2015 motion

NASHVILLE MTA/RTA STRATEGIC PLAN

STATE OF THE MTA SYSTEM REPORT

MARKET ANALYSIS

Nashville MTA

RTA

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CAMBRIDGE SYSTEMATICS

MARKET ANALYSIS

A large number of factors impact the demand for transit and its actual use, and these include:

- **Development Patterns:** There is an extremely strong correlation between development patterns and transit ridership. In areas with mixed-use and denser development and a good pedestrian environment, transit can become very convenient, and thus attractive and well used. In most cases, these "external" factors outweigh those directly controlled by the service provider.
- **Population and Employment Densities:** Put simply, where larger numbers of people live and/or work in close proximity, transit demand is higher.
- **Socio-Economic Characteristics:** Some populations use transit to a greater degree than others, and socio-economic characteristics such as age, disability status, income, and minority status provide indications of demand among populations that have a high propensity toward transit use.
- **Existing and Projected Travel Flows:** Travel flows provide information on the places between which people travel.

These factors are primary drivers of transit demand and, as such, provide strong indications of underlying transit demand. However, it should also be noted that other factors influence transit demand, and these include:

- **Walking Conditions:** Nearly all transit riders are also pedestrians, and thus walking environments strongly impact ridership. A common rule of thumb is that transit riders will walk one-quarter of a mile to access transit. However, in comfortable pedestrian environments, many transit riders will walk longer distances, while in uncomfortable environments, many will not walk even one-quarter of a mile.
- **Service Design:** Slow circuitous routes that take people closer to their destinations are preferred by some riders, such as many older adults and persons with disabilities. However, circuitous routes are viewed as very inconvenient by most others. Thus, no matter the inherent demand for transit, service must be designed appropriately to appeal to local markets.
- **Travel Times Relative to Other Options, Primarily Driving:** Most people accept that trips by transit take longer than trips by car, and the time differences can be offset by other differences. However, when the differences are smaller, ridership will be higher, and when the differences are larger, ridership will be lower.
- **Costs:** The cost of using transit is almost always lower than the cost of driving. Similar to travel time differences, when the costs of driving are higher (for example, due to high gasoline prices, tolls, and/or parking costs) transit ridership will be higher and when they are lower, transit ridership will be lower.

This market analysis examines the primary factors described above, and subsequent development of the Strategic Plan will address the secondary factors.

DEVELOPMENT PATTERNS AND TRANSIT DEMAND

Transit demand is strongly related to development patterns and, in particular, development density. In areas with denser development and more people and employees, transit can be provided in close proximity to many people. Combined with a good pedestrian environment, transit can become very convenient and thus attractive and well used.

As is the case with many American cities that have developed rapidly since the 1940s, Nashville and Davidson County have developed around the automobile, with much of the more recent development in business parks and single-use subdivisions. As this has occurred, development has grown outward from the core, and continues to do so. In 2001, *USA Today* ranked Nashville as the nation's most sprawling metro area.[2] Thirteen years later, in 2014, Smart Growth America ranked the Nashville area as the second most sprawling in the country (after Atlanta).[3] Nashville has been

[2] "A Comprehensive Look at Sprawl in America," *USA Today,* February 22, 2001.
[3] *Measuring Sprawl 2014*, Smart Growth America, April 2014.

sprawling for many years, and this sprawl has made the provision of convenient and effective transit service much more challenging.

FACTORS INFLUENCING TRANSIT DEMAND

As the MTA improves its transit service over the next 20 years, service and capital investments must be made in support of and response to current and future land use patterns. Population and employment density, land use diversity, design, regional destinations, and distance to quality transit are key factors that influence transit demand. Demand management (pricing, incentives, and other information-based programs) is also considered an important factor. Referred to as the "6Ds," these are major factors that will influence the demand for and success of transit in Nashville (see Figure 15).

Destinations

People are more likely to choose transit when it can conveniently take them where they want to go. At present, the MTA serves most major destinations in the core area, but development is growing outward. In addition, as described in the Overview of Existing Services, service frequencies on many routes are low, which makes service inconvenient. Looking forward, more frequent service will be needed to make service more convenient to major destinations, and service will need to expand to serve emerging destinations.

Distance

Both street connectivity and block length strongly influence people's likelihood of walking or biking to transit. Interconnected streets in a grid pattern tend to shorten distances between transit stops and destinations. Neighborhoods where all roads are designed to connect to arterials or collector streets allow transit customers to reach bus stops without walking out of their way and provide more efficient routing options that can support high frequency service (see Figure 16). In addition to being important indicators of effective distance to transit, block length and street network connectivity are often used in transportation research to represent design quality. This is because short blocks and well-connected streets contribute to a higher-quality pedestrian experience and pedestrian realm, and they often occur in places where other elements of good design, such as adequate sidewalks, are also in place.

FIGURE 15 OVERVIEW OF FACTORS INFLUENCING TRANSIT DEMAND - THE "6 DS"

6D Factor	Principle
Destinations	Align major destinations along reasonably direct corridors served by frequent transit
Distance	Provide an interconnected system of pedestrian routes so that people can conveniently access transit
Density	Concentrate higher densities close to frequent transit stops and stations and multimodal nodes
Diversity	Provide a rich mix of pedestrian-friendly uses to support street-level activity throughout the day and night
Design	Design high-quality pedestrian-friendly spaces that connect people seamlessly to transit
Demand Management	Provide attractive alternatives to driving by managing parking, providing incentives not to drive, and/or providing programs to help educate people about driving alternatives

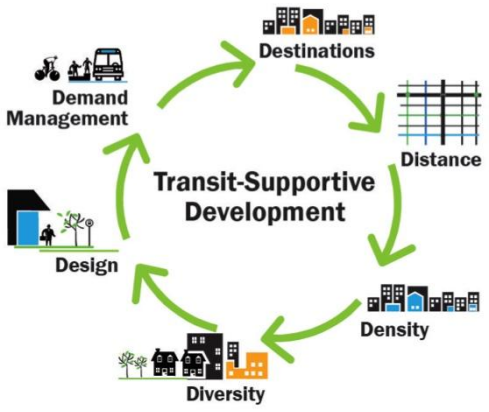
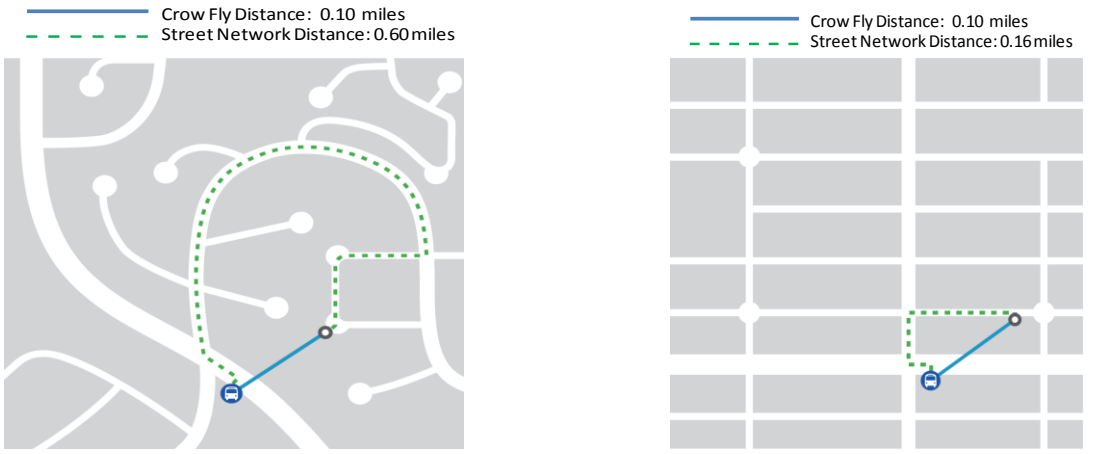


FIGURE 16 STREET NETWORK DESIGN AND WALK DISTANCES TO TRANSIT



A disconnected street network (shown at left) with long blocks and indirect streets results in long walking distances and less efficient transit operations. A well-connected street network (shown at right) enables shorter, more direct walking connections and is easier to serve cost effectively with transit.

Source: TransLink Transit Oriented Communities (2011)

The grid-like street pattern in most of older Nashville—for example, East Nashville—supports easy and comfortable access to transit (see Figure 17). However, in many newer areas—for example Parkwood Estates—pedestrian connections to streets that are suitable for attractive transit are very limited (see Figure 18).

FIGURE 17 CONNECTED STREET NETWORK IN EAST NASHVILLE

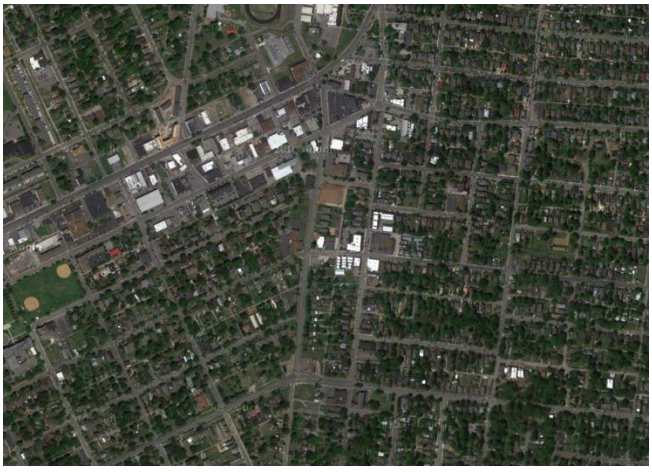
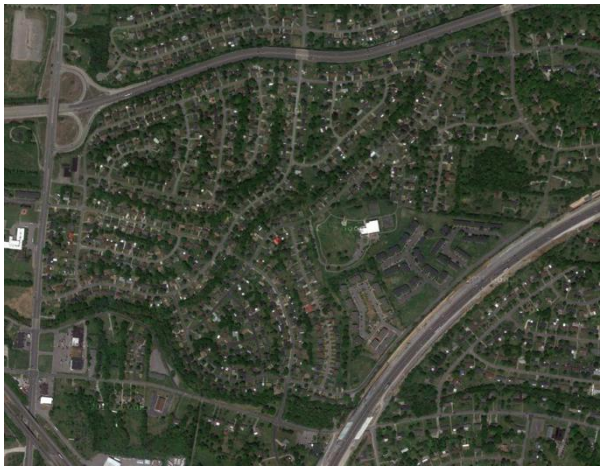


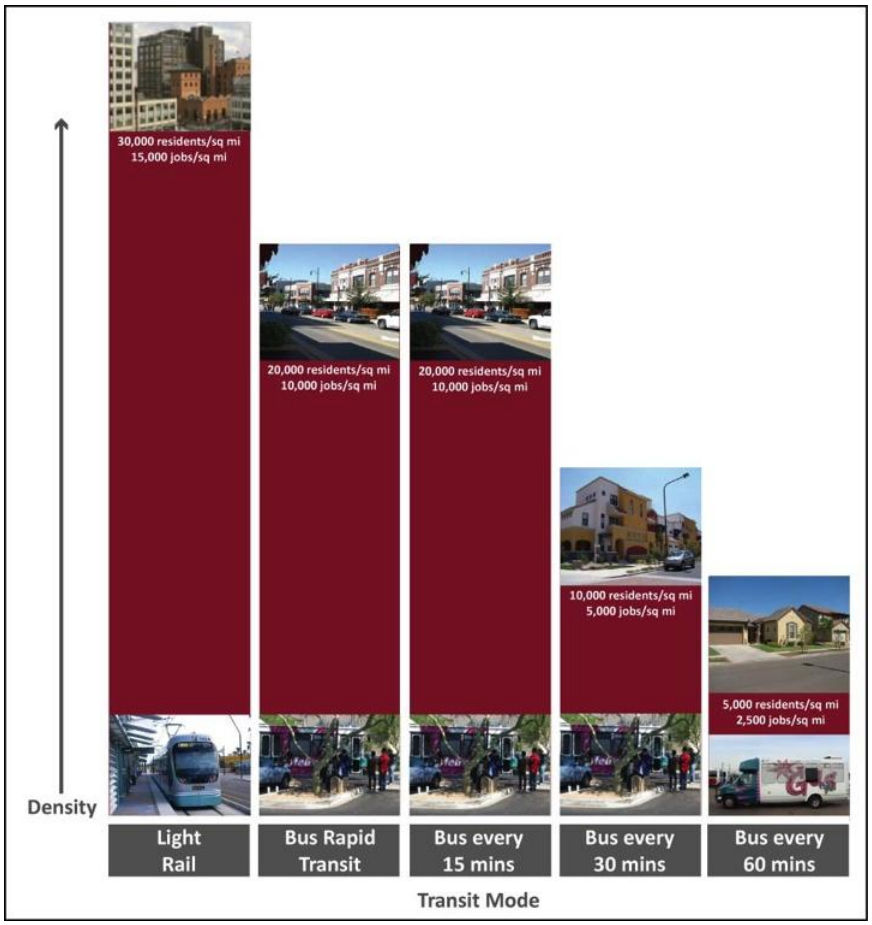
FIGURE 18 LIMITED CONNECTIONS TO ARTERIALS IN PARKVILLE ESTATES



Density

Population and employment densities determine how many people will be able to access transit. By extension, they also strongly influence the amount of service that will be required (see Figure 19) and, in turn, the types of riders who will use transit. Infrequent service is inconvenient, and thus will largely serve residents and workers who, for one reason or another, cannot drive. Frequent service, conversely, is convenient, and thus will attract many who choose to take transit rather than use other options. Frequent service is clearly desirable, but because of the operating costs involved, and to avoid running empty buses, transit service levels must be matched to demand.

FIGURE 19 RELATIONSHIP BETWEEN POPULATION AND EMPLOYMENT DENSITIES AND TRANSIT DEMAND



Source: Composite data compiled by Nelson\Nygaard from various sources

Diversity

Traditional zoning separates land uses, sets maximum densities and minimum lot sizes, and usually contains explicit regulations such as bulk and height limits and minimum parking requirements. This type of zoning generally encourages automobile use and discourages transit use (see Figure 20). Mixed-use development, which reverses this approach, is becoming more popular as it creates a more interesting environment. It also encourages transit, walking, and bicycling and focuses much less on automobiles and parking.

In the Nashville area, good examples of mixed-use development include the West End/Midtown and East Nashville. Both of these areas have a wide variety of uses including residential, commercial and other businesses, and institutional uses. In Midtown, the institutional uses include Vanderbilt and other universities. This type of development creates all-day activity in walkable environments that can be well served by transit. As further described below, the preferred future that the city has adopted as part of NashvilleNext envisions much more mixed-use development. That change will both increase transit demand and enable the provision of much more effective transit service.

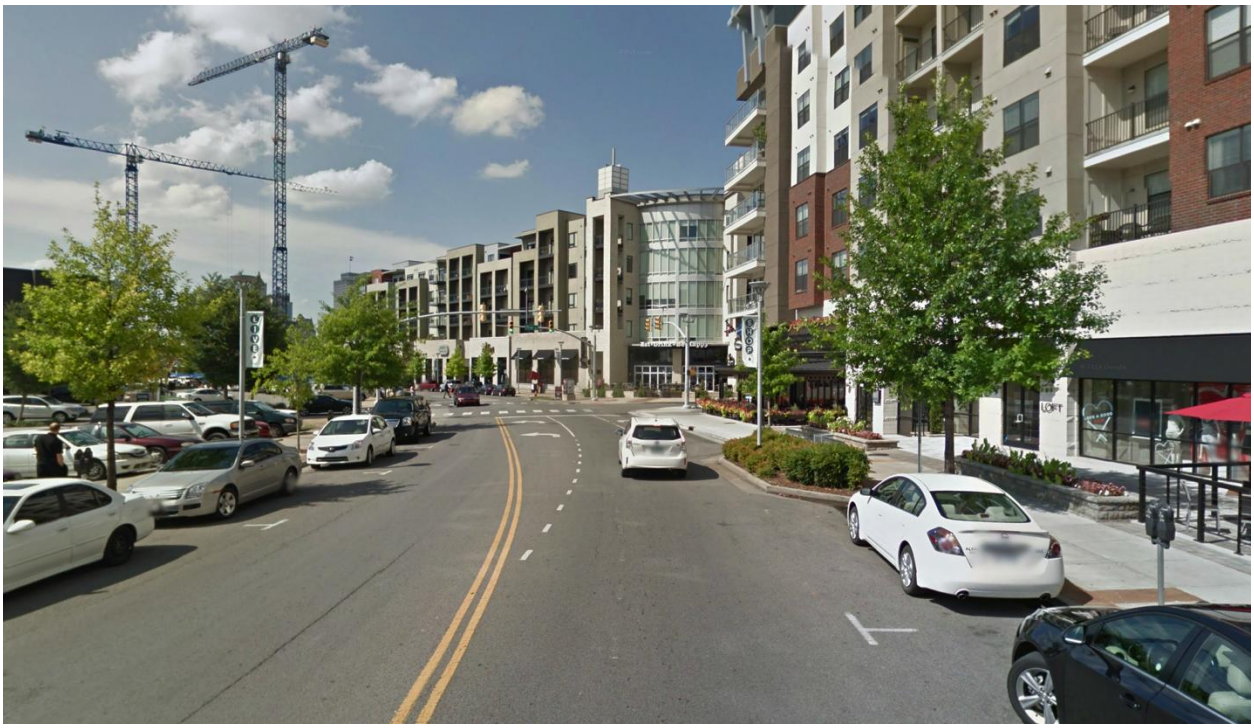
FIGURE 20 TRADITIONAL ZONING AND SPRAWLING DEVELOPMENT ALONG GALLATIN PIKE

Source: Google Maps

Design

People will not use transit if it is difficult to use or dangerous to access. Thus, safe and accessible streets are essential to ensure that people will be able to reach transit easily and feel safe doing so. Transit stops and stations must also be attractive and clean and include amenities like benches, trash cans, and schedule information. As MTA plans for future investments in transit, coordination with the City of Nashville to prioritize safe bicycle and pedestrian access to transit will be required. A framework to invest in transit station amenities at high demand stops—as along BRT Lite routes—will also be important to build demand for transit.

FIGURE 21 NEW MIXED-USE DEVELOPMENT IN THE GULCH



Demand Management

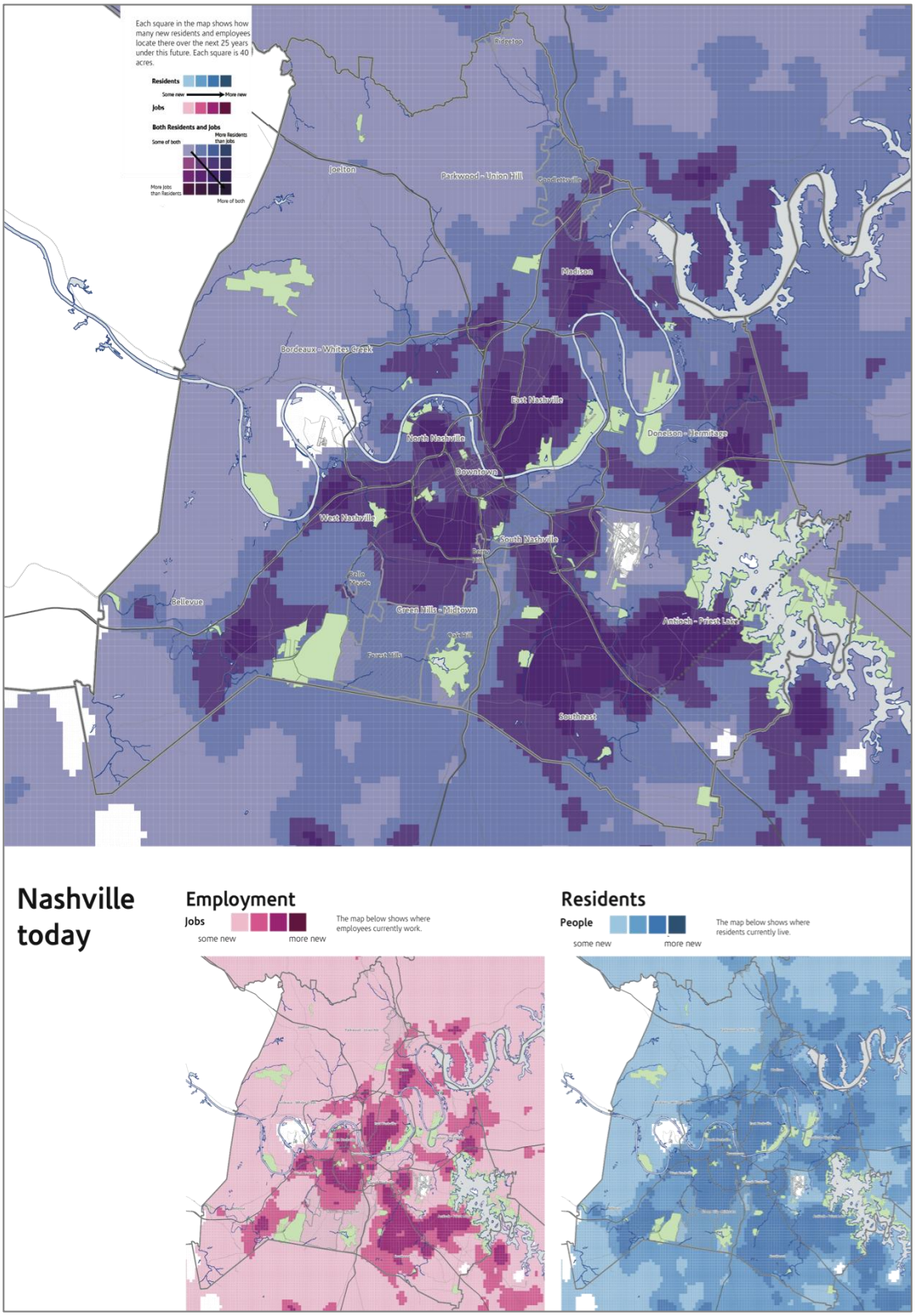
Demand management measures can be used to encourage transit use and discourage automobile use. The MTA already provides the University Pass Program to encourage more university students to ride transit. However, a comprehensive transportation demand management program that works with employers and residents to provide information and incentives for taking transit is needed to increase transit ridership.

CURRENT LAND USE

In most major metropolitan areas, population, employment, and development densities are generally greatest in and around the downtown core, and then thin with distance from the core. However, this is only partially the case in the Nashville area (see Figure 22). Overall densities are the highest in downtown and immediately surrounding areas such as Midtown and East Nashville. However, beyond the immediate core, population densities drop quickly and low density residential development expands outward to and beyond Nashville's city limits along major highways such as I-24, I-40, I-65, Gallatin Pike, and Nolensville Pike.

Employment is clustered most heavily within the inner highway loop, including downtown and Midtown. It then thins out quickly except for pockets of high employment in North Nashville and Berry Hills, and around Nashville International Airport. Elsewhere, and similar to population, employment is largely focused along major highways, in this case along I-24 and Murfreesboro Pike and Nolensville Pike to the south and I-40 to the east.

FIGURE 22 CURRENT LAND USE



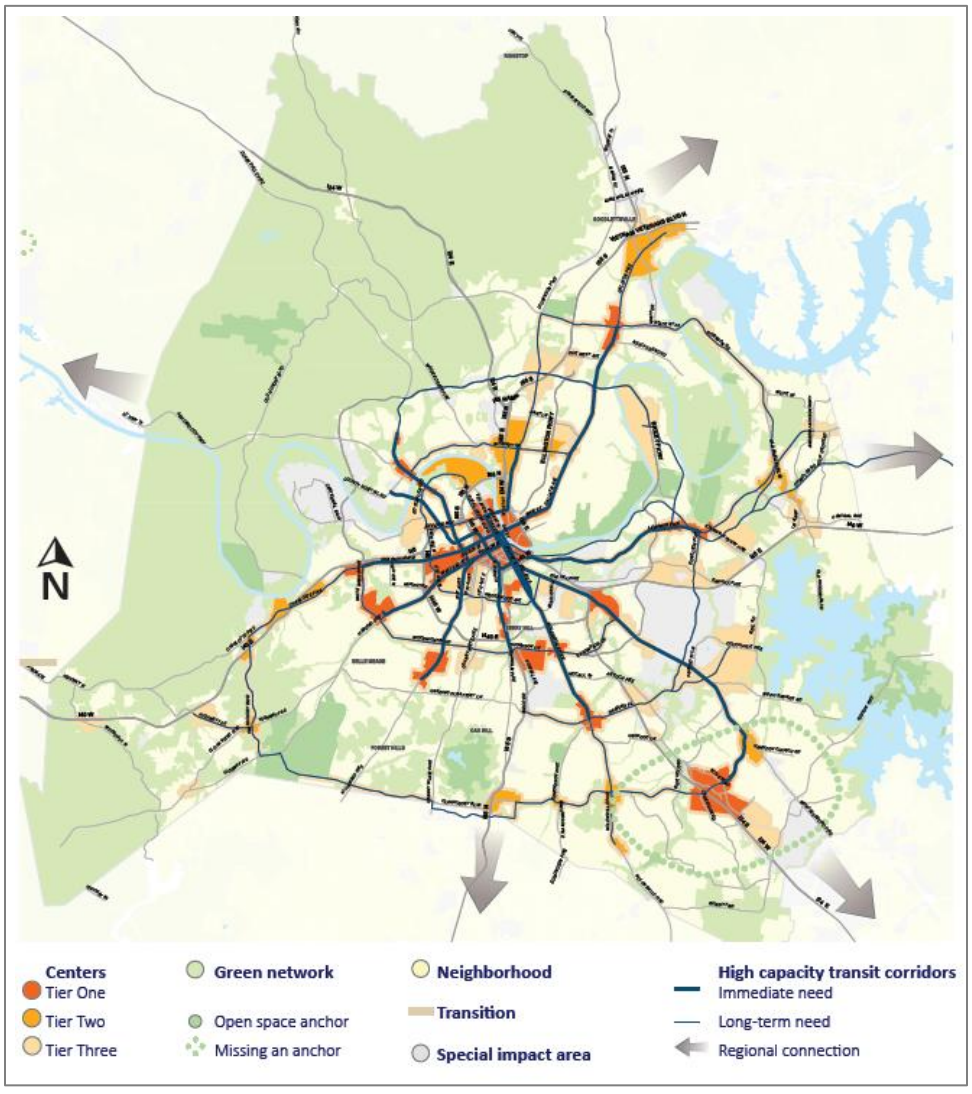
Source: NashvilleNext

FUTURE LAND USE

Over the past three years, in response to dissatisfaction with the way Nashville has been sprawling, the City of Nashville undertook a comprehensive effort to determine how its residents, businesses, and other stakeholders desire the city to grow in the future and the actions that will be needed to achieve those desires. This effort, NashvilleNext, was based on extensive stakeholder outreach to develop a shared community vision and examined three different growth strategies. The "preferred future" envisions that new development will be much more concentrated in "centers" and along major corridors, with a much greater emphasis on mixed-use development (see Figure 23).

The changes envisioned as part of NashvilleNext's preferred future will provide improvements in many areas, but particularly in terms of the ability to provide much more effective and more attractive transit service. As described above, three of the most important factors that drive both transit demand and the ability to provide transit service that can serve large volumes of people are population and employment densities and mixed-use development. These changes will both increase the demand for transit and enable the provision of much more effective transit service.

FIGURE 23 NASHVILLENEXT'S PREFERRED FUTURE



Source: NashvilleNext

CURRENT TRANSIT DEMAND

2010 POPULATION AND EMPLOYMENT

For transit to be successful, it must be frequent, fast, and easy to get to and from. More than any other factor, population and employment density will determine whether this will be possible.

- Transit needs to serve sufficiently high volumes of travelers to be cost effective, and the density of development determines the overall size of the travel market. The reach of transit is generally limited to within one-quarter to one-half mile of the transit line or station, and thus 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, while smaller markets can support only less frequent service.
- To attract travelers who have other options, such as automobiles, transit must be relatively frequent—at least every 30 minutes, and preferably every 10 to 15 minutes. Below those frequencies, transit can be expected to serve only those who do not drive or cannot drive.

In addition, population and employment levels and densities provide an indication of the types of riders that transit will serve. In general terms, there are two types of transit riders:

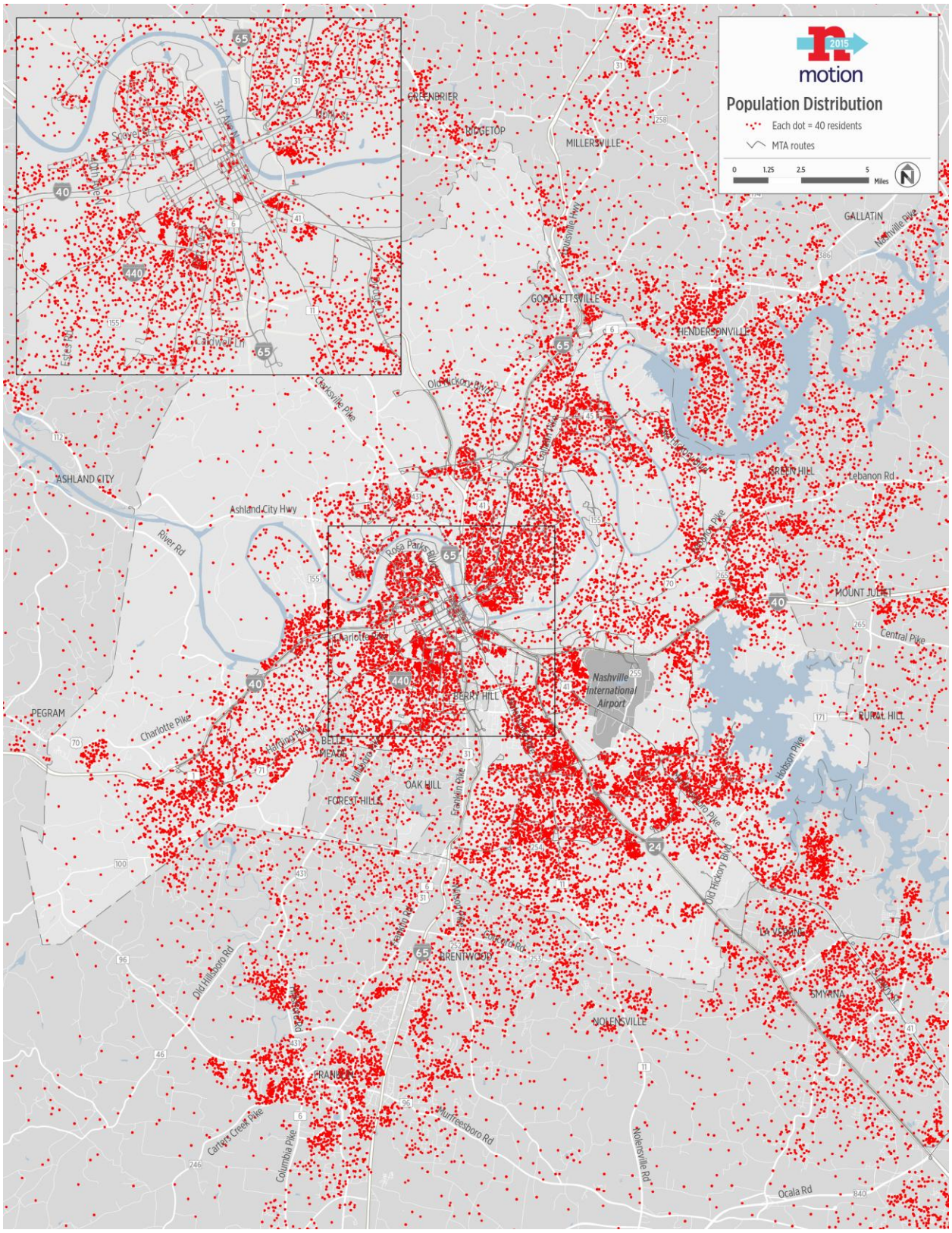
- **Riders with Many Choices**, who have sufficient resources and the ability to operate private vehicles but choose to use transit for some or all trips. These riders may choose transit to avoid congestion, the high cost of long commutes, and/or high parking charges, among other reasons.
- **Riders with Limited Choices,** who are often referred to as "transit dependent riders," use transit services because they don't have an automobile available for their trip or are unable to operate a private vehicle. Because they have less choice for travel, they rely more on transit than riders with many choices. Riders with fewer choices are also more likely to use transit to get to appointments, shop, and visit friends and family.

Transit dependent riders often live in densely populated areas, and the combination of discretionary and transit-dependent riders produces demand for even more frequent service that increases the attractiveness of transit for discretionary riders. However, in less densely developed areas, because there are fewer people, the overall demand is lower, and consequently service levels are lower. As a result, transit dependent riders often comprise a large majority of riders in less developed areas.

2010 Population Distribution

As shown in Figure 24, if a diagonal line were drawn from the northeast of Nashville to the southwest, passing through North Nashville, the large majority of residents lives to the east and south of that line, and far fewer live to the north and the west. This is the case both within the city of Nashville as well as in outlying communities. Consistent with these population patterns, MTA service is more heavily concentrated in this "half" of the service area:

FIGURE 24 POPULATION DISTRIBUTION



- Midtown/Vanderbilt, Belmont/Hillsboro Village, and Antioch have the highest total populations. Each of these areas is served by multiple MTA routes, and service coverage is good.[4]
- The area just west of Nashville International Airport and Green Hills just outside of I-440 also have large populations. These areas are served by multiple routes, but service is more limited.
- East Nashville and Madison also have large populations. East Nashville is well served by many MTA routes; Madison less so.
- The northwestern portion of the county has significantly fewer residents. In general, this area has very limited or no fixed-route service.

Overall, MTA serves approximately half of Davidson County residents. The 2010 Census indicates that 49% of Davidson County residents live within a quarter-mile of an MTA bus stop.

2010 Population Density

As described above, population and employment densities are two of the strongest indicators of both where the demand for transit will be highest and where transit will work best. As such, with respect to population, population densities provide an indication of the underlying population-based demand for transit in terms of the type and frequency of service that would be most appropriate.

As shown in Table 4, there must be eight to 12 residents per acre to produce demand for hourly service, which is the lowest level of service that is generally considered to be acceptable. As densities grow, the demands for transit grow, particularly with respect to more frequent service. Population densities higher than 31 residents per acre produce demand for frequent services (every 15 minutes or less) and premium services.

TABLE 4 TRANSIT-SUPPORTIVE POPULATION DENSITIES

TRANSIT SERVICE LEVEL	POPULATION/ACRE
Flex Bus	0.5
Community Circulator	2
Local Bus	
60-minute frequency	8–16
30-minute frequency	16–31
15-minute frequency	31–47
10-minute frequency	47–92
5-minute frequency	>92

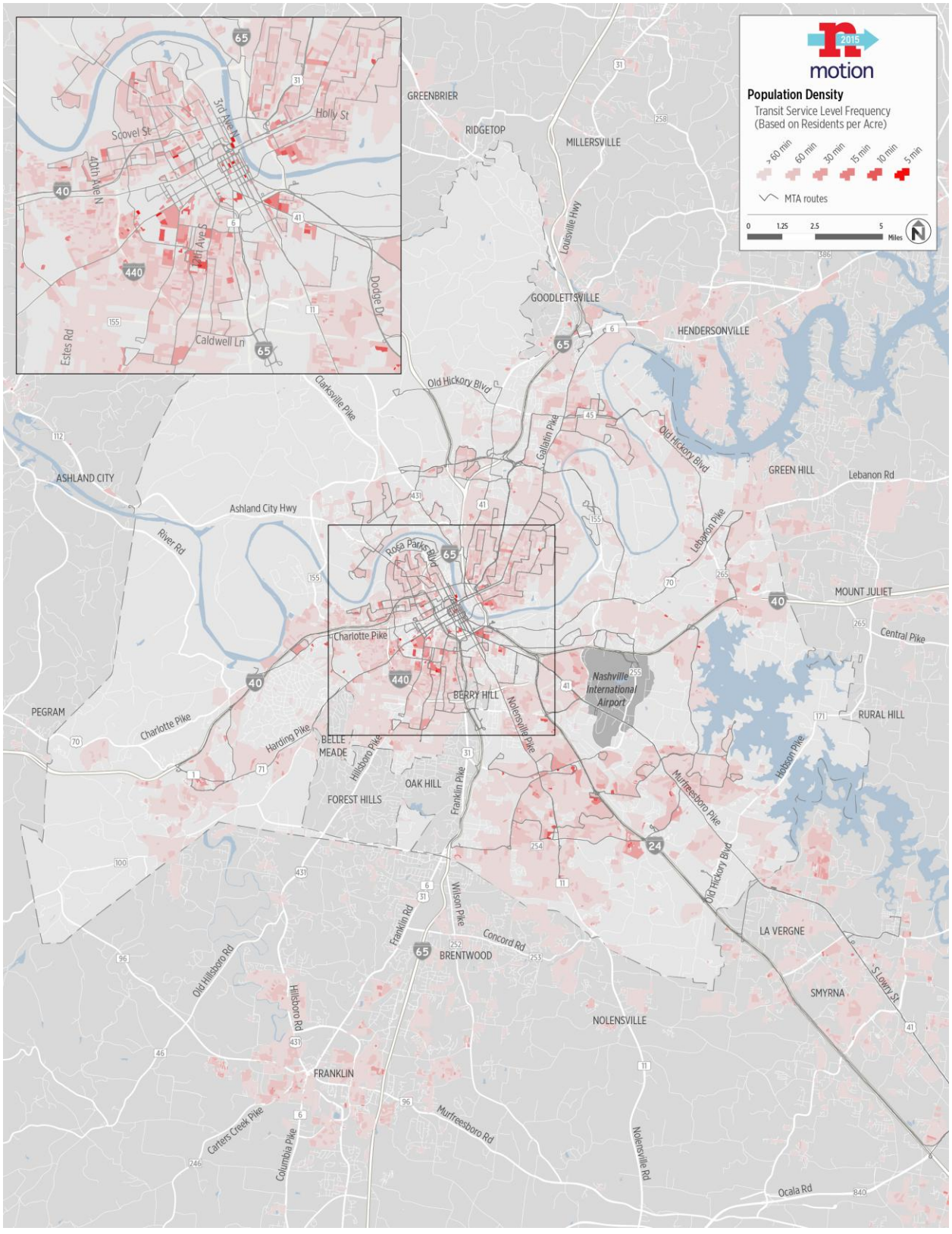
Source: Nelson\Nygaard compiled from various national sources

Based on population density alone, there are relatively few pockets of dense residential development that, by themselves, can support very high levels of transit service (every 5 to 10 minutes). These include:

- Neighborhoods adjacent to downtown, including the Gulch, Midtown/Vanderbilt, and Belmont/Hillsboro Village (see Figure 25)
- The area around Trevecca Nazarene University, southeast of downtown
- Much of East Nashville, particularly along Main Street and Shelby Avenue

[4] This section focuses on service coverage or, put more simply, whether an area is served or not. However, as described in the Overview of Existing Services, the hours that many routes operate are short, and service frequencies are long. Thus, the fact that service exists does not necessarily mean that it is convenient. As a result, while this section presents important information on how service coverage relates to demand, this information must also be used in conjunction with the data presented in the Overview of Existing Services and the analysis included in the Assessment of the Existing System.

FIGURE 25 POPULATION DENSITY



Most other residential areas, by themselves, have underlying demand for service every 30 to 60 minutes. These are largely neighborhoods located along major highways, such as I-24, I-40, I-65, Gallatin Pike, and Nolensville Pike. It should be noted, however, that while individual neighborhoods may only have underlying demand for 30 to 60 minute service, much of that demand is for service to and from downtown Nashville. As a result, that demand "accumulates" along a route, and does ultimately support the more frequent services that are provided in most major corridors.

Beyond Briley Parkway, areas to the north, northwest, and west have very little population-based transit demand. Correspondingly, there is also very little transit services—a single local route and two express routes.

2010 Employment Distribution

The location and number of jobs is a second strong indicator of transit demand, as traveling to and from work often accounts for the most frequent type of transit trip. Compared to population, employment in Nashville and Davidson County is much more concentrated (see Figure 26) and can support higher levels of transit service.

The largest concentrations of jobs are located in downtown Nashville and west of downtown in the Gulch and Midtown. There are also high concentrations of jobs in Berry Hill, along Hillsboro Pike at and around the Mall at Green Hills, near the intersection of I-440 and I-65, and north of Nashville International Airport. These areas all have underlying demand for frequent transit service. With the exception of jobs at and near the airport, all of these areas are well served or fairly well served currently.

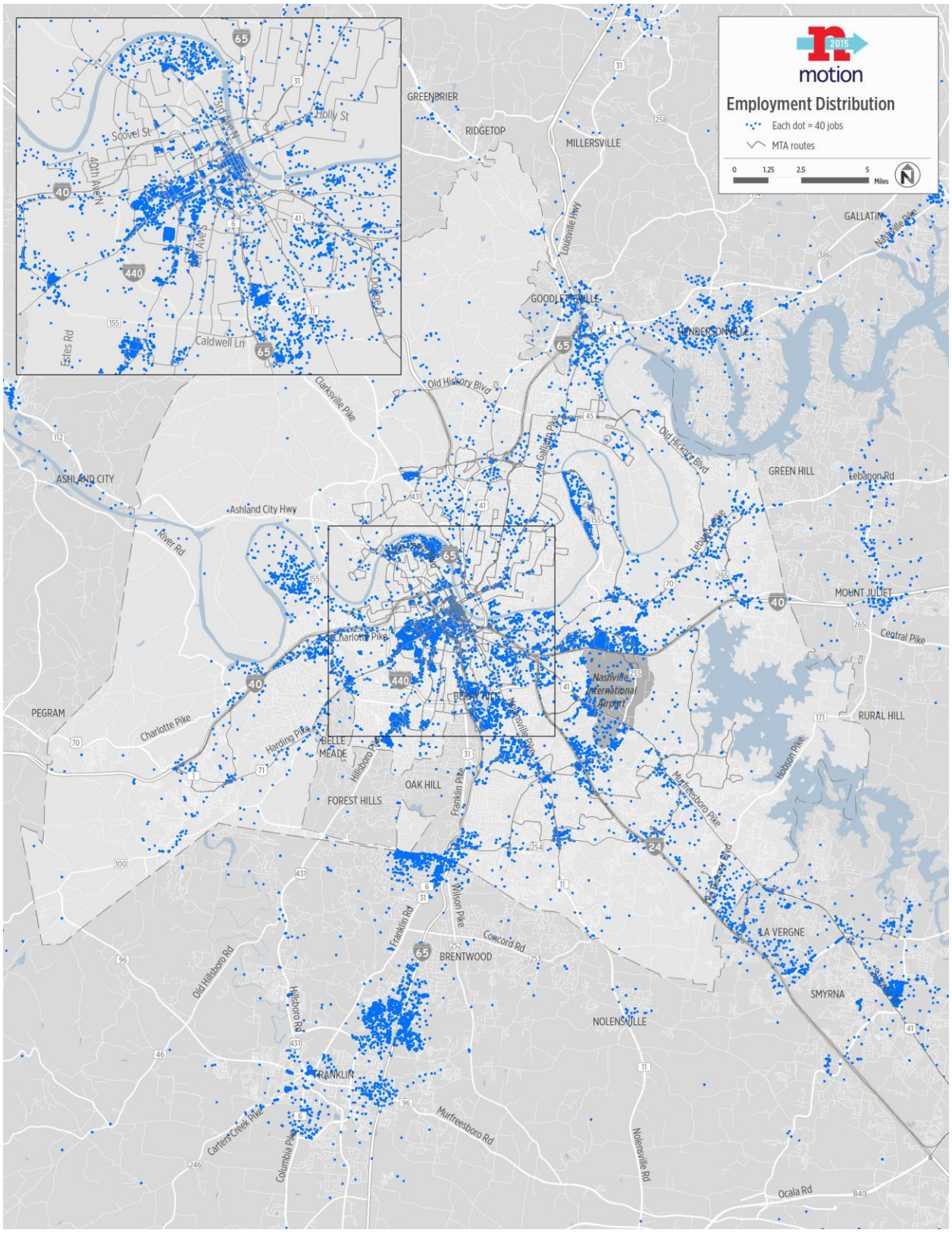
There are smaller, but still noteworthy, concentrations of jobs the intersection of Harding Pike and White Bridge Pike (Nashville State Community College and the Target shopping center), along Old Hickory Boulevard in the northern portion of Brentwood, and in northeast Franklin around I-65. Harding Pike and White Bridge Road are served by frequent service, but the other areas are outside of MTA's current service area.

In addition to these areas:

- Buena Vista Heights, the area between Briley Parkway and the Cumberland River, and just south of John C. Tune Airport have moderate job clusters. Buena Vista Heights and the Briley Parkway areas are each served by one MTA route, while the John C. Tune Airport area is not served.
- Many jobs are also located along some of the region's major corridors, most of which are well or fairly well served:
  - East toward Mount Juliet along I-40
  - East and northeast along Route 80
  - South along Nolensville Pike
  - Southeast along I-24
  - West along I-40
  - North along Gallatin Pike

As with population, there are relatively few jobs in the northern, northwestern, and west parts of the city and county, and also very little transit service. Overall, the MTA serves a greater proportion of jobs (74%) than population (49%).

FIGURE 26 EMPLOYMENT DISTRIBUTION



2010 Employment Density

In the same manner as population densities, employment densities provide a strong indication of underlying employment-based transit demand. As shown in Table 5, four to six jobs per acre typically produce demand for hourly bus service. As densities grow, the demands for transit grow, particularly with respect to more frequent service. Employment densities higher than 16 jobs per acre produce demand for frequent services (every 15 minutes or less) and premium services.

TABLE 5 TRANSIT-SUPPORTIVE EMPLOYMENT DENSITIES

TRANSIT SERVICE LEVEL	JOBS/ACRE
Flex Bus	–
Community Circulator	–
Local Bus	
60-minute frequency	4–8
30-minute frequency	8–16
15-minute frequency	16–24
10-minute frequency	24–48
5-minute frequency	>48

Source: Nelson\Nygaard compiled from various national sources

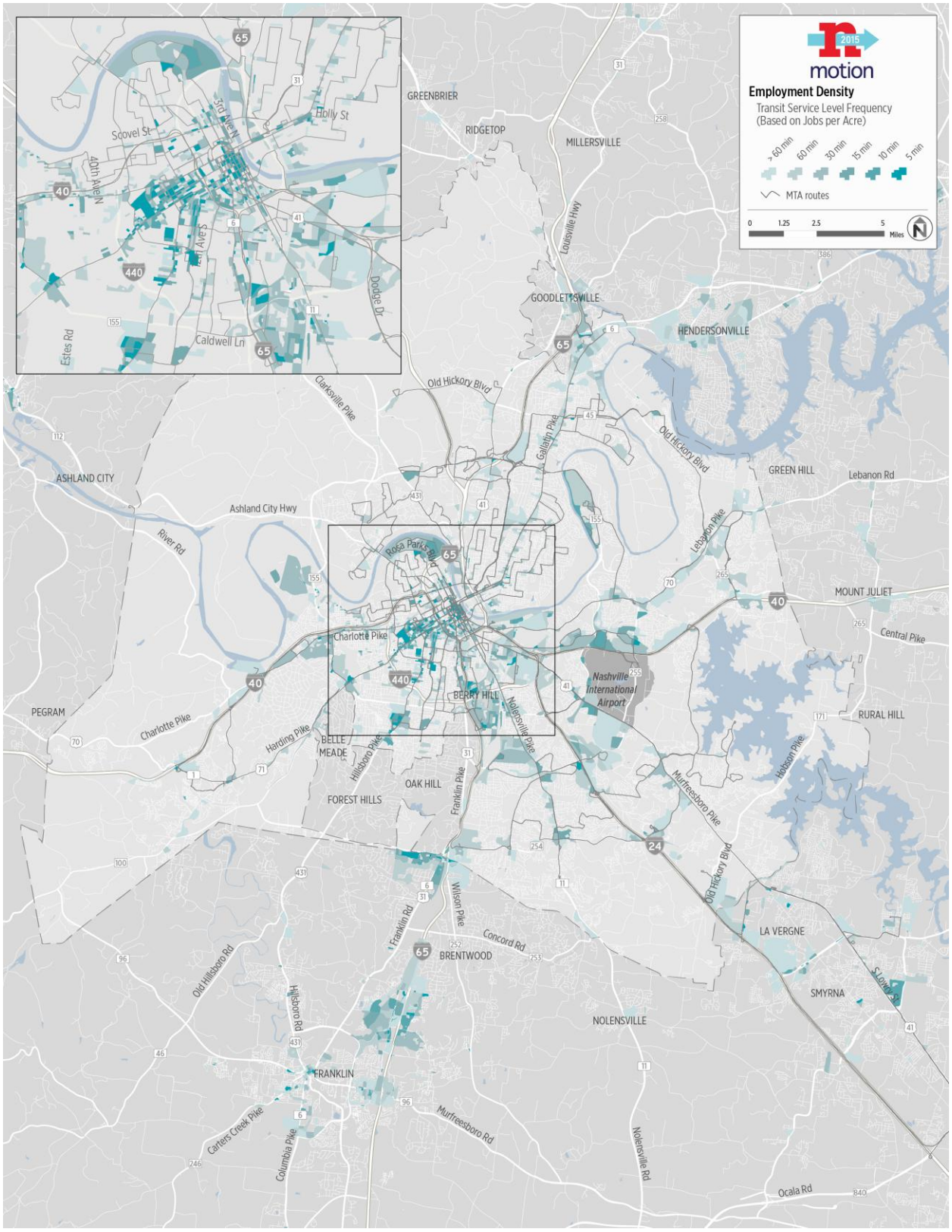
In Davidson County, employment density is highest within the inner highway loop, including downtown and Midtown (see Figure 27). It then thins out quickly except for pockets of high employment in MetroCenter/North Nashville and Berry Hills, and around Nashville International Airport. Elsewhere, and similar to population, employment is largely focused along major highways, in this case along I-24 and Murfreesboro Pike and Nolensville Pike to the south, and I-40 to the east.

In more detail, the areas with the highest employment densities, and those with the highest underlying employment-based demand for transit service are:

- Downtown Nashville and Midtown. Downtown is the focal point of the MTA system; there is also a high emphasis on service to Midtown.
- The MetroCenter area of North Nashville just south of the Cumberland River. This area is served by Route 9 MetroCenter, which provides links to downtown.
- Berry Hill, which has a number of high-density employment blocks, some of which can support service every five minutes and the majority of which can support service every 15 minutes. Berry Hill is served somewhat peripherally by Route 12 South, which provides service to and from Midtown and downtown via Granny White Pike and 12th Avenue South, and by Route 1 100 Oaks that provides peak period-only service.
- There are also transit-supportive employment densities along many major roadways, including Hillsboro Pike, I-24 extending southeast from downtown, I-40 and Lebanon Pike extending east from downtown, and Gallatin Pike extending northeast from downtown. These areas have underlying demand for service that operates every 15 to 30 minutes. The MTA serves most of these areas, but some service is limited, especially in the vicinity of the airport.

Similar to population density, beyond Briley Parkway, areas to the north, northwest, and west have very little employment-based transit demand.

FIGURE 27 EMPLOYMENT DENSITY



2010 Composite Transit Demand

The previous sections present population and employment-based demand separately, but particularly in mixed-use areas where there are both large numbers of residents and jobs, transit demand will be significantly higher than indicated by the individual measures. When the two measures are viewed together, the number of areas with strong underlying transit demand increases (see Figure 28):

- Downtown and Midtown Nashville are by far the most transit-supportive areas in Davidson County. In these neighborhoods, many blocks have sufficient population and employment density to support a very high level of transit service, potentially as high as every 5 minutes during peak periods.
- Several of the local corridors east and south of downtown have densities that are sufficient to support high and moderate levels of service. Hillsboro Pike to the southwest, Nolensville Pike to the southeast, and Lebanon Pike to the east all have strong transit markets.
- There are several corridors that have residential and employment densities that, viewed simply by themselves, have demand for only moderate levels of service. These include Gallatin Pike, Nolensville Pike, and Charlotte Pike. However, as discussed below in the Travel Patterns sections, a large proportion of this demand is to and from Nashville's core areas. As such, the cumulative demand between outer areas and downtown can support high levels of service. Furthermore, these corridors have also been designated as high capacity transit corridors by NashvilleNext and, as discussed in the Future Demand chapter, future demand will be much higher.

In areas north, northwest, and west of Briley Parkway, even when population and employment densities are considered together, there is still only very low underlying demand for transit service.

SOCIO-ECONOMIC CHARACTERISTICS

Many population groups have a higher propensity for transit use than the overall population. These include:

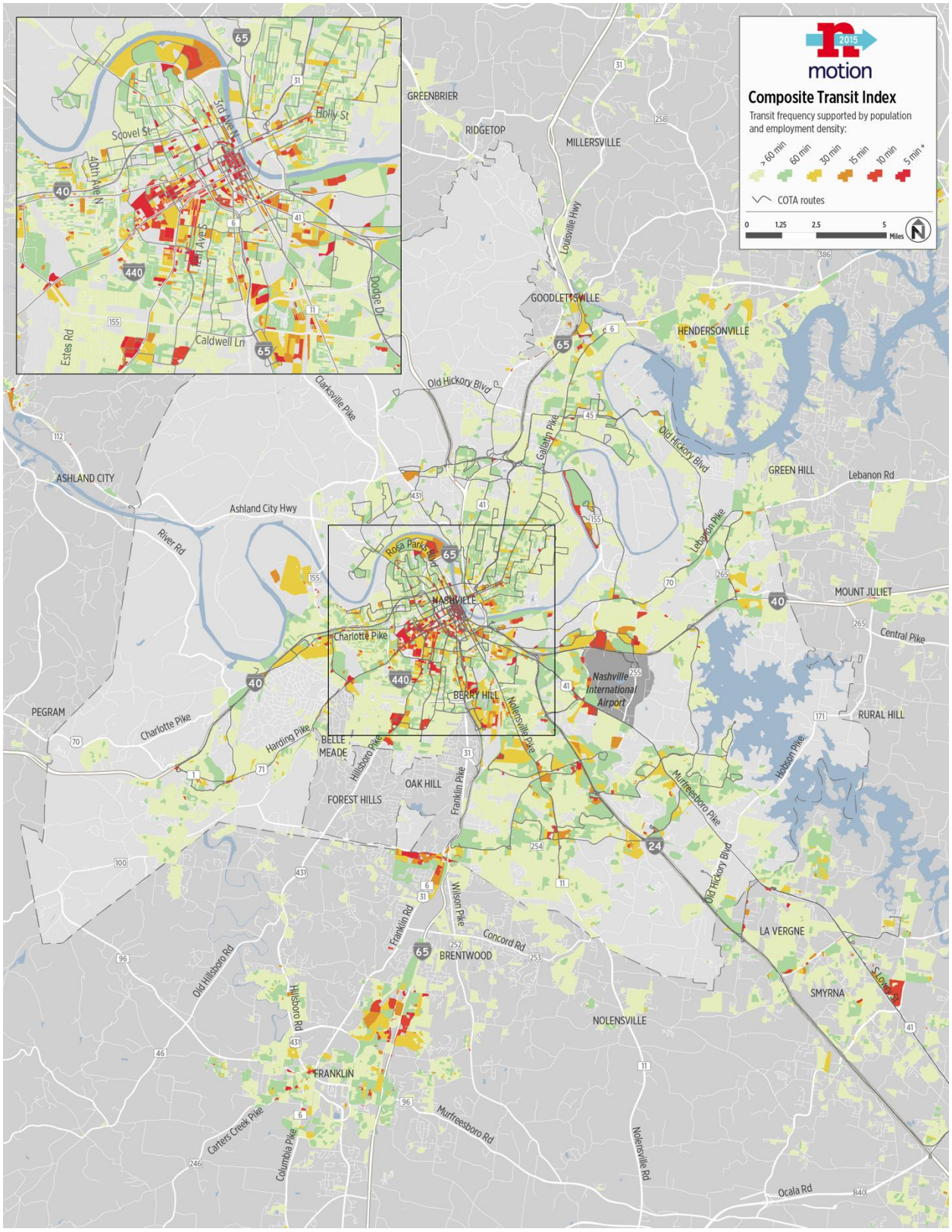
- **Millennials,** who in general have a significantly higher interest in using many transportation options such as transit, walking, and biking and a lower interest in driving. In many cases, the availability of good transit is an important factor in where they will live.
- **Seniors,** who as they age often become less comfortable or less able to operate a vehicle. Transit offers older adults the freedom to stay in their homes as they transition away from their vehicles and "age in place."
- **Persons with Disabilities,** many of whom cannot drive or have difficulty driving.
- **Low Income Residents,** often use transit because it is much less expensive than owning and operating a car.
- **Minorities,** have lower incomes and use transit because it is much less expensive than owning a car.

Transit-Oriented Populations

	Percent
Millennials	30%
Seniors	11%
Persons with Disabilities	7%
Low Income Households	15%
Minorities	36%

(as a % of Davidson County's population)

FIGURE 28 COMPOSITE TRANSIT DEMAND



Another population that uses transit to a much greater extent than the general population is residents without automobiles. In larger cities, many residents do not have an automobile by choice because transit is more attractive, 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. However, in urban areas such as Nashville that are oriented toward automobile travel and where transit options are limited, persons without automobiles largely consist of those with lower incomes or people who do not drive.

There is a large amount of overlap between these groups. For example, many elderly residents have low incomes and also have a disability; a large proportion of individuals without access to an automobile are also low income households; and minority populations typically use transit to a greater extent because of low incomes and not specifically due to ethnic background. Still, the presence of each population group is an important indicator of increased demand for public transit, and thus is presented individually.

At the present time, lower income individuals and those who do not drive comprise a large proportion of the MTA's ridership. This reflects both the current development patterns of Nashville and Davidson County and the design of the system. Going forward, service to disadvantaged populations will remain important, but to fulfill a more meaningful role in the area's transportation system, MTA will need to develop services that are attractive to a much broader cross-section of the county's population.

Millennials

Like all ambitious cities, Nashville desires to attract a young, talented workforce and their families, and this will be critical to ensuring the area's continued success. A recent survey of Millennials by Transportation for America and the Rockefeller Foundation reported that more than half of Millennials would prefer to live in a place where they do not have to rely on cars to get around. Two-thirds also say that access to high-quality transportation will be one of the top three criteria in considering where they decide to live next. In Nashville, the same report indicates that 73% would prefer to live in a place where "most people have transportation options so they do not need to rely only on cars" versus "a place where most people rely on cars to get around," and 64% say they expect to live in walkable places where they don't necessarily need a car. However, only 6% say they that where they currently live in Nashville is such a place.

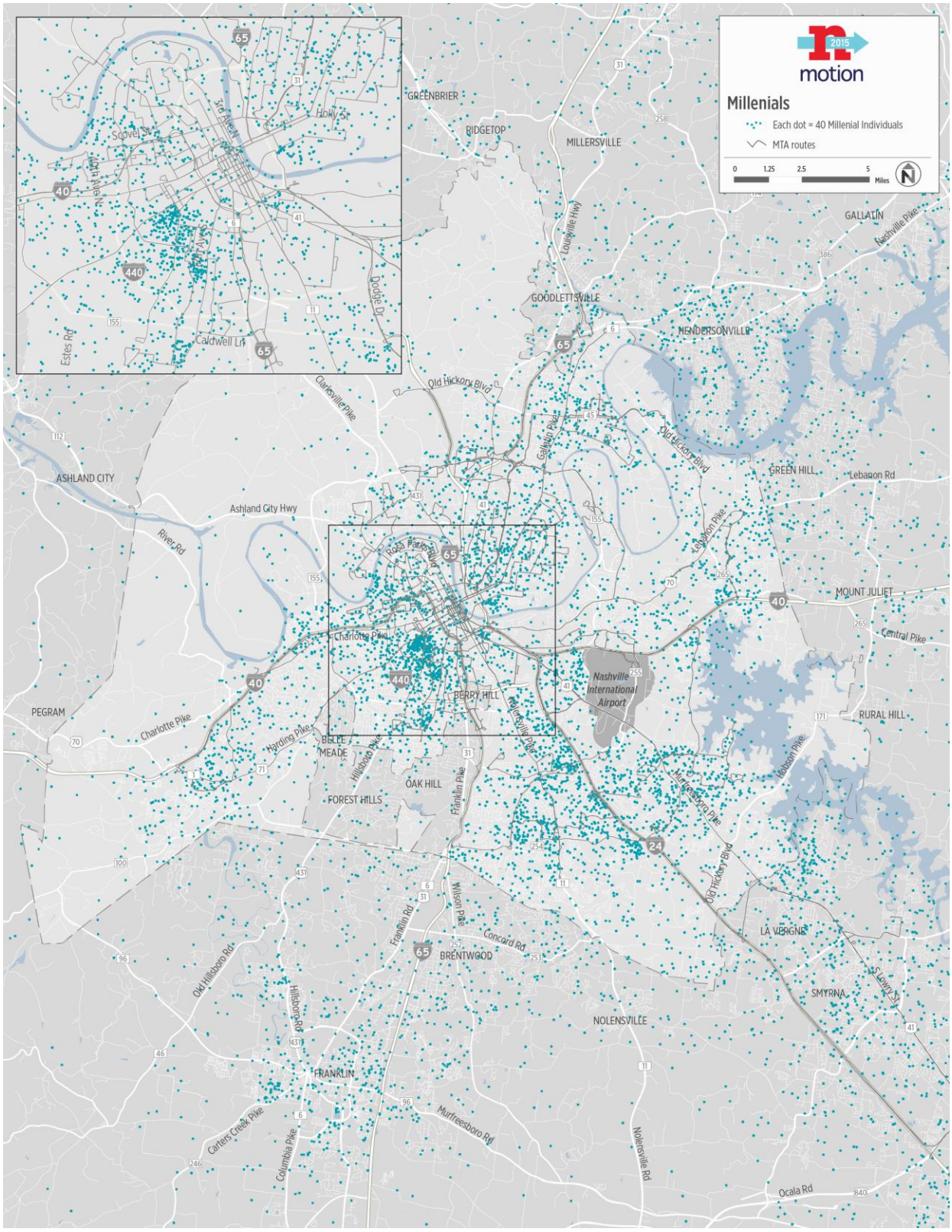
There are currently over 188,000 Millennials, defined as individuals born between 1980 and 2000, in Davidson County; Millennials represent 30% of Davidson County's population. Millennials live throughout the county, but with the highest populations in areas around Nashville's major universities—in Midtown around Vanderbilt University, in Belmont/Hillsboro Village around Belmont University, and around Tennessee State University (see Figure 29). There are also large populations of Millennials along Nolensville Pike, extending south from downtown, and in East Nashville.

Older Adults

Baby Boomers, and those before them, increasingly desire to remain as active and independent as possible and to age in place. One important way for them to remain independent is through the availability of transit.

In Davidson County, approximately 65,000 residents, or nearly 11% of the county's population, are 65 or over. Older adults live throughout the county, but in general, more live in suburban areas than in the city core (see Figure 30). This is most evident in downtown Nashville, which has a lower proportion of older adults in relation to the area's total population. Elsewhere, however, the distribution of older adults generally matches the distribution of the general population. Exceptions are clusters of older adult populations located north and northeast of Belle Meade, in Belleview south of the Memphis-Bristol Highway, and along Gallatin Pike in Madison. Some of these clusters, particularly those near Belle Meade, have relatively limited access to transit service.

FIGURE 29 DISTRIBUTION OF MILLENNIALS



Persons with Disabilities

While many people with disabilities are able to drive, many cannot. As a result, public transportation, including both regular fixed route bus service and specialized paratransit services, are an essential resource to ensure people with disabilities can have active and independent lives.

In Davidson County, 44,074 people, or 7% of the population, have a disability. The distribution of these individuals generally matches the distribution of the general population (see Figure 31). It also generally matches the distribution of older adults, since older adults are more likely to have a disability. Larger populations of individuals with a disability are located in and adjacent to downtown Nashville, in Germantown and MetroCenter, north of downtown Nashville along Gallatin Pike, and south of downtown between Nolensville Pike and I-24. There are also relatively large clusters of individuals with disabilities located in Pasquo and Hermitage.

Most areas with a large number of residents with disabilities are well served by transit. However, residents with disabilities live throughout Davidson County, including many areas where the provision of transit is not practical.

Low-Income Households

People with low incomes tend to use transit to a greater extent than higher income residents because transit provides significant cost savings over automobile ownership and use. In 2013, 39,659 households, or more than 15% of the county's households, were in poverty. This rate is high, above the national average of 13.5%.

Poverty is most concentrated around downtown Nashville, particularly in the West End, Midtown, Belmont/Hillsboro Village, and East Nashville (see Figure 32). Other concentrations of households living in poverty are in North Nashville, southwest of Nashville International Airport in Antioch, and extending northeast from downtown along Gallatin Pike, particularly in Madison.

Most areas with high numbers of low income households—those near downtown and Midtown—receive among the highest levels of transit in the service area. Antioch and the Gallatin Pike corridor are also well served by existing MTA service. Service in many other areas—such as west of Nashville International Airport, between Nolensville Pike and I-24 south of downtown, in the southwestern portion of East Nashville, and south of the John C. June Airport—are not as well served.

Minorities

Minority populations use transit to a much greater extent than non-minority populations, largely because they tend to have lower incomes than non-minorities. This means that there is a large amount of overlap between minority populations and low-income households; however, the presence of high numbers of minority residents still provides a strong additional indicator of transit demand. The provision of effective transit service to minority populations is also particularly important to the Federal Transit Administration and is a requirement under Title VI of the Civil Rights Act of 1964.

Minority populations in Davidson County are most concentrated in the Germantown/MetroCenter neighborhoods and in East Nashville adjacent to downtown (see Figure 33). Other large clusters of minority residents are located in Belmont/Hillsboro Village and along I-24 southwest of Nashville International Airport. Since minority residents tend to live closer to downtown Nashville or in the southeastern portion of Davidson County, most areas with a large number of minority residents receive among the highest levels of transit in Davidson County.

FIGURE 30 DISTRIBUTION OF OLDER ADULTS (65 AND OLDER)

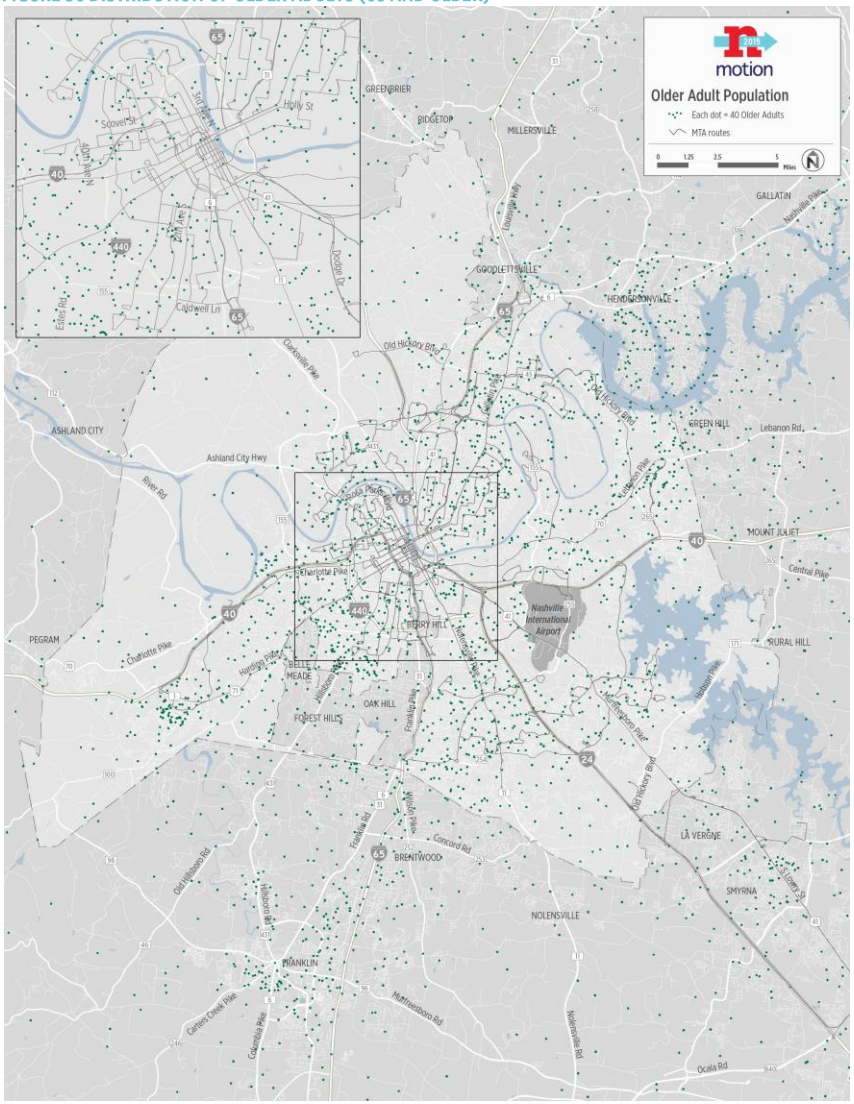


FIGURE 31 DISTRIBUTION OF PERSONS WITH DISABILITIES

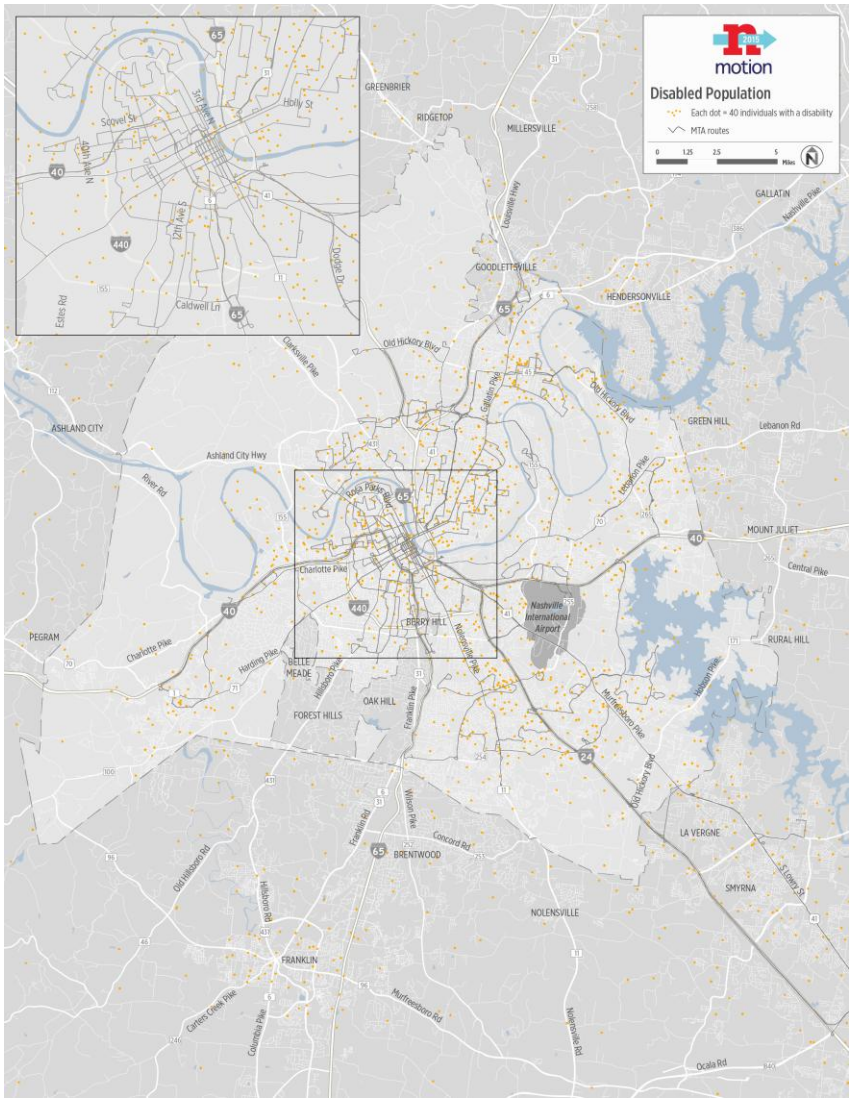


FIGURE 32 DISTRIBUTION OF LOW-INCOME HOUSEHOLDS

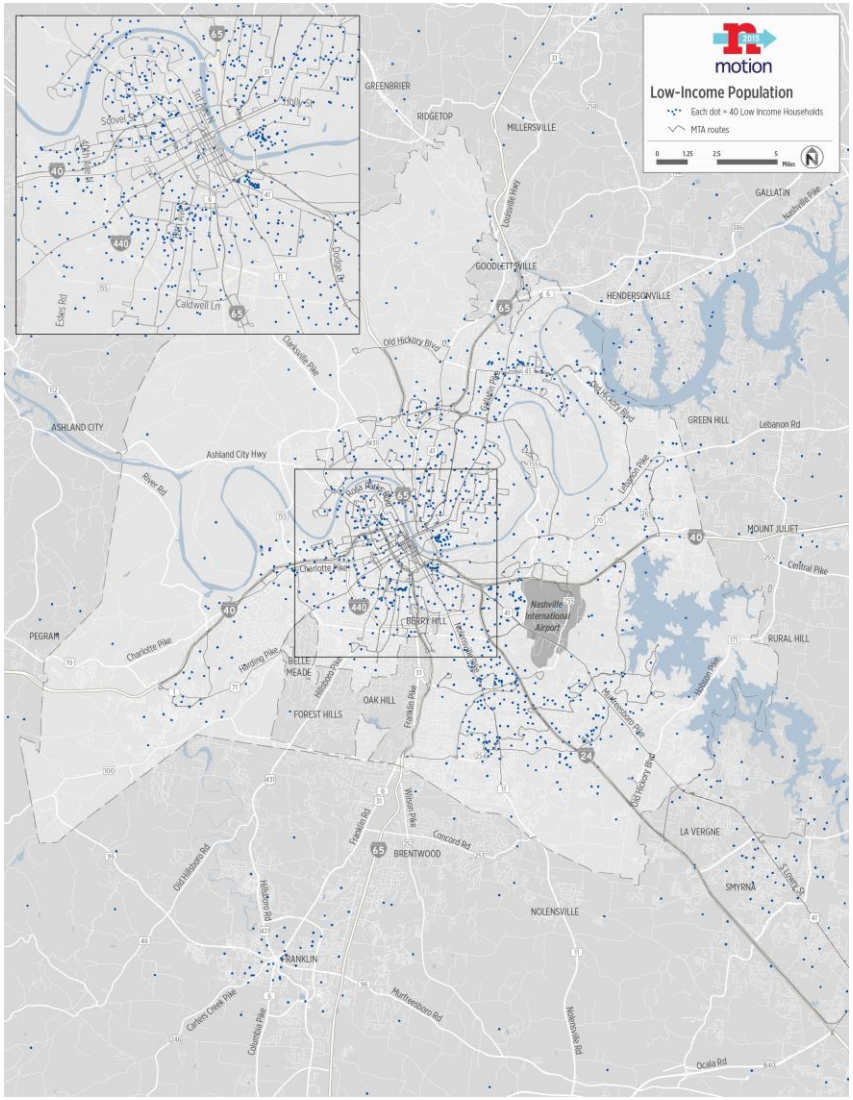
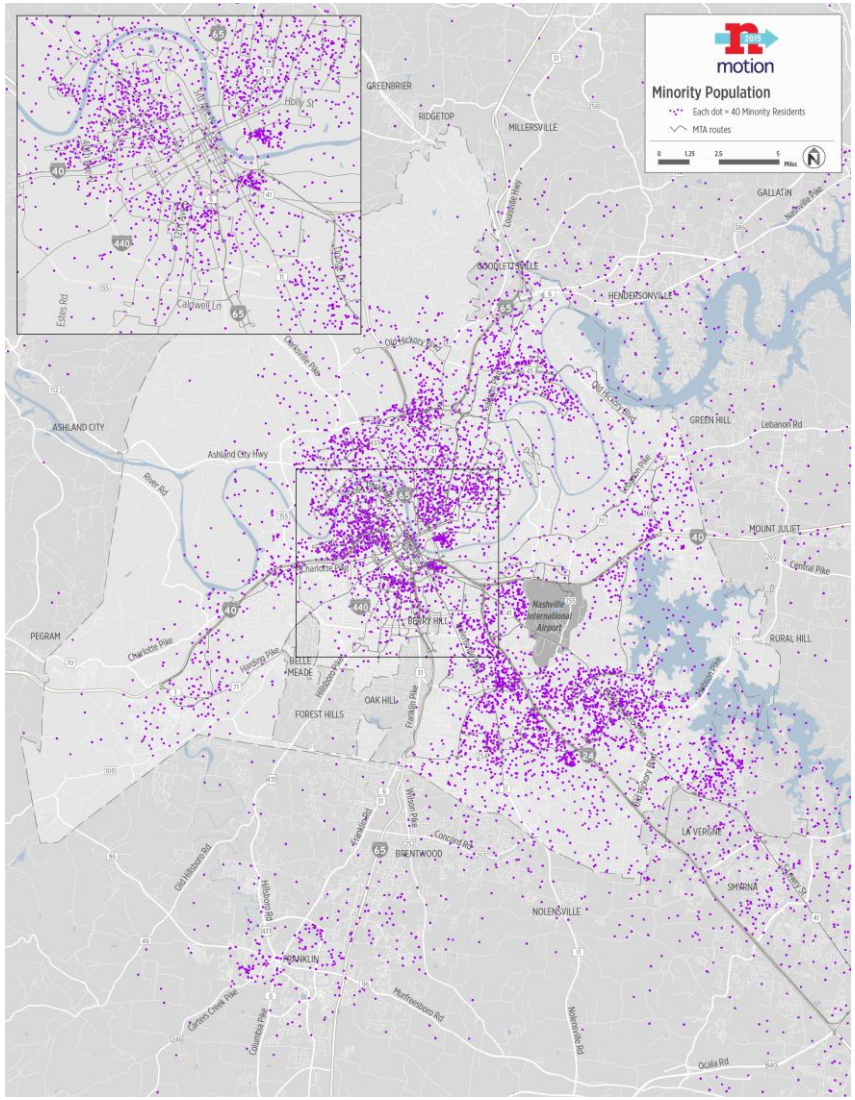


FIGURE 33 DISTRIBUTION OF MINORITY POPULATIONS



FUTURE TRANSIT DEMAND

Future transit demand in Davidson County will be driven by a number of factors. The most important will be Davidson County's population and employment growth and the new growth patterns envisioned by NashvilleNext.

2040 POPULATION DISTRIBUTION

Davidson County is projected to grow by more than 20% from 2010 to 2040. As is the case with current population distribution, if a diagonal line that passed through North Nashville were drawn from the northeast of Nashville to the southwest, based on projections developed as part of NashvilleNext, the large majority of residents will continue to live to the east and south of that line. Not surprisingly, downtown and Midtown will continue to have the largest concentration of residences, but there will also be a continued outward growth of population, particularly northeast and west of downtown (see Figure 34):

- Midtown/Vanderbilt, Belmont/Hillsboro Village, and Antioch are projected to continue to have the highest populations. Though all of these areas are served by multiple MTA routes and service coverage is good, by 2040 these areas will likely require more frequent service and longer service spans due to their significant population increase.
- East Nashville and Madison will also experience significant population growth and will continue to have large populations. While East Nashville is well served by many MTA routes, Madison has more limited service; both areas will likely need more frequent service according to 2040 population projections.
- Despite the population growth projected to occur in most of Davidson County, the northwestern half of the county is projected to see much less growth and continue to have significantly fewer residents.

The number of Davidson County residents located within a quarter mile of an MTA bus stop is projected to increase to approximately 382,000, a 23% increase from 2010. At the same time, if MTA service remains the same, 50% of Davidson County residents are projected to live within a quarter mile of a MTA bus stop, which is similar to the present. Though the percentage of county residents served will remain similar, the 20% increase in population conveniently served by MTA routes will require more frequent service and longer service spans in order to satisfy the increase in demand caused by this population increase. Additionally, in order to provide convenient service to a greater percentage of residents, MTA will likely need to expand its service to better serve the slight outward population growth, particularly northeast and west of downtown.

2040 POPULATION DENSITY

With the projected population growth, and as shown in Figure 35, population densities will increase slightly in areas with less demand for transit today. Despite these increases, there will still be relatively few pockets of dense residential development that, by themselves, can support very high levels of transit service (every 5 to 10 minutes). The majority of the county's density increases will occur in area that can currently only support limited frequency service; thus these density increases mean that more areas within the county will be able support transit service every 30 to 60 minutes.

FIGURE 34 2040 POPULATION DISTRIBUTION

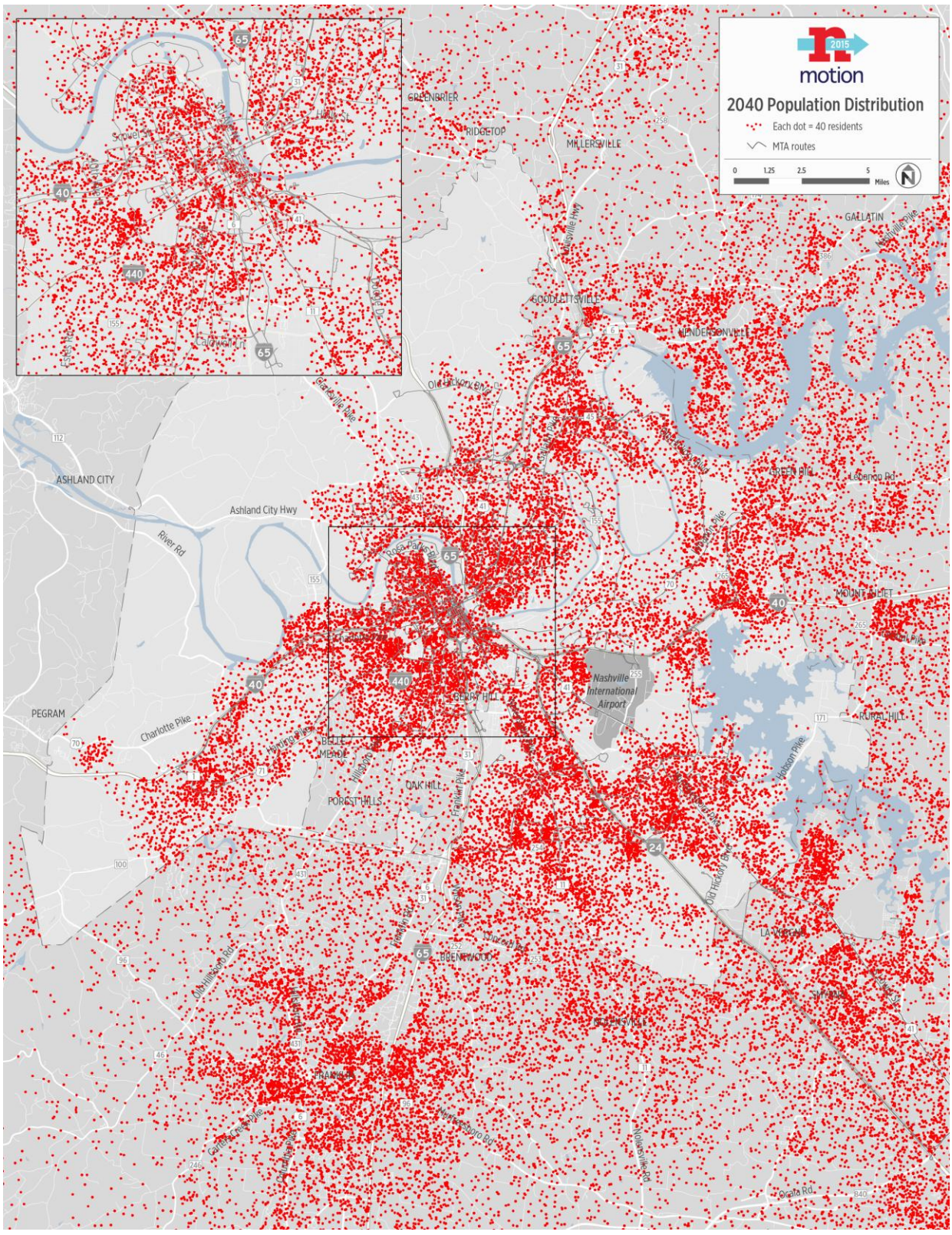
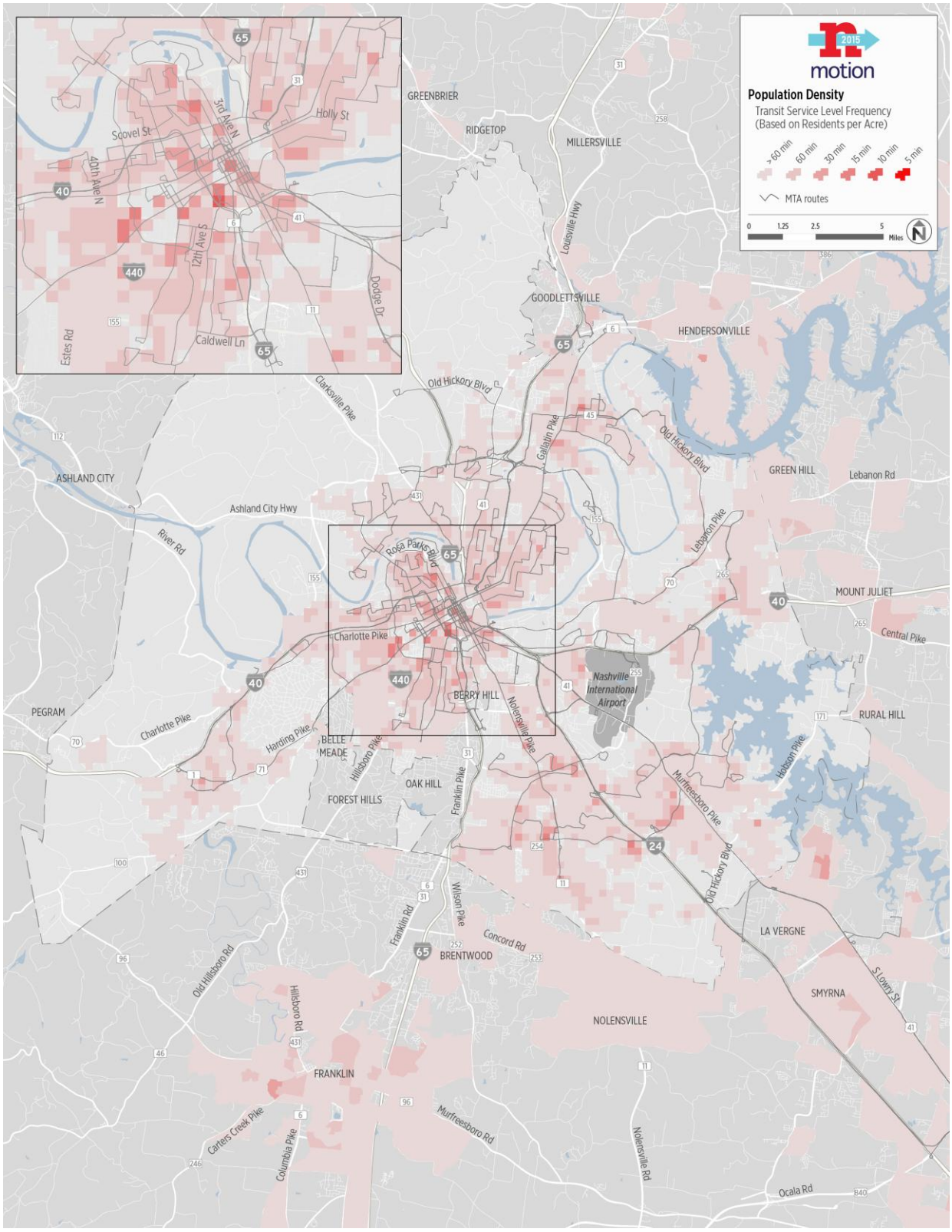


FIGURE 35 2040 POPULATION DENSITY



The highest population densities will be in downtown Nashville, areas adjacent to downtown, and a few areas to the northeast and southeast:

- Belmont/Hillsboro Village
- Jefferson Street/MetroCenter
- Midtown
- West End/Elliston Place
- East Nashville
- Antioch
- Belleview
- Madison

The MTA's existing services will largely meet the needs of new growth in the Nashville core. However, there may be increasing demands for more frequent service and longer spans of service.

2040 EMPLOYMENT DISTRIBUTION

Between 2010 and 2040, Davidson County's employment is projected to almost double. This growth is projected to occur along various corridors within Davidson County, with particularly high growth in the downtown core and in midtown (see Figure 36). Other significant growth areas include:

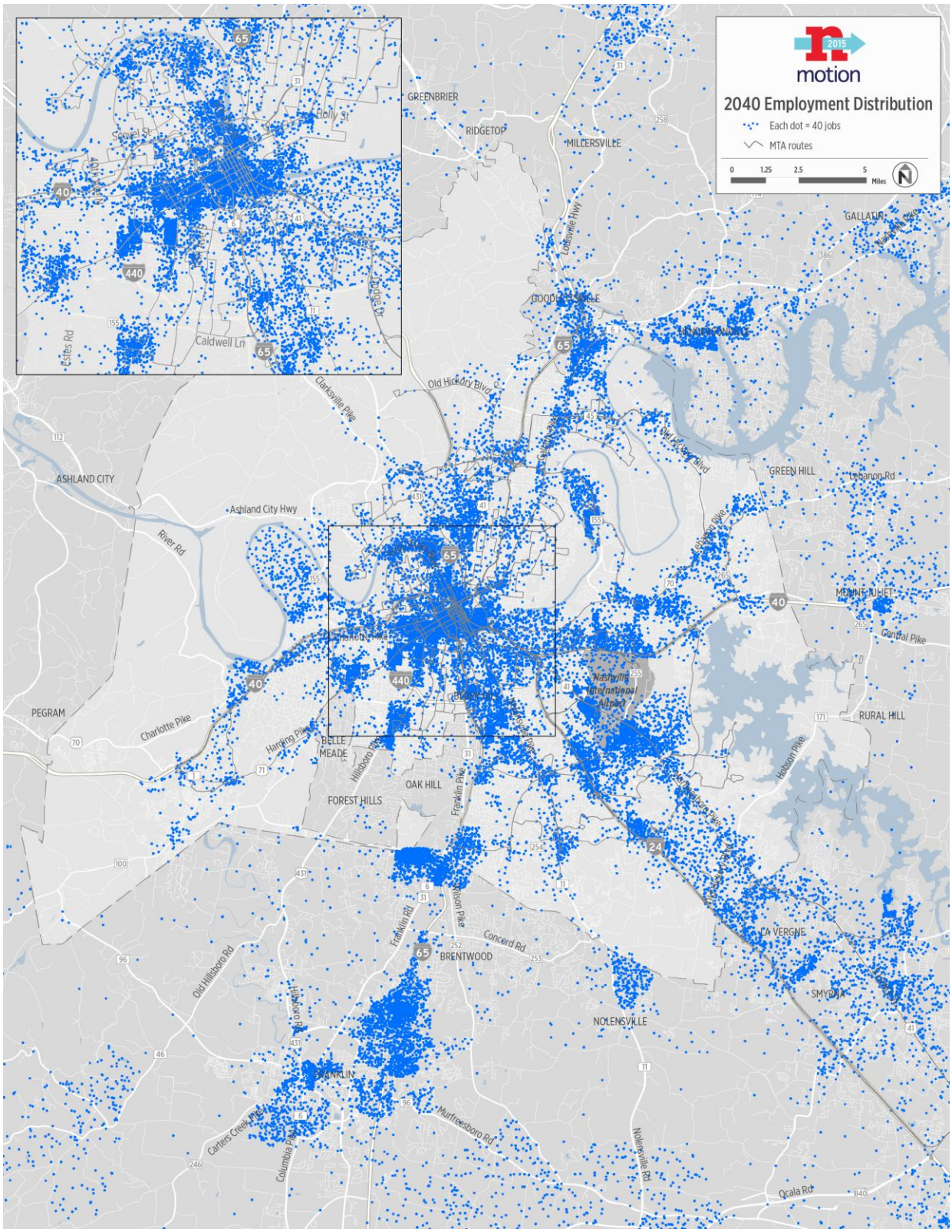
- North of downtown in the Jefferson Street/MetroCenter neighborhood
- Southeast of Nashville International Airport
- Along Gallatin Pike in Madison and Goodlettsville
- In Brentwood near the intersection of Franklin Road and Old Hickory Boulevard

While much of this new employment will occur in areas that are currently served by transit, the frequency and span of service will need to increase to serve employment growth in downtown and midtown Nashville and along these corridors.

There is also a significant amount of growth projected in areas between corridors currently served by MTA, for example between Nolensville Pike and I-65 in Berry Hill and between Murfreesboro Pike and I-24 south of Nashville International Airport. Since the growth is projected to occur between corridors currently served by existing MTA service rather than directly along these corridors, the addition of new routes to serve these areas will need to be planned in order to provide service to these employment locations.

The number of jobs located within a quarter mile of an MTA bus stop is projected to increase to nearly 582,000, a 76% increase from 2010. At the same time, if MTA service remains the same, 67% of Davidson County residents would work within a quarter mile of an MTA bus stop. Though the percentage of county jobs served will decrease slightly from 2010, the doubling of jobs conveniently served by MTA routes will require more frequent service and longer service spans.

FIGURE 36 2040 EMPLOYMENT DISTRIBUTION



2040 EMPLOYMENT DENSITY

The county's projected employment growth will increase demand in areas where there is already significant underlying demand and create new demand in additional areas (see Figure 37). The county's highest employment densities will be able to support more frequent service than its residential densities. Areas with high employment density are more concentrated in downtown and along major corridors than areas with high residential densities, which means that areas with high employment density can be more efficiently served by MTA fixed-route services.

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

- Downtown Nashville
- Midtown Nashville
- South of Nashville International Airport, particularly along Murfreesboro Pike and I-24 extending southeast from downtown
- Berry Hill
- Along Hillsboro Pike extending southwest from downtown

With the exception of portions of Antioch, most of these areas are currently served by MTA. However, many of these areas have transit service that operates with only moderate frequency, even during morning and evening peak travel periods.

2040 COMPOSITE TRANSIT DEMAND

When considering both population and employment-based future demand, it becomes clear there will be significant underlying transit demand throughout much of Davidson County (see Figure 38). While much of this demand will be located in or adjacent to downtown, some of this demand will emerge in areas that currently have limited service:

- Downtown and midtown Nashville are projected to have combined population and employment levels that would support very frequent service of every 5 minutes during peak periods.
- A number of neighborhoods adjacent to downtown and midtown, including East Nashville, the Germantown/MetroCenter neighborhood, and Belmont/Hillsboro Village, will also have a relatively high transit demand.
- There will be high underlying demand for transit in Antioch, with demand for frequent service near Nashville International Airport along Murfreesboro Pike.
- Demand for transit will develop and/or significantly grow in:
  - Areas to the east and south of midtown, including Belmont/Hillsboro Village extending southeast from midtown along Hillsboro Pike and the Sylvan Park neighborhood
  - East Nashville
  - Along I-40 extending east from downtown

FIGURE 37 2040 EMPLOYMENT DENSITY

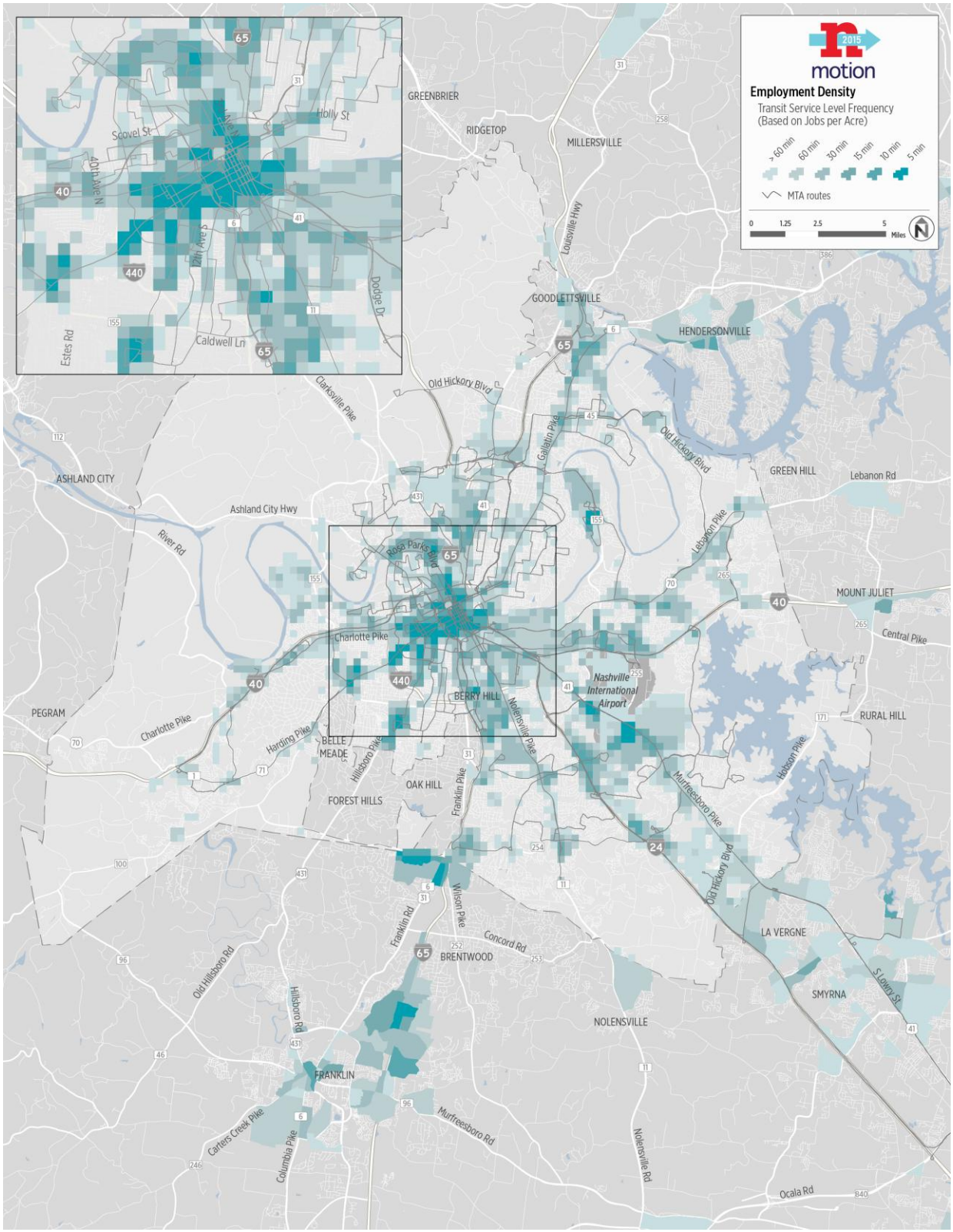
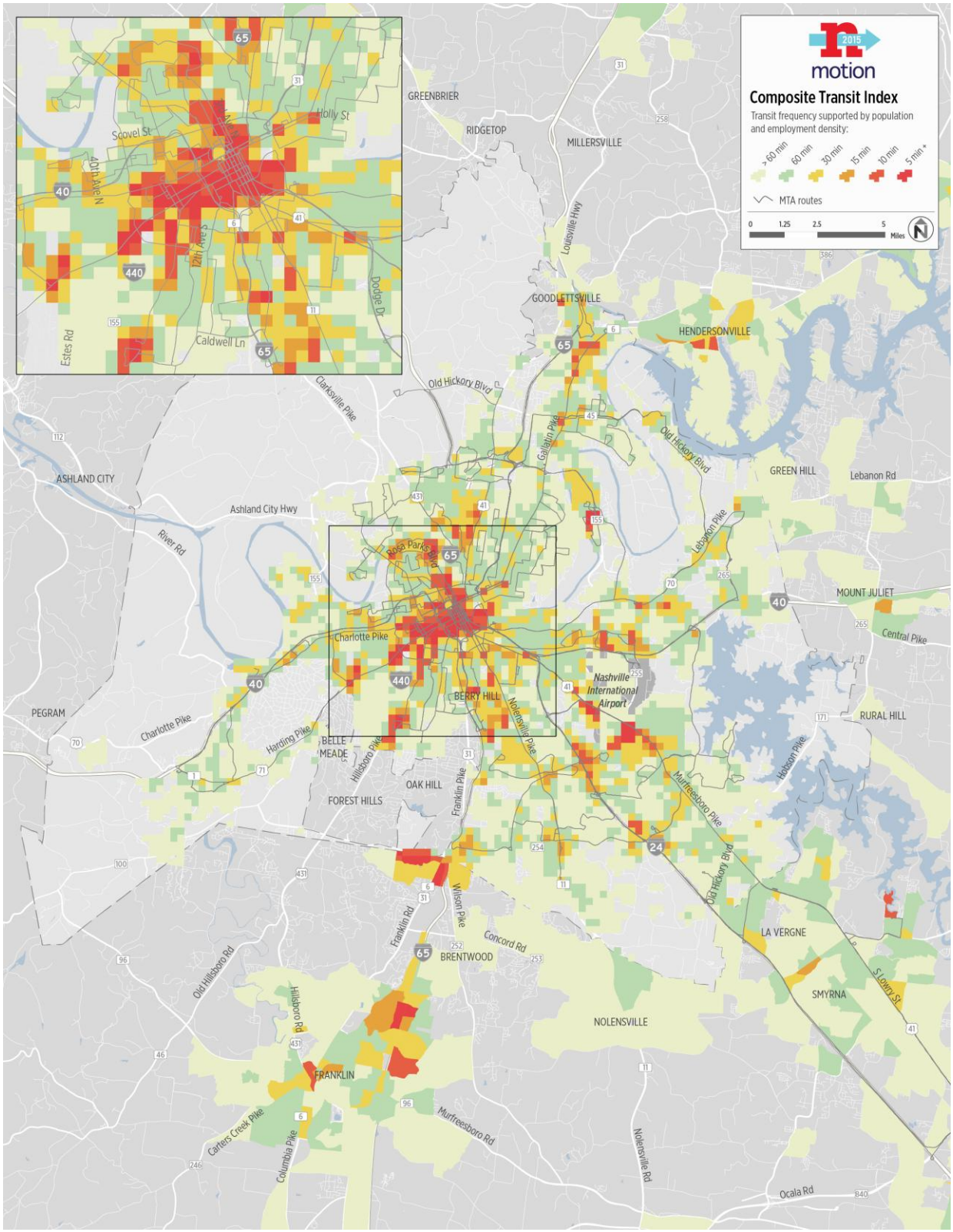


FIGURE 38 2040 COMPOSITE TRANSIT INDEX



CURRENT AND FUTURE TRAVEL PATTERNS

For transit to be effective, it must take people from where they are to where they want to go. In Davidson County, the largest volumes of trips have historically been to and from downtown Nashville, and this continues to be the case today. However, recent growth has been outward, and thus there is increasing demand for service to other places.

People also travel for many reasons, including to and from work and school and for shopping, medical, recreation, social, and other purposes. Transit serves all types of trips, but for all transit systems, work trips are particularly important. This is the case for a number of reasons, including public policy and because many work trips are concentrated around times and to places that can be very effectively served by transit (for example, peak period trips to and from downtown Nashville). Transit serves work trips throughout the day, but the highest numbers of trips are made during morning and late afternoon peak periods. Trips for other purposes typically comprise much lower volumes than work trips, occur between more dispersed locations, and are often more oriented toward midday and evening.

2010 TRAVEL PATTERNS

As population and jobs have grown outward, trip patterns have become very dispersed. However, downtown Nashville and Midtown remain the focal point of the largest volumes of trips.

All Trip Types

As of 2010, for all types of trips, the heaviest travel flows in Davidson County are centered on downtown Nashville and Midtown (see Figure 39). They are also generally to and from locations adjacent or close to the downtown core rather than to and from outer areas:

- The highest travel flows are between Midtown and downtown, with nearly 17,000 trips per day.
- There are also large travel volumes between Germantown/MetroCenter, East Nashville, Belmont, and Nashville International Airport and downtown.
- Other areas with smaller, but still high, volumes include between Belmont/Hillsboro Village and Green Hills and downtown.

There are also a number of non-downtown travel flows that are significant. These include:

- Between neighborhoods along Gallatin Pike, the Hermitage, and Donelson and the Nashville International Airport
- Between neighborhoods along Gallatin Pike and East Nashville
- In and around Gallatin, Bellevue, Lebanon, and locations along Murfreesboro Pike

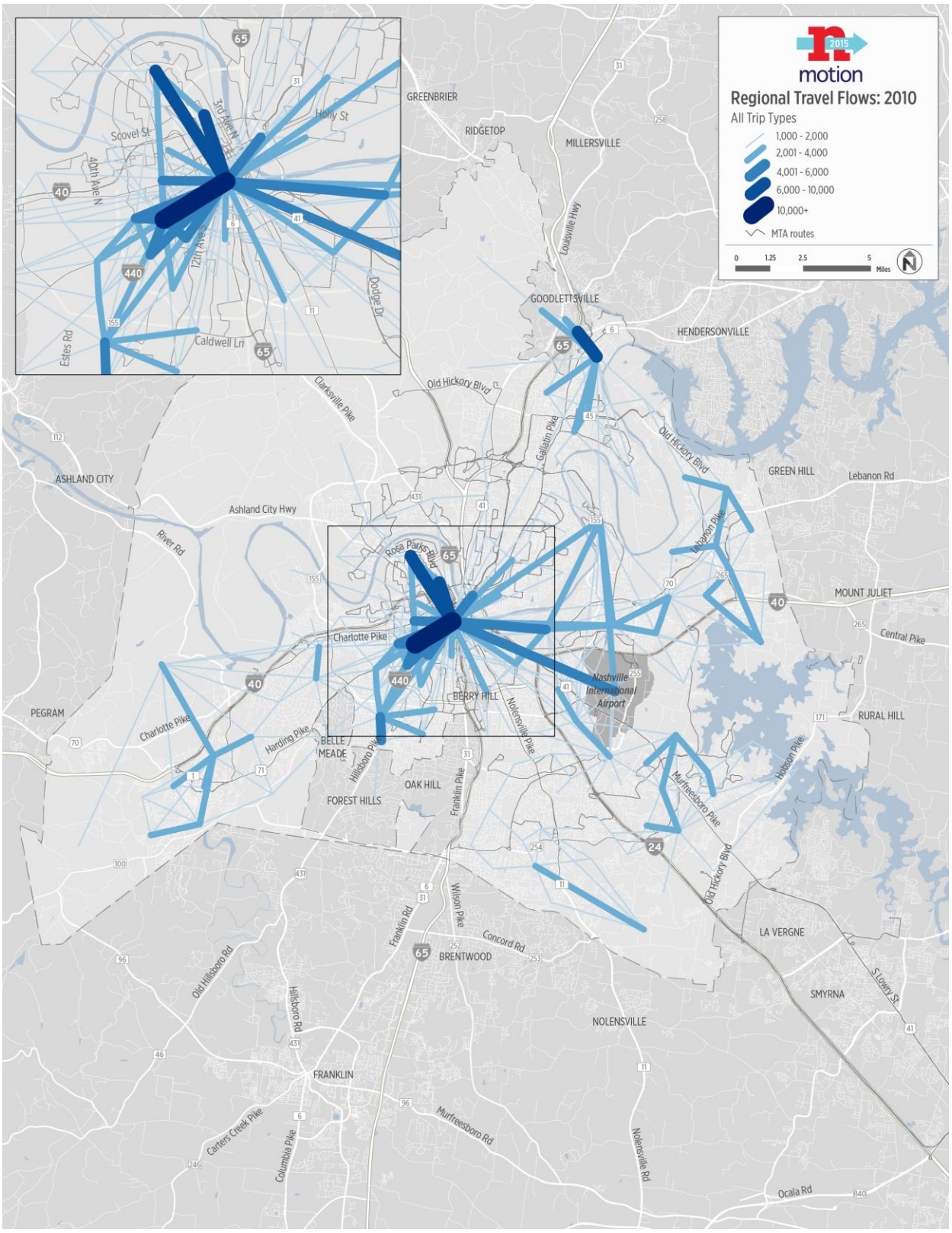
The MTA provides service to all of the major travel flows to and from downtown and Midtown, either directly or via connections to Midtown in downtown. However, as discussed previously, while service coverage exists, many routes operate relatively infrequently and with limited days and hours of service. For trips that are not to or from downtown, service is either not provided or is very limited.

Work Trips

Home-based work trips, which are a major component of transit trips, are only a relatively small portion of the travel made by automobile but are a large proportion of trips made via transit. When only work trips are considered, and as shown in Figure 40, the highest travel volumes are between:

- Midtown and downtown

FIGURE 39 2010 TRAVEL FLOWS– ALL TRIP TYPES



- North Nashville, and particularly Germantown and MetroCenter, and downtown
- Belmont, Hillsboro, and the West End and Midtown

The MTA provides service to each of these markets, either directly or via connections to Midtown in downtown, and usually with relatively frequent service.

2040 TRAVEL PATTERNS

With continuing increases in population and employment, the amount of travel in Davidson County will increase significantly. Changes envisioned in NashvilleNext will also better focus travel patterns in ways that will enable transit to become more effective.

All Trip Types

In 2040, there will be very large increases in travel volumes to and from downtown Nashville and Midtown. Total volumes will be highest in the urban core and particularly high inside of I-440 (see Figure 41). However, they will also be much higher from nearly all inner area neighborhoods:

- The highest travel volumes will be between Midtown, Germantown/MetroCenter, and East Nashville and downtown, with 19,000 to 25,000 trips per weekday.
- Other areas with high volumes will be to and from downtown and Midtown, including neighborhoods along Gallatin Pike, South Nashville, Nashville International Airport, Donelson, and Green Hills.

Outside of the core, the largest increases in travel volumes will be to and from Gallatin, Antioch, Bellevue, and locations around Briley Parkway to the north.

Nearly all of the travel flows to and from downtown Nashville are currently served by transit in some fashion. However, high travel volumes indicate that more service will be needed. Of the major non-downtown travel, most are served with either limited or no transit.

Work Trips

By 2040, there will also be very large increases in the volumes of work trips. As in 2010, and in spite of continued outward growth, nearly all of the highest volumes will continue to be to and from downtown (see Figure 42). The number of long distance commutes will also increase significantly:

- The highest work trip travel volumes will be between North Nashville, the West End, Midtown, East Nashville, and the Gallatin Pike Corridor and downtown. These corridors will be able to support very high levels of transit service.
- There will also be a large number of trips between La Vergne, Smyrna, and downtown and Antioch.[5] La Vergne and Smyrna are currently beyond the limits of MTA service and are now served with RTA express routes. Increasing travel volumes in these areas indicate that it may be warranted to extend MTA services to these areas and to implement local services.
- Most other major corridors to and from downtown will have moderate work trip travel volumes. Nearly all of these corridors currently are served by the MTA, and service will need to be increased and improved as travel volumes grow.

With the exception of the Antioch area, downtown work trip flows will remain very dispersed. Thus, while demand for transit service will grow, this demand will remain much lower than for downtown-oriented service.

[5] Note that the zone used for the La Vergne area is relatively large and, as a result, encompasses more trips that many other zones. As a result, trips would be more dispersed than implied in Figure 27.

FIGURE 40 2010 TRAVEL FLOWS– WORK TRIPS

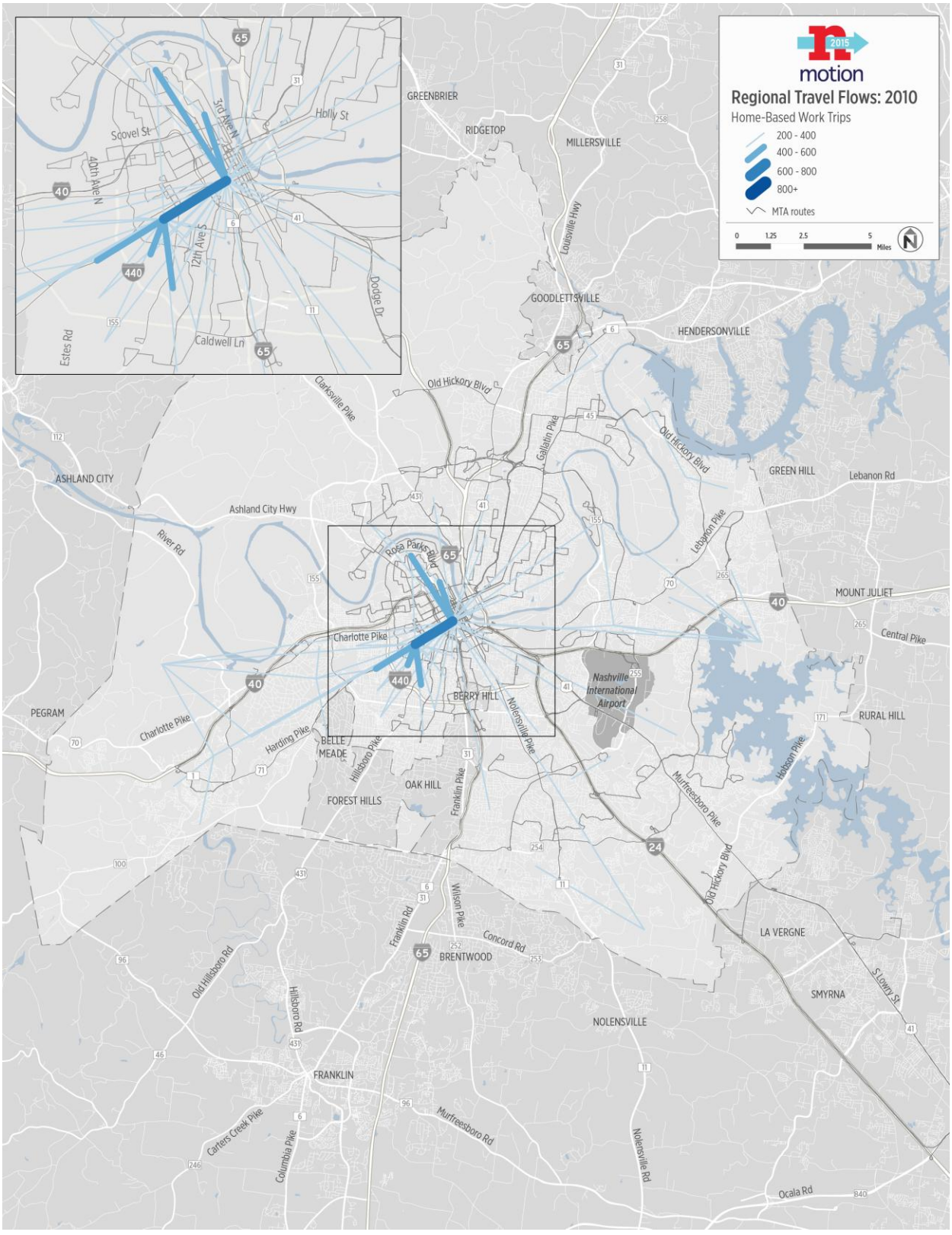


FIGURE 41 2040 TRAVEL FLOWS– ALL TRIP TYPES

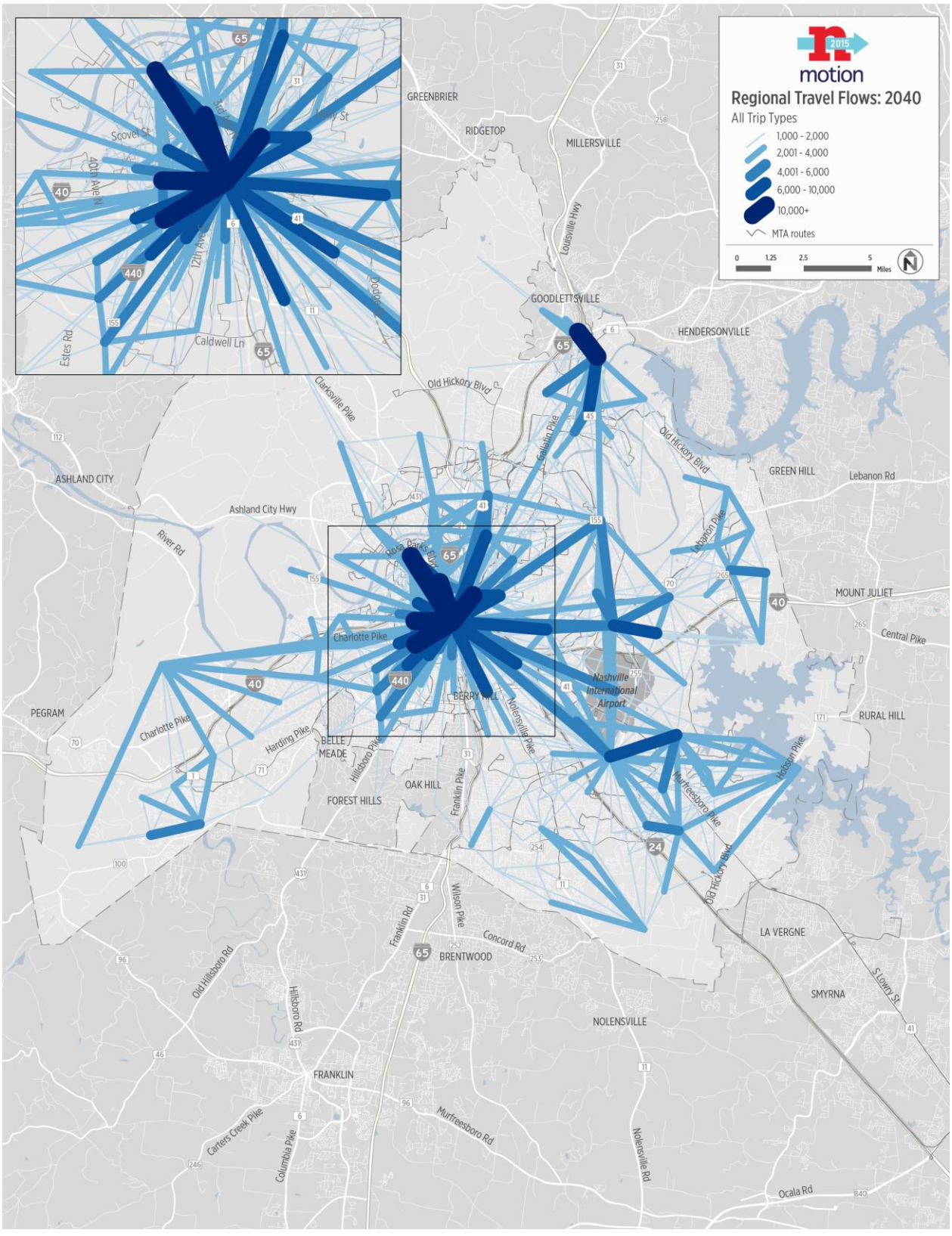


FIGURE 42 2040 TRAVEL FLOWS– WORK TRIPS