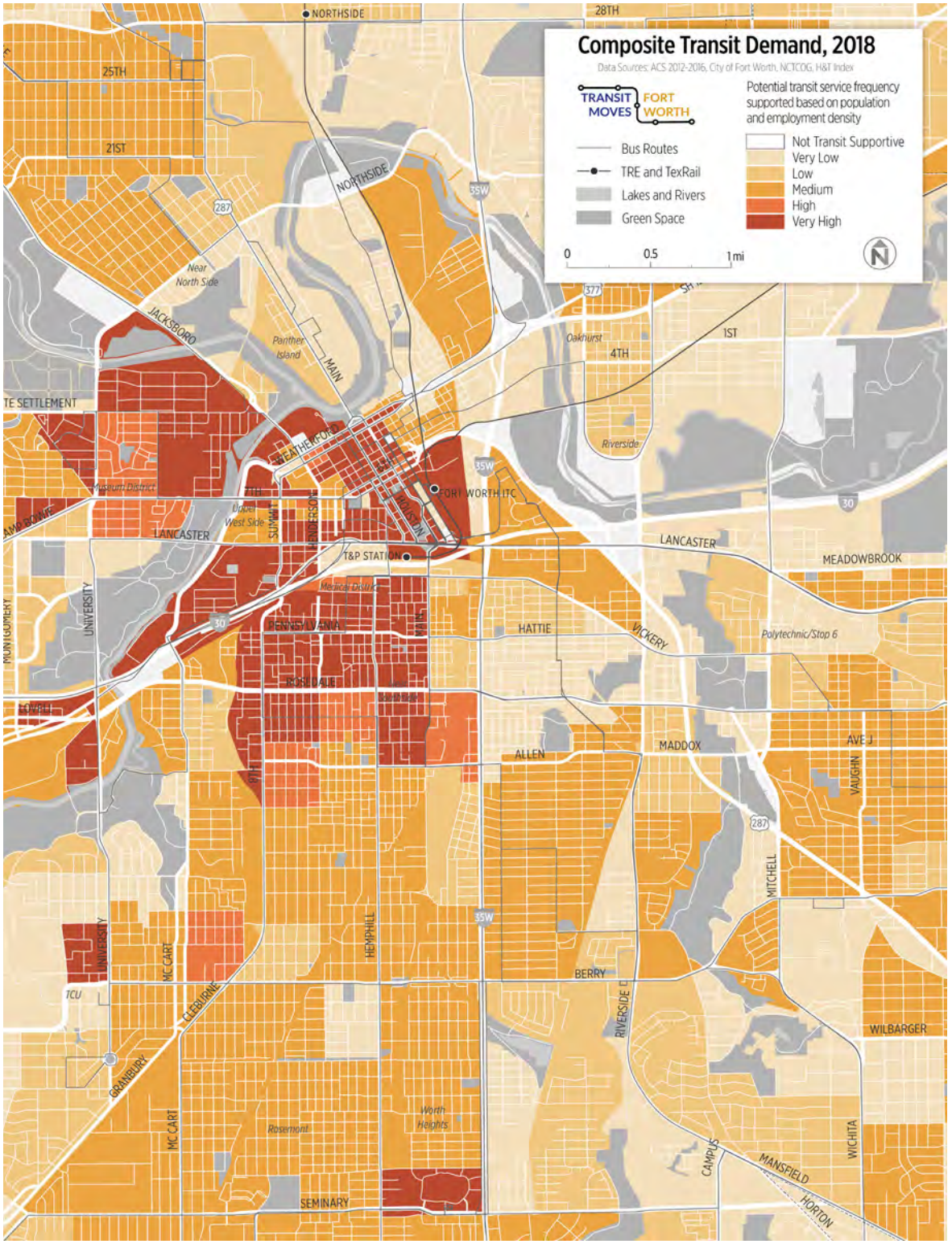
Area Supportive of Transit Service

As of 2018, 31% of the City of Fort Worth's land area and 26% of Tarrant County's land area is dense enough to support some level of fixed transit service. These transit-supportive areas have minimum 10 residents per acre and/or 5 jobs per acre, supporting hourly service operated by a local bus or microtransit. The areas shown in dark brown are dense enough, with their 45 or more residents per acre and/or 35 or more jobs per acre, to support frequent and premium service. As Fort Worth expands and densifies, these transit supportive areas will intensify in terms of their demand, and transit service should change to meet these growing needs.

Acreage of Transit-Supportive Land, 2018

Fort Worth

Tarrant County



Major Activity Centers

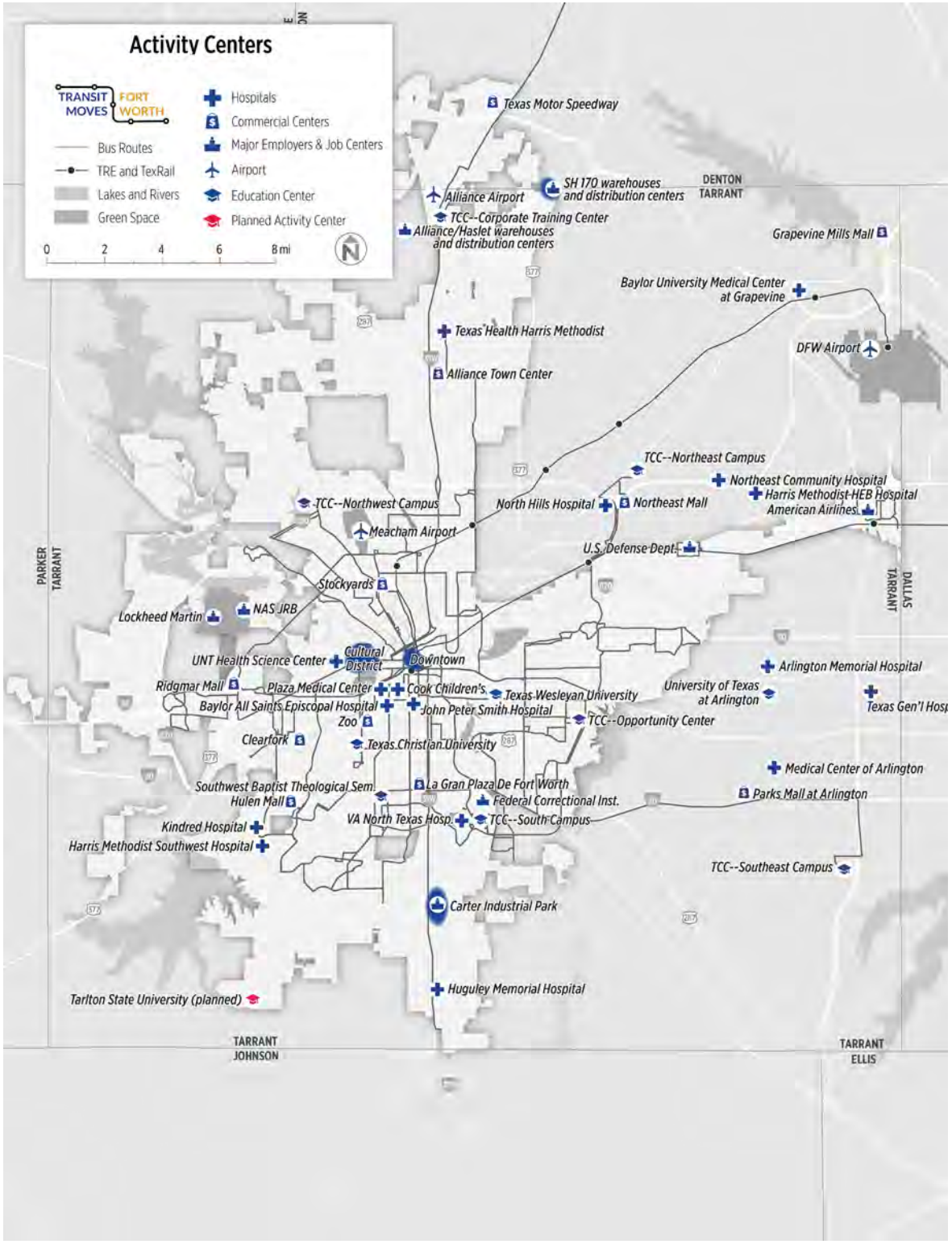
Some activity centers generate additional demand for transit. Most of these places – large employers, shopping malls and retail centers, hospitals, and town centers – generate relatively consistent demand for transit throughout the year. Other activity centers like colleges and universities are significant transit demand generators only during certain seasons of the year.

Many major employment centers in the exurban regions of Fort Worth are located on isolated campus-like settings, like Huguley Memorial Hospital, the planned Tarlton State University campus, and defense-oriented employers like Lockheed Martin, the Department of Defense, and the Naval Air Station Joint Reserve Base.

Activity centers in Fort Worth with more than 1,000 on-site jobs include:

- Texas Christian University
- Ridgmar Mall
- Plaza Medical Center
- John Peter Smith Hospital
- Hulen Mall
- Huguley Memorial Hospital
- Baylor All Saints Episcopal Hospital
- Arlington Memorial Hospital
- American Airlines
- Lockheed Martin
- NAS Fort Worth JRB

Other important activity centers are regions with large concentrations of certain jobs, like downtown, the Cultural District/museums west of downtown, and major regional industrial centers in Alliance, South Fort Worth, and along SH 170 in far north Fort Worth. The outlying industrial zones are less dense but could be good candidates for service by a transportation management association (see next page).



Alternatives to Fixed Route Service

Traditional fixed-route bus services, including circulator service, should operate in areas that have sufficient density and socioeconomic conditions to support it. However, there are many types of public transportation services, including flexible services like flexible "flex" routes, demand response, and/or ridesharing services (see figure on next page).

Local Circulators and Feeders

Local circulator services typically operate on an hourly headway and are designed to directly serve important destinations and corridors.

Feeder services are designed to provide an easy connection to transit stations or high frequency transit services.

Flex Routes

Flex services are a hybrid between fixed route and demand response service. Flex routes travel along a fixed alignment with scheduled start times, but can deviate from the route up to 1/4 mile to directly serve a destination if requested by a rider. Passengers may also "flag" a bus at any safe point along the fixed route rather than having to walk to a specific stop.

Demand Response

Demand response services (sometimes called Dial-A-Ride) provide door-to-door trips within a specified service area using smaller transit vehicles. These services typically operate in lower density suburban and rural communities.

Rideshare Services (TNCs)

Private rideshare companies, or Transportation Network Companies (TNCs) like Uber and Lyft, compete directly with transit and evidence suggests they play a role in declining transit ridership across the country. However, public-private partnerships with these companies can also help serve as a way for individuals to reach fixed route services on demand and be integrated into a transit system rather than competing by serving trips in low-density areas that are not efficiently served by traditional transit.

While density, more than raw numbers, matters most to traditional fixed route or frequent service, office parks and warehouses, which employ many people in one area, are often a priority for a region to serve with transit. Often employees of these areas are lower income or work second and third shift times and may have fewer resources to put toward transportation. Large employers often take an interest in how their employees get to work and are more likely to have the resources to invest in their employees' commutes. Areas such as the South Fort Worth Industrial Center between I35, Oak Grove, Everman and Altamesa—where there are many jobs but distributed less densely across the area and segregated by large surface parking lots—make them a better candidate for other types of service.

Transportation Management Associations

Employment areas like that lack concentrated density but still form a congregation of employers are prime targets for Transportation Management Associations (TMAs), public-private partnerships between transit agencies and local employers who run shuttles or van services that coordinate with public transit services. Schedules and drop off points can be coordinated to get employees to and from the main sites of a service area. This type of service is much more efficient than a fixed-route looping bus service. Coordinated partnerships can help get employees to their destinations faster, and they can help a transit agency run more productively.

Houston Downtown Management District TMA

The Houston Downtown Management District works with Central Houston, Inc. to provide TMA services to employers and employees in the downtown Houston, Texas area.

The following areas in Tarrant County are traditionally less dense but do represent large employment areas. They could be well suited to be served by a TMA.

- Carter Industrial Park
- Alliance Gateway
- Alliance Airport/Westport Intermodal
- North Fort Worth Industrial Center (Mercantile, Fossill Creek, Meacham)
- CentrePort

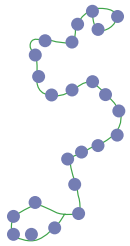
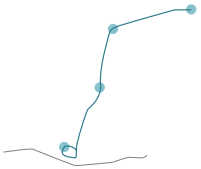
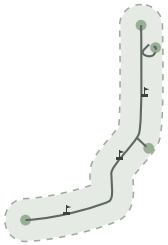
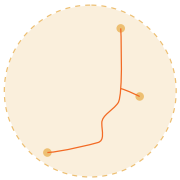
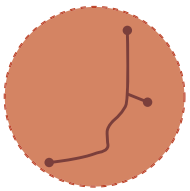
Microtransit

Microtransit is a term often used to describe private companies or branches of transit agencies that use vans or small transit vehicles, often in conjunction with on demand service applications generally accessed through smartphones. When run by private companies, routes are often determined based on demographic information and crowdsourced data and may only operate during peak periods primarily as a commuter service. Much like TMAs, there is a potential to partner with microtransit companies to offer a suite of services with the recognition that one size doesn't fit all when it comes to transit. Microtransit run by transit agencies can be a demand-response service that helps transport individuals to the nearest fixed route. This service may pick up individuals at the location they request, or have fixed "nodes" that serve as pickup or drop-off points. Microtransit is one way to address "first-mile/last-mile" connectivity issues.

Blue Zones and Complete Streets

Another strategy to enhancing access to transit is to improve the built environment to facilitate access to planned transit stops and stations. These improvements can include building sidewalks or bike paths to facilitate access to planned transit capital improvements or expanding the available passenger amenities with items like bus stop signage, bike racks, benches, and shelters.

Together with Blue Zones Project, the City of Fort Worth is working to improve the safety of the city's streets for all users, abilities and ages by assuring Complete Street policies are adopted. Complete Streets support active transportation, improving bicycle and pedestrian infrastructure to encourage people to move naturally. Blue Zones Project's mission is to make healthy transportation choices easier, among many other health-related opportunities throughout the City.

TRANSIT SERVICE TYPES FOR LOW DENSITY AREAS		BENEFITS AND CHALLENGES	VEHICLE TYPE
LOCAL CIRCULATOR		**BENEFITS** Stops are close together, requiring less walking. Provides good coverage, serving a wide variety of destinations. **CHALLENGES** Routes can be circuitous and make frequent stops, causing longer travel times. Riders have less flexibility about when they travel. Longer travel times which attracts fewer riders than other fixed-route services.	
FEEDER		**BENEFITS** The schedule of these services is tied to the arrivals and departures of high-frequency transit service Alignments are direct in order to make the trip as fast as possible to riders. Cost effective way to allow riders to make long distance trips on transit. **CHALLENGES** Feeder services are for passengers planning to connect to another transit service and must be very reliable to ensure that passengers make their connection	
FLEX ROUTE		**BENEFITS** Flex service can meet requirements for complementary ADA paratransit service without traditional demand response service. Riders can get door-to-door service if their trip starts and ends within the 1/4 mile boundary. **CHALLENGES** Riders may not know when the bus is coming. Travel is indirect and trips can take a long time due to deviations requested by riders.	
DEMAND RESPONSE		**BENEFITS** Provides service in areas that lack the population density to support fixed-route bus service. Improves the mobility of residents without other travel options. **CHALLENGES** Often requires 24 hour advance reservations, reducing service convenience. High cost per passenger than other transit services.	
TNC		**BENEFITS** Provides service in areas that lack the population density to support fixed-route bus service. Improves the mobility of residents without other travel options. **CHALLENGES** Providing only a subsidy of TNC trips could result in passengers paying high fares. Difficult to set restrictions on trips.	

Looking Forward to 2045

By 2045, population and employment will have increased significantly, resulting in a marked intensification and expansion of areas supportive of more frequent transit service.

Planning for the Future

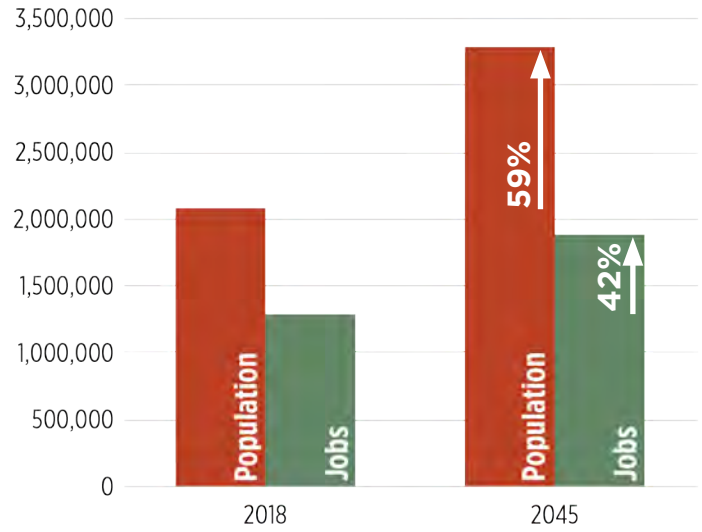
As most transit improvements are long-term investments, it is as important to understand future developments and changes in population, employment, and land use as understanding existing conditions. Looking ahead to 2045, the population of Tarrant County is projected to increase by 59% and jobs are expected to increase by 46%.

What goes into the Forecasts

The North Central Texas Council of Government's travel flows model assumes some important regional transit investments are operational in 2045. Travel following regional rail and high-capacity bus lines are shown on 2045 transit travel forecast maps:

- Mansfield Rail Line from Fort Worth ITC to Midlothian
- Cleburne Rail Line from Fort Worth ITC to Cleburne Intermodal Transportation Depot
- Southwest TEX Rail from Fort Worth T&P Terminal to McPherson
- IH 35W Express Bus from Fort Worth ITC to Texas Health Presbyterian Park & Ride in Denton
- IH 30 Express Bus from Fort Worth ITC to Lamark Park & Ride in Arlington

Projected Population and Job Growth in Fort Worth

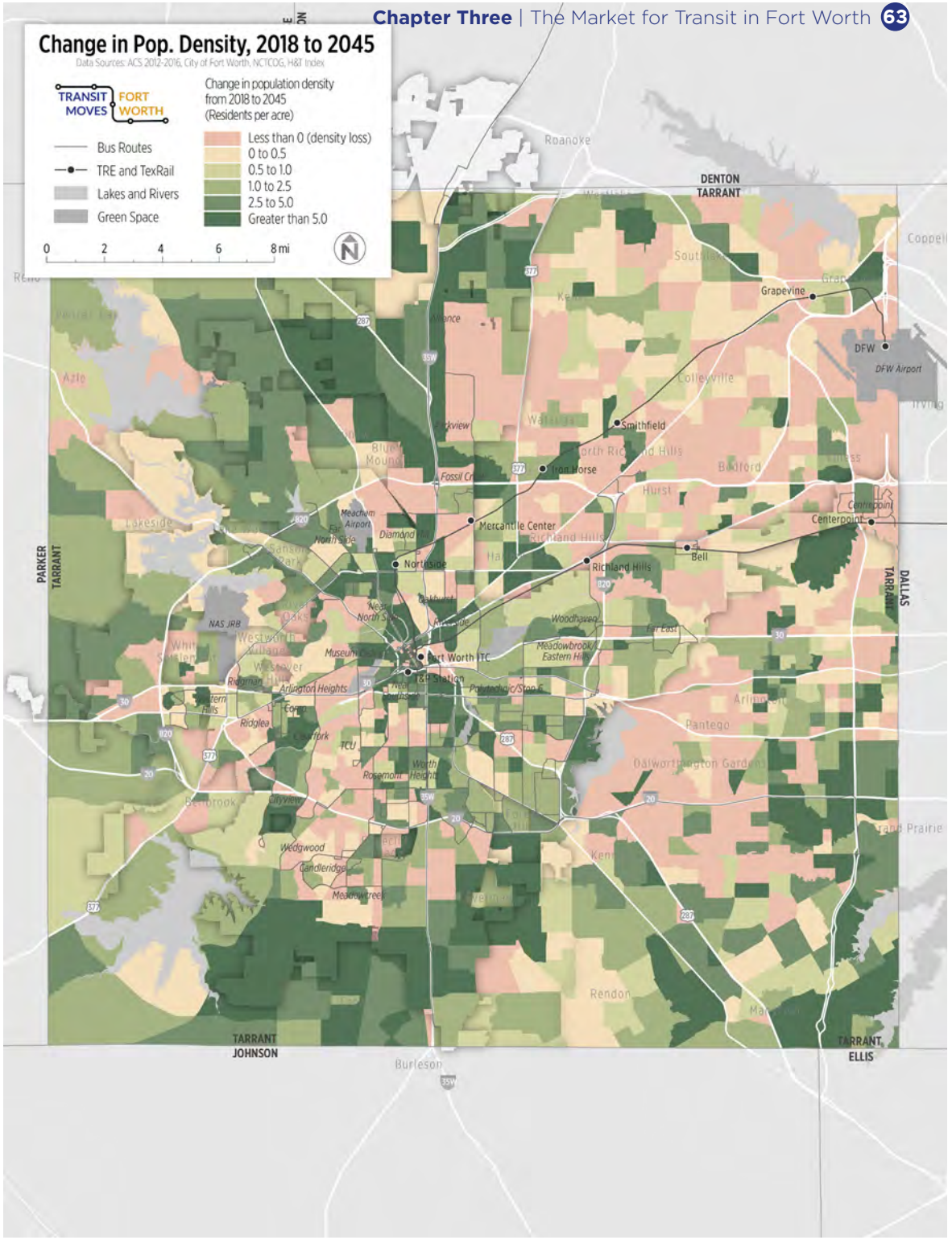


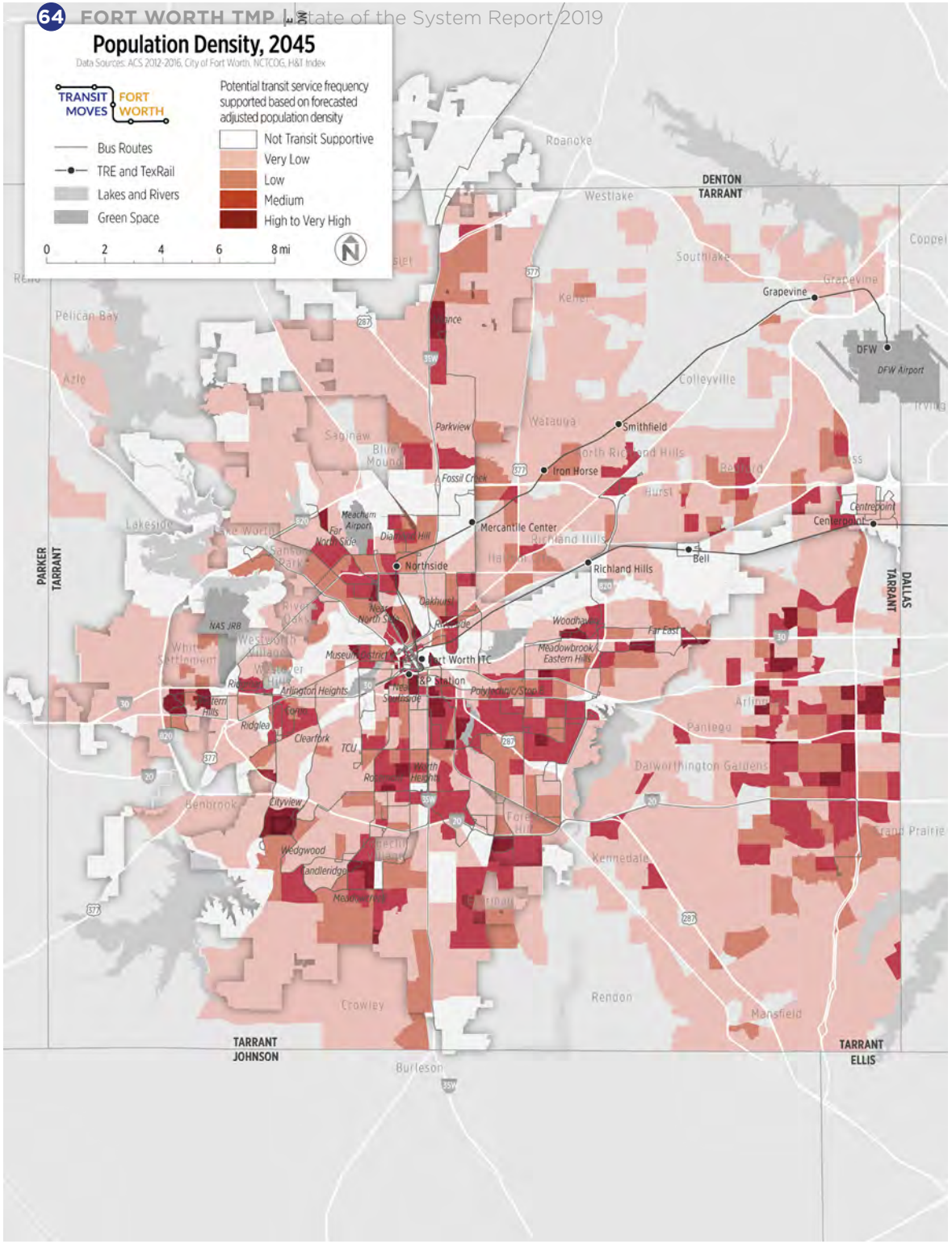
Population Growth 2018 - 2045

A 59% increase in population by 2045 will bring Tarrant County's population to about 3,264,000 people from its current population of 2,066,000. With this expected population growth, as this map shows, population densities will increase in currently developed areas as well as in other areas with less demand for transit today.

Areas where the most growth is expected to occur within the City of Fort Worth are:

- Near Southside
- Rosemont
- Far south & southwestern Fort Worth
- Clearfork
- Western Hills
- Ridglea
- Museum District
- Stockyards/Near Northside
- Downtown and adjacent neighborhoods
- Riverside/Oakhurst
- Fossil Creek
- Alliance Town Center
- Far north & northwestern Fort Worth
- Polytechnic Heights
- Stop Six





Population Density 2045

As a result of this increased density, these areas will see a significant increase in demand for transit service. The highest population densities will be in downtown Fort Worth, areas to the northeast and east, and a few areas to the west:

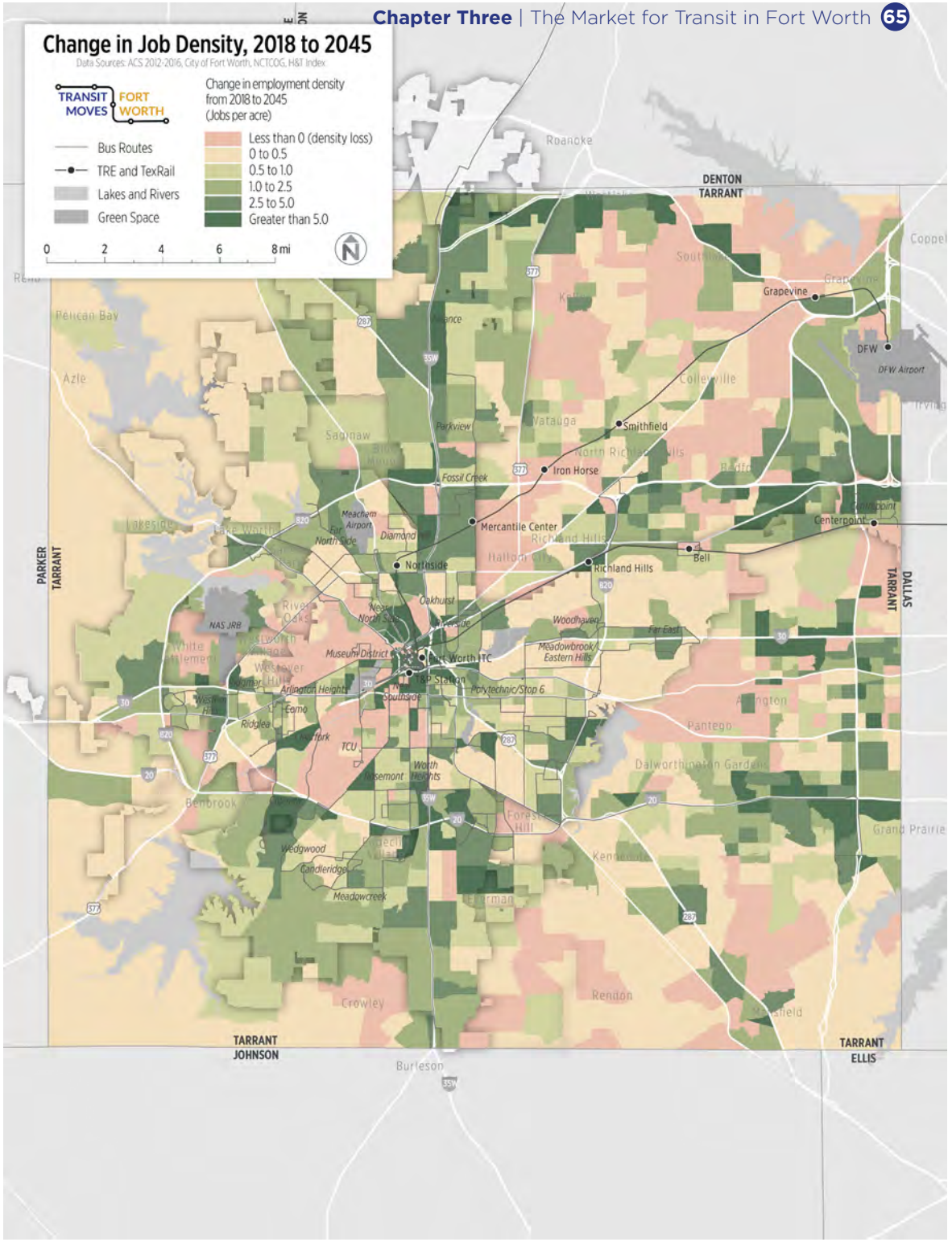
- Downtown and adjacent neighborhoods
- Near Southside
- Museums/Cultural District
- Rosemont & Worth Heights in southern Fort Worth
- Meadowcreek and Candleridge West in far south Fort Worth
- Cityview in Southwest Fort Worth
- Western Hills, Ridgmar, and Como in West Fort Worth
- Near Northside/Stockyards in northern Fort Worth
- Alliance Town Center in far north Fort Worth
- Riverside in northeastern Fort Worth
- Woodhaven in east Fort Worth
- Polytechnic Hegihts and Stop Six in Southeast Fort Worth
- Around Everman in far southeastern Fort Worth

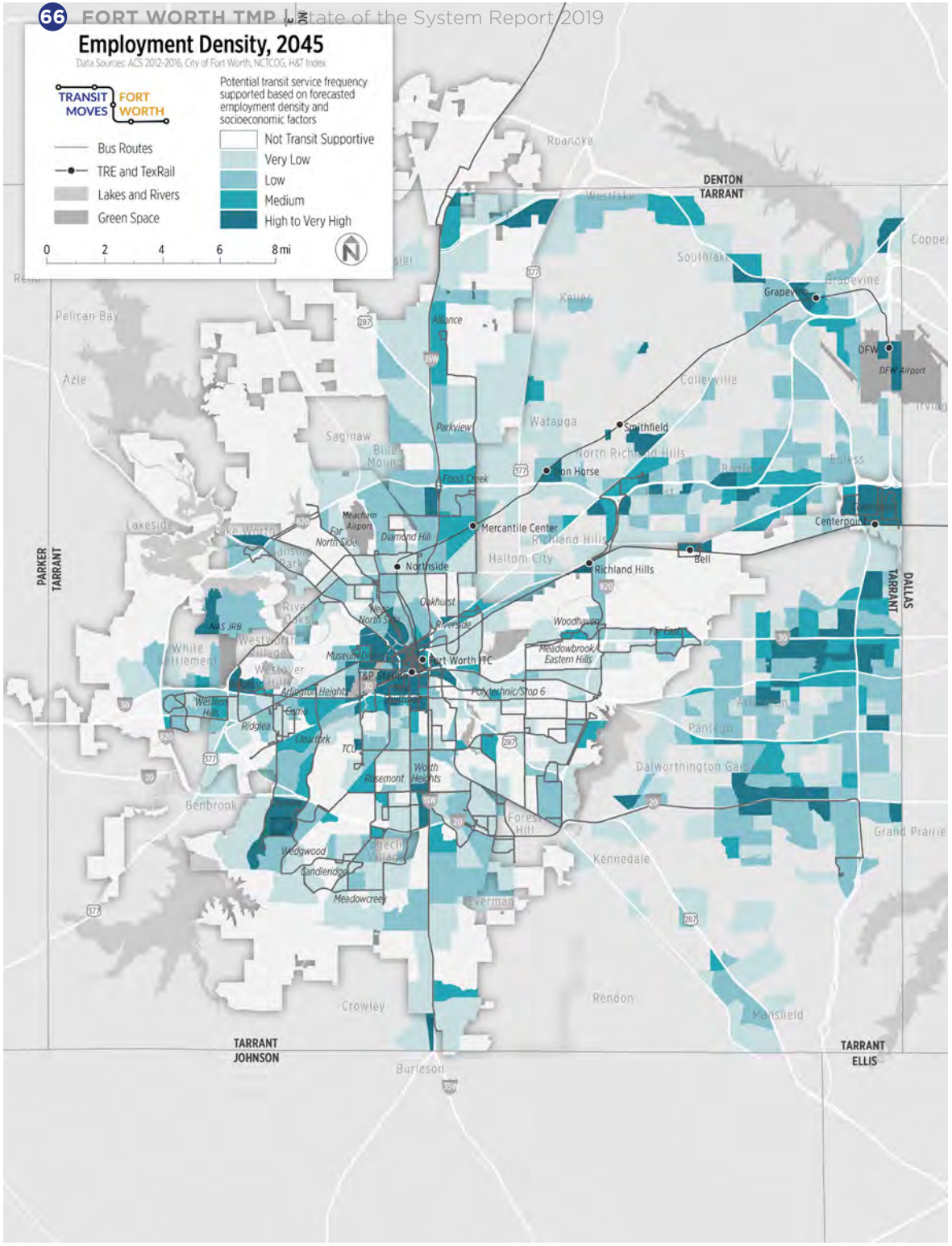
Employment Growth 2018-2045

As with population, employment growth in Fort Worth will increase significantly in areas where there is already high-to-medium underlying demand, and some new areas of employment density are expected to emerge. By 2045, the number of jobs in Tarrant County is projected to expand from about 1,282,000 jobs today to 1,872,000 jobs, a 46% increase.

Areas where the most growth is expected to occur within the City of Fort Worth are:

- Downtown
- Medical District/Near Southside
- Museums/Cultural District
- Near Northside
- Worth Heights
- Clearfork
- Western Hills
- Ridgmar
- Fossil Creek
- Alliance Town Center
- Along I-35 in far north Fort Worth
- CentrePort
- Along I-820 west of Lake Arlington
- Around intersection of I-20 and I-35 in southern Fort Worth





Employment Density 2045

Areas where there will be much higher or new significant demand for transit include:

- Downtown Fort Worth
- To the north along I-35W
- Throughout most of Arlington and surrounding communities
- Many areas along I-820, including Forest Hill, White Settlement, and Westworth Village (Naval Air Station/ Joint Reserve Base)
- Areas to the northeast, including Richland Hills and Grapevine

With the exception of areas within the I-820 loop, most of these areas are either currently unserved by transit or have only very limited service.

Composite Demand 2045

When considering both population and employment-based future demand, it becomes clear there will be significant underlying transit demand throughout much of Tarrant County. As this map shows, the percentage of land area in Fort Worth that will be supportive of fixed-route transit will increase and intensify.

New areas that will be able to support frequent fixed route transit within the City of Fort Worth include:

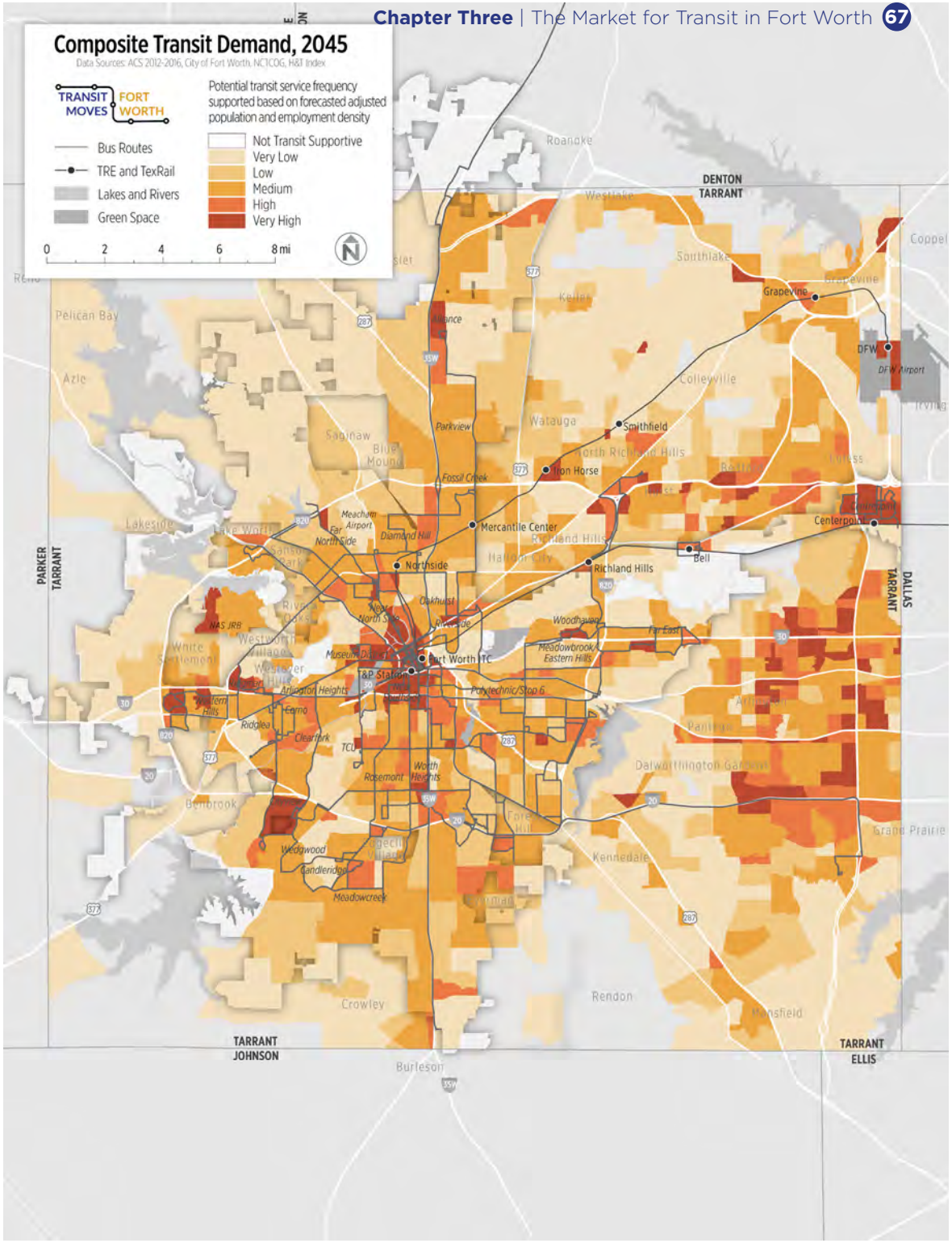
- Cityview
- Alliance Town Center
- Near North Side and Panther Island
- Riverside in northeastern Fort Worth

By 2045, 57% of the City of Fort Worth's land area is expected to have residential and/or job densities high enough to support service operating at least every hour (minimum 10 residents per acre and/or 5 jobs per acre). 42% of Tarrant County's land area will support fixed route transit service.

Acreage of Transit-Supportive Land, 2045

Fort Worth

Tarant County

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Travel Flows 2018 - 2045

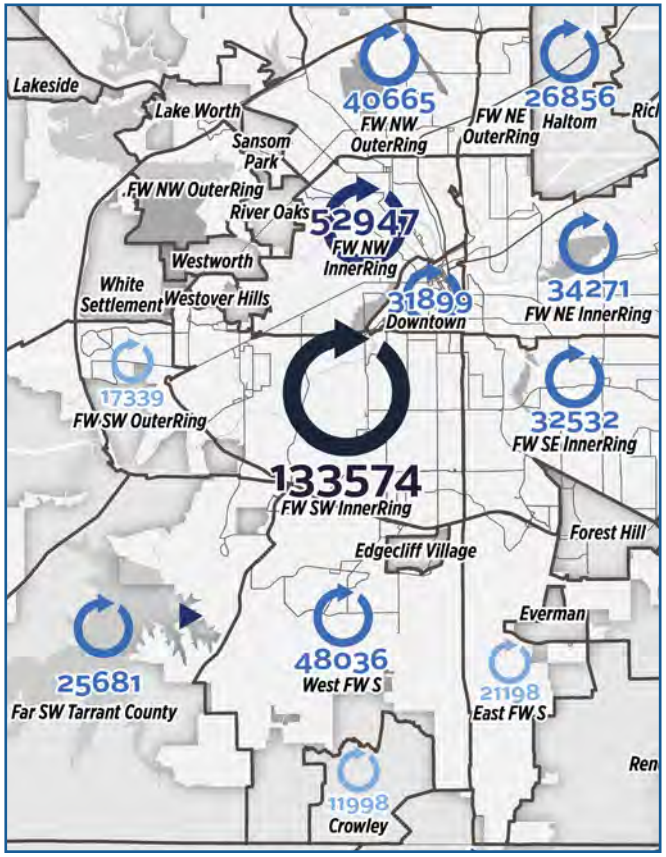
Travel flows show the places that people travel between, within, and outside of Tarrant County. They are one resource useful for determining where direct or relatively easy connections should be made within the Fort Worth region.

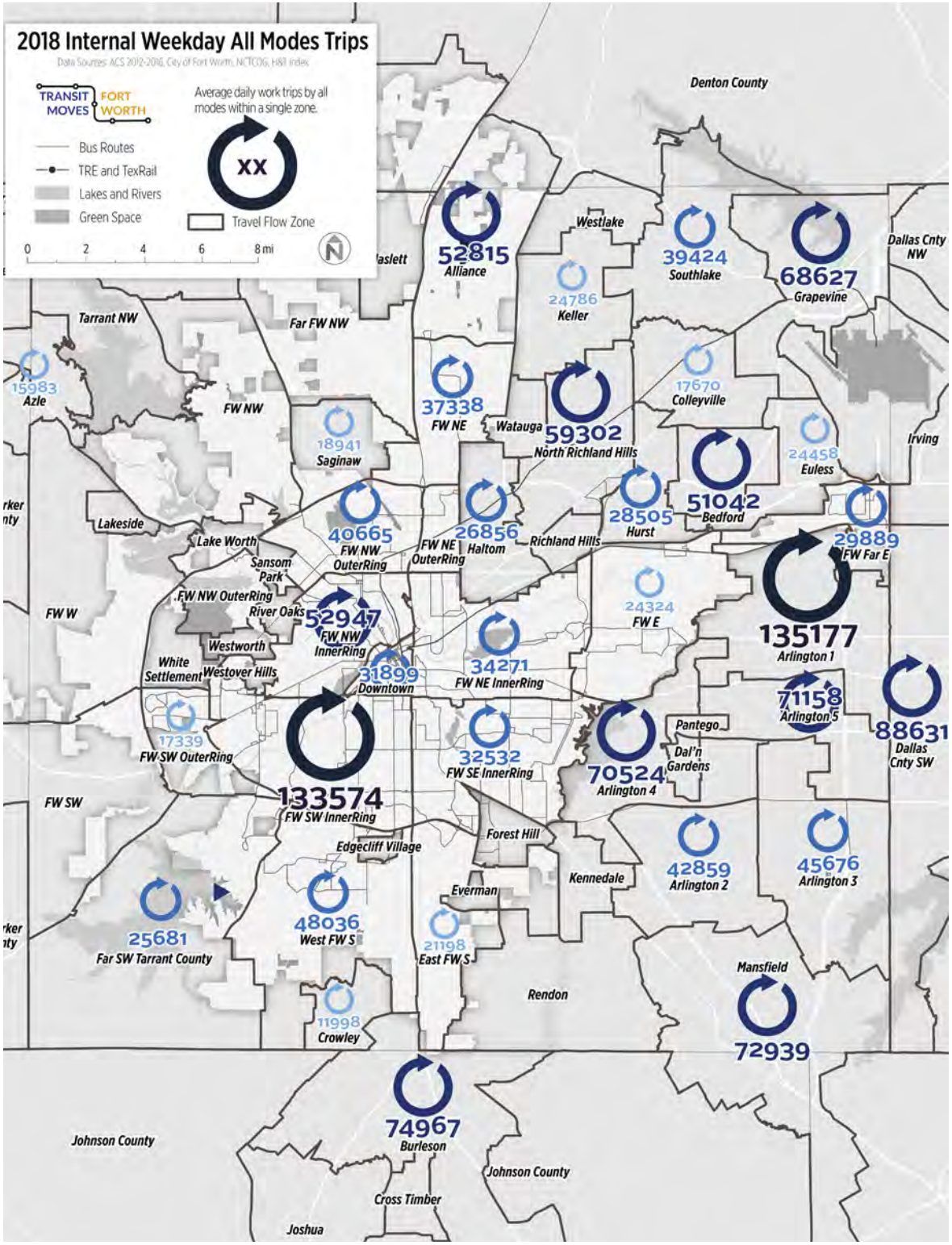
For this analysis, Tarrant County was divided into travel zones based on neighborhoods, the existing road network, and boundaries used in existing model data. This study examines existing and forecasted weekday travel flows between areas throughout both Tarrant County and the surrounding counties. This analysis compares present and future transit trips to trips by all modes in order to provde an understanding of which existing automobile trips can be captured by transit.

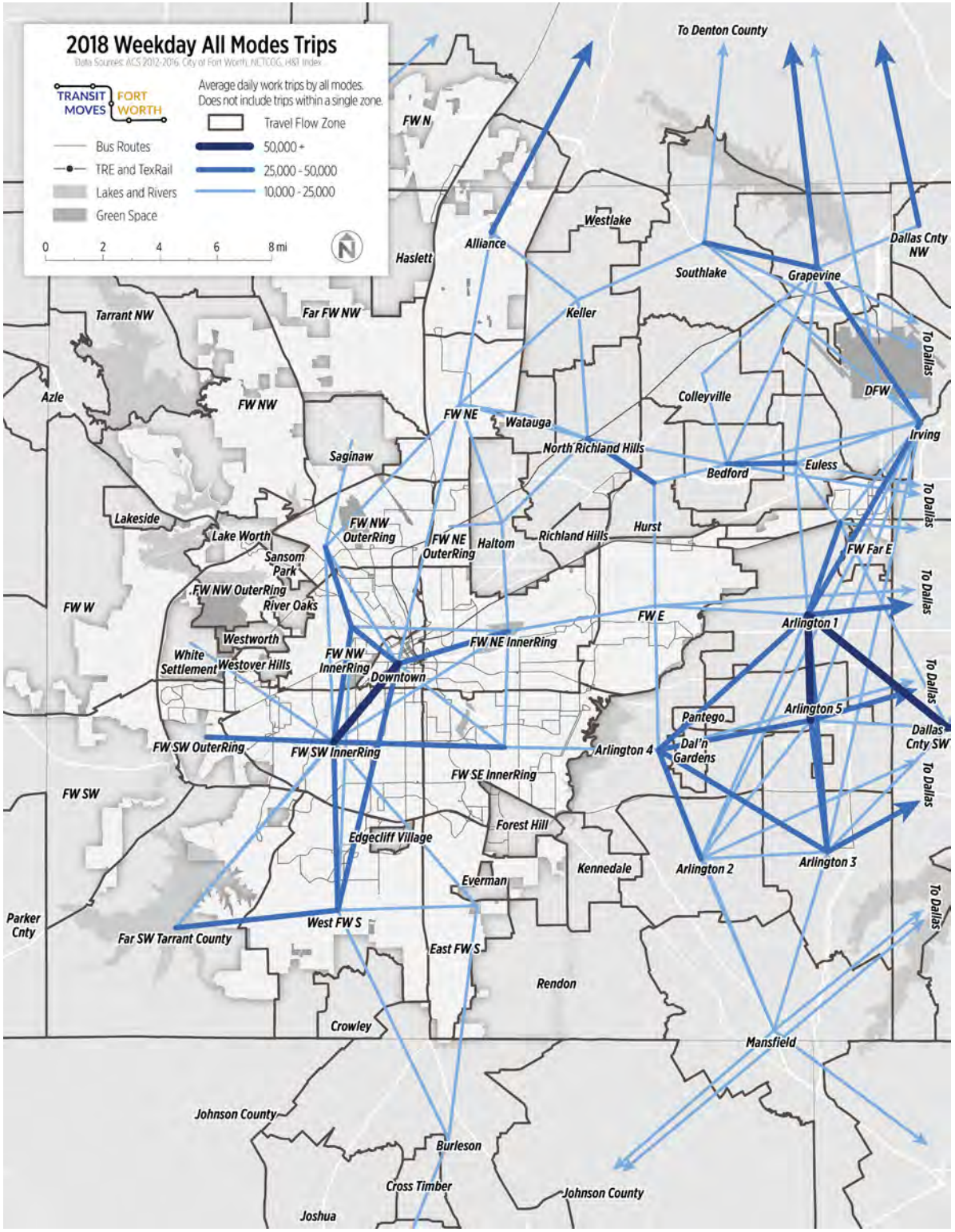
Existing All Modes Travel Flows

2018 Average Weekday Intra-Zone All Modes Trips

Trips made on all modes (transit, automobile, carpool and vanpool) in Tarrant County can provide an understanding of which travel markets exist for transit to potentially capture. Visualizing existing internal travel flows in Tarrant County show that car trips within zones are far more intense and dispersed across all zones than transit trips. Arlington, far northeast Fort Worth, Grapevine, and southwest Fort Worth emerge as major zones of travel in the region.







2018 Average Weekday All Modes Travel Flows

Existing inter-zone travel flows maps show that the heaviest travel flows are centered on the core of Fort Worth, as well as southwest of downtown Fort Worth and eastern Tarrant County.

- The greatest travel flows are between downtown Fort Worth and the areas southwest and northwest of downtown.
- There are major travel flows in the east and around Arlington
- Relatively intense travel occurs between most urbanized regions of southwest Fort Worth
- There is a large flow of travel to the northeast of Loop 820, around Hurst and North Richland Hills
- Grapevine and Alliance are significant hubs of travel, with some heavy travel flows to adjacent areas including Denton County

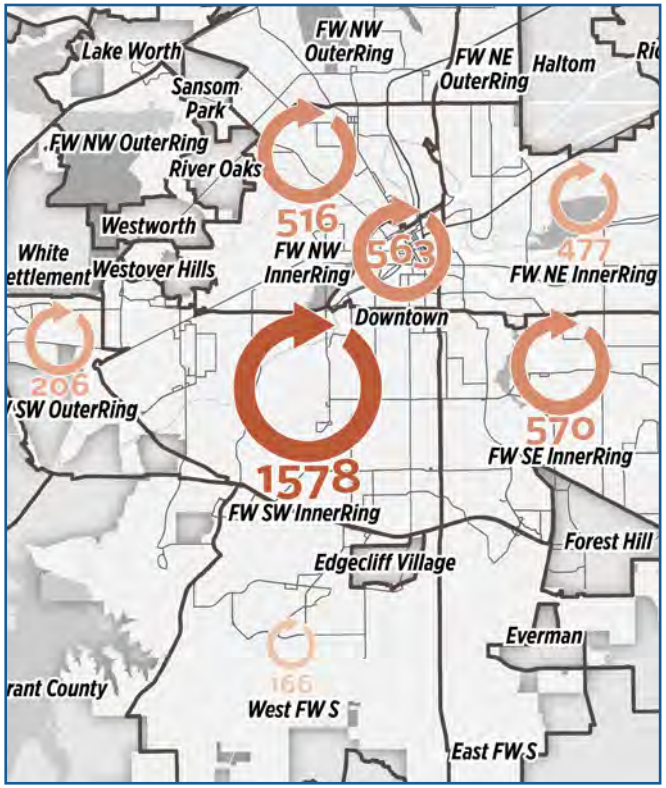
Existing Transit Travel Flows

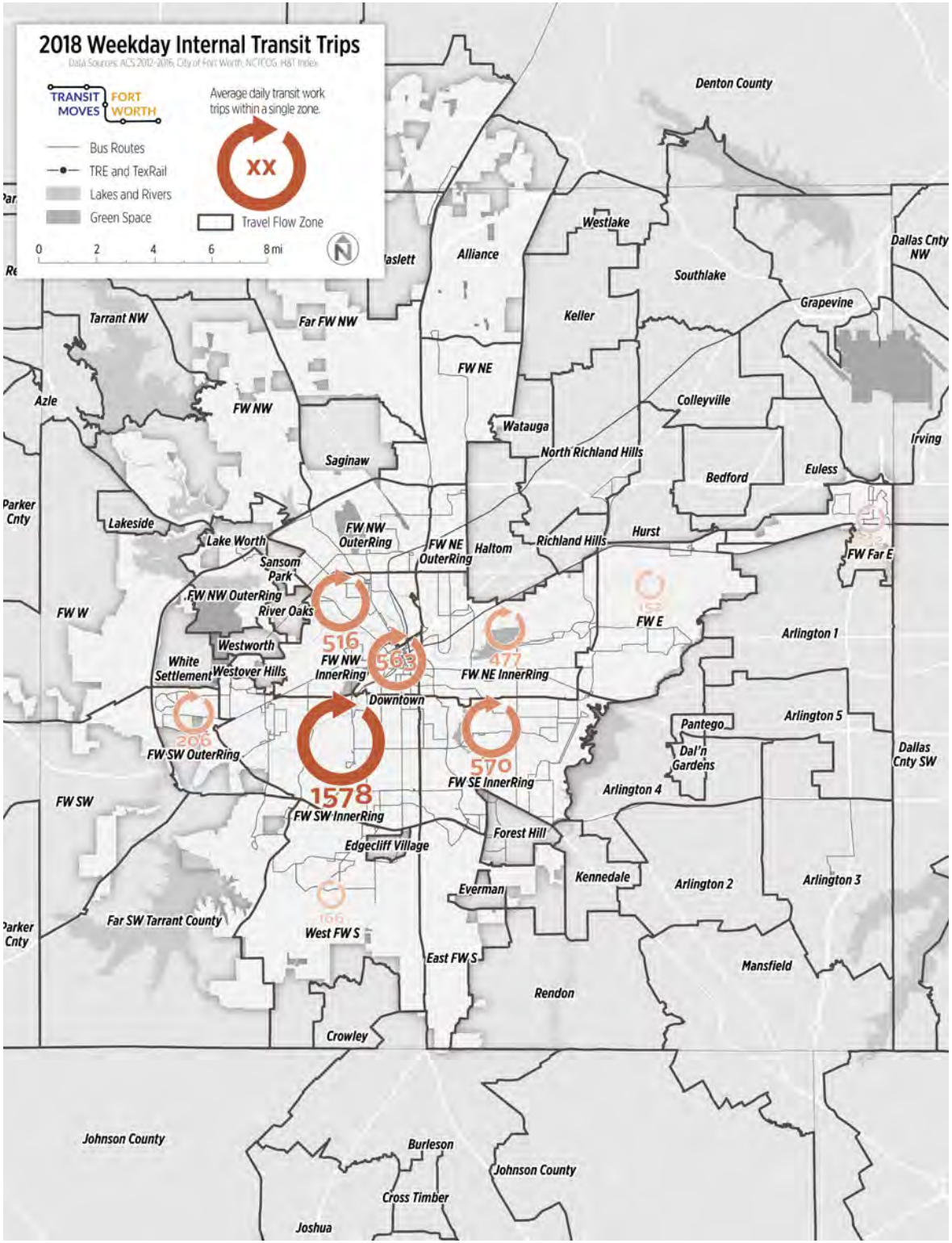
2018 Average Weekday Intra-zone Transit Trips

Today, Downtown Fort Worth, the Fort Worth medical district, and the inner loop neighborhoods of Fort Worth create most activity for existing transit trips.

Within travel zones, the most transit activity occurs in the southwest inner loop region of Fort Worth, followed by Downtown, southeast Fort Worth, and northwest Fort Worth with more than 500 daily internal transit trips.

Activity drops off as one moves farther out from the urban core, with about 150 daily transit trips in the western part of far south Fort Worth, about 200 trips west of 183 and east of Loop 820, and fewer than 200 trips in the far eastern travel zones of Fort Worth.





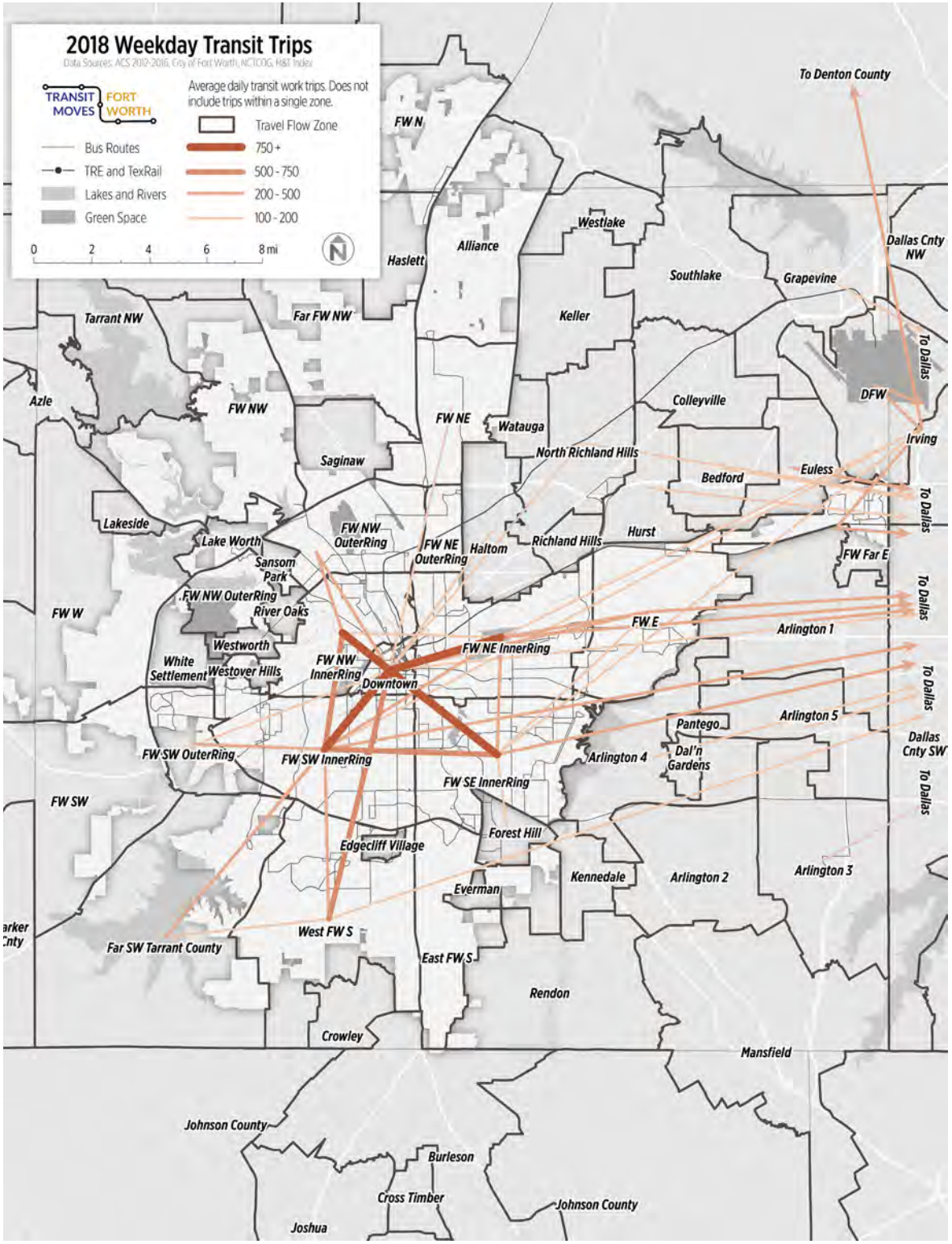
2018 Average Weekday Transit Travel Flows

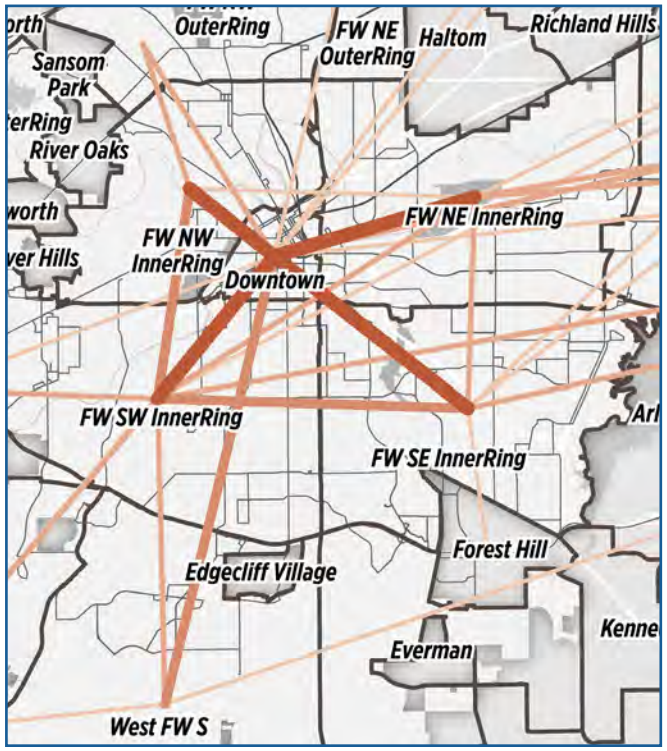
Reflecting the radial design of Trinity Metro's bus services, the largest transit trip volumes are generally oriented to and from downtown Fort Worth. Trip pairs that have more than 750 trips per weekday are all oriented toward downtown to and from the neighborhoods within Loop 820.

In addition to downtown-oriented trips, there are several large travel flows crosstown between the areas of Fort Worth within the loop. These larger travel flows (500-750) daily trips occur between:

- Near Southwest and Near Southeast Fort Worth
- Near Northwest and Near Southwest Fort Worth
- Far Southwest and Near Southwest Fort Worth
- West Fort Worth South and Downtown

Note that this map does not include transit trips taken on TEXRail, since NCTCOG data is current as of December 2018, before TEXRail began operating in early 2019.





Future All Modes Travel Flows

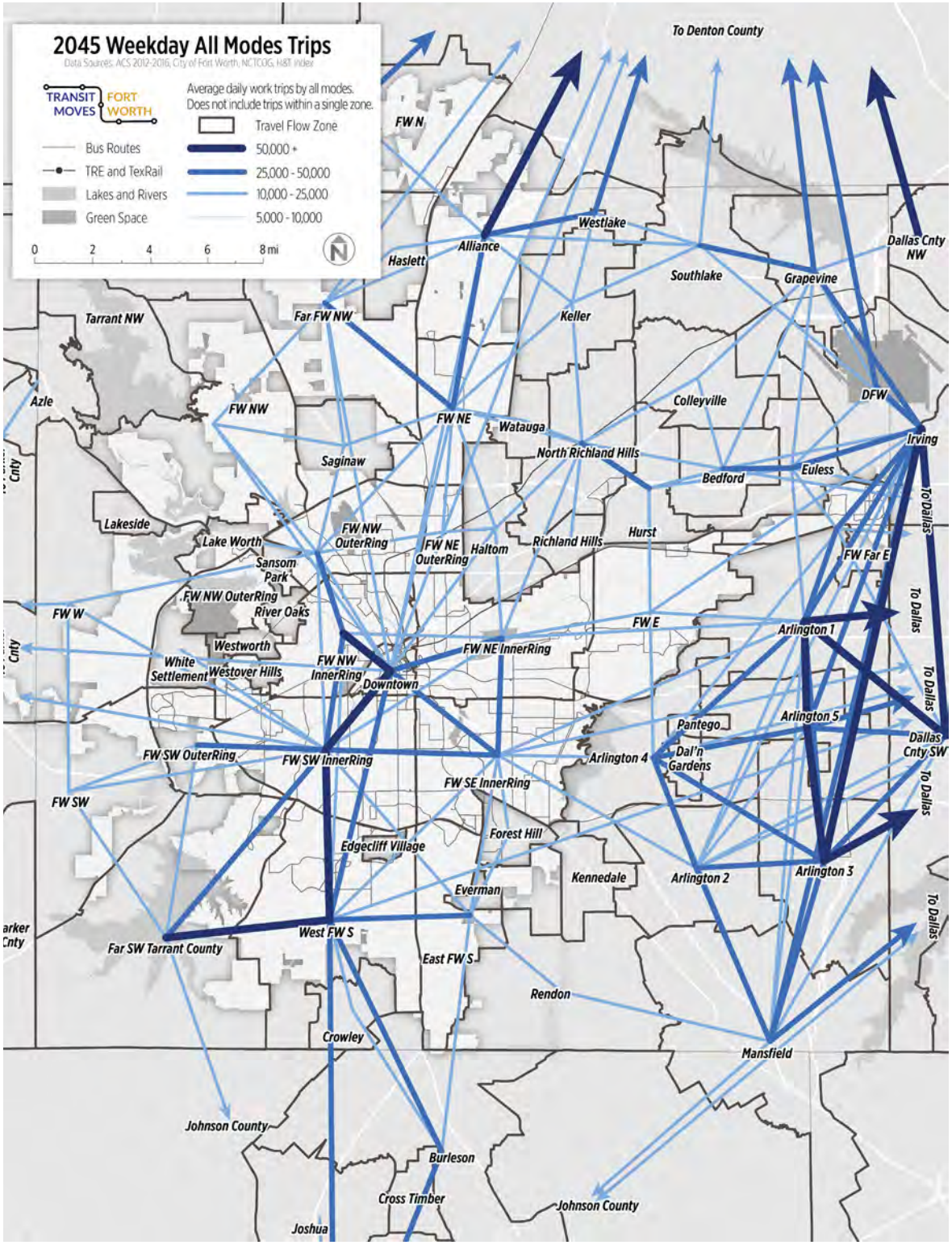
2045 Average Weekday All Modes Travel Flows

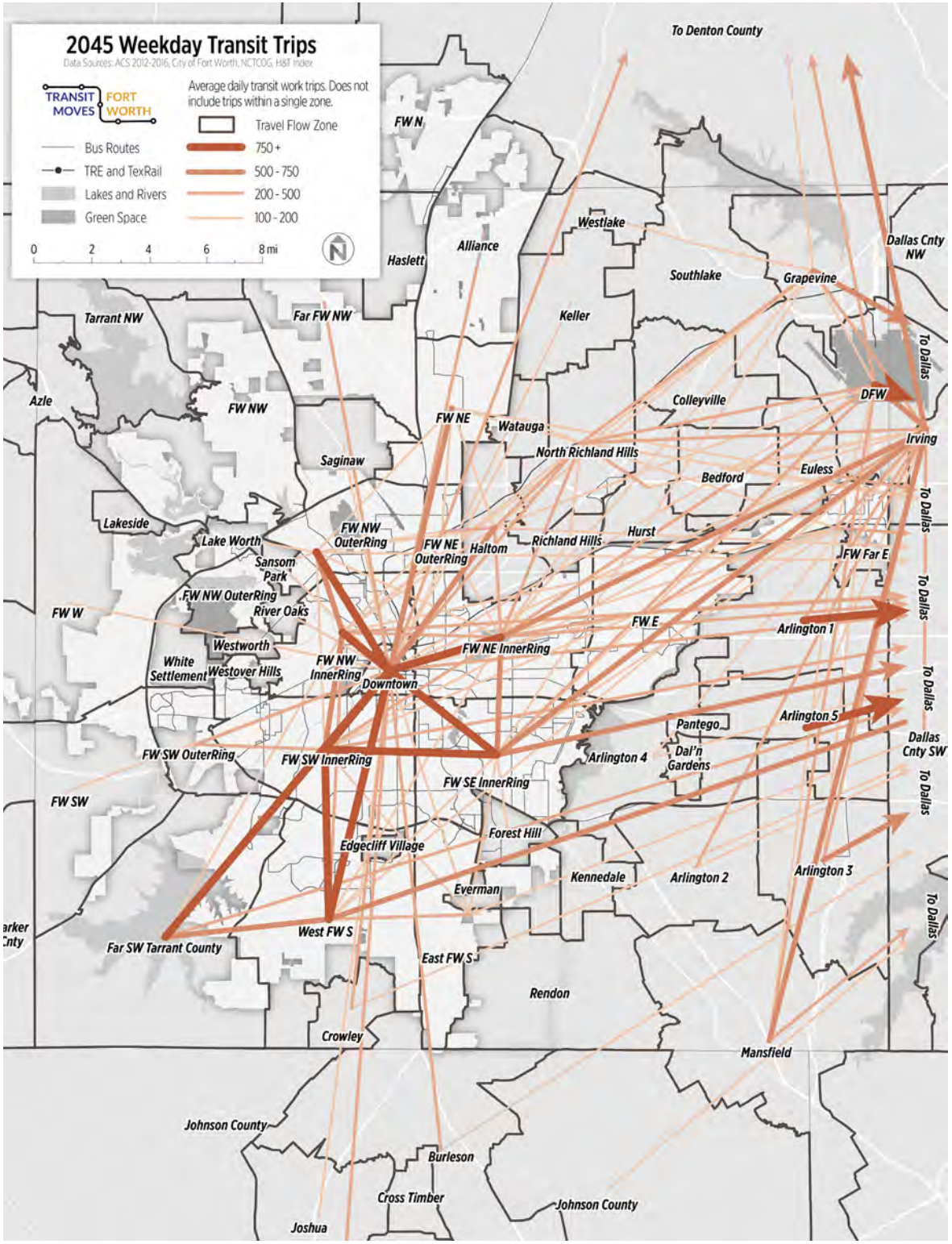
A significant increase in travel flows across the region will accompany the large increase of people and jobs in Tarrant County. All flows will become heavier over time, and the largest travel flows continue to be located around:

- The core of Fort Worth
- East-west across Fort Worth
- To the east of Fort Worth around Arlington.

Additional travel flows that will increase include:

- East-west travel between Fort Worth and Arlington
- Increased travel in eastern Tarrant County, including in Arlington and between Arlington and communities immediately surrounding the city.
- Growing north-south travel to and from Fort Worth, particularly between southeastern Fort Worth and northern Fort Worth around the Alliance area
- Travel in northeastern Tarrant County around North Richland Hills and Hurst
- Between the far southwestern regions of Tarrant County





Future Transit Travel Flows

2045 Average Weekday Transit Travel Flows

All transit flows between all inner loop zones, especially to and from Downtown Fort Worth, are projected to increase in volume.

By 2045, trips between Downtown and both far northeast Fort Worth (FW NE) and the northwest outer loop area emerge as very large volume flows (750+). New very large (750+) transit trip flows also emerge crosstown, between the SW and SE inner loop areas, and southwest across the loop to southwest and south suburban Fort Worth.

In addition to these Fort Worth-centered future transit trips, intercity trips between Fort Worth and the mid-cities (Irving, Alrington, Grand Prairie, Grapevine, etc.) increase significantly in volume due to the expected growth of TEXRail ridership. Grapevine, Irving, and Arlington emerge as major regional transit trip centers for activity to and from Dallas.