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1 Introduction

The Memphis and Shelby County Office of Sustainability, in coordination with a consortium of municipalities, organizations, and stakeholders is in the process of developing a plan, known as the Mid-South Regional Greenprint and Sustainability plan. The study area includes a three-state, four county region that is roughly consistent with the Memphis urbanized area. The region is centered on the City of Memphis and includes Shelby County and Fayette County, Tennessee as well as parts of northern Mississippi (DeSoto County) and eastern Arkansas (Crittenden County). The Greenprint is a wide-reaching effort that is designed to create a regional vision and strategic plan that will strengthen economic growth opportunities and ensure growth is in sync with other regional goals and objectives, including environmental stewardship and equity. A key part of the project is designed to ensure benefits generated by regional growth are accessible to the broader community and distributed equitably across the region.

One of the sub-tasks associated with the Mid-South Regional Greenprint plan is the Bus Transit to Workplace Study. This study is will examine regional employment markets and the corresponding available transportation options to identify strategies for improving the accessibility of the regional job market. The end product for the study will be recommendations for improving the regional multimodal transportation network. Shelby County retained a team of consultants led by Nelson\Nygaard Consulting Associates to conduct the “Bus Transit to Workplace Study”. This study began in July 2013 and is scheduled to be completed by the end of 2013.

This report, a “State of Employment” is one of the first deliverables associated with the overall Bus Transit to Workplace Study. The analysis examines how population and employment are distributed throughout the region and the spatial relationship between the overall population and major employers and major employment areas. The analysis also considers how employment has changed in the region and the extent to which transportation services, especially alternative forms of transportation, such as bicycling, walking, carpooling and vanpooling have adapted to meet the changing employment market. The State of Employment report is designed to be a working document; all materials and findings presented in the report are preliminary and designed to support discussion.

The report is organized into a series of chapters, immediately following this introductory section:

- Chapter 2: Population and Regional Growth
- Chapter 3: Employment
- Chapter 4: Preliminary Case Study: FedEx Sorting Facility
- Chapter 5: Findings and Opportunities
2 REGIONAL GROWTH

Memphis, like cities around the United States originally developed in a fairly confined area centered on the Mississippi River, with neighborhoods spreading to just north, south and east of downtown Memphis. In the mid century, most of the development in Shelby County was located west of Highland Street several blocks east of the Main Street in downtown Memphis. Overtime, however, development moved south and east, as the population increased and people looked for available, developable land. As population moved out of the old municipal boundaries, the City of Memphis likewise expanded its jurisdictional boundaries by annexing much of unincorporated Shelby County. Several suburban cities also incorporated during the latter half of the 20th Century but the City of Memphis jurisdictional area includes about 315 square miles.

Incorporations and annexations have largely ended, but the urbanized area continues to change. The Memphis urbanized area continues to expand east and south as people and business continue to look for low-cost undeveloped “greenfield” land for new housing, buildings and industrial sites. Reasons for regional geographic expansion are complex and varied, ranging from lower cost development opportunities, a historic lack of land use controls, incentives or other rewards for locating in certain areas or districts, real and perceived challenges in local school districts and evolving preferences.

Population

As discussed, the Mid-South Regional Greenprint study area is based on the urbanized Memphis area. The region includes parts of three states (Tennessee, Mississippi and Arkansas), four counties (Shelby and Fayette in Tennessee, Crittenden, Arkansas and DeSoto, Mississippi), and numerous municipalities. The region is defined in many ways by the transportation infrastructure. This historic center of the City of Memphis was located on the bluffs adjacent to the east side of the Mississippi River. Two other important transportation facilities that serve as regional markers are Poplar Avenue and I-240. Poplar Avenue has long been the east-west main access road into downtown Memphis and it continues to be the main commercial corridor in the region. I-240, a more recent construct, is the ring road encircling Memphis. The intersection of Poplar Avenue and I-240 has developed a major hub of activity, most of which is commercial.

While the region is large and encompasses many jurisdictions, historically the City of Memphis has been and continues to be the community’s cultural and economic center. Memphis sits on a bluff next to the Mississippi River, thus the location provides a strategic combination of elevation and proximity to the river. The City of Memphis grew rapidly in the first half of the 20th Century and had a population of some 400,000 in 1950. A period of intense population growth followed, such that by 1970, there were some 625,000 people living in the city. Since the 1970s, however, growth in the city itself has been much more moderate; in 2010, the population is only marginally larger with 650,0001.

While population growth in Memphis slowed, the urbanized area continued to add people, especially in the suburban communities in Shelby County and DeSoto County. Between 1990 and 2000, the region

1 US Census
added nearly 200,000 people, growing by 20% over the ten year period. The region grew by another 10% between 2000 and 2010 to a population of 1.2 million (see Table 1). The vast majority of this growth occurred in DeSoto County, which added just over 90,000 people between 1990 and 2010 and suburban Shelby County, which added more than 70,000 people over the same period. This demonstrates a clear trend of decentralization – the region overall is growing, but with population moving to DeSoto County in northern Mississippi and the suburban communities outside of the Memphis city limits (see also Figure 1).

**TABLE 1 | METROPOLITAN MEMPHIS DISTRIBUTION OF POPULATION BY JURISDICTION**

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>City of Memphis, TN</td>
<td>618,652</td>
<td>650,100</td>
<td>646,889</td>
<td>5.1</td>
<td>-0.5</td>
</tr>
<tr>
<td>Shelby County, TN (Not including Memphis)</td>
<td>207,678</td>
<td>247,372</td>
<td>280,755</td>
<td>19.1</td>
<td>13.5</td>
</tr>
<tr>
<td>Fayette County, TN</td>
<td>25,559</td>
<td>28,806</td>
<td>38,413</td>
<td>12.7</td>
<td>33.4</td>
</tr>
<tr>
<td>Crittenden County, AR</td>
<td>49,939</td>
<td>50,866</td>
<td>50,902</td>
<td>1.9</td>
<td>0.1</td>
</tr>
<tr>
<td>DeSoto County, MS</td>
<td>67,910</td>
<td>107,199</td>
<td>161,252</td>
<td>57.9</td>
<td>50.4</td>
</tr>
<tr>
<td>Region</td>
<td>901,828</td>
<td>1,084,343</td>
<td>1,178,211</td>
<td>20.2</td>
<td>8.7</td>
</tr>
</tbody>
</table>

_Source: US Census_

In addition to trends of population moving south and east regionally, within the City of Memphis and Shelby County, the population is moving away from the older neighborhoods located inside the I-240 loop to neighborhoods outside of the loop in the east, north and southeast (see Table 2). The sub-regions or planning districts with the greatest increase in population include Raleigh-Bartlett, East Memphis, Shelby Farms/Germantown, Collierville and East Shelby County. The sub-regions losing population include Southwest Memphis, North Memphis, Airport, downtown Memphis and Midtown.
TABLE 2 | CHANGE IN POPULATION BY SHELBY COUNTY PLANNING DISTRICTS
Travel Patterns

As discussed, Shelby County and the surrounding area originally developed around the City of Memphis. Initially much of the economic activity centered around downtown Memphis and Poplar Avenue, thus much of the travel patterns radiated to/from these locations. As the region decentralized and population, jobs and economic activity decentralized, travel patterns likewise decentralized. The current travel patterns for all trips in the region, as depicted by the Urbanized Memphis Metropolitan Planning Organization’s 2010 Travel Demand Model, demonstrate the importance of East Memphis and Germantown as places where people are traveling to and from (see Figure 2). This data also highlights strong demand for transportation between several places, including to and from neighborhoods within the City of Memphis (Midtown/Depot, Hickory Hill, Southwest Memphis, and East Memphis) and areas just outside of the city boundaries, especially Germantown/Shelby Farms and Raleigh/Bartlett.

Travel flow data shows the importance of the Germantown/Shelby Farms area. Of particular interest is the strong demand for travel to and from Germantown/Shelby Farms from neighborhoods within the City of Memphis (Hickory Hill and East Memphis) as well as neighborhoods outside of the city boundaries (Raleigh/Bartlett, Northeast Shelby County and Collierville). Some of these origin and destination travel pairs have transit service, although with the exception of the Poplar Avenue corridor most travel pairs are not well connected by existing transit service. In addition, even areas within the City of Memphis, some of the cross-town travel demands, such as travel between Hickory Hill, Airport and Southwest Memphis are not currently well connected by transit services.

Other important travel demands include travel within DeSoto County (West DeSoto County and East DeSoto County) as well as travel from DeSoto County to Hickory Hill and Southwest Memphis. These travel flows are also not currently served by public transportation.

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*Data was not available for Crittenden County Arkansas*
Decentralization and Income

Generally speaking, newer suburban communities tend to be wealthier as compared with the urban core. This trend tends to be true nationally and reflects a wide variety of factors. As part of understanding the accessibility of jobs in the Memphis urbanized area, therefore, we also broadly considered how per capita incomes have changed over time for each of the sub areas for which data was available and compared these with income growth overall in the United States as a whole (see Table 3). The study used per capita income as a proxy for wealth and data shown is in current dollars, not adjusted for inflation. Thus the analysis does not consider the purchasing power of the income, only the amount.

As compared with the rest of the United States, in 1990, individuals living in the Memphis urbanized area had considerably less income as compared to the national average. While the gap varied by jurisdiction, per capita income in each of the jurisdictions was below the national average. Over time, some communities, namely DeSoto and Fayette Counties sufficiently increased per capita income to be more in line with the national average.

In 1990, for example, per capita income in Fayette County was 33% below the national average; by 2010 it was 1% higher. Likewise, per capita incomes in DeSoto County were 13% below in the national average in 1990 and in 2010 had narrowed the gap to 8%. Data for the other three areas – the City of Memphis, Shelby County and Crittenden County show that per capita income has remained about 20%, 7% and 30% below the national average respectively (see Table 4).

It is also worth noting that Shelby County data includes the City of Memphis, thus the incomes of individuals living in Shelby County but outside of the Memphis city limits are likely significantly higher incomes that shown by the data. Thus the data shows that as population and employment moved out of the City of Memphis, those communities generally became wealthier, both relative to the region overall and as compared with the national average.

### TABLE 3 | MEMPHIS URBANIZED AREA – PER CAPITA INCOME, 1990 - 2010

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>City of Memphis, TN</td>
<td>$11,687</td>
<td>$17,838</td>
<td>$21,007</td>
<td>52.6%</td>
<td>17.8%</td>
</tr>
<tr>
<td>Shelby County, TN (Including Memphis)</td>
<td>$13,330</td>
<td>$20,856</td>
<td>$25,002</td>
<td>56.5%</td>
<td>19.9%</td>
</tr>
<tr>
<td>Fayette County, TN</td>
<td>$9,627</td>
<td>$17,969</td>
<td>$26,898</td>
<td>86.7%</td>
<td>49.7%</td>
</tr>
<tr>
<td>Crittenden County, AR</td>
<td>$9,334</td>
<td>$14,424</td>
<td>$18,241</td>
<td>54.5%</td>
<td>26.5%</td>
</tr>
<tr>
<td>DeSoto County, MS</td>
<td>$12,509</td>
<td>$20,468</td>
<td>$24,531</td>
<td>63.6%</td>
<td>19.9%</td>
</tr>
<tr>
<td>National average</td>
<td>$14,387</td>
<td>$22,346</td>
<td>$26,558</td>
<td>55.3%</td>
<td>18.8%</td>
</tr>
</tbody>
</table>

Source: US Census

### TABLE 4 | MEMPHIS REGION DIFFERENCE BETWEEN LOCAL AND NATIONAL PER CAPITA INCOME, 1990 – 2010

<table>
<thead>
<tr>
<th></th>
<th>1990</th>
<th>2000</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>City of Memphis, TN</td>
<td>(19%)</td>
<td>(20%)</td>
<td>(21%)</td>
</tr>
<tr>
<td>Shelby County, TN (Including Memphis)</td>
<td>(7%)</td>
<td>(7%)</td>
<td>(6%)</td>
</tr>
<tr>
<td>Fayette County, TN</td>
<td>(33%)</td>
<td>(20%)</td>
<td>+1%</td>
</tr>
<tr>
<td>Crittenden County, AR</td>
<td>(35%)</td>
<td>(35%)</td>
<td>(31%)</td>
</tr>
<tr>
<td>DeSoto County, MS</td>
<td>(13%)</td>
<td>(8%)</td>
<td>(8%)</td>
</tr>
</tbody>
</table>

Source: US Census
Transportation Investments

The movement of housing and jobs away from a central core to outlying and suburban communities requires a parallel investment in a wide variety of infrastructure in services such as sewer, water, and schools but also transportation. For people to be able to live and/or work in outlying areas, they need a way to get to/from these locations. Generally speaking, in the Memphis urban area, nearly all of resources invested in the transportation network were made to facilitate the movement of goods or travel by automobile. Thus, as the region developed new roadways, or widened existing ones, investments were nearly solely focused on building and expanding roads. As a result, some of the region’s primary commercial corridors, including Germantown, Goodman, and Stage Roads, as well as the eastern end of Poplar Corridor were developed without any, or only minimal pedestrian infrastructure.

Pedestrian infrastructure and transit service are closely related; nearly every transit rider, including people traveling by bus or rail, walk to or from transit for at least one part of their trip. Another factor that makes transit successful is density – large numbers of people and jobs concentrated around corridors mean there is large market for people to walk to and from the transit line. For the most part, development – including housing but also retail and industrial employment, were built with the assumption that people would exclusively travel to them by automobile. As a result, new buildings were built with very large parking lots and long setbacks from the road meaning that anyone walking from the road to the front door of a business or job site would have to walk long distances. Consequently, the combination of development patterns and minimal or no adequate pedestrian facilities, such as sidewalks and crosswalks, makes it very difficult for transit to be successful.

Another challenging factor for the alternative transportation network is regional funding of transit service. Currently, the region has only one transit operator, the Memphis Area Transportation Authority (MATA). MATA is a local service that primarily operates within the boundaries of the City of Memphis. While MATA is funded by a combination of passenger fares, federal and state funds, all of the funding provided locally is allocated by the City of Memphis. This means that MATA is not funded, and consequently not fully authorized, to provide service to the outlying areas, even as more jobs and population move to these areas. While MATA has historically provided some limited transit services to areas outside of the municipal boundaries with large amounts of employment or services, generally speaking there is no transit service outside of the City of Memphis. Consequently, transit is not an option for an increasingly large share of the region’s population or employment.

Economic Impacts

The impact of limited transportation choices creates a significant financial burden on travelers, especially for low income workers, who may or may not have access to reliable private transportation or who may be challenged to pay the cost of transportation. Currently, the AAA estimates the average cost of owning and operating an automobile at roughly $9,000 per year based on a per mile cost of $0.596 per mile and an individual driving 15,000 miles a year3. These costs are average and reflect a ‘basic sedan’ some vehicles will be less expensive to operate while others will be more (see Table 5). Given per capita incomes ranging between $20,000 and $27,000, this means that on average, individuals may spend 30% to 45% on vehicle costs. While the cost of owning and operating a vehicle is high, it also clear that the cost of vehicle ownership is increasing, thus the proportion of income all workers, but especially low income workers spend on vehicle ownership is likewise increasing.

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3 AAA Your Driving Costs Study, 2012
Transportation costs are largely driven by the cost of owning a private vehicle, but the marginal cost of the amount of travel (i.e. mileage) also affect costs. These costs include fuel as well as wear and tear on the vehicle. Because these costs depend on how much a vehicle is driven, they vary by location. People living in downtown Memphis, for example, have lower transportation costs as compared with people living in the periphery of the study area (see Figure 3). For example, households and individuals living in the outlying areas such as Millington, Fayette County and the southern portions of DeSoto County are, on average, approximately $1,500 per month, which is nearly twice as expensive as the average monthly transportation costs incurred by people living in Memphis (estimated at about $800 per month).

**TABLE 5 | COST OF OWNING A VEHICLE (2010 – 2013) AS REPORTED BY AAA AND BASED ON “AVERAGE SEDAN”**
Housing costs are also an important factor in access to employment. Housing is typically accounts for the largest single expenditure for individuals and households; transportation is often the second or third largest expenditure. The impact of combined transportation and housing costs underscores the financial challenges facing low and medium income individuals and households. As discussed, the cost of owning a single vehicle can be as high as $9,000 per year, or about $750 per month. Average apartment rental prices in the City of Memphis for a two bedroom apartment are estimated to be between $600 and $700 per month4. This means, on average, individuals living in Memphis spend approximately $1,500 per month on housing and transportation costs combined, or about $18,000 annually. Given per capita income for Memphis and much of the study area, ranges between $18,000 and $24,000, many people could spend nearly their entire incomes on housing and transportation. Unlike housing costs, transportation costs could be reduced through the use of public transit or other shared ride programs, such as carpools and vanpools.

Housing and transportation costs are intertwined with regional decentralization. In urban areas around the country, including the Memphis area, people move to suburban areas for a variety of reasons, including in search of lower housing costs. The profile of housing costs in Memphis is such that housing costs are lowest in the center of the urbanized area, get higher in areas to the east of the City of Memphis, and then start to decrease again in outer most areas (see Figure 4). While areas located further on the fringe of the region have somewhat lower housing costs, when transportation costs are combined, these areas are considerably less affordable (see Figure 5).

Housing and transportation costs shown in Figures 4 and 5 highlight two important findings – although many people move to suburban locations in search of lower cost housing, when transportation costs are taken into consideration, the increased transportation costs often outweigh savings associated with lower housing costs. In addition, the combined costs of transportation and housing mean many people spend as between more than half and as much as 70% of their incomes on these two expenditures. Furthermore, because people living in the outlying areas must rely almost exclusively on travel by private vehicle, there are few opportunities to reduce transportation costs by using alternative transportation modes.

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4 Rentrange.com
FIGURE 4 – MEDIAN MONTHLY HOUSING COSTS (2012)

Housing Costs
Average Median Monthly Housing Costs

≤$500 $1,750 ≥$3,000

Data: Census TIGER, Census LEHD 2004 & 2011, FedEx, Census ACS 2006-2011, Greater Memphis Chamber
Memphis Area Transit Authority

0 1 5 10 Miles
FIGURE 5 – HOUSING AND TRANSPORTATION COSTS AS PROPORTION OF MEDIAN MONTHLY INCOME (2012)
3 EMPLOYMENT

The Memphis urbanized area has a diverse and dynamic economy that developed out of a strategic location along the Mississippi River. Historically the Mississippi River was an essential arterial for moving people and goods; it is still a major transportation facility and Memphis continues to be a major inland hub and distribution center. More recently, the region has built on its historic role as a logistics and distribution hub to become an intermodal hub with river, rail, road and air access. FedEx's headquarters and FedEx use of the Memphis International Airport (MIA) as its primary hub has made MIA the busiest cargo airport in the U.S. The airport and area immediately surround the airport, branded as the Aerotropolis, is largest economic driver in the State of Tennessee, responsible for nearly $30 billion in economic impact annually.

In addition to the logistics and distribution, Memphis also has an emerging healthcare and medical services industry. There are currently has over 19 hospitals including St. Jude’s Children’s Research Hospital, which is renowned nationally for research and treatment of pediatric cancer and other catastrophic childhood diseases. Other key industries in the Memphis area include education, government and tourism. The education sector includes a wide range of tertiary institutions, some of the most well known of which include the University of Memphis, the University of Tennessee Health Science Center, Christian Brothers University, the LeMoyne-Owen College and Rhodes College. Tourism is part of the local economy in Shelby County but also an important regional sector, especially in northern Mississippi. The Tunica Resorts, located 30 miles south of the City of Memphis is the third largest gaming area in the United States, after Las Vegas and Atlantic City. Tunica Resorts attracts over 12 million visitors annually.

An important consideration for this effort is how employment is dispersed geographically throughout the region. Like population, employment is following a pattern of decentralization and suburbanization. The City of Memphis still has the largest number of jobs in the metropolitan area, and combined with Shelby County accounts for 87% of all jobs in the region. This pattern is likely to continue, especially given that the Memphis International Airport plays such a significant role in the regional economy. At the same time, however, job growth is largely occurring outside of the I-240 loop, at locating at the fringe of the region (see Table 6).

TABLE 6 | METROPOLITAN MEMPHIS DISTRIBUTION OF EMPLOYMENT BY JURISDICTION

<table>
<thead>
<tr>
<th>Jurisdiction</th>
<th>2005 Employment</th>
<th>2010 Employment</th>
<th>Change 2005 - 2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>City of Memphis, TN</td>
<td>76.4 %</td>
<td>74.1 %</td>
<td>-2.3 %</td>
</tr>
<tr>
<td>Shelby County, TN (Not including Memphis)</td>
<td>12.0 %</td>
<td>12.7 %</td>
<td>0.7 %</td>
</tr>
<tr>
<td>Fayette County, TN</td>
<td>1.2 %</td>
<td>1.3 %</td>
<td>0.1 %</td>
</tr>
<tr>
<td>Crittenden County, AR</td>
<td>3.0 %</td>
<td>3.2 %</td>
<td>0.2 %</td>
</tr>
<tr>
<td>DeSoto County, MS</td>
<td>7.5 %</td>
<td>8.7 %</td>
<td>1.2 %</td>
</tr>
</tbody>
</table>

Source: US Census
In addition to looking at the summarized distribution of employment, the study team also mapped changes in employment by plotting green dots for each 20 jobs gained and red dots for 20 jobs lost, with dots randomly assigned to census blocks (see Figure 6). The data shows downtown and Midtown Memphis has both lost and gained jobs, while much of the area inside the 240 loop has lost jobs. There is a clear pattern of job gains right along parts of the 240 loop as well as Germantown Road, Collierville and in DeSoto County. Most job growth is clustered around major transportation facilities, largely I-240, but also Poplar Avenue, Lamar Avenue/US-4, Germantown Road, and I-40.
FIGURE 6 – MEMPHIS URBAN AREA: CHANGE IN EMPLOYMENT

Job Growth
jobs gained or lost by Census Block between 2004–2011

- Jobs Gained
- Jobs Lost

MATA Weekday Transit Service Level
low  high

Data: Census TIGER, Census LEHD 2004 & 2011, FedEx, Census ACS 2006-2011, Greater Memphis Chamber Memphis Area Transit Authority
Employment Density

To illustrate the distribution of jobs throughout the study area, the study team compiled the U.S. Census Longitudinal Employer-Household Dynamics (LEHD) program’s data of jobs by location within Census blocks into a dot density map, shown in Figure 7. Though there are limitations of LEHD data such as headquartering and the absence of some rare classes of employment, the Census Bureau has worked to remedy these limitations and now the data typically represents over 90% of all employees accurately.5

MATA fixed-route transit service (current to the Fall, 2013) is also shown on the map. MATA routes are all shown as grey lines, but the number of weekday trips is shown in varying levels of thickness to indicate the level of service on the roadway (see inset that illustrates how frequency of service on the MATA transit routes is shown by varying the thickness of the line). Overlaying the transit service level on top of the distribution of employment shows the interaction between jobs and transit service.

This data shows the largest clusters of employment are in and around:

- The Memphis International Airport (the Aerotropolis)
- Downtown and Midtown Memphis
- The intersection of Poplar Avenue and I-240
- Germantown Road
- Bartlett and the intersection of Germantown and Stage Roads
- The area south and east of the airport
- Southaven/Horn Lake
- There are also smaller clusters exist in West Memphis, Olive Branch, and Hernando.

Some of these employment clusters are well-served by a high level of transit service, primarily downtown Memphis, midtown Memphis, along Poplar Road and Bartlett. Some areas have very low levels of transit service, such as the Airport and southeast Memphis and several have no fixed-route service at all, including Millington, Arlington, Collierville, and all of DeSoto County.

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5 NCHRP 08-36, Task 098 Improving Employment Data for Transportation Planning, AASHTO. September 2011.
FIGURE 7 – EMPLOYMENT IN MEMPHIS URBANIZED AREA, 2010

All Jobs
all jobs by Census block (2011)

Jobs (each dot = 20 jobs)

MATA Weekday Transit Service Level

Data: Census TIGER, Census LEHD 2004 & 2011, FedEx, Census ACS 2006-2011, Greater Memphis Chamber Memphis Area Transit Authority
Major Employers

The size and distribution of major employers is a significant component of understanding the local employment market. By definition, major employers employ large numbers of employees at singular locations. In addition, major employers themselves tend to cluster together and create larger areas of significant employment. Using data from the Greater Memphis Chamber, the region’s largest 100 employers was plotted with varying circle sizes to indicate employee counts (see Figure 8).

Not surprising, the major employer data correlates closely with the employment density (see Figure 6) with a few exceptions. Most major employers are located in Memphis, particularly downtown, around the airport, with a handful scattered throughout southeast and eastern Memphis. None of the region’s largest employers are located in northern Memphis, Arkansas or Mississippi.

The study area’s largest employer is FedEx, which employs 30,000 people. FedEx has multiple work sites in the study area, including its world headquarters just south of Germantown, and its global SuperHub at the airport, with approximately 11,000 of these employees work at the SuperHub.

- Other major employers, include Methodist Le Bonheur Healthcare (8,700 employees), Wal-Mart Stores (6,000 employees), and First Tennessee Bank (4,000 employees). Although shown as a single location, in each of these cases, in actuality employees are located across multiple sites.
- 12 of the region’s 100 largest employers are located in the vicinity of the Poplar/I-240 intersection. Combined, these 12 employers employ approximately 20,000 workers.
- There are a number of major employers in southeast Memphis, but they are widely dispersed and not clustered in close proximity to each other.
- Outside of downtown and Midtown Memphis, there are relatively few major employers located inside the I-240 loop.

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6 Note the employee count may indicate the count of employees also at other firm locations, an acknowledged drawback of the data known as “headquartering.” This includes FedEx, which is shown as a single location at the airport, even though employees are assigned to multiple locations.
FIGURE 8 – 100 LARGEST REGIONAL EMPLOYERS IN MEMPHIS URBANIZED AREA, 2010

Largest Employers
the 100 top employers in greater Memphis

Employees: 430
MATA Weekday Transit Service Level: low to high

Data: Census TIGER, Census LEHD 2004 & 2011, FedEx, Census ACS 2006-2011, Greater Memphis Chamber, Memphis Area Transit Authority
Jobs by Type and Pay

Of key interest to this effort is not only the location of employment, but the spatial distribution of both different types of jobs and the pay range associated with these jobs. The distribution and location of different job types was analyzed by using employment data reported by the U.S. Census uses the North American Industry Classification System (NAICS), system to classify employment. The study team compiled the major employment classifications in the Memphis Urbanized area for the 20 largest employment classifications and compiled together with the number of employees by sector and average annual wage (see Table 7). The largest employment sector in the Memphis urbanized area is health care and social assistance, which employees some 75,800 people in the region. This sector has an average annual wage of approximately $43,000, which is considerably higher than the average per capita income. The next two largest sectors, on the other hand, retail and accommodation and food services employ a lot of people (58,900 in retail and 55,700 in accommodation and food services) but offer considerably lower average wages of approximately $24,600 and $16,300, respectively. The highest wage sectors, management of companies and enterprises and finance and insurance, have relatively jobs, with 29,300 and 20,900 employees respectively.

TABLE 7 | EMPLOYMENT BY TYPE WITHIN THE MEMPHIS METROPOLITAN STATISTICAL AREA

<table>
<thead>
<tr>
<th>Firm Class (sorted by employee count)</th>
<th>Employees</th>
<th>Avg Annual Wage</th>
<th>General Class for Map</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health care and social assistance</td>
<td>75,844</td>
<td>$43,081</td>
<td>Healthcare</td>
</tr>
<tr>
<td>Retail trade</td>
<td>58,872</td>
<td>$24,656</td>
<td>Retail &amp; Hospitality</td>
</tr>
<tr>
<td>Accommodation and food services</td>
<td>55,676</td>
<td>$16,269</td>
<td>Retail &amp; Hospitality</td>
</tr>
<tr>
<td>Transportation and warehousing</td>
<td>54,619</td>
<td>$38,640</td>
<td>Industrial</td>
</tr>
<tr>
<td>Administrative, support, waste management, remediation services</td>
<td>47,165</td>
<td>$25,839</td>
<td>Other Services</td>
</tr>
<tr>
<td>Wholesale trade</td>
<td>35,710</td>
<td>$55,361</td>
<td>Industrial</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>35,420</td>
<td>$49,307</td>
<td>Industrial</td>
</tr>
<tr>
<td>Management of companies and enterprises</td>
<td>29,310</td>
<td>$98,692</td>
<td>FIRE (finance, insurance, real est.)</td>
</tr>
<tr>
<td>Other services (except public administration)</td>
<td>24,890</td>
<td>$25,706</td>
<td>Other Services</td>
</tr>
<tr>
<td>Finance and insurance</td>
<td>20,912</td>
<td>$87,502</td>
<td>FIRE (finance, insurance, real est.)</td>
</tr>
<tr>
<td>Construction</td>
<td>19,669</td>
<td>$41,971</td>
<td>Industrial</td>
</tr>
<tr>
<td>Professional, scientific, and technical services</td>
<td>18,817</td>
<td>$52,112</td>
<td>Professional/Educational Services</td>
</tr>
<tr>
<td>Educational services</td>
<td>11,293</td>
<td>$31,208</td>
<td>Professional/Educational Services</td>
</tr>
<tr>
<td>Real estate and rental and leasing</td>
<td>7,085</td>
<td>$38,794</td>
<td>FIRE (finance, insurance, real est.)</td>
</tr>
<tr>
<td>Information</td>
<td>6,535</td>
<td>$47,791</td>
<td>Professional/Educational Services</td>
</tr>
<tr>
<td>Arts, entertainment, and recreation</td>
<td>6,438</td>
<td>$29,613</td>
<td>Professional/Educational Services</td>
</tr>
<tr>
<td>Utilities</td>
<td>398</td>
<td>$58,186</td>
<td>Industrial</td>
</tr>
<tr>
<td>Industries not classified</td>
<td>70</td>
<td>$10,429</td>
<td>--</td>
</tr>
<tr>
<td>Agriculture, forestry, fishing and hunting</td>
<td>0</td>
<td>$--</td>
<td>--</td>
</tr>
<tr>
<td>Mining, quarrying, and oil and gas extraction</td>
<td>0</td>
<td>$--</td>
<td>--</td>
</tr>
</tbody>
</table>

Source: U.S. Census, LEHD 2011. Note public sector employment is omitted because it was not available in the LEHD dataset.

The 20 classes of employment were also combined into six broader classifications of employment and mapped in Figure 9. This data shows that healthcare jobs, as expected, cluster around the medical centers in Memphis and high paying jobs in finance, insurance and real estate are clustered in downtown Memphis, at the Poplar/ I-240 intersection, along Germantown Road, and along Sam Cooper Boulevard and I-40. Lower paying jobs in retail trades are found along Germantown Road, Poplar Avenue and in Collierville and DeSoto County.

7 Data does not include public sector employment.
Jobs by Pay Range

Taking a closer look at the location of jobs with lower pay ranges, jobs with annual income less than $15,000, between $15,000 and $40,000, and greater than $40,000 were plotted in Figure 6. Overall, low income jobs track well with the distribution of all jobs (see Figure 10), but several trends are apparent:

- While there are numerous clusters of low income jobs throughout the study area such as at the airport, southeast Memphis, downtown Memphis, and Bartlett, these clusters are home to large numbers of jobs of all income ranges. Thus, there aren’t obvious areas where low income jobs are overrepresented.

- There are areas where low income jobs appear to be underrepresented. There are few low income jobs shown in Arlington and President’s Island. These areas are home to small clusters of jobs as indicated in Figure 1, so these jobs must be higher income jobs.

- Some significant clusters of low income jobs are well-served by fixed route transit service. These include the airport, Poplar Avenue in the vicinity of I-240, downtown Memphis, and Midtown Memphis. While these jobs themselves may be served by a relatively high level of transit service, the workers’ homes may not be well served or directly connected to these jobs.

- Some significant clusters of low income jobs are not well-served by fixed route transit service. These include Germantown Road, Stage Road, West Memphis, and Southeast Memphis. These clusters have very limited transit service, so transit is typically an unrealistic option for travel to work.

- Some significant clusters of low income jobs are not served by fixed route transit service at all. These clusters include Olive Branch, Southaven, Hernando, and Collierville. These employees’ only option of getting to work is driving.
4  PRELIMINARY CASE STUDY – FEDEX

One of the longer term goals of the Bus Transit to Workplace (“Bus Transit”) study is to identify specific strategies that will help improve the accessibility of employment. In particular, the Bus Transit study will look at where employees live relative to their job site. Although the information is static, representing only a single point in time, generally speaking patterns are expected to remain constant. By looking at the residential data in conjunction with employment locations, we are able to see exactly where people need to go. While still preliminary, a case study is included here as an illustration of both the challenges and opportunities associated with retrofitting an automobile oriented development pattern and create multimodal transportation choices.

The study team received a set of employee addresses for individuals working at the FedEx sorting facility on Democrat Road. These addresses were randomized within Census blocks to preserve privacy but still show enough detail to understand transportation demand (Figure 11). Employee addresses were also color-coded for the sorting center’s two main shifts: the day shift from 8 AM to 5 PM (colored as orange) and the night shift from 11 PM to 4 AM (colored purple).

As shown, relatively large number of the people working at the sorting facility live close by, especially in the areas to the east/southeast, west/southwest and north of the FedEx sorting facility. There is also no apparent difference between the residences of employees working during the day and those working at night. As a result, transportation options that work for the daytime employees should also work for people working the night shift.

In terms of available transportation, Democrat Road is large roadway with two lanes of traffic in each direction, no sidewalks and no crosswalks or pedestrian signals to help people cross the street. There are a large number of parking lots along the roadway, especially due to the recent relocation of the rental car facilities from Democrat Road to the airport. The main entrance to the FedEx facility, however, is located close to Democrat Road and easily accessible from the street for people traveling east. People traveling from the west and potentially being dropped off on the west side of the road, would need to cross the street without a crosswalk or way to stop traffic.

There are a handful of MATA bus routes that operate along Democrat Road and some of which have a stop directly in front FedEx’s main Democrat Road facility, including:

- **Route 2 Madison** operates between downtown Memphis and the airport via East Parkway and Airways and includes service to small portion of Democrat Road en route to the Airways Terminal and the Memphis International Airport. A rider would need to walk roughly 1.6 miles to the entrance of the FedEx sorting facility on a road with no sidewalks or crosswalks and fairly substantial truck traffic.
  
  Route 2 offers service roughly every 30 minutes during the morning and afternoon commute times and 45 minutes during the middle of the day and evening. The route operates roughly between 5:45 AM and 11:15 PM.

- **Route 30 Brooks** operates between the intersection of Third Avenue and Brooks to the Oak Court Mall via Democrat Avenue, the American Way Terminal and Perkins Road. The bus stops directly in front of the FedEx facility. There are a total of 15 trips a day, most of which are
clustered around the morning and afternoon commute times. The route operates roughly between 5:45 AM and 6:00 PM.

- **Route 4 Walker** offers nighttime service between downtown Memphis, operating along Democrat Road and to the Airport. There are five trips between 7:15 PM and 11:15 PM that depart hourly from the North End Terminal and downtown Memphis. The bus stops in front of the FedEx sorting facility.

- **Route 32** provides a north-south connection through central Memphis along Hollywood Road and Airways Boulevard to the Airways Terminal. The route departs nearly every 30 minutes throughout the day (between 5:45 AM and 10:30 PM). There are also five trips on the schedule that travel off the main route to stop in front of the FedEx sorting facility (7:23 AM, 9:01 AM, 10:39 AM, 12:17 PM, 1:55 PM, 3:33 PM and 5:11 PM).

To illustrate how effective the existing bus service may be for workers, the study team identified three hypothetical employees placed in various locations and examined their travel options for travel to and from work were assessed:

Employee A lives on Graves Road, just south of Brooks Road, about 5 miles from work. **Transit would be a realistic option for day shifts**, as Route 30 directly connects the work site and the home. Route 30’s frequency of service is relatively low, so the employee would have to allow about an hour of travel time on both ends of the trip. Driving would still be a more attractive option, however, as the employee would only have to allow about 15 minutes to drive to or from work. **Transit would not be a realistic option for night shifts**, however, as Route 30’s service (6 AM – 6 PM) span isn’t adequate and travel by transit would require significant walking, multiple transfers on alternative routes, and upwards of 2 hours travel time each way.

Employee B lives on Cottonwood Road at Castleman Street, also about 5 miles from work. **Transit would be a realistic, though not ideal, option for day shifts**, as the employee would have to take two routes (36 and 30) and transfer at the American Way Transit Center. Because of the service levels on both routes and the need to transfer, the employee would have to allow just under an hour of travel time on both ends of the trip. Driving would be a more attractive option, as the employee would only have to allow about 15 minutes to drive to or from work. **Transit would not be a realistic option for night shifts**, however, as Route 30 and 36’s service span aren’t adequate and travel by transit would require travelling downtown on alternate routes to make a transfer at the North End Terminal and 2 to 3 hours of travel time each way.

Employee C lives on Raleigh Lagrange Road at Battle Creek Drive, about 17 miles from work. **Transit would not be a realistic option for day shifts or night shifts**. Day shifts would require about 1.5 hours of travel time to work and 3 hours travel time from work, including multiple transfers and significant walking on the home end. Night shifts would require 3-4 hours of travel time to and from work, with multiple transfers and connections at the North End Terminal (NET), in addition to significant walking on the home end. Driving is a much more attractive option, requiring just 20 minutes of travel time on both ends.

This example illustrates the mismatch between employees, employers and the alternative transportation network:

- One of the largest regional employers, FedEx has a large number of jobs at a single location 3131 Democrat Road.

- Democrat Road is a low density corridor, with no sidewalks, no crosswalks and has fairly heavy truck traffic. It is not a comfortable environment for people who may wish to walk along the roadway or wait for a bus and there is no clear way to cross the street.

- Other than the FedEx facility, Democrat Road is very sparsely populated. There are large parking lots on one hand and an enclosed FedEx facility on the other hand. Unless the bus service is serving the FedEx facility or using Democrat Road as the most direct path to another destination, there is little demand for bus service along Democrat Road.

To serve workers traveling to/from the night shift special service would need to be designed. Other potential opportunities include:
- Designate bike routes between adjacent neighborhoods and the airport. The travel distances are relatively short making cycling a reasonable option for people traveling to the day shift, if a safe route can be designated. Bike routes may also be supported with bike facilities, such as lockers for people to store their bikes while at work.

- Install a crosswalk in front of the FedEx facility with a pedestrian activated signal so people can cross the street.

- Build a bus pull-out location and shelter near the entrance of the FedEx facility, on both sides of the road. The bus pull-outs will allow MATA vehicles to pull out of traffic when they are picking-up and dropping-off passengers. Shelters will make it clear where people should go to get the bus and provide shelter while people wait. If the stops are going to be used for night shift workers, they should also offer lighting.

- Orient existing bus service around specific FedEx shift time, 8 AM to 5 PM (day shift) and 11 PM to 4 AM (night shift). The day shift is well timed with the MATA network overall; bus service is most frequent at the start and end times, thus transfers with other services should be more convenient and support access for most parts of the city to FedEx. There are few other MATA bus services operating at 11 PM and no service available at 4 AM.

- Operate community shuttles from neighborhoods east and west of the airport could be designed to bring workers from the neighborhoods directly to the FedEx facility. Most of the workers live in fairly close proximity to Democrat Road, thus shuttles could provide fairly fast and direct service.

- Operate shuttles from MATA bus hubs at Airways and American Way. Significantly more bus service connects riders to the MATA hubs at Airways and American Way. These hubs are located close but not within walking distance to FedEx/Democrat Road. Shuttle service could connect these facilities at key times to connect the broader MATA network with this employer.
FIGURE 11 – DISTRIBUTION OF EMPLOYEES WORKING AT FEDEX SORTING FACILITY BY SHIFT

FedEx Employee Distribution
employee homes randomized within Census blocks

Night Shift  Day Shift

MATA Weekday Transit Service Level  low  high

Data: Census TIGER, Census LEHD 2004 & 2011, FedEx, Census ACS 2006-2011, Greater Memphis Chamber Memphis Area Transit Authority
5 FINDINGS

The Memphis urbanized area is following a development pattern of decentralization and suburbanization, such that in 2010, about half of the regional population and about 25% of the regional employment are located outside of the major regional city, the City of Memphis. This pattern is particularly remarkable because the City of Memphis covers a large area, thus as compared with other urbanized areas in the United States, Memphis is more sprawled and less centralized. The pattern of decentralization and suburbanization means many people must travel longer distances to get to/from employment. In the case of the Memphis urbanized area, MATA is the region’s only public transportation operator and MATA is funded locally, thus operates largely only provides service within the City of Memphis. Consequently, much of the region’s population and a considerable number of jobs are only accessible by automobile.

The challenge facing the Memphis area and the Mid-South Regional Greenprint plan is how to ensure regional growth is accessible to the broadest portion of the population possible. The purpose of the Bus Transit to Workplace Study, as discussed, is to identify strategies to increase the accessibility to more employment markets for more people.

The challenge is considerable. Decentralization has not only dispersed people and jobs over a large area, it has also reduced the level of densification. The lack of density has real implications for public infrastructure, including transportation because lower density automobile oriented communities very difficult to access without a vehicle. It is difficult for transit to serve these areas because there are no enough jobs or population located along key corridors so that transit service can operate with sufficiently frequent service so that the service is considered convenient, or in some cases, a realistic option. At the same time, the cost of travel to/from these locations is significant and in many cases, can be prohibitively expensive for people with lower incomes.

Despite challenges, there are several findings that suggest there are opportunities to diversify transportation options and strengthen existing ones:

- **Most large employers are located in Memphis, with varying degrees of access to transit.** The City of Memphis is home to the overwhelming majority of the area’s top employers, with several large employers located in downtown and Midtown Memphis. These areas are well served by transit.

- **Healthcare jobs are the largest type of job and are highly clustered in select areas, many with good transit service.** The healthcare sector is the largest sector of employment in the study area, and these jobs tend to cluster around medical centers and medical office parks. Some of the most significant clusters of healthcare employment in Midtown Memphis and around St. Jude’s Hospital, are located in urban areas that are well-served with transit service. Other clusters, such as Baptist East and in West Memphis, are located in suburban areas that do not support or have good transit service.

- **The region’s largest economic engine, the Aerotropolis, is also located inside the City of Memphis.** The airport area is home to the largest cluster of jobs in the area. The surrounding area, especially areas to the east and west of the Airport also have a large amount of population, including people who work at the airport. Although the airport does not currently
have good transit access and the area is not especially transit oriented, there may be opportunities to make relatively minor changes to transit service to better serve employment, or offer slightly different types of transit services, such as community shuttles or flex service to increase access between areas. Given the short distances there may also be opportunities to create safe bicycle routes between adjacent neighborhoods and airport employers.

- **Another large cluster of jobs and major employers is located at the intersection of Poplar and I-240.** Poplar Avenue has excellent transit service, but there are challenges with the land form (no sidewalks or crosswalks, large parking lots, etc.) around the office parks just east of I-240. However, there may be opportunities to extend transit service slightly and/or offer transit demand management strategies to provide “last mile” connections between the end of the transit line and the front door of the employers.

- **Accessing jobs in the Germantown Road and Wolfchase Mall have some transit service but face similar challenges as the Poplar/240 area.** There may be opportunities to make minor adjustments to transit service and/or look to carpools and vanpools to offer transportation alternatives.

- **There are several significant travel demands to/from areas on the eastern edges of Shelby, especially the Germantown/Shelby Farms area that are no served by transit.** Despite being among the most important travel destinations in the entire study area, the Germantown/Shelby Farms area is not well served by transit. While there are some services, most existing MATA service to Germantown is at very low frequencies. Developing transit service in this market is challenged by the fact that Germantown it is outside of the City of Memphis and therefore does not provide funds to support transit service; and by the lack of pedestrian infrastructure and land use patterns that are not supportive of transit service.

- **Suburban employment markets in Collierville and Southaven are not accessible by transit and generally speaking have poor environments for pedestrians or bicyclists.** Workers may get these to these areas with specialized services, such as vanpools, carpools or commuter buses. There are also opportunities for employers to reward and encourage these forms of transportation with incentives and support programs.