Comprehensive Operations Analysis

Final Report • July 2022

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1.Introduction

1.1. Study Background & Purpose

In July 2020, Lextran engaged Nelson\Nygaard, under contract to Kersey and Kersey Architects, to conduct a comprehensive operations analysis (COA) of its fixed-route, paratransit, and vanpool operations. Since its last COA was completed in 2015, Lextran has implemented a number of service changes and launched new initiatives aimed at improving productivity and customer satisfaction across its network. As Lextran embarks on its 50-year anniversary in 2023, this COA will serve as a blueprint for delivering high-quality, customer-focused transit services to the Lexington community in the years to come.

The purpose of this COA study is to develop strategies to align Lextran's resources with demand for public transportation throughout the Lexington-Fayette County community. Comprehensive operational analyses are typically short-range studies with a five-year planning horizon, focused on service optimization strategies derived from analyses of the existing network and input from customers and stakeholders. As Lextran last completed a COA in 2015, this study serves as the authority's latest update to its short-range service delivery strategy.

1.2. Study Goals & Objectives

This COA project is rooted in the context of Lextran's strategic plan, which the agency updates on a regular basis to ensure alignment between its mission and business objectives and practices. As part of a strategic planning session conducted in 2020, senior Lextran staff identified three key pillars to help inform the Board's strategic planning process. The three pillars are identified below with specific objectives related to this COA effort:

1. **Deliver a high-quality product and service.**
   - Provide more direct trips and reduce the need for customers to travel downtown
   - Improve on-time performance of paratransit and fixed-route service
   - Improve passenger facilities and amenities
2. **Demonstrate value to our community.**
   - Engage the community to solicit their perspective on transit service
   - Identify key markets among the business and non-profit community to create new partnerships
3. **Manage and sustain resources.**
   - Maximize productivity of existing capital assets and revenue streams
   - Identify capital and operational needs

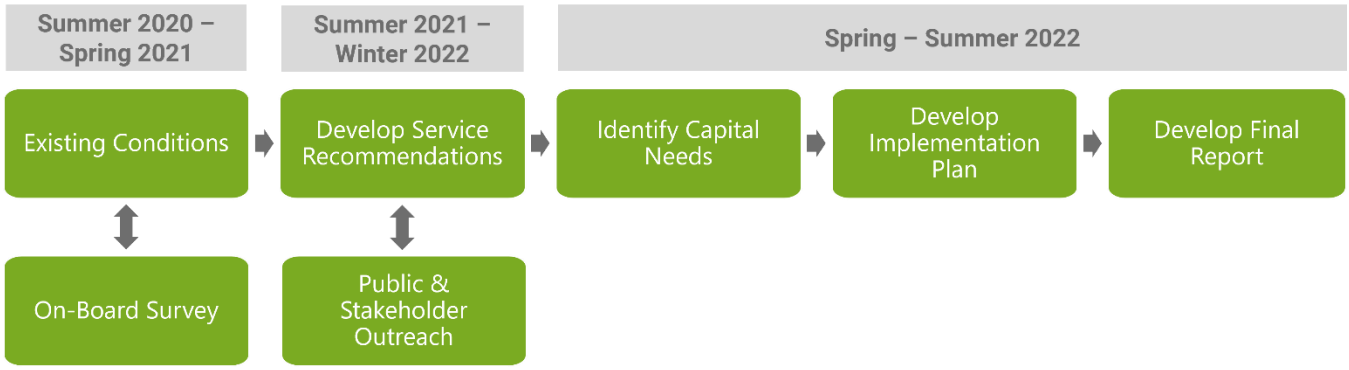
1.3. Study Process

The COA kicked off in Summer of 2020 and was delivered through three phases, as shown in **Figure 1-1** and described below:

- **Phase 1: Existing Conditions Assessment:** The first phase involved a comprehensive discovery and analysis process. The objectives of this phase were to determine how efficiently and effectively Lextran serves Lexington's mobility needs and to identify opportunities for service improvement. During this phase, the project team administered an on-board survey to determine how riders currently use Lextran to travel throughout the community and gauge customer satisfaction.

- **Phase 2: Service Recommendations Development:** In the second phase, the project team developed service recommendations to improve Lextran's fixed-route bus network. At the conclusion of this phase, the project team conducted rider and stakeholder outreach to collect feedback on the draft recommendations.
- **Phase 3: Implementation Plan and Final Report Development:** In the third and final phase, the project team refined the draft service recommendations based on community input, created a phased implementation plan, and identified capital and operating needs to implement the recommendations presented in this COA.

Figure 1-1: COA Study Timeline



1.4. Report Contents

This report documents the analysis and findings and recommendations of the Lextran COA. The remainder of this document covers the following topics:

Section 2: Existing Conditions provides a summary of the existing conditions analysis, including key findings from the market and service assessment tasks.

Section 3: Fixed Route Action Plan presents near, mid, and long-term recommendations to improve Lextran's fixed-route bus network.

Section 4: Mobility On-Demand Action Plan documents the findings and recommendations of a Mobility On-Demand (MOD) feasibility analysis for the Lextran service area.

Section 5: Capital Plan identifies proposed capital improvements to support Lextran's fixed-route and paratransit services.

Section 6: Financial Plan presents an overview of Lextran's existing expenses and revenue sources, estimated capital and operating costs to implement the recommendations of this COA.

Appendix: The Appendix provides supporting documentation referenced throughout this document.

2. Existing Conditions

2.1. Introduction

This section documents the analysis and findings of the existing conditions task of the Lextran COA. This section is organized as follows:

Section 2.2: Summary of Key Findings highlights the primary findings of the market and service performance assessments. These findings serve as a basis for the recommendations presented in subsequent chapters of this report.

Section 2.3: System Overview provides a summary of Lextran's current service characteristics, organization, and key peer benchmarks for its fixed-route bus and paratransit operations.

Section 2.4: Market Assessment provides an overview of the demographic and socioeconomic conditions within the Lextran service area that influence the demand for transit. This section also explores network accessibility and key travel patterns throughout the region based on an analysis of location-based services (LBS) data.

Sections 2.5 – 2.7: Service Assessment provides an analysis of Lextran's existing fixed-route bus, paratransit, and vanpool service performance.

2.2. Summary of Key Findings

The objective of the existing conditions analysis is to answer key questions related to mobility needs within Lexington-Fayette County and Lextran's ability to address these needs efficiently and effectively. This section summarizes the main findings of the existing conditions analysis within the context of these questions.

2.2.1. Market Assessment Observations and Findings

How well does Lextran cover its service area, including traditionally disadvantaged communities?

- Overall, Lextran provides good service coverage within its existing fixed-route service area, which generally encompasses the urban services area. Over half of the population residing within the urban services area is located within a quarter-mile of a bus stop and more than three-quarters of the population is within a half-mile of a bus stop.
- Employment coverage is even more robust, with 68% of urban services area-based jobs within a quarter-mile and 90% within a half-mile of a stop.
- Lextran generally provides good service coverage to traditionally disadvantaged communities. A Transit Market Index (TMI) was used to predict areas in Fayette County with the highest likelihood of generating transit ridership based on socioeconomic indicators such as low-income households and minority populations, among others. Most Census block groups (CBGs) across the service area registering TMI scores as medium-high or high are served with at least one route.
- All but one public housing development operated by the Lexington Housing Authority are located within of a quarter mile of a bus stop. Most grocery stores are served within a quarter mile of a stop, as are two thirds of the high schools and middles schools in the service area.

How accessible is the Lexington region via Lextran in terms of travel time?

- Nearly the entire urban services area is within a 60-minute transit trip to downtown Lexington during the AM peak, inclusive of both walk time and transit trip time. In general, most areas with the best job accessibility also have higher population density, low-income household density, and minority population density.
- Lextran provides job access to historically disadvantaged communities throughout Lexington. A travel time analysis shows that CBGs with above-average densities of equity populations generally have better transit access to jobs compared to the community as a whole. Several notable exceptions exist, including the Kirklevington Park, Eastland, Joyland, and Richmond Road subareas.

What is the impact of Lexington's development patterns and roadway geometry on network design?

- The urban growth boundary has had significant influence on land development in Fayette County, especially in terms of density. While most modern American cities have developed with significant urban sprawl, Lexington's development patterns are comparatively uniform within the urban service area. This results in some areas at the edge of the urban service area that may benefit from transit service but are difficult to serve due to poor street connectivity or schedule constraints dictated by Lextran's pulse schedule design. Examples can be found south of Man O' War Boulevard from Clays Mill Road to Tates Creek Road that include areas with relatively dense housing.
- Lextran operates a hub and spoke network that is largely dictated by Lexington's radial roadway geography. Although this is conducive for a single transfer location in the center, it makes crosstown routes difficult to execute effectively. While Lextran operates two dedicated crosstown routes, transfers are necessary for most crosstown travel movements.
- Lextran's strong service coverage is accomplished, in part, by creating deviations off major roads into neighborhoods. Routing vehicles off major roads and into neighborhoods does reduce walk times and distances for some riders, but it also decreases vehicle speeds and in-vehicle time for all passengers. Reducing the number of deviations would increase the speed of vehicles and give Lextran the opportunity to reach greater distances. It should be acknowledged, however, that the relationship between route deviations and service speed is oftentimes a delicate tradeoff that transit operators seek to balance, rather than simply choosing one design philosophy over the other.
- Several neighborhoods in Lexington that register as disadvantaged are located one or more blocks off the major arterial streets. Moreover, outside of the downtown and University of Kentucky (UK) core, many pockets of disadvantaged communities are scattered throughout the periphery of the city in areas with challenging street networks, such as Southeastern Hills. Although most of these areas receive transit service, many of them do not have bi-directional service (i.e. routes serve streets in each direction) or are served by circuitous routes. This results in a high coverage network, but also creates loops and longer travel times for some passengers. Examples include Route 2 on Waverly Drive off Georgetown Road, Route 7 on Eastland Parkway, Route 3 outside of New Circle Road, and Route 13 between New Circle Road and Wan O' War Boulevard.

What are the key travel markets in Lexington and how well does Lextran serve them?

- Like many midsize cities with major research universities, the University of Kentucky (UK) is the predominate feature shaping the Lexington travel market, with about 16% of the county's jobs located in and around the campus and adjacent medical center. An analysis of all-mode travel as measured using AirSage location-based services (LBS) data indicates that the most prominent travel patterns in Lexington are indeed driven by connections with UK.
- Lextran's service design and ridership metrics reflect this reality. Through its partnership with UK, Lextran provides campus circulator routes that are the most productive in the system, accounting for 41% of total weekday ridership in Fall 2019. Boardings in the UK and UK/Central Baptist Hospital alone represent 39% of the total ridership activity throughout the network. The two weekday UK routes and Lextran's most frequent and productive core local route, Route 5: Nicholasville Road, serve UK along with a limited local route, Route 16: Southland Drive.
- Downtown is another key travel market in terms of employment density and LBS trip density and is clearly well-served with transit due to the presence of the Downtown Transit Center. In terms of its importance as a transit travel market, however, downtown ranks fifth out of all subareas when transit center boardings are subtracted. In fact, of the top ten subareas in terms of aggregate ridership activity, five are located outside of New Circle Road (Winburn/Radcliff, Eastland, Richmond Road, Southeastern Hills, and Nicholasville Road - outside of New Circle Road) and three are located adjacent to New Circle Road (Russell Cave Road, Cardinal Valley, and Nicholasville Road – inside New Circle Road). These subareas account for over 40% of the total weekday ridership activity.
- The LBS analysis reveals that the Lextran network serves most major all-mode travel movements in Lexington. Many movements, including several prominent travel markets located closely to one another, require a transfer downtown, which creates long travel times compared to automobile travel. Travel markets located on opposite sides of the city can generally be facilitated via a direct path with a single transfer downtown. On the other hand, travel markets located along the periphery of the city oftentimes lack direct paths, forcing customers to travel downtown to make a transfer just to return outbound in generally the same direction to reach their destination. These are markets that Lextran is probably not capturing and opportunities should be explored to better serve them.
- One notable example of this issue is the area along the Fayette-Jessamine County line. This area shows strong trip volumes tied to the Beaumont and Nicholasville Road subareas. From west to east, these include Beaumont, Wyndam Downs, Nicholasville Road, Waterford, Park Place, and Southeastern Hills. Collectively, interactions between these subareas totals about 50,000 daily trips, although currently there is no direct transit service linking them.
- Several high-volume markets do not currently have direct service connections. The possibility of providing better connections between key subarea pairs should be explored, including UK-oriented markets such as Richmond Road to UK and Beaumont to UK, and crosstown markets such as Nicholasville Road to Beaumont and Fortune Drive to Richmond Road.

Where are emerging activity centers located?

- As evidenced by an analysis of recent population and employment growth, there are several emerging markets along the periphery of the urban services boundary that should be evaluated for future service expansion. A key emerging market with major planned developments is within the Fortune Drive and Hamburg subareas in northeast Lexington along I-75. The Beaumont subarea in southwest Lexington is another area of high employment growth and generates considerable trip volumes.
- Lexington's 2018 Comprehensive Plan established a policy directing new high-density development to occur along major corridors and in the downtown area. These corridors include Newtown Pike, Winchester Road, Richmond Road, Tates Creek Road, Nicholasville Road, South Broadway, Versailles Road, Leestown Road, and Georgetown Road.

2.2.2. Service Assessment Observations and Findings

How does Lextran measure up to its peers?

- By most measures, Lextran is a well-operated transit company. Although there has been a recent decline in Lextran's ridership, this is more likely due to broader industry trends rather than local factors. According to 2018 National Transit Database (NTD) figures, Lextran's systemwide boardings per revenue hour and revenue mile ranked higher than its peer cohort average.
- Lextran has managed to successfully contain its operating costs in recent years. Lextran's cost per passenger trip and cost per revenue hour decreased by 1% per year between 2015 and 2019. These figures compare favorably against its peer group and the industry average over the same period.
- Though Lextran's farebox recovery is on par with its peers, its average fare paid is lower than its peers and the industry average. This is consistent with peer fare data collected by Lextran staff in April 2019 which indicated an average peer base fare of $1.44, compared to Lextran's base local fare of $1.00.

How productive are Lextran's routes?

- Lextran's fixed-route ridership productivity is heavily influenced by its routes serving the University of Kentucky. Of Lextran's 18,000 average weekday passengers in Fall 2019, Route 14: UK Blue and White Routes, accounted for nearly a third of the total system ridership. Another circulator route serving UK and neighborhoods housing student populations, Route 15: Red Mile, ranks second and accounts for 10% of system ridership. Together, these two routes produce 41% of Lextran's average weekday ridership.
- Outside of the UK routes, a handful of core routes make up nearly a third of total weekday ridership. Route 5: Nicholasville Road is the strongest performer, at 1,700 daily passengers, or 10% of the system total. Other top-tier ridership producers include Route 3: Tates Creek Road, Route 8: Versailles Road, Route 6: North Broadway, and Route 7: North Limestone, which collectively produce about 21% of the system total. Together with the UK services, these seven routes account for over 70% of the total system weekday ridership while requiring just over half of the system weekday operations and maintenance (O&M) budget to operate.
- Among the bottom performers in terms of ridership production are Lextran's two non-UK circulator routes and eight limited/night routes. These 10 routes produce five percent of total weekday ridership while consuming 13% of the total (O&M) budget. Two of the most notable under-performing routes in the Lextran system include Route 24: Old Frankfort Pike and Route

17: Northside Connector. Both routes provide peak-only service at 70-minute headways through lower-density areas. Route 24 predominantly serves light industrial areas along Old Frankfort Pike, while Route 17 connects two retail centers in northeast Lexington via a circuitous route through low-density residential neighborhoods.

How productive and cost efficient and effective is Lextran?

- One of the most common cost effectiveness metrics in the transit industry is the net cost per boarding, which is $4.10 on weekdays for Lextran's fixed route network. Saturdays are the least cost effective, at $5.18 (Sunday cost per boarding is $4.85). Other efficiency metrics are favorable as well (net cost per revenue hour and mile). One potential improvement, however, could be increasing the price of fares. Lextran has not increased their fares to keep up with the rate of inflation as other transit agencies have. While increasing fares typically has a negative impact on ridership, a small increase in price would likely mitigate the severity of such an impact. Moreover, a small increase in fares would likely improve most, if not all, of the cost efficiency metrics.
- Several circulator and limited routes are notable under-performers with very high average costs per boarding. On weekdays, Routes 17 and 24 have a net cost of nearly $40.00 per passenger boarding. Route 16 has a net cost of about $25.00 per boarding, while Route 18 has a net cost of $15.00 per boarding. These routes warrant consideration of alignment modifications, service reductions, or new service delivery strategies to provide more cost-effective mobility for the markets they serve.

How does Lextran's productivity vary between weekdays and weekends?

- Among Lextran's 13 core local routes, productivity (measured by boardings per revenue hour) is only slightly lower on weekends compared to weekdays. However, there is a wider range in productivity among individual routes, with some routes performing better on weekends. In general, the routes with the highest weekday ridership (Routes 3, 5, 6, 7, 8, 10) are more productive on Saturday and/or Sunday compared to weekdays in terms of boardings per revenue hour. This finding may point to a need to provide enhanced service on several routes on weekends to serve latent demand in key markets.

How does Lextran's productivity vary over the course of a typical day?

- Several routes exhibit very high ridership on the very first trip of the day. For example, Routes 2, 3, 6, 7, 8, 9, and 11 have much higher ridership on the first inbound trip of weekday service compared to subsequent trips. This indicates that increasing the span of service on these routes by offering an additional trip earlier in the day may be well received by riders. Location data showing travel movements of cellular devices corroborate the early service gap. These data show a surge in AM peak travel movements at 7AM, while transit trips per hour doesn't peak until closer to 9AM. Additionally, total transit boardings peak in the 5PM hour, slightly after transit trips per hour begin to decline. This would suggest that expanding the span of service later into the day may also be well received by riders.

How reliable are Lextran's services?

- Over five bid periods evaluated between January 2019 and June 2020, Lextran's on-time performance (OTP) was generally near or above its established target of 90%. Weekday OTP ranged between a low of 89% in Fall 2019 and a high of 95% in Spring 2020 (post COVID service reductions). Saturday OTP ranged between 92% in Summer 2019 and 96% in Spring 2020. Sunday OTP ranged between 94% and 96%.
- At Lextran, a bus is considered on-time if it departs a designated timepoint no more than one minute early or seven minutes late, a generous threshold compared to many transit agencies. If Lextran were to narrow this window to one minute early and five minutes late, OTP would drop to 84%. If early arrivals were eliminated, OTP would drop to 69%.

How was Lextran's ridership productivity impacted by the COVID-19 pandemic?

- Following national trends, both Lextran and its peer group experienced significant ridership losses between 2014 and 2018. Lextran lost 17% of its ridership over this period, slightly more than its peer cohort, which saw a 16% ridership loss. Since 2018, however, Lextran's ridership began to increase. Compared to relatively stagnant ridership observed of its peers and across the industry, Lextran's ridership increased from July 2018 until the onset of the COVID-19 pandemic in March 2020. Based on a 12-month rolling average, between July 2018 and January 2020, average ridership among Lextran's peers dropped five percent compared to a one percent decline across the industry. Lextran, on the other hand, saw a ridership increase of ten percent across this period.
- The pandemic's initial impact on Lextran's ridership productivity was generally less severe compared to its peers and the industry average. At its low point in April during mandatory shut-down orders, Lextran experienced a year-over-year monthly ridership loss of 68%, compared to an 82% decline among its peers and a 72% decline across the industry. Ridership across the country began to recover beginning in May 2020. By June 2020, Lextran's year-over-year monthly ridership loss was 40%, compared to 62% for its peers and 55% for the industry. Lextran's relative resilience through the early months of the pandemic may be due in part to the fact that it was less aggressive in cutting back service compared to its peers.
- While Lextran's total systemwide weekday ridership dropped by 56% in the early months of the pandemic, the ridership loss was 27% among the routes that maintained at least some level of service. Routes that continued operating on a normal weekday schedule saw a total ridership loss of 17% compared to a 36% loss for routes that operated on a reduced schedule. A handful of routes saw very little ridership impact, including Route 8, which serves areas indicative of high transit propensity, and Routes 17 and 22.

2.3. System Overview

This section provides a general overview of Lextran, including its history and background, current services, organization, and budget. A peer analysis is provided at the end of this section to help draw comparisons between Lextran and industry benchmarks.

2.3.1. Background

History

Public transportation in Lexington has a long history spanning over 100 years. The earliest iteration of Lexington's public transportation system consisted of streetcars that were owned and operated by Kentucky Utilities. By the late 1930s, motorbuses had replaced streetcars and the system was sold and renamed the Lexington Transit Corporation. In April 1972, the local government incorporated the system under KRS 96A as the Transit Authority of the Lexington-Fayette Urban County Government (LFUCG). The newly formed public authority began operating under the Lextran brand in December 1973.

In 2004, Lexington voters approved a new property tax assessment to provide a dedicated local funding source for Lextran. This new revenue stream allowed Lextran to grow significantly in the following years. Between 2004 and 2010, revenue hours grew by 40% and ridership increased by nearly 60%. While service levels continued to increase in subsequent years, ridership trended downward between 2010 and 2015, largely mirroring broader national trends. Lextran's ridership began an upward trend in 2016 until the onset of the COVID-19 pandemic in early 2020.

Recent Initiatives

Since its last COA in 2015, Lextran has launched new capital programs and initiatives aimed at achieving its strategic priorities. Notable recent initiatives include:

- **Rider Amenities at Many Places (RAMP):** The RAMP program seeks to improve the passenger experience through enhancements to bus stop access and amenities. The RAMP program is based on a route facility inventory completed in 2018 which informed the prioritization of stop improvements. Projects implemented through the RAMP program include pedestrian access and Americans with Disabilities Act (ADA) improvements and installation of stop amenities such as shelters and benches.
- **Downtown Transit Center Improvements:** Lextran is in the process of upgrading its downtown transit center to improve bus operations, pedestrian access and wayfinding, and safety. Planned and ongoing improvements include priority signal for buses departing transit center, placemaking at bus bays, pedestrian signage, wayfinding improvements, lighting improvements, and a technology and security refresh to add real-time arrival screens on platform and upgraded security cameras.

2.3.2. Lextran Services

This section provides a summary of Lextran's service area, its existing service types and fixed-route service classes, service levels and operating requirements, fare structure, and capital assets.

Service Area

Lextran operates within a service area of approximately 286 square miles covering the entirety of Fayette County. While Lextran serves unincorporated parts of the county with its Wheels service, its fixed-route service is generally limited to the confines of the Urban Services Boundary, which encompasses approximately 86 square miles. Lextran defines its fixed-route service area as ¼-mile from each fixed route. The total service area coverage for ¼, ½, and ¾ miles of Lextran's fixed route network is provided in **Table 2-1**.

Table 2-1: Lextran Fixed Route Service Area

Service Area Definition	Total Area (sq. mi.)	Percent of USA within Service Area
Within ¼ Mile of fixed route	42.8	50%
Within ½ Mile of fixed route	65.0	76%
Within ¾ Mile of fixed route	78.8	92%

Overview of Services

Lextran serves Lexington-Fayette County with several transit service types, each designed to meet a different need of the community. Currently, Lextran offers three primary service types: fixed-route bus, demand response paratransit (branded as "Wheels"), and vanpool.

- **Bus:** Lextran's fixed-route bus services generally serve the area within the Lexington Urban Services Boundary with a total of 25 routes. Collectively, Lextran's fixed-route network serves roughly 900 stops across 225 route miles using a peak weekday fleet of 52 buses. Lextran's network is radial in structure, based on a single transit center located in downtown Lexington. This enables a pulsed-based schedule for most of its routes. Lextran's fixed-route network is depicted in

- **Figure** 2-1.
- **Paratransit:** The Wheels paratransit service is available to only those who cannot utilize the fixed routes because of a disability. Wheels is available throughout the entirety of Fayette County. However, trips outside of a ¾-mile radius from a fixed-route are provided at a premium compared to trips within the fixed-route service area.
- **Rideshare:** Lextran offers a vanpool service, branded Commute with Enterprise, that provides an alternative commuting solution for commuters who start or end their trip in Fayette County. Lextran provides a $400 per month subsidy for every new vanpool. Groups of four or more commuters, who live in the same general areas and commute 20+ miles to a common workplace are eligible to participate.

Fixed Route Service Classifications

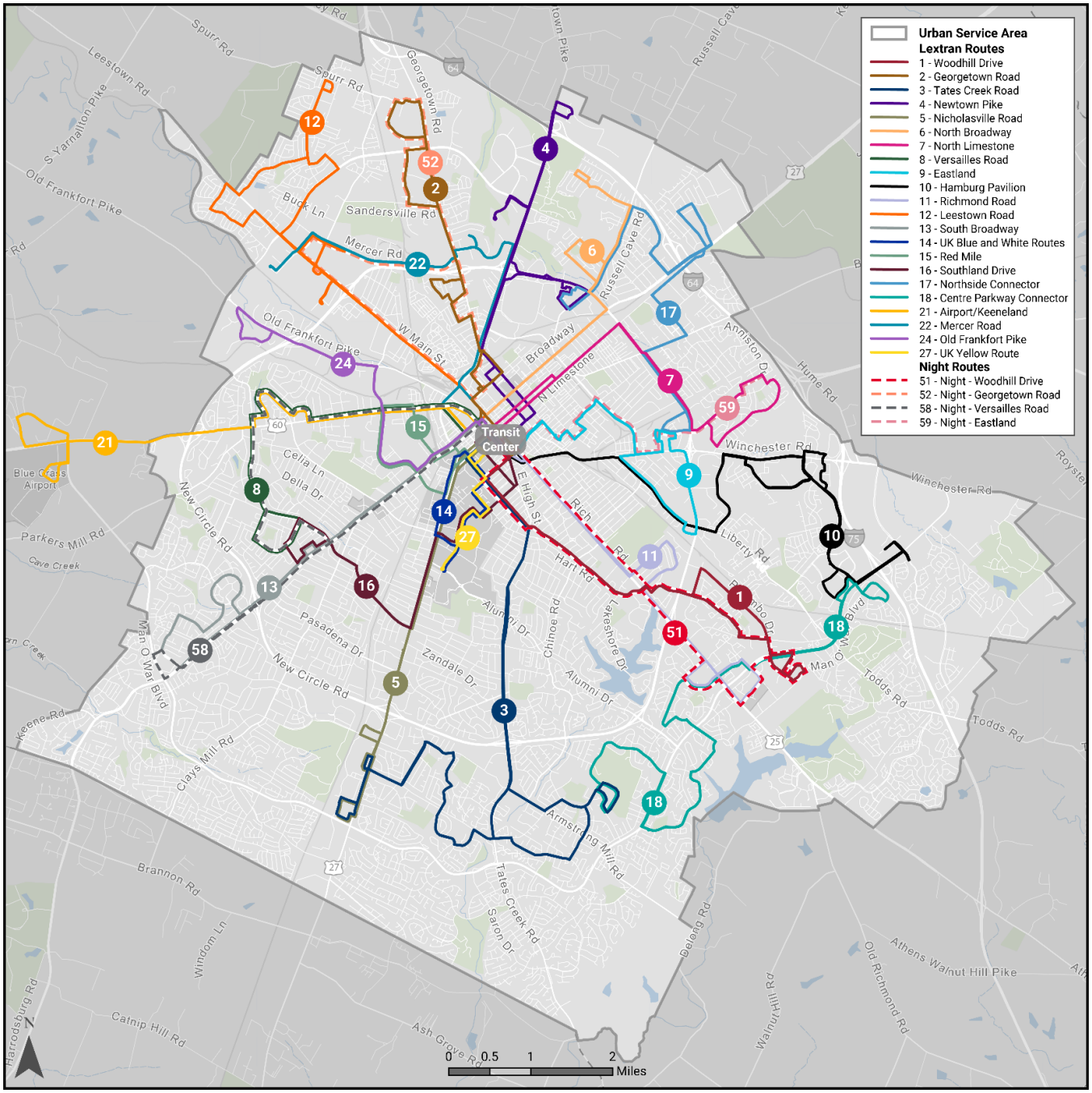
Lextran further classifies its fixed-route bus services into three functional classifications: core, limited, and circulator. For the purpose of this COA, Lextran's late evening routes have been separated from the Limited Local classification. Each route classification is defined below and identified by route in **Table 2-2**:

- **Core**– Core routes make up about half of Lextran's services, and link neighborhoods, employment centers, and various other locations. Core routes serve Lexington's primary arterials radiating from downtown. There is a total of 13 core local routes in the Lextran network, each operating seven days per week.
- **Circulator** – Circulator routes are typically confined to a small geographic area compared to local routes. Circulator routes do not serve the Transit Center and are typically bi-directional loops in areas of high population and commercial density. There is a total of five circulator routes in the Lextran network.
- **Limited** - Limited service routes fill the gaps created by Lexington's hub-and-spoke transportation network. Limited service routes are typically less frequent and are scheduled specifically to the attractions and destinations on each route. There is a total of four limited routes in the Lextran network.
- **Limited Night** – Night routes combine several core local routes during the late evening hours after 9:00 PM. Night routes provide service along key corridors at 60-minute headways. There are a total of four night routes in the Lextran network.

Table 2-2: Lextran Fixed Routes by Service Functional Classification

Route #	Route Name	Lextran Functional Class	Days in Service
1	Woodhill Drive	Core	Wkd / Sat / Sun
2	Georgetown Road	Core	Wkd / Sat / Sun
3	Tates Creek Road	Core	Wkd / Sat / Sun
4	Newtown Pike	Core	Wkd / Sat / Sun
5	Nicholasville Road	Core	Wkd / Sat / Sun
6	North Broadway	Core	Wkd / Sat / Sun
7	North Limestone	Core	Wkd / Sat / Sun
8	Versailles Road	Core	Wkd / Sat / Sun
9	Eastland	Core	Wkd / Sat / Sun
10	Hamburg Pavilion	Core	Wkd / Sat / Sun
11	Richmond Road	Core	Wkd / Sat / Sun
12	Leestown Road	Core	Wkd / Sat / Sun
13	South Broadway	Core	Wkd / Sat / Sun
14	UK Blue and White Routes	Circulator	Wkd
15	Red Mile	Circulator	Wkd / Sat / Sun
17	Northside Connector	Circulator	Wkd
18	Centre Parkway Connector	Circulator	Wkd / Sat
27	UK Yellow Road	Circulator	Sat / Sun
16	Southland Drive	Limited	Wkd
21	Airport/Keenland	Limited	Wkd
22	Mercer Road	Limited	Wkd
24	Old Frankfort Pike	Limited	Wkd
51	Night - Woodhill Drive	Limited (Night)	Wkd / Sat
52	Night - Georgetown Road	Limited (Night)	Wkd / Sat
58	Night - Versailles Road	Limited (Night)	Wkd / Sat
59	Night - Eastland	Limited (Night)	Wkd / Sat

Figure 2-1: Lextran Fixed Route Network



Source: Lextran GTFS, Fall 2019

Fixed-Route Service Levels

Published schedules and General Transit Feed Specification (GTFS) data were used to identify bus service frequencies and span of service for Lextran's last pre-COVID bid period, Fall 2019. **Figure 2-2** displays the span of service and frequency by hour by day of week for each route in the Lextran network. The following general observations were made regarding Lextran's fixed-route service levels:

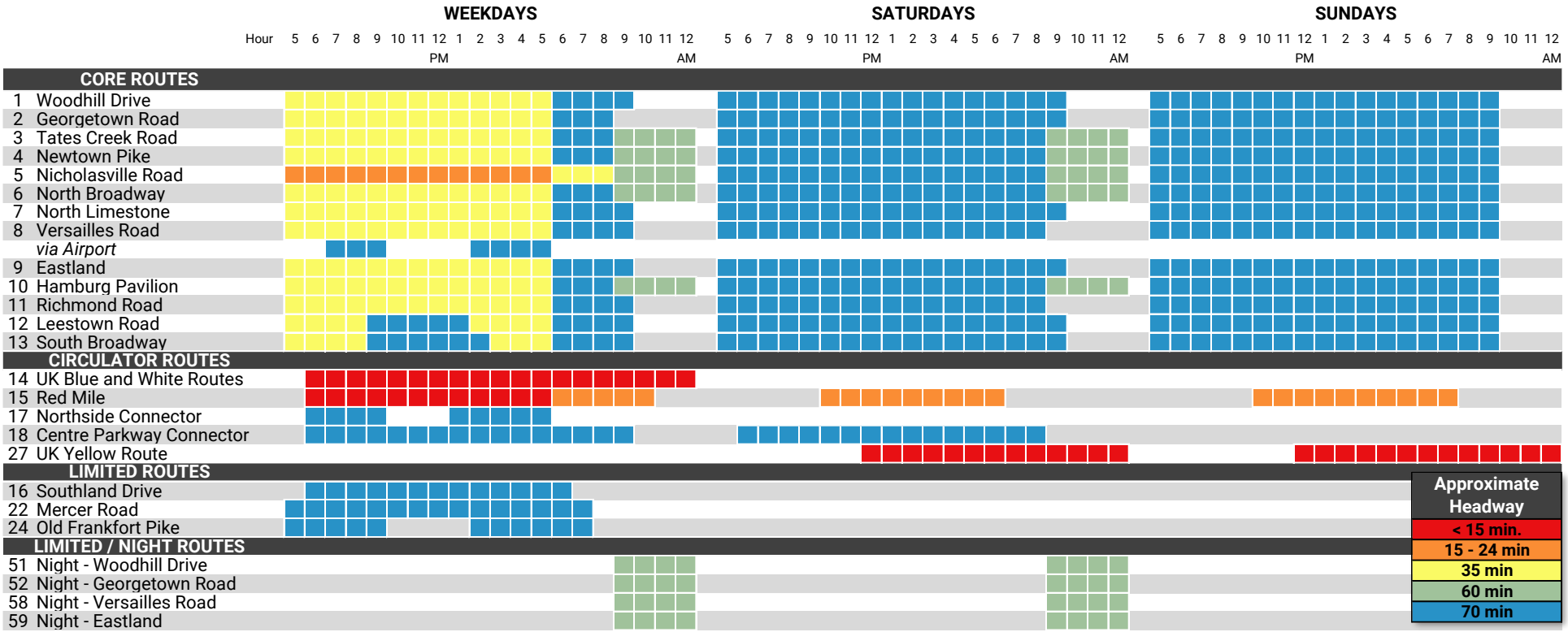
Weekdays

- **Core:** On a typical weekday, Lextran provides consistent 35-minute headways throughout the day on most of its core fixed routes, tapering back to 70 minutes in the evenings. Route 5, which serves the Nicholasville Road corridor, operates 15 -to- 20-minute frequencies throughout the day. Routes 12 and 13 have 35-minute peak headways and 70-minute midday and evening headways. Routes 3, 4, 5, 6, and 10 operate 60-minute headways from approximately 9:00 PM to 12:30 AM.
- **Circulator:** Lextran's UK circulator services, Routes 14 and 15, provide frequent service within and around the campus. Route 14 provides 6 to 10-minute headways during the daytime hours and 12-minute headways in the evenings. Route 15, which connects off-campus housing in the Red Mile area with the UK campus, provides 12-minute headways during the day and 24-minute headways in the evenings. Lextran's remaining two circulator routes, Routes 17 and 18, provide 70-minute headways throughout the day. Route 17 provides AM and PM peak service, while Route 18 provides all-day service.
- **Limited:** Three of Lextran's limited routes, Routes 16, 22, and 24 provide 70-minute headways, with Routes 16 and 22 providing all-day service, and Route 24 providing AM and PM peak service.
- **Night:** Lextran operates four late-night routes, Routes 51, 52, 58, and 59, at 60-minute headways, from 9:00 PM to approximately 12:30 AM.

Weekends

- **Core:** On weekends, Lextran's core routes operate at consistent 70-minute headways throughout the day. The majority of routes begin service during the 5:00 AM hour and end service during the 9:00 PM hour. Routes 3, 4, 5, 6, and 10 operate until the 12 AM hour on Saturdays, while all routes end service during the 9:00 PM hour on Sundays.
- **Circulator:** On weekends, the primary UK circulator, Route 14, is replaced with Route 27, which operates at 15-minute headways from noon through midnight. Route 15 also operates at 15-minute headways on weekends from approximately 10:00 AM until 6:00 PM. Route 18 operates on 70-minute headway on Saturdays only.
- **Limited:** Lextran does not operate any of its limited routes on weekends.
- **Night:** Lextran operates night service at similar levels to weekdays on Saturday but does not provide night service on Sundays.

Figure 2-2: Lextran Service Levels by Route (Fall 2019)



Source: Lextran GTFS, Fall 2019

GTFS data was also used to determine combined service frequencies at the stop level (e.g., three 60-minute routes stopping at the same bus stop is identified as a stop with a combined 20-minute average service frequency). This analysis provides a general understanding of the spatial distribution of service levels throughout the system over the course of a day. **Figure 2-3** displays the combined frequency by stop for the weekday peak, midday, and evening periods, and the Saturday and Sunday midday periods. Detailed maps can be found in Appendix A-1. General observations are provided below:

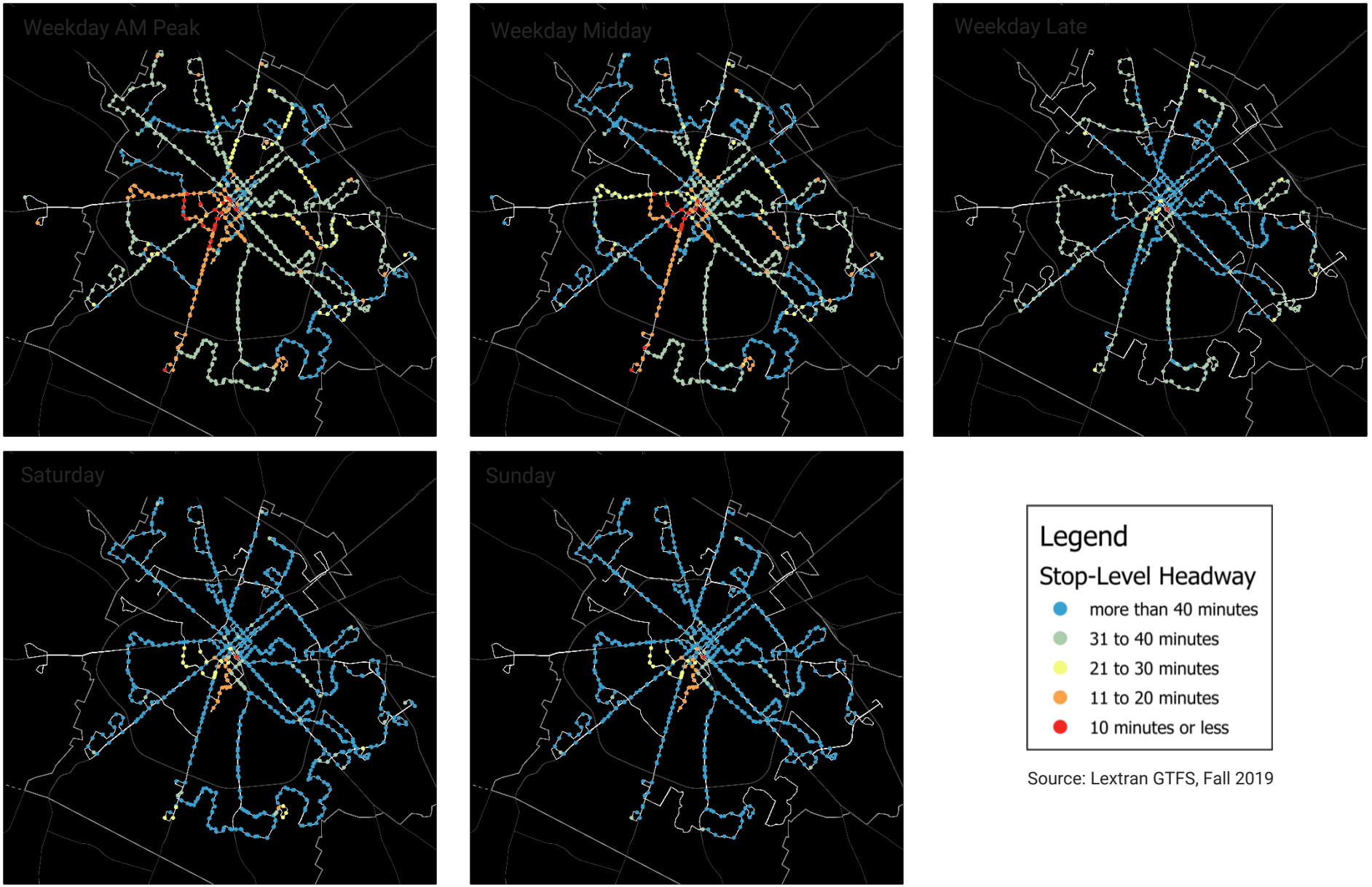
Weekdays

- **AM Peak:** Lextran provides service on most of the main arterials radiating outward from downtown Lexington. During the peak periods, most of the radial corridors have a minimum service level of 35-minute frequencies. Corridors and areas with the most frequent levels include:
    - Nicholasville Road between downtown and the Nichols Park & Man O' War Blvd area (10 to 20-minute combined frequency)
    - Versailles Road between downtown and the Cardinal Valley & Alexandria Dr area (10 to 20-minute combined frequency)
    - Newtown Pike between downtown and New Circle Rd (20 to 30-minute combined frequency)
    - The UK campus and surrounding neighborhoods, including the Red Mile area.
- Cross-town corridors tend to have less frequent service compared to the primary radial corridors. These areas are typically served by Lextran's limited and circulator routes with 70-minute all-day service, including:
    - The Bryan Station, Joyland, and Winburn-Radcliff area in north Lexington, served by Route 17
    - The Man O' War corridor between the Southeastern Hills and Hamburg areas of southeast Lexington, served by Route 18
    - Mercer Road and Nandino Blvd in the Leestown Rd, Masterson Station, and Georgetown Rd areas of northwest Lexington, served by Route 22
    - The Old Frankfort Rd corridor in west Lexington between Alexandria Dr and Versailles Rd, served by Route 24
- **Midday/Evening:** In the midday, service levels decrease relative to the peak along Versailles Rd, Leestown Rd, and Harrodsburg Rd. Service along Old Frankfort Pike northwest of Versailles Rd is eliminated in the midday period.
- **Late Evening:** Lextran offers hourly service during the late evening hours on key radial corridors across the service area. Late evening service is not provided on most crosstown corridors and at the periphery of the network. More frequent late evening service is provided on the UK campus and surrounding areas.

Weekends

- Saturday service levels are fairly uniform across the Lextran service area. While coverage is limited compared to weekdays on the periphery of the network, the key radial corridors are served with 70-minute frequencies. The most frequent Saturday service is located in and around the UK campus.
- Sunday service levels are similar to Saturdays along most corridors, with 70-minute service provided throughout most of the network. On Sundays, however, service is not offered on Route 18, which eliminates service coverage in southeast Lexington along the Man O' War corridor.

Figure 2-3: Lextran Average Headways by Stop (Fall 2019)



Source: Lextran GTFS, Fall 2019

Fare Structure

Lextran offers different fares and passes for fixed-route and paratransit services. These fares, passes, and related policies collectively make up the fare structure, which is shown in **Table 2-3**. Fares are paid upon boarding vehicles and passes can be purchased at the Downtown Transit Center, Loudon Administrative Office, Lexington Kroger stores, or online. Transfers are issued to single-ride customers and are valid for 90 minutes.

Table 2-3: Lextran Fare Structure (valid Spring 2020)

Fare Product	Adult	Student[1]	Youth[2]	Seniors, People with Disabilities, & Veterans[3]	Medicare Cardholders[1]
Fixed Route					
Standard (Base)	$1.00	$0.80	$0.80	$0.50	$0.50
Day Pass	$3.00	$3.00	$3.00	$1.50	$1.50
20-Ride Pass	$15.00	$15.00	$15.00	$15.00	$15.00
30-Day Pass	$30.00	$20.00	$20.00	$15.00	$15.00
Class Pass	One Semester - $50.00 / One School Year - $75.00				
Wheels Paratransit					
Single Ride within ¾-mile of fixed route	$1.60 each way[4]				
Single Ride outside of ¾-mile of fixed route	$2.00 each way[4]				

1. Requires ID or other verification
2. Age 6 and under free
3. Age 62 and above
4. One personal care attendant can ride for free

Capital Assets

According to its latest Transit Asset Management Plan (TAMP) published in 2018, Lextran operates an active fixed-route fleet of 67 buses. Its fleet mix is primarily comprised of Gillig low-floor diesel, diesel hybrid, and CNG buses, ranging in length from 30' – 40'. Lextran also operates six Proterra electric buses and six 26' cutaways. Lextran's revenue vehicle inventory is provided in **Table 2-4**.

Lextran's demand response contractor owns and operates a fleet of 43 cutaways, seven vans, and six automobiles, for a total fleet of 56 vehicles. For its Vanpool operation, Lextran's service contractor operates a total fleet of ten vehicles.

In addition to rolling stock, Lextran owns an inventory of 17 non-revenue support vehicles, including service trucks and crew transport vans. Its key facility assets include the following:

- **Administrative Building** – located at 200 West Loudon Avenue, Lexington, KY 40508
- **Maintenance Facility** (including bus wash building, CNG fueling station, fueling building, and maintenance shop) – located at 200 West Loudon Avenue, Lexington, KY 40508
- **Downtown Transit Center** – located at 150 East Vine Street, Lexington, KY 40507

Table 2-4: Revenue Vehicle Inventory

Asset Class	Acquisition Year	Make	Model	Count	Average Age (yrs)	Past Useful Life Benchmark
Bus (owned by Lextran)						
Cutaway	2012	Ford	26' ALLSTAR	3	6	No
Cutaway	2013	Ford	26' ALLSTAR	1	5	No
Bus	2009	Gillig	29' Trolley Diesel	1	9	No
Bus	2009	Gillig	29' Trolley Hybrid	2	9	No
Bus	2011	Gillig	29' Low Floor- Diesel	5	7	No
Bus	2011	Gillig	29' Low Floor- Hybrid	1	7	No
Bus	2011	Gillig	35' Low Floor- Hybrid	1	7	No
Bus	2016	Gillig	35' Low Floor- CNG	5	2	No
Bus	2004	Gillig	40' Low Floor-Diesel	6	14	Yes
Bus	2005	Gillig	40' Low Floor-Diesel	4	13	No
Bus	2007	Gillig	40' Low Floor-Diesel	17	11	No
Bus	2012	Gillig	40' Low Floor- Diesel	1	6	No
Bus	2012	Gillig	40' Low Floor- Hybrid	2	6	No
Bus	2014	Gillig	40' Low Floor- Diesel	1	4	No
Bus	2015	Gillig	40' Low Floor- Diesel	1	3	No
Bus	2015	Gillig	40' Low Floor-Diesel	1	3	No
Bus	2015	Gillig	40' Phantom- Diesel	2	3	No
Bus	2016	Gillig	40' Low Floor- CNG	2	2	No
Bus	2017	Gillig	40' Low Floor- CNG	5	1	No
Bus	2016	Proterra	43' Catalyst- Electric Bus	5	2	No
Bus	2018	Proterra	43' Catalyst- Electric Bus	1	0	No
			TOTAL ACTIVE FLEET	**67**		
Paratransit (owned by contractor)						
Automobile				6		
Cutaway				43		
Van				7		
			TOTAL ACTIVE FLEET	**56**		
Vanpool (owned by contractor)						
Sports Utility Vehicle		GMC		4		
Sports Utility Vehicle		Nissan		1		
Sports Utility Vehicle		Ford		1		
Van		Ford		4		
			TOTAL ACTIVE FLEET	**10**		

Source: Lextran Transit Asset Management Plan (2018)

2.3.3. Agency Organization

Lextran is an independent transit authority that was incorporated by the Lexington-Fayette Urban County Government in 1972 to unify and coordinate a mass transportation system for Fayette County. Lextran is governed by an eight-member board appointed by the mayor and approved by the Urban County Council. In addition, Lextran's annual budget is reviewed and approved by the Urban County Council. The following sections describe Lextran's organizational structure and key external partnerships.

Lextran Staffing and Organization

Lextran utilizes a management contracting model whereby the Board issues a contract to a private contractor to provide key executive personnel to manage the operation of the system. Since 2013, Lextran has employed Transdev, an international private public transportation operator, to provide management services to the agency. Under this arrangement, Transdev employs the General Manager and Assistant General Manager. The General Manager oversees the day-to-day operation of the agency and reports directly to the Board of Directors.

While the executive management of the organization is contracted out, Lextran's administrative, operations, and maintenance functions are directly operated by agency employees. **Figure 2-4** on the following page depicts the agency organizational structure as of May 2022. Lextran is organized into seven departments, each managed by their respective directors.

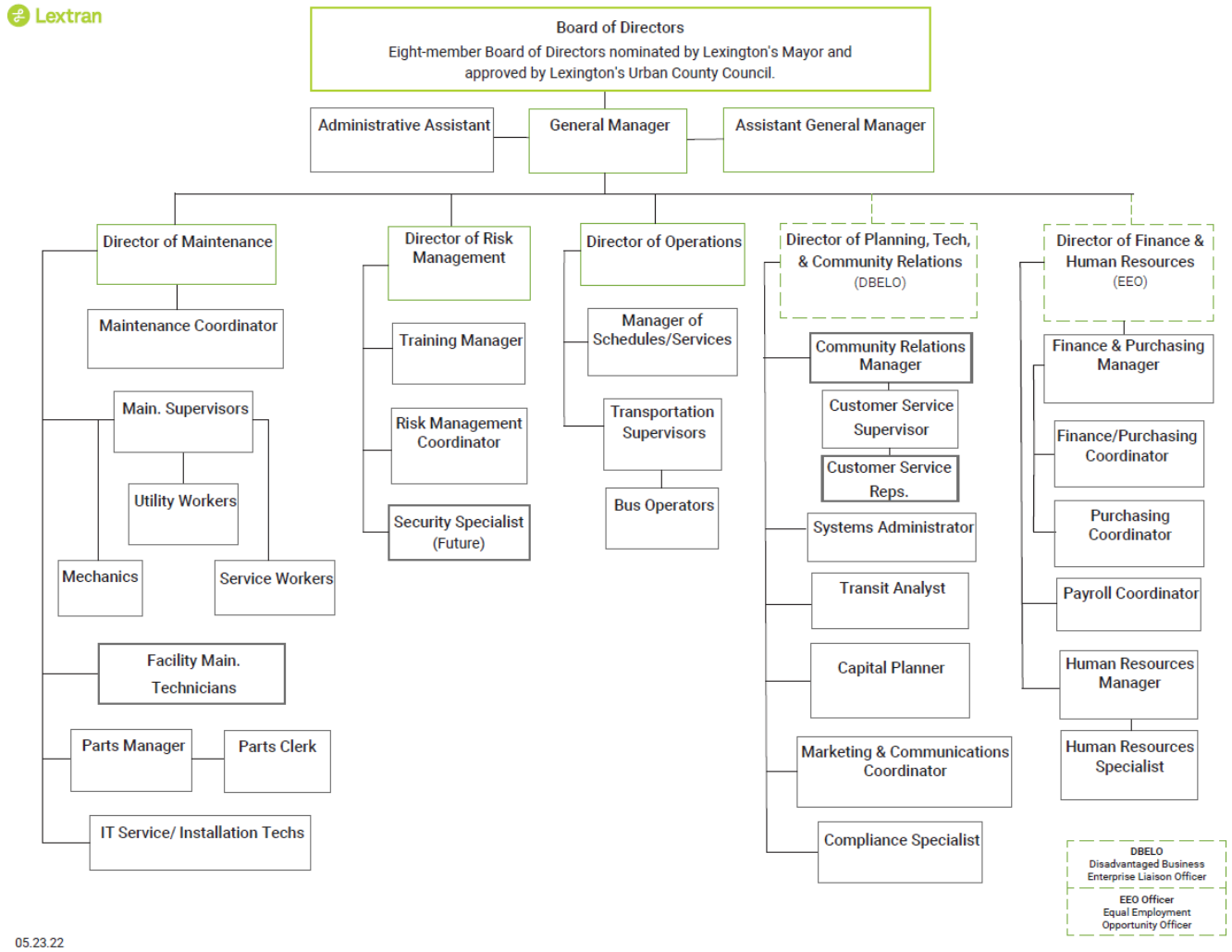
Coordination and Partnerships

Lextran contracts out its demand response paratransit service, Wheels, through a partnership with the Bluegrass Area Chapter of the American Red Cross. Lextran also contracts out its vanpool service to Commute with Enterprise.

Lextran maintains a partnership with the University of Kentucky to provide two campus-oriented shuttle routes: Route 14 (UK Blue and UK White Route) and Route 27 (UK Yellow Route). UK contributes approximately $2.4M annually to Lextran in exchange for this service.[1] As part of this partnership, UK and Lextran established the Free City Transit program, which allows UK students, faculty, and staff to ride any Lextran route free of charge, simply by showing their valid Wildcard ID.

[1] Source: FY2021 Proposed Budget (April 15, 2020 Board Packet)

Figure 2-4: Lextran Organizational Chart (May 2022)



Source: Lextran (May 2022)

2.3.4. Peer Benchmarks

A peer analysis was conducted to assess how efficiently Lextran provides fixed-route and paratransit services and how effectively it meets the needs of its customers. To complete these analyses, various performance measures were derived from the most recently available National Transit Database (NTD) data for the motorbus (MB) and demand response paratransit (DR) modes. The analysis was conducted over a five-year period (FY 2015–2019) to understand trends among the peers.

Three broad categories of indicators and performance measures were analyzed:

- *Service Productivity* measures transit service demand relative to unit of service provided (e.g. hours or miles).
- *Cost Efficiency and Effectiveness* measures how much an agency spends per passenger trip and per unit of service provided.
- *Resource utilization* measures how efficiently an agency deploys its assets.
- *Transit Investment and Service Quality* measures the amount of transit service provided within a service area in terms of resource investment and level of service.

Peer Group

Lextran staff conducted a peer analysis in April 2019 at the request of its Board of Directors. As part of that effort, Lextran staff selected a set of 16 peer transit agencies based on criteria including: geographic region (with priority given to state peers such as TANK and TARC), presence of a University or similar major generator, agency governance structure (independent agency or city government), service area population (within ±150,000 of Lexington), number of households in urbanized area, annual unlinked passenger trips served by the agency, vehicles operating in maximum service. Lextran's peer cohort as defined by staff in 2019 was utilized for this effort. These peer agencies are identified in **Table 2-5**.

Table 2-5: Peer Transit Agencies

Agency Name	City, State
Ann Arbor Area Transportation Authority	Ann Arbor, MI
Capital Area Transit System	Baton Rouge, LA
Capital Area Transportation Authority	Lansing, MI
Chatham Area Transit Authority	Savannah, GA
Chattanooga Area Regional Transportation Authority	Chattanooga, TN-GA
City of Tallahassee	Tallahassee, FL
Des Moines Area Regional Transit Authority	Des Moines, IA
Durham Area Transit Authority	Durham, NC
Fayetteville Area System of Transit	Fayetteville, NC
Greensboro Transit Authority	Greensboro, NC
Metro Transit System	Madison, WI
South Bend Public Transportation Corporation	South Bend, IN-MI
Toledo Area Regional Transit Authority	Toledo, OH-MI
Transit Authority of Northern Kentucky	Cincinnati, OH-KY-IN
Transit Authority of River City	Jefferson County, KY-IN
Wichita Transit	Wichita, KS

Source: Lextran

Motorbus Key Findings

Key findings from the motorbus (fixed-route) peer analysis are summarized below:

Service Productivity

- Contrary to peer and national trends, Lextran's ridership increased by 15% between 2015 and 2019, compared to an 11% decrease among both its peer cohort and industry average.
- Lextran is more productive than its peers in terms of motorbus passenger trips per revenue hour and mile. Over the five-year five-year period, Lextran's productivity has remained stable compared to a four percent annual average decrease among its peers.
- As measured by passenger trips per service area capita, Lexington's service consumption of 15 trips per capita falls below the peer average of 17 trips per capita but above the national average of 9.4 trips per capita.

Cost Efficiency and Effectiveness

- On a cost per passenger trip basis, Lextran delivers service more cost effectively compared to its peers and the industry as a whole. Lextran's cost per passenger trip of $4.63 is about 22% below the peer average and has decreased slightly over the five-year period.
- Lextran has managed to successfully contain its operating costs in recent years, with its cost per revenue hour decreasing by 1% per year since 2015, compared to a 2% peer increase.
- Lextran's farebox recovery is on par with the peer average and has been increasing at a 7% annual rate since 2015, compared to a 3% average annual decline among the peer group.
- Lextran's average fare paid of $0.82 per trip is 21% lower than its peers and 27% lower than the industry average. This is consistent with peer fare data collected by Lextran staff in April 2019 which indicated an average peer base fare of $1.44, compared to Lextran's base local fare of $1.00.

Resource Utilization

- Lextran operates a limited amount of deadhead service, as evidenced by its revenue mile per vehicle mile ratio of 0.95. Lextran slightly outperforms its peers and the industry average (0.92 and 0.91 revenue miles per vehicle mile, respectively) in this regard.
- Lextran tends to put fewer miles on its vehicles in a year (about 37,000) compared to its peers (about 44,000). This is primarily a function of Lextran's relatively small fixed-route service area.
- Lextran's average speed in revenue service has decreased 4% per year since 2015. Lextran's average speed of 9.5 miles per hour (mph) is well below the peer average of 12.7 mph and national average of 13.6.

Transit Investment and Service Quality

- As measured by operating expenses per service area capita, Lexington spends less on transit compared to its peers but significantly more than the national average. In 2019, Lextran spent about $68 per capita compared to a per capita investment of $83 by peers.
- Lextran's service quality compares favorably to its peers and the industry average, both in terms of average headway provided and span of service. Lextran's average headway is 23 minutes compared to a peer average of 31 minutes and industry average of 37 minutes. Lextran's average weekday span of service of 19 hours is on par with its peers and slightly above the industry average of 17 hours per weekday.

Table 2-6: Motorbus National Average and Peer Key Performance Indicators

Metric	National Average		Peer Average		Lextran	
	2019 Value	Avg. Annual Growth Rate: 2015-2019	2019 Value	Avg. Annual Growth Rate: 2015-2019	2019 Value	Avg. Annual Growth Rate: 2015-2019
Service Productivity						
Passenger Trips Per Revenue Hour	15	-5%	19	-4%	23	0%
Passenger Trips Per Revenue Mile	1.26	-4%	1.53	-4%	2.38	4%
Average Trip Length (in miles)	4.83	-1%	3.91	0%	4.18	-3%
Passenger Trips Per Service Area Capita	9.39	-4%	16.59	-3%	14.8	4%
Cost Efficiency and Effectiveness						
Operating Expense Per Passenger Trip	$9.13	8%	$5.92	8%	$4.63	-1%
Operating Expense Per Revenue Hour	$102.12	2%	$100.61	2%	$104.80	-1%
Operating Expense Per Revenue Mile	$7.67	3%	$8.02	2%	$11.03	3%
Operating Expense Per Passenger Mile	$2.10	12%	$1.55	8%	$1.11	2%
Farebox Recovery (%)	12%	-6%	18%	-3%	18%	7%
Average Fare	$1.12	2%	$1.04	5%	$0.82	6%
Resource Utilization						
Revenue Miles Per Vehicle Mile	0.91	0%	0.92	0%	0.95	0%
Vehicle Miles Per Peak Vehicle	45,362	0%	44,085	0%	36,890	0%
Average Speed (RM/RH)	13.55	-1%	12.69	0%	9.50	-4%
Transit Investment and Service Quality						
Operating Expense Per Service Area Capita	$47.38	2%	$82.67	3%	$68.30	2%
Vehicle Miles Per Service Area Capita	8.31	1%	11.05	1%	6.48	-1%
Route Miles Per Sq. Mi of Service Area	2.87	0%	2.75	0%	0.65	-5%
Average Headway (in minutes)	36.92	-1%	30.58	1%	23	-3%

Source: Annual NTD Reports (2015-2019)
Additional peer charts can be found in Appendix A-2.

Paratransit Key Findings

Key findings from the demand response peer analysis are summarized below:

Service Productivity

- Lextran's demand response paratransit service, Wheels, experienced a 20% increase in ridership between 2015 and 2019. This trend stands in contrast to its peer group and the industry average. On average, paratransit ridership among Lextran's peers increased 1% between 2015 and 2019 while the industry saw an average decrease of 11%.
- Lextran's Wheels service is less productive compared to its peers in terms of passenger trips per revenue hour (1.7 vs. 2.0, respectively) but slightly more productive in terms of passenger trips per revenue mile (0.14 vs. 0.13, respectively). These figures remained relatively stable between 2015 and 2019.
- Lextran's demand response service consumption per capita is 26% greater than its peers and 77% greater than the industry average. Coupled with the fact that Lextran's fixed route service consumption per capita is below its peers, this indicates a need to investigate opportunities to slow the future growth of future eligible paratransit riders by improving fixed-route accessibility.

Cost Efficiency and Effectiveness

- Lextran's demand response service is more cost effective and efficient compared to its peers and the industry average. Lextran's cost ratios per passenger trip ($26.68), revenue hour ($46.40), and revenue mile ($3.71) are significantly below peer and industry benchmarks and held fairly stable between 2015 and 2019.
- Lextran's average fare paid ($1.62) is about half of the peer benchmark ($2.66). Like its fixed route service, Lextran offers a base paratransit fare that is well below what its peers charge. This is also evidenced through its lower-than-average farebox recovery ratio, although this is mitigated by Lextran's relatively efficient cost structure.

Resource Utilization

- Lextran's demand response deadhead factor (0.9 revenue miles per vehicle mile) is on par with both its peer and industry benchmarks. This metric held steady between 2015 and 2019.
- Like its fixed route service, Lextran's demand response average speed in revenue service (12.5 mph) is slower than its peer (15.5 mph) and industry (13.7 mph) benchmarks. Its average speed declined at a commensurate rate with its peers over the five-year evaluation period.

Investment and Service Quality

- Lextran's paratransit investment per capita ($20.48 per capita) is nearly identical to its peers.
- Lextran's demand response vehicle miles per service area capita (6.4) is greater than its peers and nearly twice the industry average, a figure that increased 3% per year between 2015 and 2019.

Table 2-7: Demand Response National Average and Peer Key Performance Indicators

Metric	National Average		Peer Average		Lextran	
	2019 Value	Avg. Annual Growth Rate: 2015-2019	2019 Value	Avg. Annual Growth Rate: 2015-2019	2019 Value	Avg. Annual Growth Rate: 2015-2019
Service Productivity						
Passenger Trips Per Revenue Hour	2.33	0%	2.01	-3%	1.74	0%
Passenger Trips Per Revenue Mile	0.19	1%	0.13	-2%	0.14	2%
Average Trip Length (in miles)	8.18	-1%	9.11	0%	7.19	-17%
Passenger Trips Per Service Area Capita	0.43	-5%	0.61	1%	0.77	5%
Cost Efficiency and Effectiveness						
Operating Expense Per Passenger Trip	$38.07	5%	$33.40	4%	$26.68	1%
Operating Expense Per Revenue Hour	$77.96	4%	$66.34	3%	$46.40	1%
Operating Expense Per Revenue Mile	$6.31	5%	$4.32	2%	$3.71	3%
Operating Expense Per Passenger Mile	$5.60	4%	$3.74	2%	$3.71	59%
Farebox Recovery (%)	9%	-3%	8%	-7%	6%	-1%
Average Fare	$2.49	1%	$2.66	-1%	$1.62	0%
Service Efficiency						
Revenue Miles Per Vehicle Mile	0.86	0%	0.87	-1%	0.86	0%
Vehicle Miles Per Peak Vehicle	30,174	0%	36,589	2%	37,123	-3%
Average Speed (RM/RH)	13.68	0%	15.47	0%	12.51	-2%
Transit Investment and Service Quality						
Operating Expense Per Service Area Capita	$13.18	1%	$20.46	5%	$20.48	6%
Vehicle Miles Per Service Area Capita	3.45	0%	5.39	4%	6.40	3%
Weekday Span of Service (in hours)	16.56	2%	17.78	1%	19.00	0%

Source: Annual NTD Reports (2015-2019)
Additional peer charts can be found in Appendix A-2.

Measuring the Impacts of the COVID-19 Pandemic

Given the unprecedented impacts of the COVID-19 pandemic across the global economy, it is useful to analyze its effects on Lextran, its peers, and the transit industry as a whole. Using monthly NTD reports, year-over-year percent change in ridership, vehicle revenue hours provided, and productivity per revenue hour was calculated. **Figure 2-5** through **Figure 2-7** depict two-year trend lines to compare Lextran's performance to its peer cohort and the transit industry average. Key findings are summarized below:

- Compared to relatively stagnant ridership observed of its peers and across the industry, Lextran's ridership increased from July 2018 until the onset of the pandemic in March 2020. Based on a 12-month rolling average, between July 2018 and January 2020, average ridership among Lextran's peers dropped 5% compared to a 1% decline across the industry. Lextran, on the other hand, saw a ridership increase of 10% across this period. As shown in **Figure 2-5**, most of Lextran's ridership gains over this period occurred in FY 2019 before leveling off in FY2020.
- The pandemic's impact on Lextran's ridership productivity was generally less severe compared to its peers and the industry average. At its low point in April 2020 during mandatory shut-down orders, Lextran experienced a year-over-year monthly ridership loss of 68%, compared to an 82% decline among its peers and a 72% decline across the industry. Ridership across the country began to recover beginning in May 2020. By June 2020, Lextran's year-over-year monthly ridership loss was 40%, compared to 62% for its peers and 55% for the industry.
- Lextran's relative resilience through the early months of the pandemic may be due in part to the fact that it was less aggressive in cutting back service compared to its peers. As shown in **Figure 2-6**, Lextran reduced service hours by 34% and 27% in April and May, respectively, compared to the prior year, while its peers cut service by more than 40% during those months. As a result, Lextran's year-over-year productivity per revenue hour, as shown in **Figure 2-7**, was less severely impacted and began to recover more rapidly compared to its peers and the industry average.

Figure 2-5: Ridership Year-Over-Year Percent Change, June 2018 – June 2020

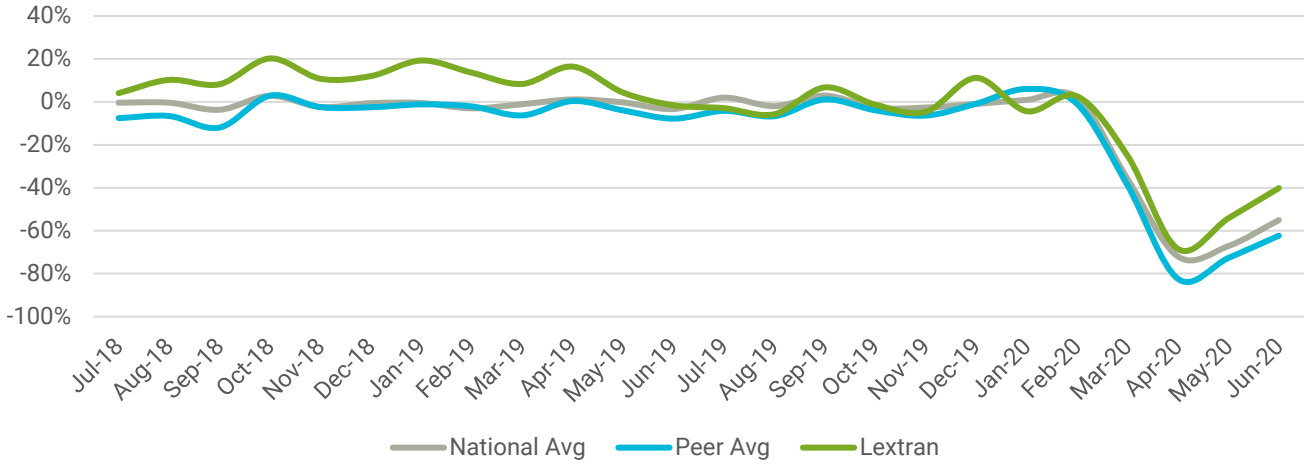


Figure 2-6: Vehicle Revenue Hours Year-Over-Year Percent Change, June 2018 – June 2020

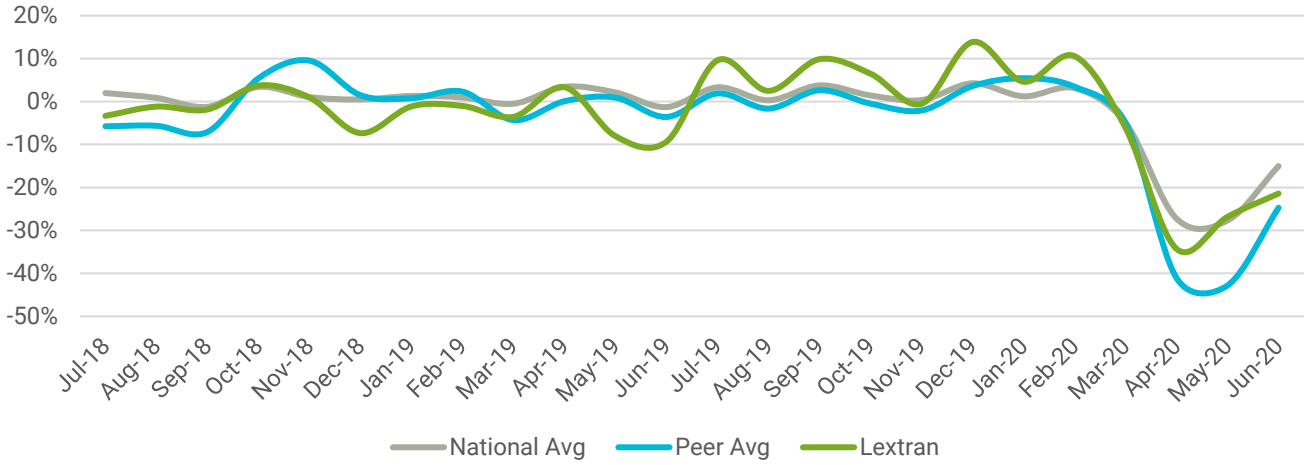
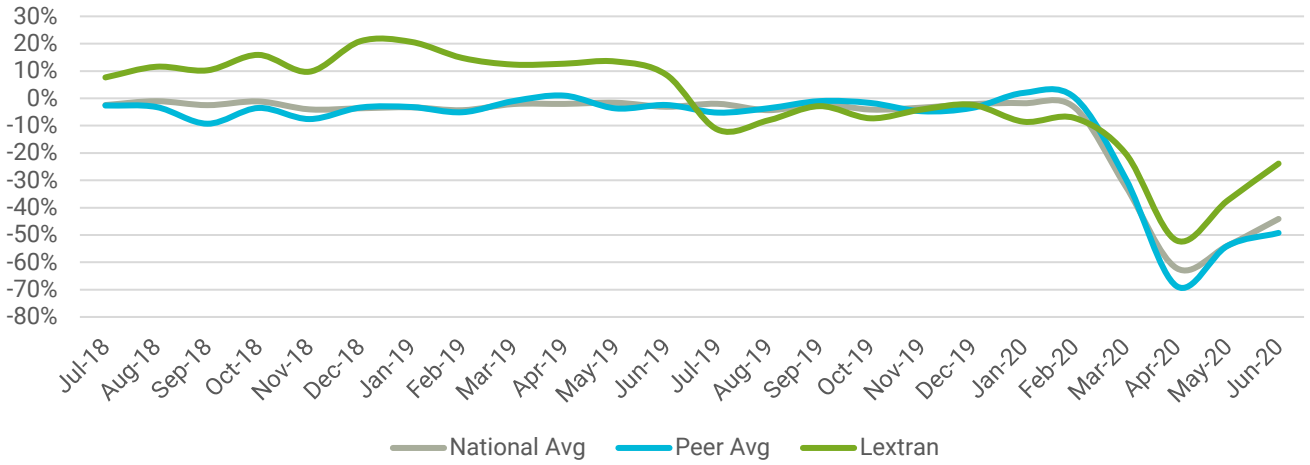


Figure 2-7: Ridership per Vehicle Revenue Hour Year-Over-Year Percent Change, June 2018 – June 2020



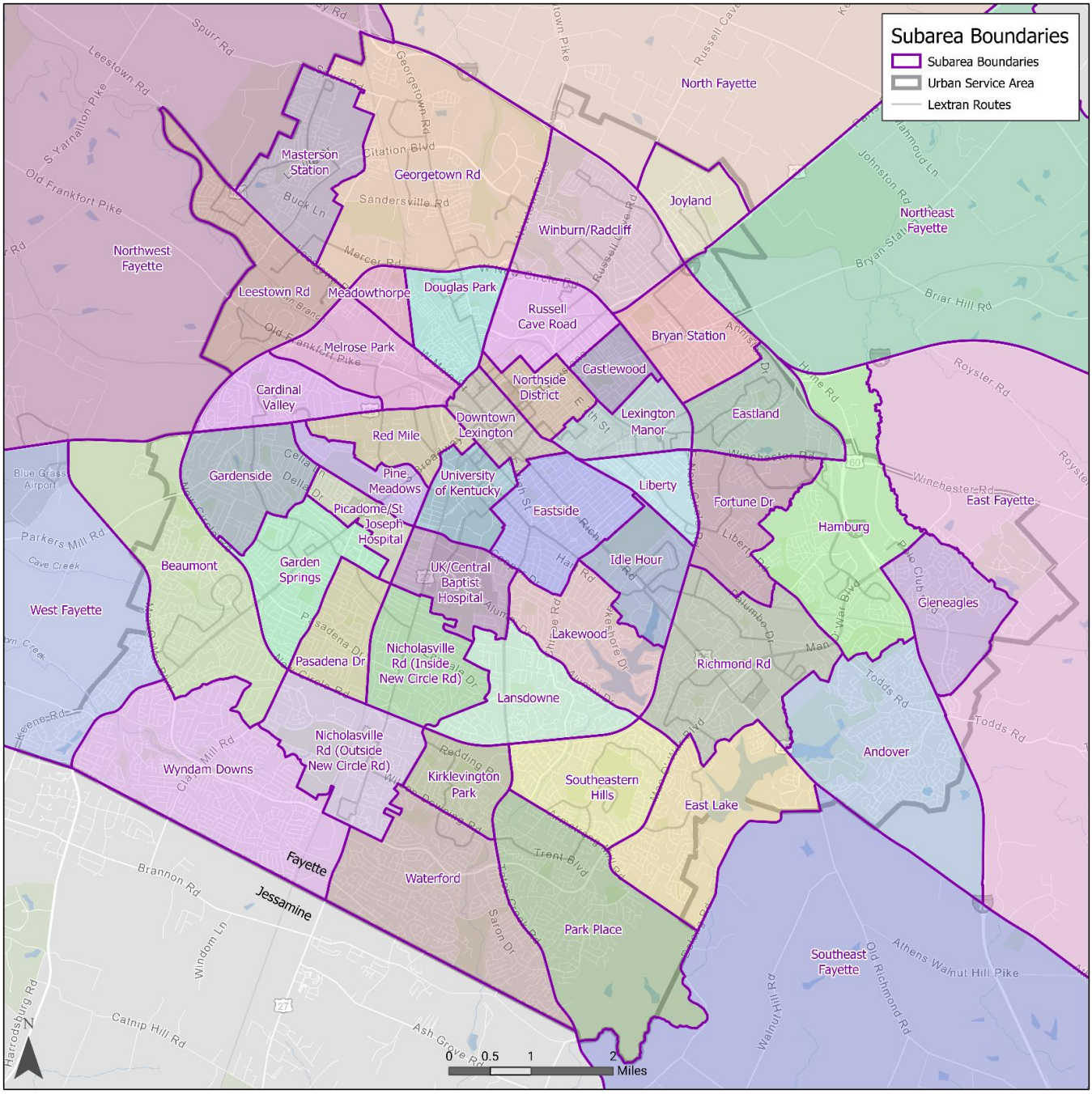
Source: NTD Monthly Module Adjusted Data Release (July 2020 dataset)

2.4. Market Assessment

To understand the need and feasibility of public transportation services in Lexington-Fayette County, a transit market analysis was prepared to evaluate the community characteristics and travel patterns that influence the potential demand for transit service. The following four sections provide an overview of the components of transit demand. The first section, Estimating the Demand for Transit, offers an introduction to transit demand, discussing key definitions and high-level determinants of transit ridership. The second section, Service Area Environment and Development Trends, offers insight into recent local planning initiatives that impact transit as well as discusses the transit-land use connection in Lexington. The third section, Service Area Demographics, delves into the specific characteristics that drive ridership as well as the communities that rely on transit the most. The final section, Service Area Travel Patterns, discusses the results of travel study using Location Based Services (LBS) data that show where and when people travel in Lexington.

Several data sources were utilized throughout the process of creating the market assessment. American Community Survey (ACS) and Longitudinal Employer-Household Dynamics (LEHD) data at the census block group (CBG) level are used extensively throughout this section. However, in some contexts, such as neighborhood accessibility or city-wide travel movements, a geographical unit larger than a CBG is more appropriate. Therefore, as part of the existing conditions analysis, subareas were defined with Lextran staff by clustering CBGs together that were similar in land use and character. These subareas are intended to represent how locals think of the many distinct areas in Lexington with names that are readily understood. These subareas are shown below in **Figure 2-8**. This figure should be referenced throughout as the text makes use of the subarea nomenclature repeatedly.

Figure 2-8: Lexington Subareas



2.4.1. Estimating the Demand for Transit

The demand for public transportation is influenced by a variety of factors. These factors include population and employment density, the prevalence of transportation disadvantaged populations, major activity generators, parking availability and cost, and the cost of driving a personal automobile (monetary and time). In most urban settings, population and employment density are typically the most effective indicators of transit patronage.

In addition to population and employment, other factors help distinguish transit markets in a community. Transit markets are commonly grouped into two categories:

- **Discretionary riders** are those who have adequate financial and physical means to operate a private automobile but choose to ride transit as a personal choice or out of convenience. Discretionary riders are more commonplace in high-density metropolitan areas, where factors such parking availability and the cost of driving due to long commutes or traffic congestion increase the advantage of riding transit versus driving.
- **Transit dependent riders** are those who utilize transit services due to lack of financial resources or physical ability to own or operate a personal automobile. Compared to discretionary riders, transit dependent riders tend to use transit for a larger variety of trip purposes beyond work commuting, including shopping, medical appointments, and social activities.

In midsize urban settings like Lexington, the demand for transit is largely driven by transit dependent riders, although major activity and employment centers can significantly influence demand in specific locations. Other factors that would otherwise attract choice riders, such as parking availability and the cost of driving, are less common in Lexington. A notable exception, however, is the University of Kentucky (UK), where limited parking availability and the pedestrian-oriented environment create a strong market for transit in and around campus.

2.4.2. Service Area Environment and Development Trends

This section provides the environmental context of Lexington so that the transit system can be assessed through the appropriate lens. While there are myriad influential factors on the transit system, the most critical components can be grouped into three categories: planning, land use, and development. The Planning Context section identifies the most relevant planning studies over the past several years and focuses on how each document is related to transit. The Land Use Context section examines the land classification system in the county and calculates the proportion with access to the Lextran transit network. The third and final topic is the Development Trends section, which looks at how quickly different areas within the county are growing in terms of population and jobs.

Planning Context

A review of planning literature was conducted to examine the status of the local plans. A total of nine documents were identified as being relevant to the goals and objectives for the current planning effort. Four of these which were produced by Lextran and the remaining five were from partner agencies. Each plan is included in **Table 2-8**, which gives an overview with the key considerations and relevant goals.

Table 2-8: Summary of Relevant Plans

Plan Title (Year)	Plan/Program Overview	Key Considerations / Implications / Outcomes	Relevant Goals
Documents Produced by Lextran			
Comprehensive Operations Analysis (2015)	Th 2015 COA is the predecessor document to this COA. The 2015 COA examined existing operations and proposed short-term improvements to enhance service efficiency and effectiveness.	The COA proposed a menu of options for service adjustments, including: • Various alignment adjustments • Eliminate routes 16, 20, 23, 31 • Extend evening service on Route 15 • Offering bi-direction night service on routes 1-13 from 9PM-12AM • Offering Sunday service on Routes 1-13 from 6AM-9PM • Implement new medical route on Nicholasville, Southland, Rosemont, Harrodsburg	1. Design a more efficient and effective system by directing transit investment to where it is needed most within current funding parameters and projections 2. Expand Lextran's customer base in terms of ridership and community support 3. Enhance Lextran's role and relevance in the community and region as both a transportation provider and economic development generator 4. Minimize the impact of service changes to existing riders
US-27 Alternatives Analysis (2014)	Lextran led an Alternatives Analysis (AA) for the US-27 / Nicholasville Road corridor in partnership with LAMPO, LFUCG, KYTC, the City of Nicholasville, and Jessamine County. The study area encompassed the 10-miles of US-27 between downtown Lexington and Main Street/US-27 in Nicholasville.	This study evaluated a range of alternatives to: • Improve transit services in the corridor • Reduce transit travel times • Ensure reliability • Increase opportunities for transit-oriented development (TOD) and redevelopment The evaluation of alternatives resulted in locally preferred alternative of Mixed Traffic BRT.	1. Identifying a cost-effective transit investment for implementation in the US-27 corridor 2. Providing a foundation for integrating land use decisions with transportation and transit investments 3. Developing a dialogue to elevate the priority and status of transit within the Lexington area
Nichols Park Stop Analysis	The development of the Summit at Fritz Farm fomented changes to Routes 3 and 5. This document addressed the subsequent operational issues.	This study intended to mitigate the following: • Vehicle conflicts created from vehicle left turns • Turning movement that causes vehicles to scrape pavement • Some passengers must wait at the layover location before they can get to their destination	1. Development of low-cost solutions that can be implemented in the near term that address the operational issues currently experienced at the Walmart on Nicholasville Road

Plan Title (Year)	Plan/Program Overview	Key Considerations / Implications / Outcomes	Relevant Goals
Transit Asset Management Plan (2018)	This plan documents the inventory, management, and prioritization of assets.	The Transit Asset Management Plan includes: • Capital Asset Inventory • Condition assessment • Investment prioritization	1. Gather relevant information about useful life benchmarks and the TERM scale for condition of assessments of non-rolling stock 2. Using FTA's ULB, evaluate the cost of replacement of rolling stock 3. Conduct an internal survey on aging fleet impacts 4. Use survey to foster internal discussion leading to hitting targets
Documents Produced by Partner Agencies			
2045 Metropolitan Transportation Plan	This long-range plan communicates the future vision, goals, strategies, projects and programs for transportation in the Central Kentucky Region, with a focus on the planning area of Fayette and Jessamine County.	This study includes the following: • Short and long-range transportation improvement projects • Transit expansion/improvements discussion, including: regional transit, increased service frequency, reduced travel times, operational and administrative facility, Bus Rapid Transit, and transit financial plan	1. Establish regional visions, goals, and objectives 2. Assess existing transportation system 3. Predict future travel demand 4. Assess community needs and desires 5. Identify solutions and strategies 6. Predict future financial resources 7. Develop long-range and short-range investment strategies 8. Prioritize and evaluate projects and programs 9. Implement the plan and monitor system performance
2030 Long Range Transportation Plan (LRTP)	This plan reveals the guidelines for improving the public transit system of the Lexington Area for 25 years.	Key elements of the LRTP included documentation of: • Public involvement and outreach activities • Potential transit improvement elements determined • Transit demand analysis and modeling that analyze and compare the cost-effectiveness of different transit improvement plans • Financial analysis and forecasts	1. Determines potential transit improvements 2. Presents transit demand analysis methodologies and a TransCAD based transit model 3. Identifies projects and implementation plan 4. Estimates both operational and capital costs 5. Forecasts transit funds expected to be available to implement the recommended projects and improvement plans

Plan Title (Year)	Plan/Program Overview	Key Considerations / Implications / Outcomes	Relevant Goals
Imagine Lexington Comprehensive Plan (2018)	This document provides flexible yet focused planning guidance to ensure equitable development of the community's resources and infrastructure that enhances quality of life, fosters regional planning and economic development	Imagine Lexington created the following: • Equity policy of adding residential opportunities by up-zoning areas near transit for populations who rely solely on transit • Sustainability policy of developing a multimodal transportation network and infrastructure, and seeking collaboration with regional transit partners for the commuting public • Sustainability policy of encouraging transit-oriented development, increasing density along major corridors and in the infill and redevelopment area to support transit ridership, reducing vehicle miles travelled • Led to the creation of Imagine Nicholasville Road, described below	1. Grow successful neighborhoods 2. Protect the environment 3. Create jobs and prosperity 4. Improve a desirable community 5. Maintain urban and rural balance 6. Implement the plan
Imagine Nicholasville Road (2020-2021)	This study aims to produce recommendations derived from public input that will be used to guide future development efforts and decision-making for Nicholasville Road.	This study is a direct result of Lexington's 2018 Imagine Lexington Comprehensive Plan. The plan includes: • Exploring how the community can improve one of Lexington's major corridors • Focusing on how more housing and a mix of land uses along the corridor can help the city's housing needs	1. Prioritize transportation investments and coordinate them with redevelopment as it occurs over time. 2. Identify how to create a more pedestrian and transit-oriented environment on Nicholasville Road

Plan Title (Year)	Plan/Program Overview	Key Considerations / Implications / Outcomes	Relevant Goals
Downtown Lexington Traffic Movement and Revitalization Study (2015)	This study provides a structured, systematic process for evaluating the conversion of streets from one-way to two-way and provides information to decision makers regarding the impacts and mitigation.	The outcomes of this study include: • Recommendation of transit center relocation feasibility study, including potential redevelopment of the existing facility, removing the Martin Luther King, Jr. Boulevard viaduct, and establishing an at-grade intersection with Vine Street • Based on conversions, a recommendation to re-evaluate the current routing system in the downtown area to mitigate or reduce congestion impacts	1. Assess the ability of the downtown street system to accommodate current and future traffic conditions with all streets converted to two-way 2. Determine if conversion can reduce driver confusion, increase accessibility of businesses, and moderate vehicle speeds for improved safety 3. Determine negative impacts and problem spots and propose practical solutions 4. Engage public participation 5. Provide information to decision makers
Lexington Area Bike-Ped Master Plan (2018)	This study reveals a network of high-quality walkways and bikeways that connect communities and fosters economic growth and regional collaboration	Key recommendations of the Ped Master Plan include: • Coordinate with Lextran to improve pedestrian access to transit stops • Adoption of a complete streets policy, which should accommodate all people who use the street, whether traveling on foot bike, transit, or car	1. Enhance Connectivity 2. Encourage economic growth 3. Promote equity 4. Improve health 5. Increase safety 6. Increase mobility

Land Use Context

Land use has a profound impact on transit and its ability to serve effectively and efficiently. It is therefore critical to discuss the land use components in Lexington-Fayette County that are relevant to the success of Lextran. High-density development is the cornerstone of the most productive transit service, and it is oftentimes aided (or restricted) by the built environment. This section discusses the factors that influence Lexington's transportation network, with particular attention to those most germane to transit.

Existing Transportation Infrastructure

Lexington is located in central Kentucky, and while there are no interstates that run through the city core, I-64 and I-/75 cross through northeast Lexington for access to nearby major cities. Within the county, the urban growth boundary, discussed in more detail below, has a significant impact on the transportation network with far more roadways constructed in the urban service area compared to the rural service area.

The transportation infrastructure within Lexington is highly radial in design. Roughly ten main arterial roads (e.g. Nicholasville Road, Richmond Road, and Leestown Road) extend outward from the downtown core with very few roads offering a continuous path from one arterial street to another. New Circle Road (State Highway 4), however, completely circles the city at a distance from the downtown core ranging from roughly 4four miles to the south to two miles to the north. Although about 1/3rd of New Circle Road has been commercially developed and functions as a principal arterial, most of it operates as a limited access highway and represents the primary connection to other regions of the city without traveling directly into the city center. About 1.5 miles south of New Circle Road is Man O' War Boulevard, which is a principal arterial that provides some additional cross-town access for southern Lexington. The downtown area of Lexington is characterized by a grided street network, as are many surrounding neighborhoods. Connectivity in these areas, however, is impacted by the numerous one-way pair streets, which emphasize capacity over directness of travel. Lextran's bus routes are therefore impacted by the street network and direction of travel, by limiting the number of options for travel movements in these areas. It should be noted that Lexington has been interested in converting the one-way streets to two-way. More information on this topic can be found in **Table 2-8,** which includes details on the Downtown Lexington Traffic Movement and Revitalization Study from 2015.

Urban Growth Boundary and Zoning

There has long been an emphasis on preserving farmland and directing development to urban areas in Lexington. In 1958, Lexington enacted the nation's first urban growth boundary, which defined the line between the urban service area (USA) and the rural service area (RAS). New development was restricted to the USA, while land area minimums were placed on land holdings in the RSA. Although updates to the original urban growth boundary have occurred since (1980 and 1996), Lexington continues to direct development inward rather than into adjacent farmlands. In addition, Lexington has permanently preserved 277 farms (nearly 30,552 acres) of farmland by way of Purchase of Development Rights. Under this program, which is also commonly known as PDR, the city purchases the right to development land commercially from the farm owner, thereby protecting it from future development. Because of the importance of the urban and rural services areas, the boundary is shown in all figures in this section for reference.

The impact of the urban growth boundary can be seen in the distribution and proportion of land-uses in Lexington-Fayette County. To gain additional insight, the most up-to-date zoning file was obtained from the Lexington Open Data portal (last updated in January 2020). The relative zoning classifications within the urban service area and rural service area are shown in **Table 2-9**. Additionally, to understand land use in the context of transit availability, the zoning within a 0.25-buffer distance from every stop in the Lextran transit network is also included. Highlights from this analysis are described below:

- The zoning analysis shows that there is a variety of land-uses within the urban service area and relatively few land-uses in the rural service area. Nearly all (98%) of the rural service area is zoned as Agricultural Rural. In the urban service area, the two most prevalent land uses are Single Family Residential (38%), and Planned Neighborhood Residential (13%). In general, these types of land uses are not conducive to productive fixed-route transit service.
- The most common land use around bus stops by total acreage is also zoned as Single Family Residential (31% of transit access area) and Planned Neighborhood Residential (13% of transit access area).
- All business-focused zones in the USA are well covered by the transit network, including 84% of Commercial Center, 94% of Highway Service Business, and 100% of Downtown Businesses.
- One potential area for improvement may be in the High-Density Apartment zoning, where transit currently covers 66% of the total area. Generally, the areas that are not within 0.25 miles of a bus stop that are zoned for this use are on the periphery of the city, outside of Man O' War Boulevard. Many of the largest parcels are located in the Waterford and Park Place subareas. Additional pockets of High-Density Apartment zoning without transit access are in Wyndam Downs just southwest of Walmart Nichols Park, and near Todds Road where the Richmond Rd, Andover, and Hamburg subareas meet. Depending on roadway access, underlying demographic characteristics, and development of these areas, this could potentially represent an opportunity for future service improvements.

Table 2-9: Land Use Classification in Lexington-Fayette

Land Use Category	Land Use Classification	Rural Service Area Total (Acres)	Urban Service Area Total (Acres)	Transit Access Area Total (Acres)	Transit Access Area (% of Urban Service Area)
Agriculture	Agricultural Buffer	109.1	-	-	-
	Agricultural Natural Areas	44.2	-	-	-
	Agricultural Rural	126,092.2	2,446.6	530.9	21.7%
	Agricultural Urban	8.3	3,918.3	1,534.1	39.2%
Commercial/Business	Commercial Center	-	1,141.3	960.4	84.1%
	Downtown Business	-	49.7	49.7	100.0%
	Downtown Frame Business	-	97.0	97.0	100.0%
	Economic Development	0.0	620.7	137.4	22.1%
	Highway Service Business	78.0	1,400.9	1,319.9	94.2%
	Interchange Service Business	165.9	257.5	248.3	96.4%
	Lexington Center Business	-	144.8	144.8	100.0%
	Neighborhood Business	80.6	908.4	825.4	90.9%
	Professional Office	566.1	1,466.6	1,213.6	82.7%
	Wholesale and Warehouse Business	-	669.7	535.9	80.0%
Industrial	Heavy Industrial	38.1	760.4	585.6	77.0%
	Light Industrial	293.4	3,827.7	2,895.7	75.7%
Mixed-Use	Mixed-Use Community Zone	-	138.2	124.9	90.4%
	Mixed-Use Neighborhood Corridor Zone	-	9.5	9.5	100.0%
	Mixed-Use Neighborhood Node Zone	-	0.4	0.4	100.0%
Residential	Expansion Area Residential	2.0	2,877.8	168.9	5.9%
	High Density Apartment	-	2,487.8	1,632.3	65.6%
	High Rise Apartment	-	70.6	66.8	94.7%
	Mobile Home Park	26.2	73.4	28.6	39.0%
	Planned Neighborhood Residential	0.7	6,838.9	3,460.4	50.6%
	Residential Planned Unit Development	-	98.0	-	0.0%
	Single Family Residential	568.8	20,561.3	8,464.6	41.2%
	Townhouse Residential	0.1	1,269.0	712.3	56.1%
	Two-Family Residential	-	1,674.9	1,327.5	79.3%
University	University Research Campus	-	700.9	239.0	34.1%
Other	Community Center	-	110.9	87.4	78.8%
	Conservation District	-	8.0	-	0.0%
	Exclusive Use Zone Landfills	57.7	-	-	-
	Luigart Planned Unit Development	-	1.6	1.6	100.0%
TOTAL		128,131.3	54,630.6	27,402.9	50.2%

1. Transit Access is defined as area within 0.25 miles from bus stop

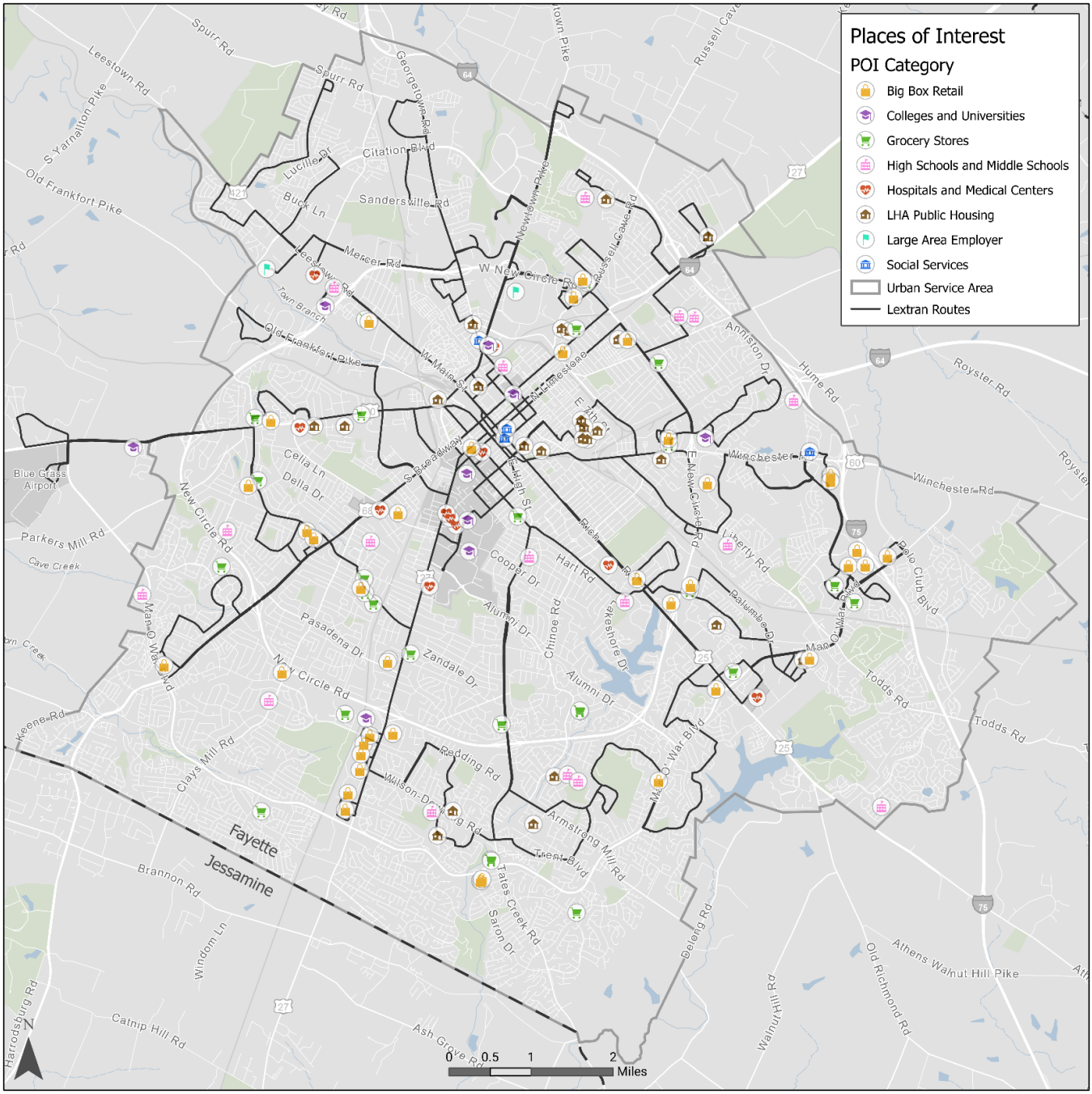
Places of Interest

Places of interest are defined here as point locations in the Lextran service area with high potential for generating transit trip productions and/or attractions. The process of identifying places of interest includes both considering locations that have high overall travel demand (e.g. large employment centers and high-density housing) as well as locations that are more likely to attract transit dependent populations (e.g. public housing and social services). In the Lextran service area, places of interest were identified and categorized into one of the following groups: big box retail, colleges and universities, grocery stores, high schools and middle schools, hospitals and medical centers, Lexington Housing Authority (LHA) public housing, large area employers, and social services.

A total of 131 places of interest in the Lextran service area were located and mapped, shown in **Figure 2-9**. Findings from this process are as follows:

- Nearly all the identified places of interest have service in the existing transit network. More specifically, a total of 112 (85%) of the locations were within walking distance of a transit route using a 0.25-mile buffer.
- Every hospital/medical center, large area employer, and social service identified is within walking distance of a transit route. Nearly all big box retail (87%) is within walking distance as well. In addition, higher education is well served, with only one of the nine colleges/universities in Lexington (Commonwealth Baptist College off of Versailles Road) not currently served by a transit route.
- Using the locations of 25 LHA public housing developments encompassing 1,009 housing units, only one location was farther than 0.25 miles from a transit route: Falcon Crest in Southeastern Hills at 0.37 miles. Most grocery stores (79%) and high schools and middles schools (65%) were within 0.25 miles of a transit route.

Figure 2-9: Places of Interest



Source: Nelson\Nygaard

Development Trends

Development in Lexington is examined here by utilizing recent population and employment growth data, as these are the two most critical components of transit demand. Population growth is examined by calculating and mapping the recent changes in Fayette County, which is then compared to the growth of the surrounding area and Commonwealth of Kentucky. Employment is then examined using LEHD data to highlight areas where jobs are increasing the most. The surrounding counties as well as the Commonwealth of Kentucky are sited for comparisons here as well.

Recent Population Growth

Population is used here as a proxy for recent development trends in Lexington. **Table 2-10** shows the five-year population growth using 2013 and 2018 ACS datasets for Fayette County and the adjacent six counties. The state is included to provide a broader perspective as well. Key findings for population changes are as follows:

- Overall, Fayette County has shown significant growth from 2013 to 2018. By increasing in population by nearly 17,900, Fayette County has grown 5.9%, which is similar to the surrounding six counties average rate of population growth of 6.1%.
- Kentucky has grown at a much slower rate than Fayette County. Fayette County accounts for an impressive 31.6% of population growth in the entire state.

Table 2-10: 2013-2018 Population Estimates

	ACS Population Estimates		5-Year Trend	
Geographic Area	2013	2018	Total Change	Percent Change
Fayette	**300,843**	**318,734**	**17,891**	**5.9%**
Bourbon	19,999	20,144	145	0.7%
Clark	35,608	35,872	264	0.7%
Jessamine	49,112	52,422	3,310	6.7%
Madison	83,976	89,700	5,724	6.8%
Scott	48,149	53,517	5,368	11.1%
Woodford	24,988	26,097	1,109	4.4%
Kentucky	4,404,659	4,461,153	56,494	1.3%

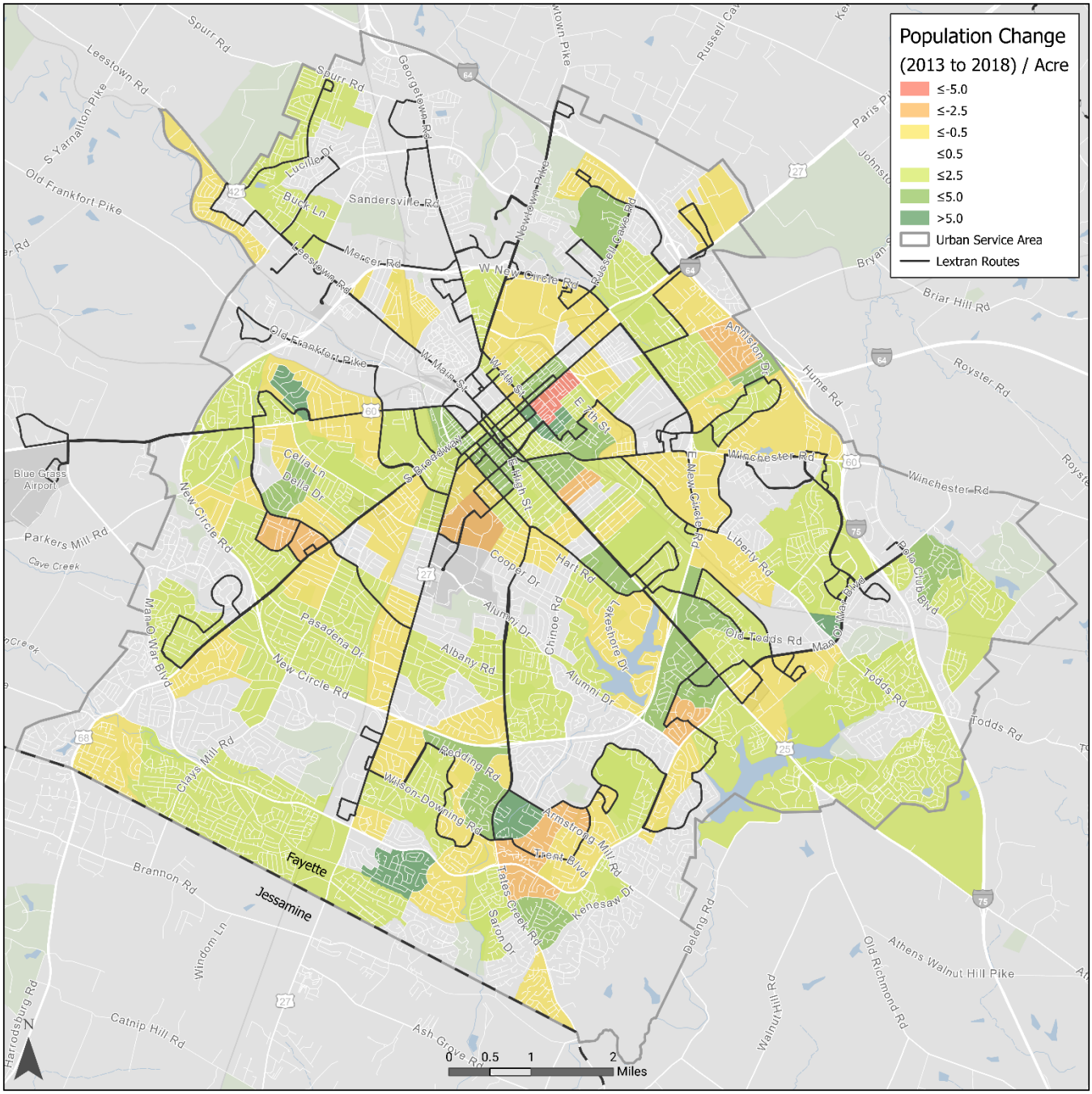
Source: US Census ACS (2013-2018)

Figure 2-10 shows changes in population from 2013 to 2018 cartographically. Key findings are as follows:

- While some areas of Lexington have experienced declines in population, most are relatively low. The area that experiences the greatest decrease in population is just north of downtown in the Northside District, which experienced losses of 6.3 and 5.7 per acre in two CBGs. University of Kentucky has also decreased in population, with a loss of over 1,100 over the five-year study period in the two most affected CBGs. This statistic, however, should be observed with the knowledge that a significant portion of the population on campus is from student housing, most of whom are not permanent residents and may be subject to greater volatility. Despite the reported decline in population, the strong ridership of these areas suggests that maintaining current service levels is likely warranted.

- Heavy population growth has occurred at Tates Creek Road and Armstrong Mill Road, particularly in the Park Place subarea. Route 3 serves the Park Place subarea approximately every 35 minutes for most of the day on weekdays. The area with the highest population growth has service in only one direction for many trips resulting in less frequent service.
- One area with recent and continuing development, is on the far eastern side of Lexington, along Polo Club Boulevard. Currently, Route 10 serves the Costco north of Man O' War Boulevard every 35 minutes during most of the day on weekdays. As this area continues to grow, consideration should be given to modifying the alignment to include new development.
- Parts of the Waterford subarea have seen significant population increase. The area just outside of Man O' War Boulevard with the greatest increase does not have currently have transit service. The closest routes to this area are Route 3 and Route 5, serving Fayette Mall.

Figure 2-10: Population Change Density (2013 to 2018)



Source: US Census ACS (2013-2018)

Recent Job Growth

Changes in jobs are representative of the overall growth of an area. **Table 2-11** below shows the total growth in jobs from 2013-2017 in Fayette County, as well as growth in the surrounding six counties and the entire state.

- Jobs have increased in Lexington-Fayette County at an even greater rate (8.5%) than population (5.9%) within a similar timeframe.
- Average job growth for the surrounding six counties of 8.9% is similar to that of Fayette County alone with 8.5%.
- Job growth in Fayette and the six-county area as a whole has outpaced job growth in the state.

Table 2-11: 2013-2017 Job Estimates (LEHD)

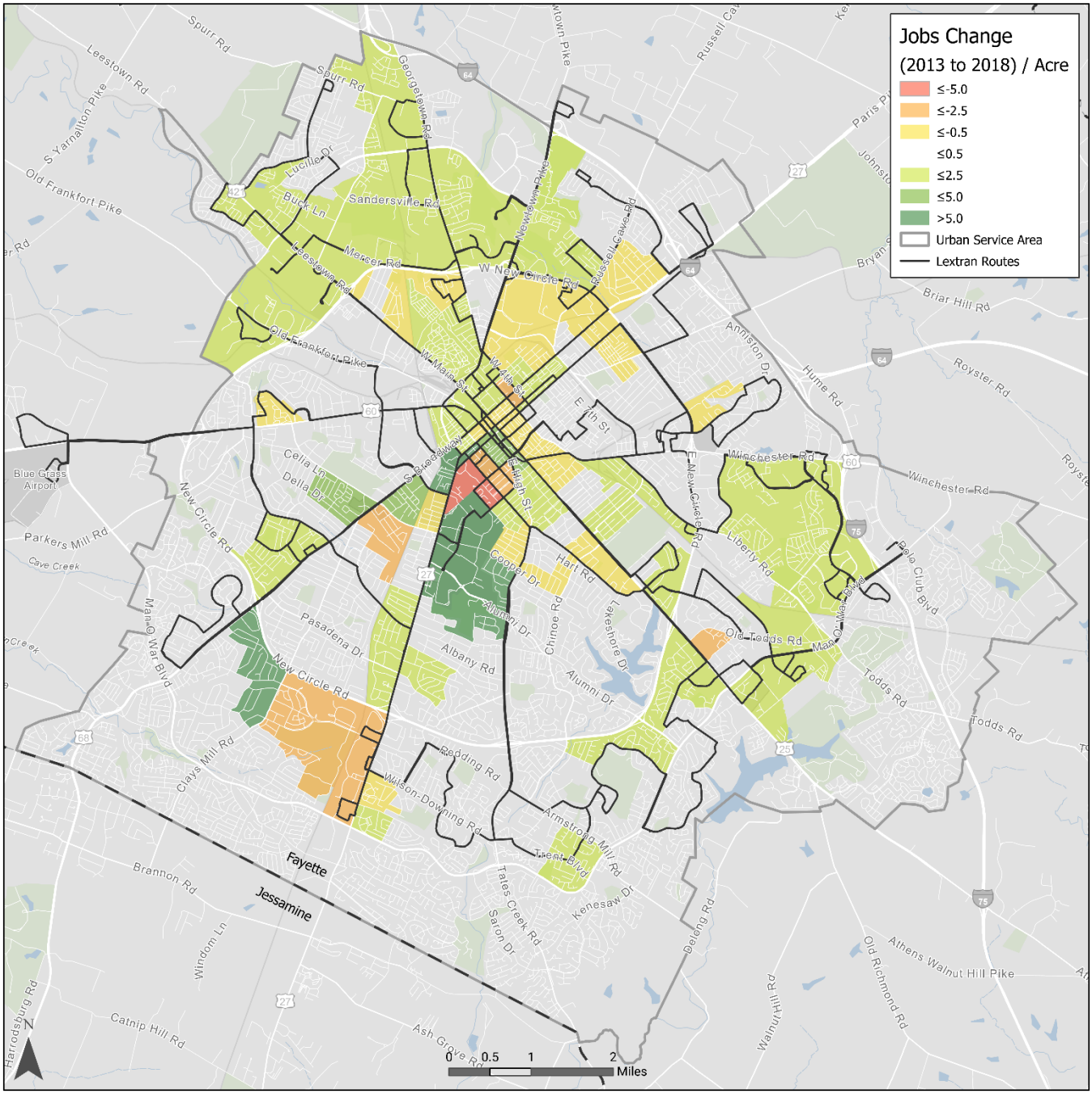
	LEHD Job Estimates		4-Year Trend	
Geographic Area	**2013**	**2017**	**Total Change**	**Percent Change**
Fayette	**184,246**	**199,853**	**15,607**	**8.5%**
Bourbon	7,069	6,888	-181	-2.6%
Clark	12,420	14,649	2,229	17.9%
Jessamine	16,277	18,455	2,178	13.4%
Madison	32,621	32,684	63	0.2%
Scott	23,100	27,205	4,105	17.8%
Woodford	9,363	9,972	609	6.5%
Kentucky	1,780,209	1,865,532	85,323	4.8%

Source: US Census LEHD (2013-2017)

A cartographic visual of job growth from 2013 to 2017 is shown in **Figure 2-11**. Several key findings become clear when investigating the LEHD data visually:

- The highest density of job growth occurs in UK/Central Baptist Hospital areas, where there has been an increase of nearly 13,000 jobs. This area is served by several routes, including Routes 5, 16, and the UK routes.
- Although the University of Kentucky subarea has CBGs with large increases in jobs, the net trend for the area is one of job loss (roughly 11,000).
- Over 4,000 jobs have been added in the southeast CBG of Beaumont. Office buildings at the corner of New Circle Road and Harrodsburg Road are likely large contributors. Routes 13 and 58 serve this area along Harrodsburg Road.
- The area of East Lexington outside New Circle Road (subareas Fortune Drive and Hamburg) has experienced large job increases. This area is currently served by Route 10 approximately every 35 minutes.

Figure 2-11: Job Change Density (2013 to 2018)



Source: US Census LEHD (2013-2017)

2.4.3. Service Area Demographics

As noted in Section 2.4.1, there are many determinants of transit demand. One of the most critical components needed to predict transit demand is demographic data. Here, demographic data are mapped and analyzed to help understand where transit demand is most likely to occur. The first section focuses on population and job density, two of the most important factors in predicting transit ridership. Immediately following is a section on density threshold analysis, which correlates population and job density with appropriate transit service levels. The third section focuses on demographics typical of transit-dependent populations, such as minority, limited English proficiency (LEP), disabled, elderly, and student populations, as well as low-income and zero-vehicle households. Demographic statistics are available within 0.25, 0.5, and 0.75 miles of Lextran bus stops to reveal both the walking distance to transit as well as the traditional 0.75-mile paratransit service area. The urban service area and the total county values are shown as well to gain additional perspective for each demographic variable.

Population and Jobs

Population

According to U.S. Census estimates, Fayette County had a population of 318,743 in 2018, as shown in **Table 2-12**. Insights from the population analysis are as follows:

- The urban service area accounted for 93.7% of the county total with a population of 298,663. In terms of transit accessibility, there are a total of 168,283 people within walking distance to a bus stop using a 0.25-mile straight line buffer.
- Population density reveals a sharp distinction between the county as a whole (1.7 people per acre) compared to the urban service area (5.5 people per acre). The area within 0.25 miles from transit holds the highest population density (6.1 per acre), suggesting that Lextran is serving the more populous areas in Lexington.

Table 2-12: Population Statistics (2018 ACS)

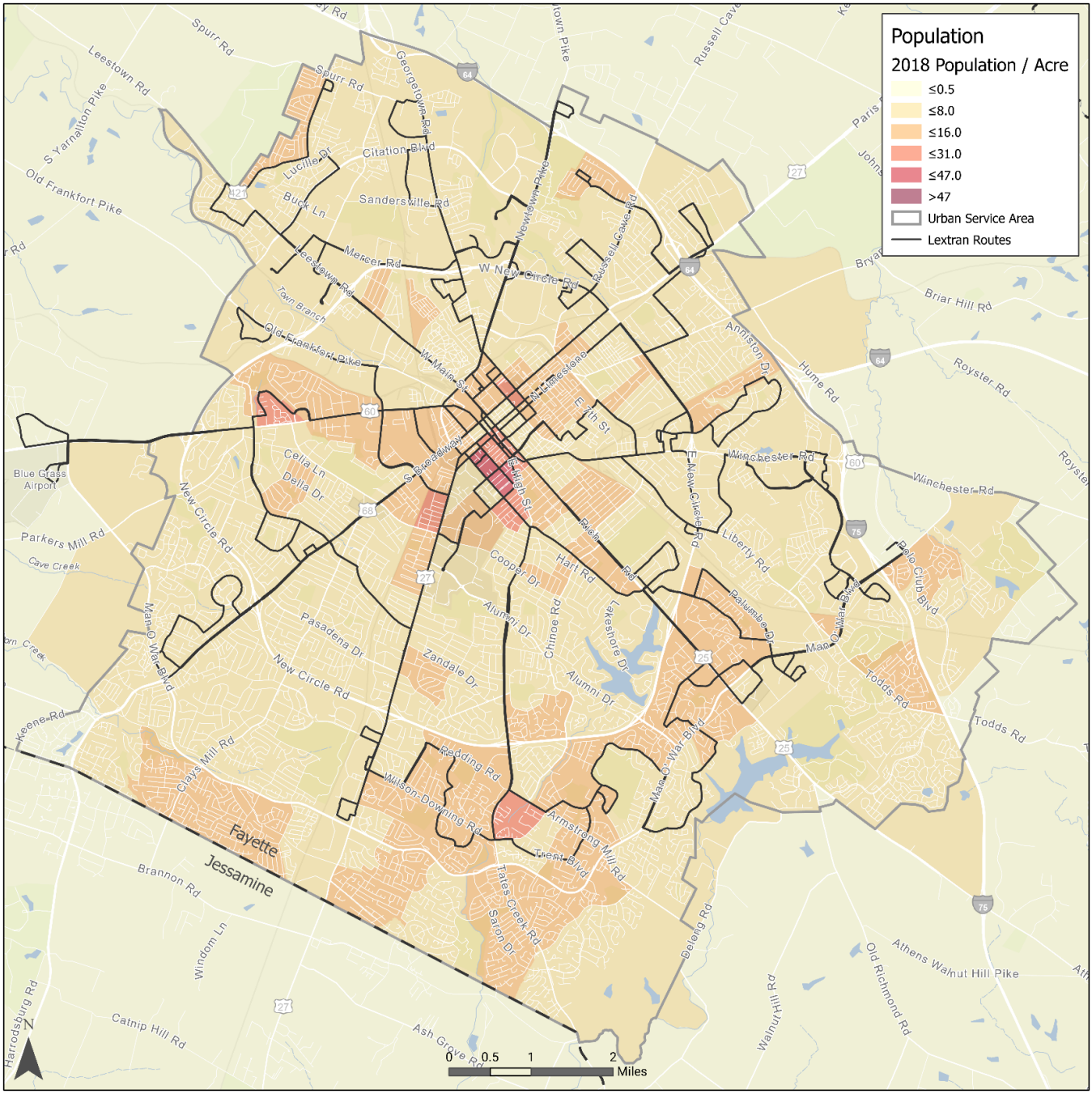
Location	Total	Density (Acre)	Percent of County Total
Within 0.25 Miles of bus stop	168,283	6.1	52.8%
Within 0.5 Miles of bus stop	227,951	5.5	71.5%
Within 0.75 Miles of bus stop	255,225	5.1	80.1%
Urban Service Area	298,663	5.5	93.7%
Lexington-Fayette	318,734	1.7	-

Source: US Census ACS (2018)

A closer look into population density is shown in **Figure 2-12** via cartographic representation. Population density color categories are shown that correspond with various levels of transit service, discussed in more detail in Section 0.

- The highest population density occurs in downtown Lexington, at 36.4 persons per acre. Transit service here is the highest in the system due to the passenger movements through the transfer center.
- The area with the second highest population density (21.17 per acre) is in Cardinal Valley, where there are numerous apartment complexes. Route 8 serves this area by deviating away from Versailles Road, operating approximately every 35 minutes with nearly 20-minute service during peak weekday periods.
- The CBG with the third highest population density (20.1 per acre) is located in Northside District just north of downtown, where Transylvania University is located. Route 4 serves this area along 4th Street, while Route 6 operates along North Broadway, yielding a high level of service appropriate for the high demand.
- Nearly all CBGs with high population density are currently being served. However, several CBGs on the southern side of Man O' War Boulevard, including the subareas Wyndham Downs, Waterford, and Park Place, do not currently have transit service. These locations may be considered for expansion. Route 5, serving Nicholasville Road, could be extended to serve one or more of these areas in the Wyndham Downs subarea. Additionally, Route 3 could be extended farther into Waterford or Park Place to serve some of the higher density locations.

Figure 2-12: Population Density (2018 ACS)



Source: US Census ACS (2018)

Jobs

The most recently available LEHD jobs data (2017) were downloaded from OnTheMap online tool and analyzed in GIS software, the results of which are shown in **Table 2-13** below. Highlights are as follows:

- Nearly all of the jobs in Fayette County are within the urban service area. Out of a total of 199,853 estimated jobs in the county, 94.3% (188,442) are within the urban service area.
- **Table 2-13** also shows that the Lextran system is serving the areas with higher density of jobs compared to the urban service area as a whole. A total of 128,563 jobs are within 0.25 miles of a bus stop, which represents 64% of all the jobs in Fayette County. This trend suggests that Lextran is providing transit service where it is needed most.

Table 2-13: Job Statistics (2017 LEHD)

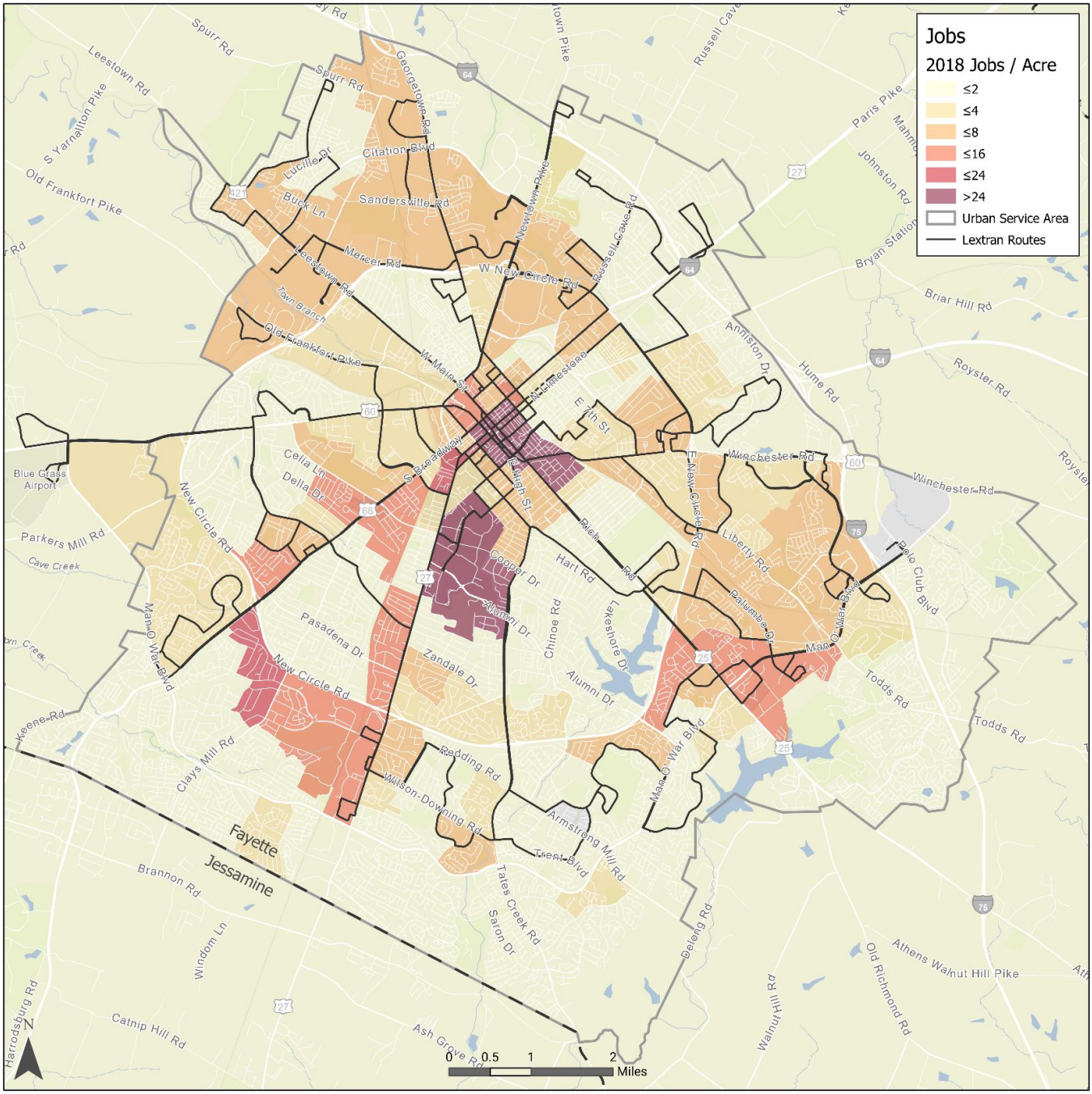
Location	Total	Density (Acre)	Percent of County Total
Within 0.25 Miles of bus stop	128,563	4.7	64.3%
Within 0.5 Miles of bus stop	169,734	4.1	84.9%
Within 0.75 Miles of bus stop	180,662	3.6	90.4%
Urban Service Area	188,442	3.4	94.3%
Lexington-Fayette	199,853	1.1	-

Source: US Census LEHD (2017)

The 2017 LEHD jobs data are shown visually in **Figure 2-13**. Several themes emerge in examination of jobs data in a geographical context.

- The highest job densities are concentrated towards the center of Lexington. Specifically, the top 7 CBGs in terms of job density are located in Downtown Lexington, Eastside, University of Kentucky, and UK/Central Baptist Hospital. These areas also appropriately have some of the highest service levels in the transit system.
- The southeasternmost CBG of Beaumont along New Circle Road (also referenced in the previous section on job growth) has a high total and density of jobs. Currently, this area has about 6,700 jobs. Route 13 currently serves this area approximately every 35 minutes, with 70 minutes during the midday. This section of Route 13 does not see particularly high ridership however, with less than 10 boardings a day on weekdays.
- Nicholasville Road has a high number of jobs, evidenced by a total of roughly 9,500 jobs in the Nicholasville Rd (Outside New Circle Rd) subarea, and approximately 8,600 jobs in the Nicholasville Rd (Inside New Circle Rd) subarea. This area is served by Route 5, which has the highest frequency of the Core Routes.

Figure 2-13: Job Density (2018 LEHD)



Source: US Census LEHD (2017)

Population and Jobs Density Threshold Analysis

Development patterns and density are a primary driver of transit demand. Most riders walk to access transit; therefore, the typical market capture area of a local bus route is generally limited to approximately ¼ to ½ mile. As a result, population and employment densities along a route determine how many people will be able to access transit and ultimately influence the level of service that can be efficiently supported in a given area. Areas with higher densities support greater frequencies of service, while lower density areas are typically better suited to lower-frequency fixed route service or alternative modes such as flexible routes or on-demand service.

Various studies conducted by the Transit Cooperative Research Program and Institute of Transportation Engineers have identified density thresholds for levels of transit service, as summarized in **Table 2-14**. As population and employment density increase, the associated transit service levels increase accordingly. It is important to note, however, that the transit service levels should be interpreted as a minimum. In many cases, higher levels of transit service will be appropriate in areas that are made up of CBGs that score lower in terms of transit service levels for various reasons, such as having several point locations that produce large amounts of ridership. It is also important to note that not every location subscribes to the same willingness to utilize transit, as local cultural preferences may have strong influence for the demand.

Table 2-14: Common Density Thresholds to Support Transit Level of Service

		Jobs per Acre					
		< 2	2 - 4	4 - 8	8 - 16	16 - 24	> 24
Population per Acre	< 0.5	DR	Flex	60 min	30 min	15 min	< 15 min
	0.5 - 8	Flex	Flex	60 min	30 min	15 min	< 15 min
	8 - 16	60 min	60 min	60 min	30 min	15 min	< 15 min
	16 - 31	30 min	30 min	30 min	30 min	15 min	< 15 min
	31 - 47	15 min	15 min	15 min	15 min	15 min	< 15 min
	> 47	< 15 min	< 15 min	< 15 min	< 15 min	< 15 min	< 15 min

Source: TCRP and ITE

Using this methodology, a density threshold analysis was performed at the block group level for Fayette County, the results of which are shown below in

Table 2-15. Key findings are summarized below:

- Although the majority of Fayette County qualifies as development levels appropriate for demand response (69.0% of land area), nearly all of it occurs outside of the urban service boundary. The population and jobs in these areas is extremely limited, representing very little of county totals. It is likely justified to restrict transit service to within the urban service area.
- Approximately half (48.8%) of the population in Fayette County lives in an area with densities conducive for at least Flex service.
- A total population of 150,289 (47.2% of the county total) lives in an area that would likely support at least 60-minute fixed route service.
- A total of 58,655 jobs are located in areas that would support at least 30-minute fixed route service, representing 29.3% of all jobs in the county.

Table 2-15: Fayette County Density Threshold Analysis Results

Threshold	Block Groups	Acres	Population	Jobs
DR	13	125,192	12,951	9,813
Flex	106	40,211	155,494	79,745
60 min	76	13,801	125,879	51,640
30 min	9	1,659	15,128	30,817
15 min	2	317	5,292	7,501
< 15 min	2	347	3,990	20,337

Population and job totals are enumerated in **Table 2-16** to show the relative densities in the urban service area, the county as a whole, and near bus stops similar to previous sections on population and jobs individually. The combination of population and jobs effectively shows the total activity that is likely to draw transit ridership in various areas of Lexington. Key trends observed in this data series are summarized below:

- Transit service appears to be appropriately aligned with population and job densities, evidenced by the highest densities associated with areas closer to bus stops.
- The majority of combined population and jobs are within walking distance to a transit stop (0.25-mile straight line distance).

Table 2-16: Population (2018 ACS) + Jobs (2017 LEHD) Statistics

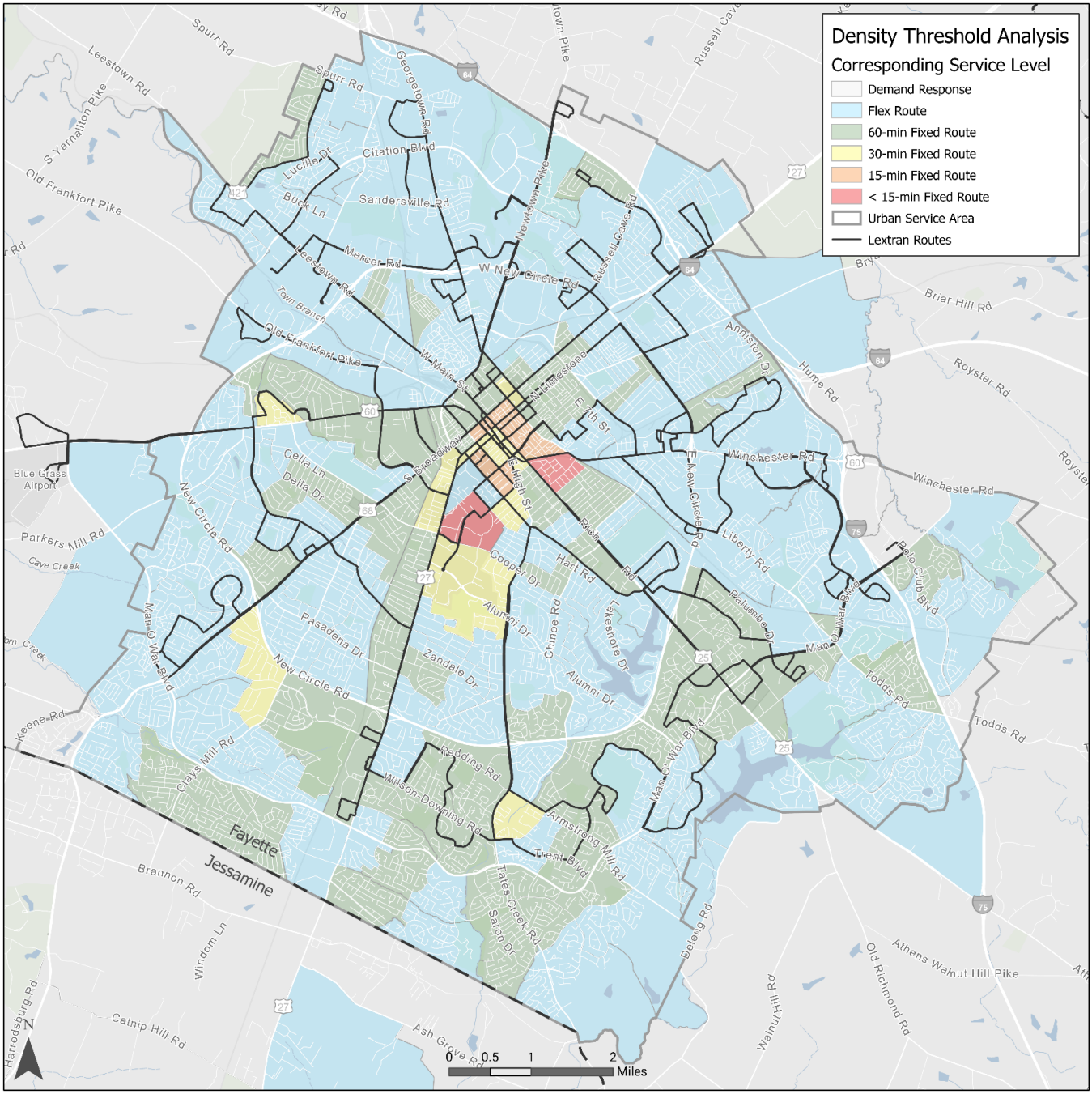
Location	Total	Density (Acre)	Percent of County Total
Within 0.25 Miles of bus stop	296,846	10.8	57.2%
Within 0.5 Miles of bus stop	397,685	9.6	76.7%
Within 0.75 Miles of bus stop	435,887	8.6	84.1%
Urban Service Area	487,105	8.9	93.9%
Lexington-Fayette	518,587	2.8	-

Source: US Census ACS (2018) and LEHD (2017)

Density-threshold analysis is shown spatially in **Figure 2-14**, with colors that correspond to the previous tables on transit level of service. The highlights of this analysis in the geographic context are as follows:

- Two locations in Lexington meet the criteria for fixed route service with headways of less than 15 minutes: the southern portion of the University of Kentucky subarea (served by Routes 16 and 14), and the northwestern portion of the Eastside subarea (served by Route 10).
- Three CBGs qualify for at least 15-minute headways, all of which are clustered in the downtown and University of Kentucky subareas, also well served by numerous routes.
- CBGs that are appropriate for at least 30-minute transit service are primarily located in the same subareas as the >15 and 15-minute headway CBGs, such as Eastside, Downtown Lexington, and University of Kentucky, and UK/Central Baptist Hospital. Cardinal Valley, served by Route 8, also has a CBG that justifies 30-minute service.
- Two locations outside of New Circle Road satisfy the densities required for 30-minute headways: the northwest corner of Park Place at Armstrong Mill Road and Tates Creek Road, as well as the southeast portion of Beaumont, currently served by routes 13 and 58.

Figure 2-14: Density Threshold Analysis



Source: US Census ACS (2018) and LEHD (2017)

Transit Market Demographic Characteristics

Aside from concentration of population and employment, socioeconomic characteristics such as household income, access to automobiles, race/ethnicity, Limited English Proficiency, disability status, age, and student population are oftentimes significant determinants of home-based demand for public transportation. Evidence from comparable communities to Lexington indicate that these traditionally transportation-disadvantaged populations, especially low-income households and those without access to automobiles, have the highest rates of transit patronage. This section investigates each of these variables through statistics and maps, looking at each variable individually. Immediately following this analysis is section 0, which details the creation of a composite score that aggregates all variables into a single index called a Transit Market Index (TMI).

Low-Income Households

There are a total of 128,806 households in Fayette County, 16.4% of which are categorized as low income, as shown in **Table 2-17**. Nearly all of the low-income households are within the urban service area (98.6%). Lextran provides transit service to a majority of these low-income households, with 74.1% of the counties total within walking distance to a bus stop.

Table 2-17: Low-Income Households Statistics (2018 ACS)

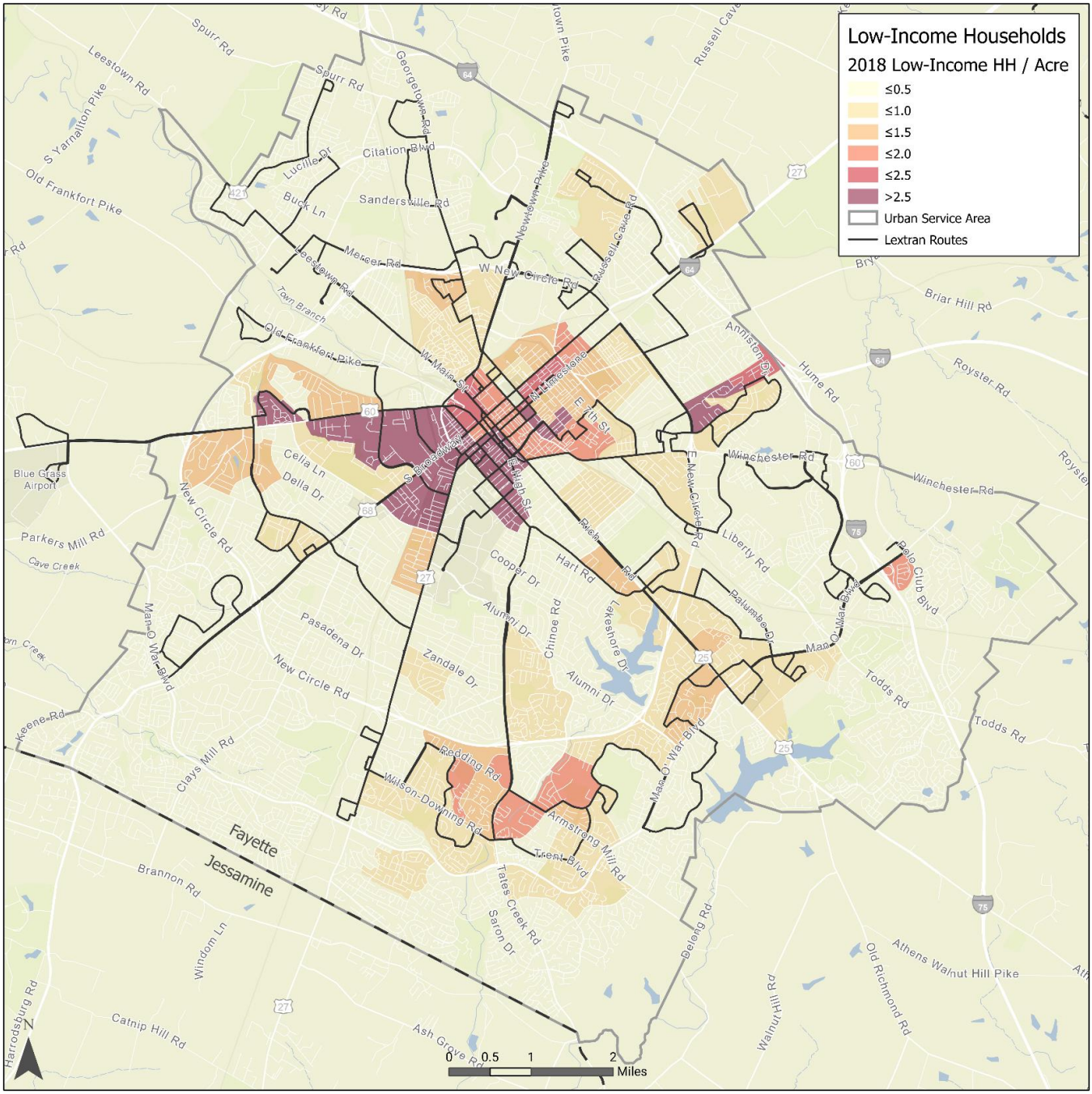
Location	Total	Percent	Density (Acre)	Percent of County Total
Within 0.25 Miles of bus stop	15,688	22.5%	0.6	74.1%
Within 0.5 Miles of bus stop	19,320	20.4%	0.5	91.2%
Within 0.75 Miles of bus stop	20,336	19.2%	0.4	96.0%
Urban Service Area	20,882	17.1%	0.4	98.6%
Lexington-Fayette	21,181	16.4%	0.1	-

Source: US Census ACS (2018)

The density of low-income households is shown in **Figure 2-15**. Areas in Lexington that are highlighted in this map are as follows:

- The entire subarea of Red Mile is made up of CBGs that fall into the highest density category of low-income households. A total of approximately 3,700 low-income households are located in this area. Route 15, a high frequency circulator, serves this area, but primarily serves the University of Kentucky without connecting to the Downtown Transit Center.
- The western portion of the University of Kentucky has a high concentration of low-income housing (a total of nearly 600 households). This area is well-served by Routes 1, 3, and 16.
- The area just south of downtown, along Maxwell Street has a high density of low-income households. Route 16 serves Maxwell Street, and Routes 1 and 3 operate within walking distance.
- Low-income housing density is high in one section of the Cardinal Valley subarea, currently served by Route 8.
- The northern portion of the Eastland subarea has a high density of low-income housing, particularly on the northern side of Eastland Parkway. Route 7 serves Eastland and has several high ridership stops in this area.

Figure 2-15: Low-Income Households Density (2018 ACS)



Source: US Census ACS (2018)

Zero-Vehicle Households

Households without access to a personal automobile also represent strong transit trip producers. In Fayette County, there are a total 10,138 (or 7.9% of all households) that do not have a vehicle available. Like low-income households, almost all zero-vehicle households are located within the urban service area (99.4%), with transit serving the majority (74.1% within 0.25 miles of a bust stop).

Table 2-18: Zero-Vehicle Households Statistics (2018 ACS)

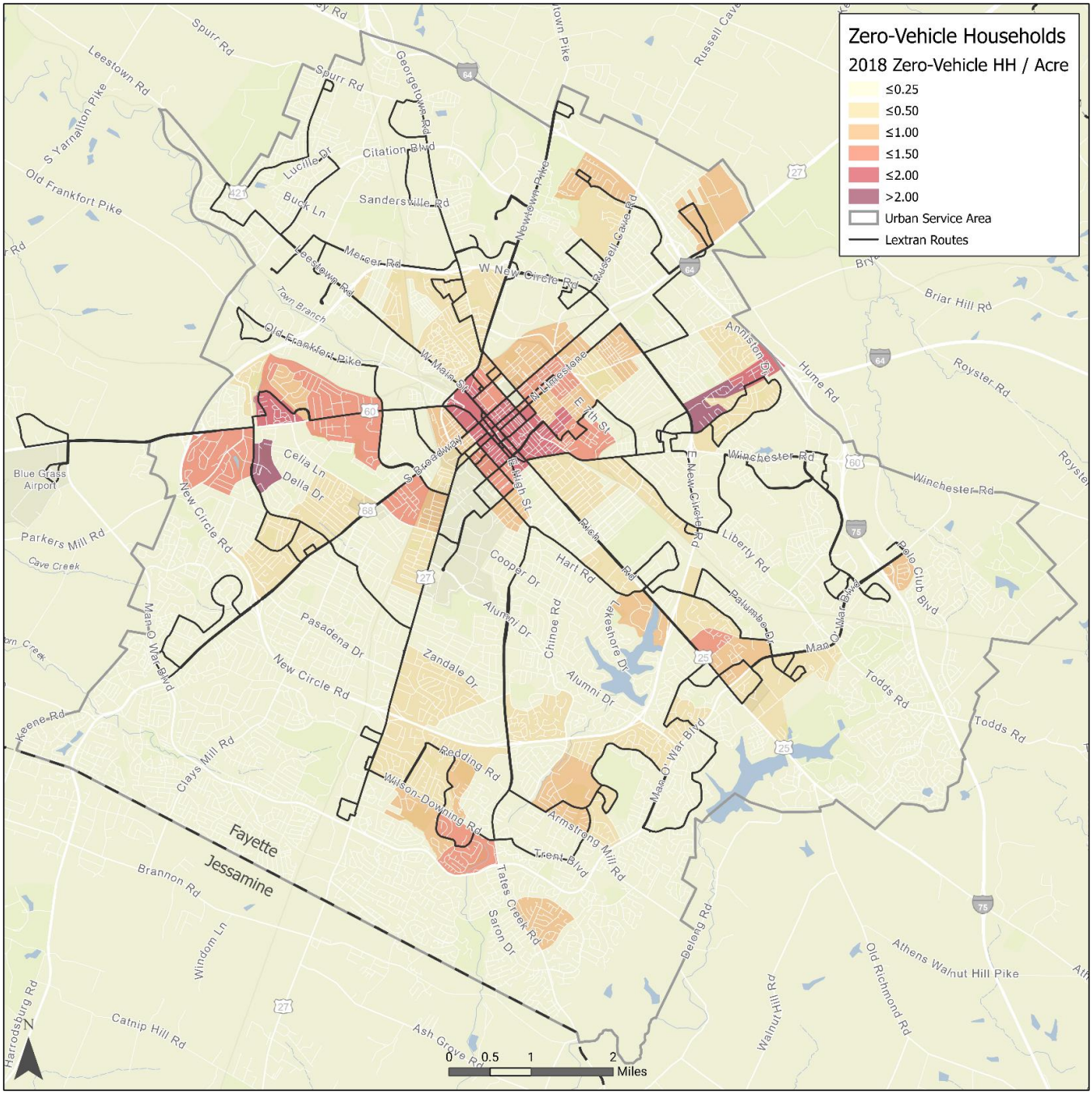
Location	Total	Percent	Density (Acre)	Percent of County Total
Within 0.25 Miles of bus stop	7,514	10.8%	0.3	74.1%
Within 0.5 Miles of bus stop	9,326	9.8%	0.2	92.0%
Within 0.75 Miles of bus stop	9,860	9.3%	0.2	97.3%
Urban Service Area	10,080	8.2%	0.2	99.4%
Lexington-Fayette	10,138	7.9%	0.1	-

Source: US Census ACS (2018)

Zero-vehicle household density is mapped in **Figure 2-16**. Areas with the greatest density of zero-vehicle households are stated below:

- The Gardenside subarea along Alexandria Drive has CBGs with high numbers of zero-vehicle households (465 and 199). This area is served by Route 8 and 58 on Alexandria Drive.
- Versailles Road has high numbers of zero-vehicle households east of Red Mile Road, with over 300 to the south in Pine Meadows (served by Routes 12 and 15) and over 600 to the north in Cardinal Valley (served by Route 8).
- The Downtown Lexington subarea has about 870 zero-vehicle households, which has higher densities of this demographic compared to the rest of the county.
- The northern portion of the Eastland subarea has a higher density of zero-vehicle households, with a total of approximately 440. This area is also high in low-income households. Route 7 serves this area with 35-minute service for most of the weekday.

Figure 2-16: Zero-Vehicle Households Density (2018 ACS)



Source: US Census ACS (2018)

Minority Population

The minority population in Fayette County makes up approximately 24.6% of the total population according to 2018 ACS data. **Table 2-19** shows the results of an analysis on minority population in the county, urban service area, and within various distances of a transit stop. Minority population is calculated at the highest levels within 0.25 miles of a transit stop, with fewer at greater distances. This trend suggests that transit stops are well situated to serve minority populations in Lexington.

Table 2-19: Minority Population Statistics (2018 ACS)

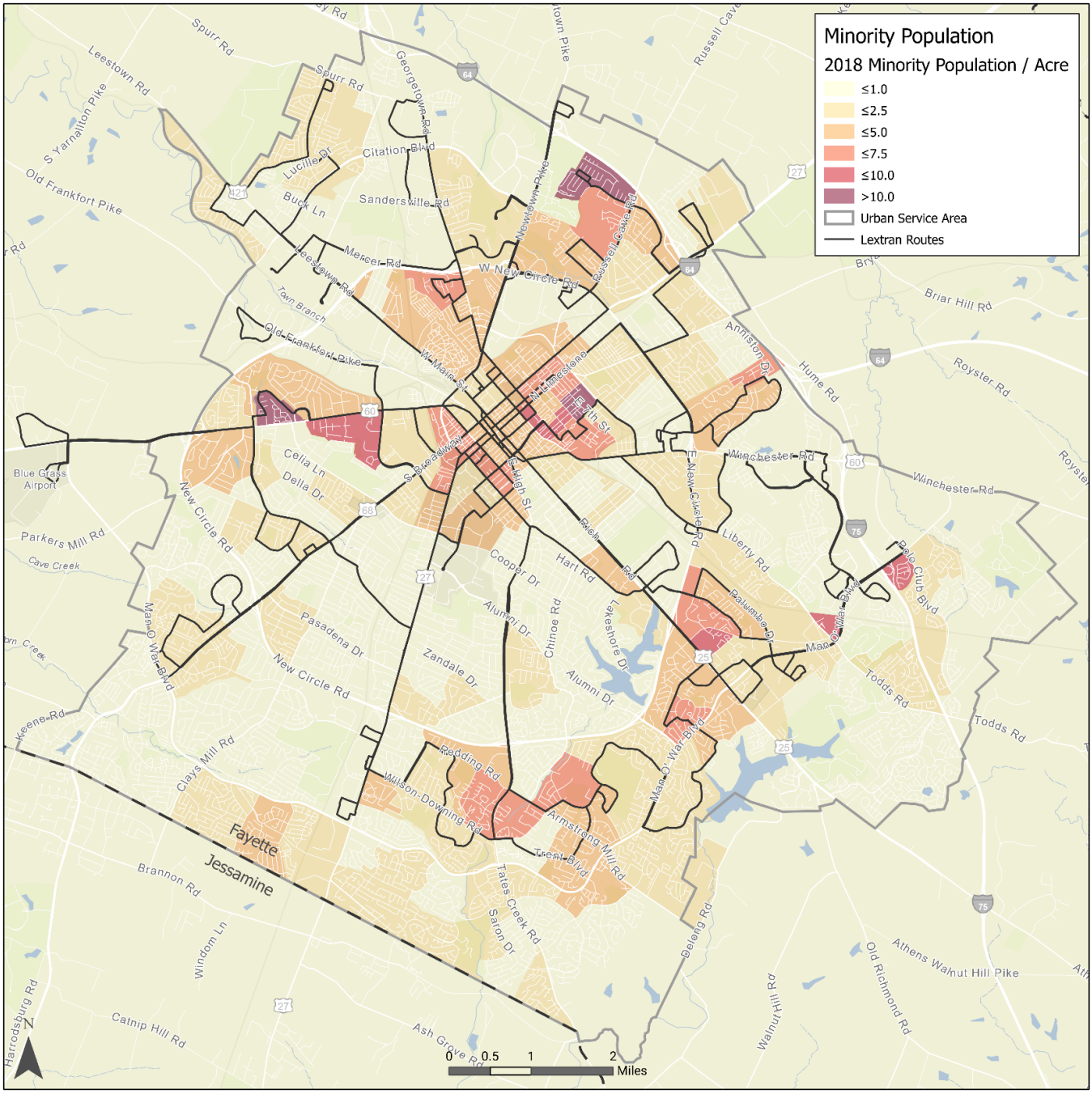
Location	Total	Density (Acre)	Percent of County Total
Within 0.25 Miles of bus stop	128,563	4.7	64.3%
Within 0.5 Miles of bus stop	169,734	4.1	84.9%
Within 0.75 Miles of bus stop	180,662	3.6	90.4%
Urban Service Area	188,442	3.4	94.3%
Lexington-Fayette	199,853	1.1	-

Source: US Census ACS (2018)

Additional analysis, also using 2018 ACS data, that involves the geographic location of minority populations is shown in **Figure 2-17**. The map of minority population concentrations reveals the following trends in Lexington:

- The minority population of a single CBG in Cardinal Valley near Hillcrest Memorial Park Cemetery is 1,455, with a density of 13.1 per acre. This location also has high low-income households and zero-vehicle households. Route 8 currently serves this neighborhood with a deviation from Versailles Road.
- Parts of the Northside District, northeast of downtown Lexington, have high densities of minority population. Routes 9, 59, and 4 operate service through this area of Lexington.
- The Winburn/Radcliff subarea has high densities of minority population along I-64, including one CBG with over 10 per acre. The total minority population in this subarea is over 6,400. Route 6 serves this area about every 35 minutes during most of the day on weekdays. Route 17 provides limited service on weekdays in the Radcliff area.

Figure 2-17: Minority Population Density (2018 ACS)



Source: US Census ACS (2018)

Limited English Proficiency Population

Limited English proficiency is determined here by the ability to speak English not well or not at all for the population 5 years old and over by the 2018 ACS. Overall populations with limited English ability are low in Fayette County, with only 2.3% of the population falling into this demographic. The percent of population with limited English proficiency increases slightly near transit stops compared to the entire urban service area and county.

Table 2-20: Limited-English Proficiency Statistics (2018 ACS)

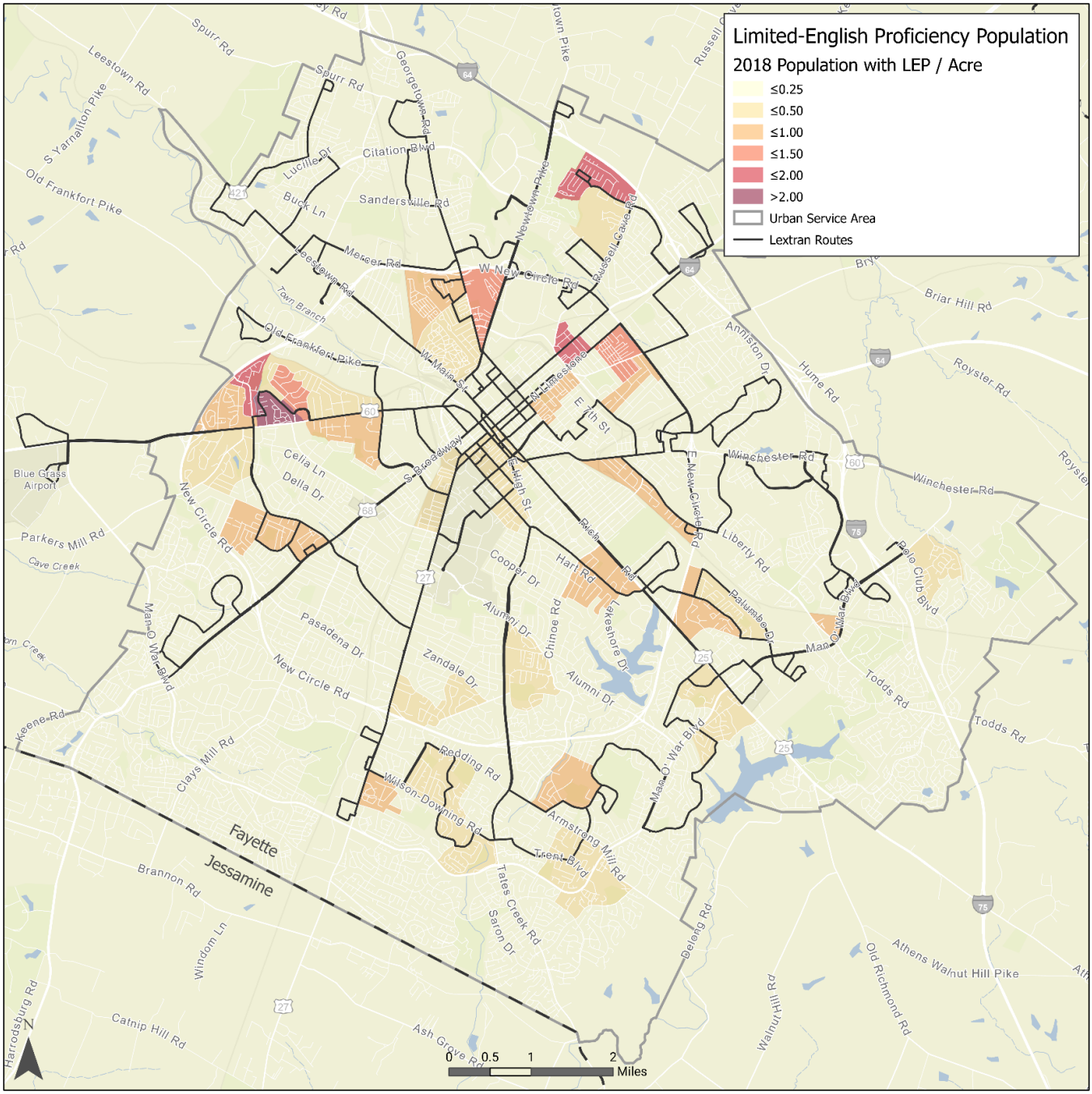
Location	Total	Percent	Density (Acre)	Percent of County Total
Within 0.25 Miles of bus stop	4,850	2.9%	0.2	65.5%
Within 0.5 Miles of bus stop	6,156	2.7%	0.1	83.1%
Within 0.75 Miles of bus stop	6,546	2.6%	0.1	88.4%
Urban Service Area	6,835	2.3%	0.1	92.3%
Lexington-Fayette	7,405	2.3%	0.0	-

Source: US Census ACS (2018)

Figure 2-18 maps the limited English proficiency population across Lexington. Geographic trends are described below:

- Most of Lexington has low numbers of LEP population.
- Cardinal Valley, particularly near Hillcrest Memorial Park, has the highest concentration of LEP population in the county, with 5.9 per acre. This area is also low in numerous other demographic variables of interest to transit. Routes 8, and 58 currently serve this area.
- The easternmost CBG in the Russell Cave Road subarea has a population of 181 that qualify as LEP. Route 6 operates through this area every 35 minutes during most of the day on weekdays.
- The Winburn/Radcliff subarea has a high density of LEP population along I-64, with a total of 328 people identifying as LEP. This location also has high density minority and is served by Route 6 and 17 as well.

Figure 2-18: Limited-English Proficiency Population Density (2018 ACS)



Source: US Census ACS (2018)

People with Disabilities

People with disabilities are another critical demographic to analyze when considering access to transit service because other modes of transportation might not be available. **Table 2-21** shows that 6.5% of the total population in Fayette is considered to have a disability. Currently, Lextran serves this population relatively well, evidenced by a total of 12,828 people with disabilities within 0.25 miles of bus stops. This translates to a total of 62.5% of the disabled population in the county having close access to transit. The 0.75-mile measure is of particular significance for this variable because of the Wheels paratransit service cost structure. Currently, the Wheels program is available to anyone in the county who satisfies the requirements. However, fares vary based on a threshold of 0.75-mile buffer distance from fixed routes. Riders who are picked up or dropped off farther than the threshold must pay a premium for the service ($2.00 versus $1.60 per one-way trip). **Table 2-21** shows that 96% of all people with disabilities in Fayette County can be picked up from their home without the need to pay a premium for the Wheels transit service.

Table 2-21: Disabled Population Statistics (2018 ACS)

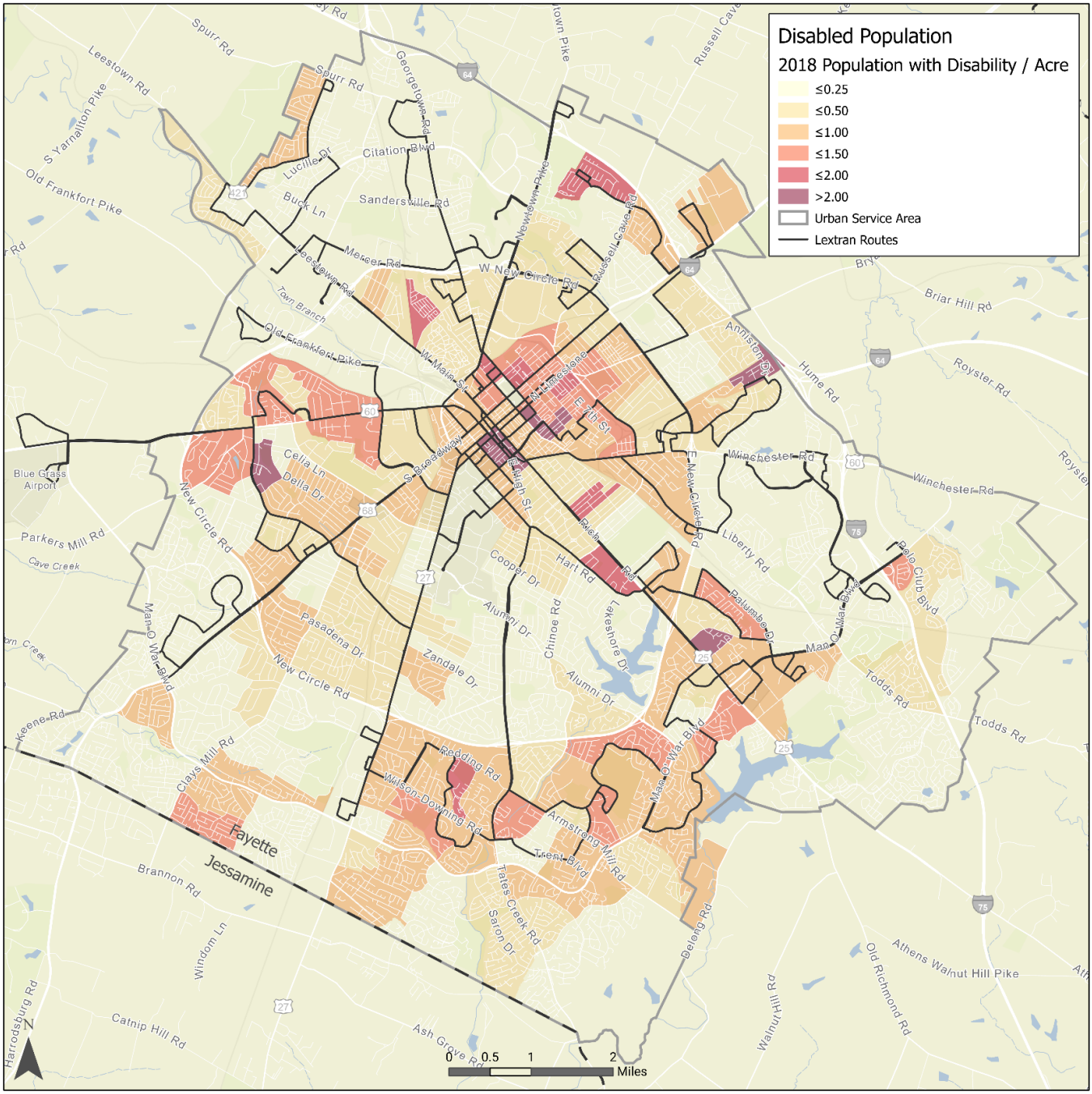
Location	Total	Percent	Density (Acre)	Percent of County Total
Within 0.25 Miles of bus stop	12,828	7.6%	0.5	62.3%
Within 0.5 Miles of bus stop	16,666	7.3%	0.4	80.9%
Within 0.75 Miles of bus stop	18,043	7.1%	0.4	87.6%
Urban Service Area	19,788	6.6%	0.4	96.0%
Lexington-Fayette	20,605	6.5%	0.1	-

Source: US Census ACS (2018)

Population density living with a disability is shown cartographically in **Figure 2-19**. Results of this analysis are described below:

- The Gardenside subarea, on both the east and west sides of Alexandria Drive, has high numbers of populations with a disability. This area is served by Route 8 and Route 58 (late service only).
- Populations with high disability counts are visible in Downtown Lexington (single CBG with 246) and just north of downtown, in the Northside District (single CBG with 236). This area in the Northside District has the highest density of population with disability, at 2.9 per acre.
- Additional pockets of populations with high densities of population with a disability are located in Richmond Road (served by Route 11), Eastland (served by Route 7), and Winburn/Radcliff subareas (served by Route 6).

Figure 2-19: Disabled Population Density (2018 ACS)



Source: US Census ACS (2018)

Elderly Population

Elderly populations, defined here as 65 years of age and older using 2018 ACS data, are typically more reliant on public transportation than younger populations. **Table 2-22** reveals the total population that falls within this age range at the county level, the urban service area, as well as within various buffer sizes of Lextran bus stops. Overall, the elderly population in Lexington is well served by transit, with 47.1% within 0.25 miles of a bus stop. The percentage of elderly population within close proximity to transit however, is lower than many other demographics of interest to transit. This is likely primarily because of the geographic dispersion of elderly population however, rather than service actively prioritizing other demographics.

Table 2-22: Elderly Population Statistics (2018 ACS)

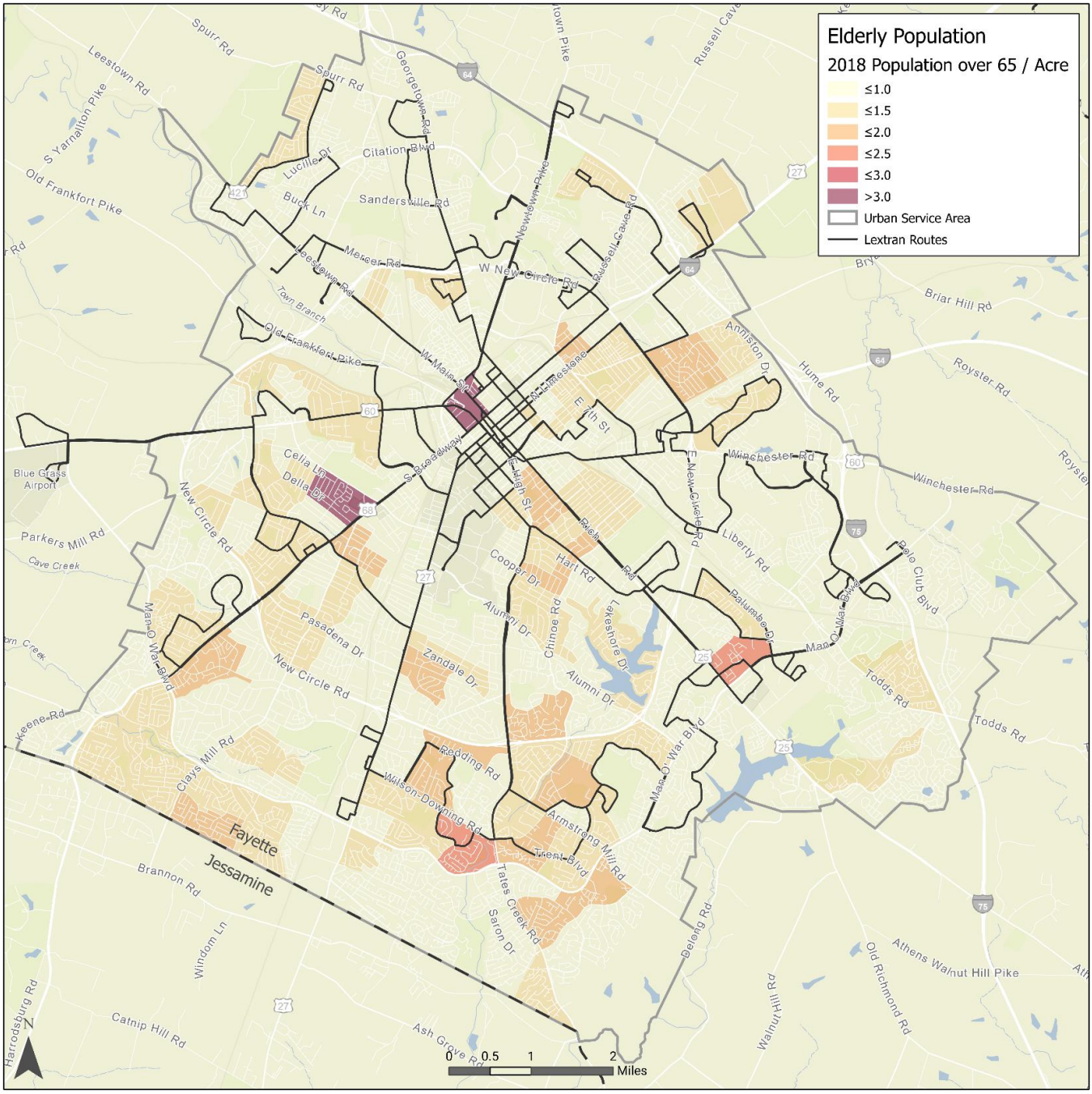
Location	Total	Percent	Density (Acre)	Percent of County Total
Within 0.25 Miles of bus stop	18,884	11.2%	0.7	47.1%
Within 0.5 Miles of bus stop	27,317	12.0%	0.7	68.2%
Within 0.75 Miles of bus stop	31,392	12.3%	0.6	78.3%
Urban Service Area	37,263	12.5%	0.7	93.0%
Lexington-Fayette	40,073	12.6%	0.2	-

Source: US Census ACS (2018)

Figure 2-20 shows the geographic distribution of the elderly population in Lexington. Areas with notable elderly population densities are as follows:

- The highest density of elderly population is located in the Picadome/St Joseph Hospital subarea with 3.2 people per acre, for a total of 649. Two senior living complexes in this area are likely driving this trend. Routes 13 travel along Harrodsburg Road to serve one side of this CBG.
- The northernmost CBG of the Downtown Lexington subarea has the second highest density of elderly population, at 3.0 per acre and a total of 376.
- There are 540 people that fall into the elderly age group in a single CBG in the Waterford subarea in southern Lexington. Route 3 serves this area, including service to the senior living Friendship Towers Apartments.

Figure 2-20: Elderly Population Density (2018 ACS)



Source: US Census ACS (2018)

Student Population

Student populations are characterized by lower incomes and oftentimes, higher transit patronage, compared to non-student populations. While this demographic may have high vehicle ownership, they may also utilize those vehicles less than non-students. Lexington has a high student population of 91,282, of which 95% live in the urban service area. Compared to the general population, students are more clustered in areas with access to transit, shown by the 57.7% of students living with 0.25 miles of a bus stop in **Table 2-23**.

Table 2-23: Student Population Statistics (2018 ACS)

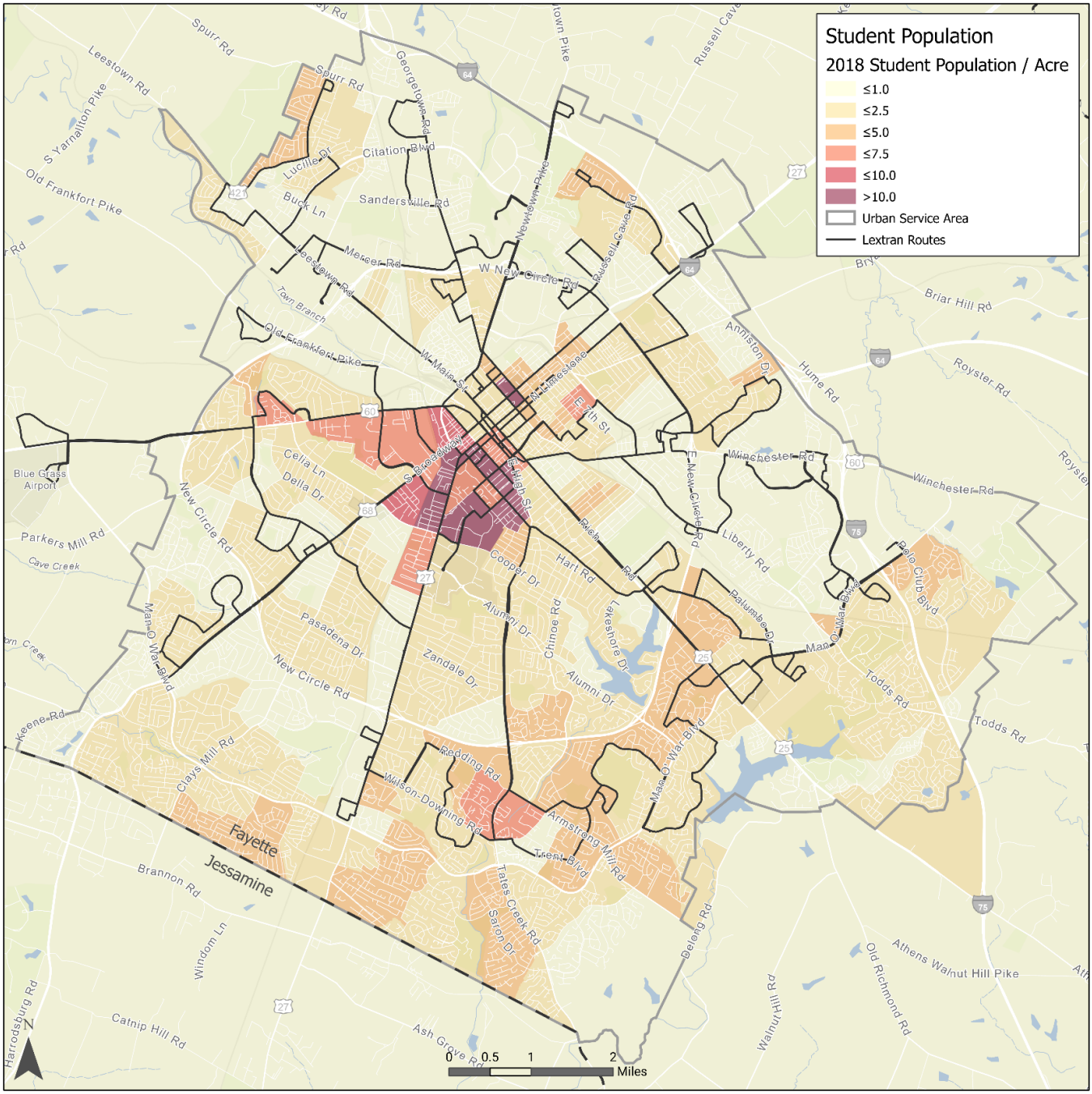
Location	Total	Percent	Density (Acre)	Percent of County Total
Within 0.25 Miles of bus stop	52,678	31.3%	1.9	57.7%
Within 0.5 Miles of bus stop	68,116	29.9%	1.6	74.6%
Within 0.75 Miles of bus stop	75,044	29.4%	1.5	82.2%
Urban Service Area	86,757	29.0%	1.6	95.0%
Lexington-Fayette	91,282	28.6%	0.5	-

Source: US Census ACS (2018)

Student population data are shown cartographically in **Figure 2-21**. Key findings are provided here:

- Although there are several colleges and universities in Lexington, as shown previously in the places of interest map **Figure 2-9**, only two have dense student populations nearby: University of Kentucky and Transylvania University.
- University of Kentucky was assigned its own subarea because of the significant size and influence in Lexington. The total student population in this subarea is 9,385. There is also significant student population in the adjacent areas, UK/Central Baptist Hospital and Red Mile. Significant transit service is located throughout these areas.
- The Northside District has a high density of student population with its proximity to Transylvania University. The densest CBG in the Northside District has 18.1 students per acre, the second most dense location in Lexington. This area also benefits from several options for transit service.

Figure 2-21: Student Population Density (2018 ACS)



Source: US Census ACS (2018)

Transit Market Index

The previous section investigated the most influential demographic variables of transit demand. While attention to each individual variable is valuable, the greatest utility comes from synthesizing these variables into a composite score. It is the composite score that can then be used to reveal the total population that is most likely to make use of transit service. In this section, a Transit Market Index (TMI) is used to predict areas in Fayette County with the highest likelihood of generating transit ridership based on aforementioned socioeconomic indicators at the CBG level using 2018 ACS datasets. It should be noted that these indicators measure home-based population characteristics, the TMI thus represents transit potential on the residential end of the trip.

Inputs into the index include each of the seven demographic variables from the previous section: low-income households, zero-vehicle households, minority population, English-speaking ability, disability, elderly population, and student population. Each variable is given equal weight in the index so that an individual counted as elderly has equal weight as a student, minority, etc. Because two of the seven variables are only available at the household level (instead of at the population level), these variables were multiplied by the population per household rate for that specific CBG. Using this methodology creates seven variables that are all at the population level for every CBG in Fayette County. Each of the seven variables were added together and then standardized using area so that a density of transit market variables was calculated for each CBG. The CBGs were then ranked against all others based on percent rank, with the lowest possible score being 0 and the highest possible score being 100. All scores in between were computed by interpolating between the maximum and minimum values and then grouped into quantiles to show equal numbers of low, low/medium, medium, medium/high, and high TMI scores.

The downside of standardizing the values on a scale of 0 to 100 however, is that outliers such as extremely high or low values are hidden. The raw TMI density scores reveal two such outliers: one in downtown (CBG 210670008021) and one around Hillcrest Memorial Park (CBG 210670020011). These CBGs are discussed in the results section below.

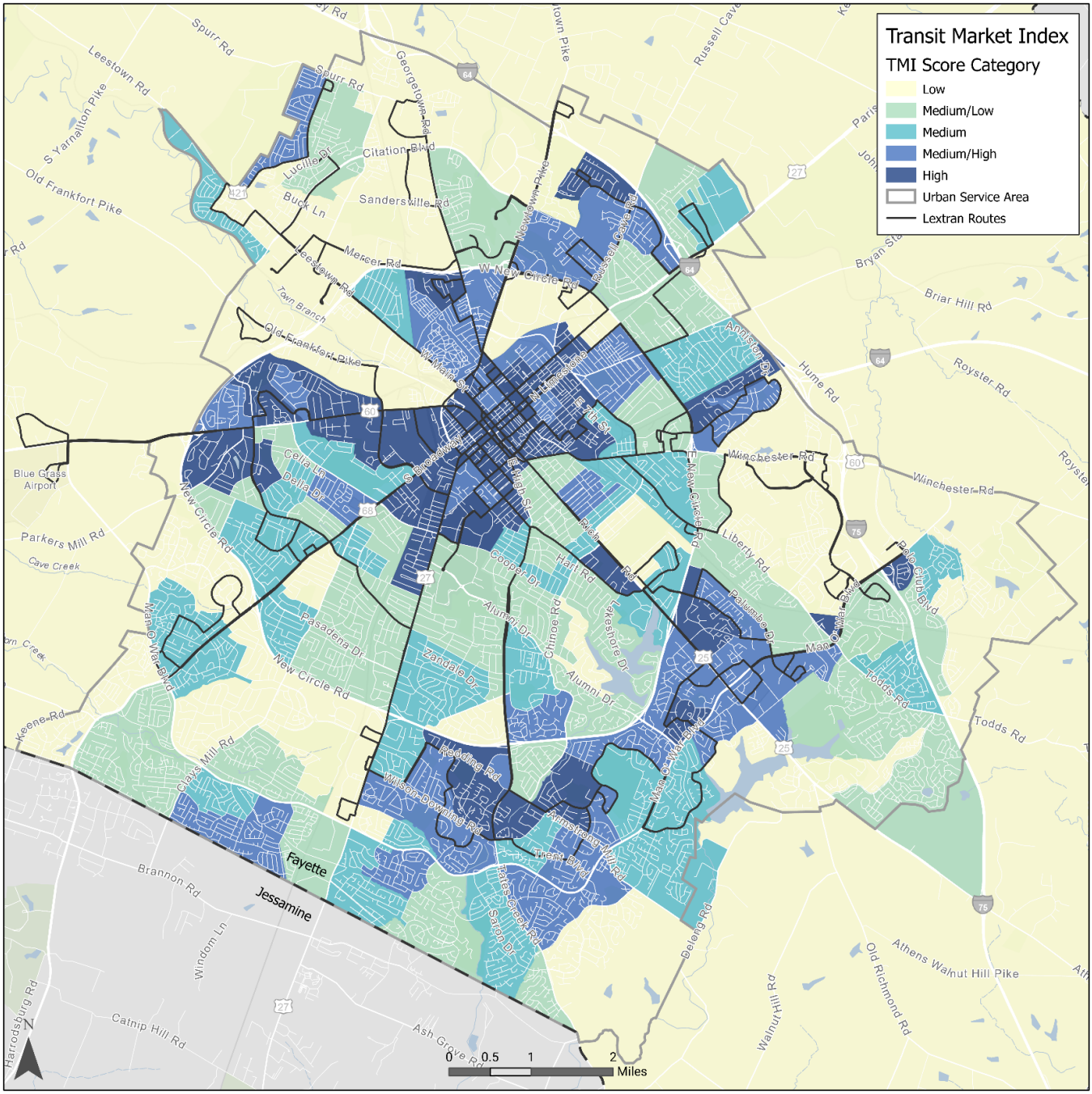
The results of the TMI analysis are shown in **Figure 2-22**. Key findings of the TMI analysis are shown below:

- Central Lexington has numerous high TMI scores, including the subareas of Downtown Lexington, Northside District, University of Kentucky, and Red Mile. In particular, the CBG in southern downtown bound by Euclid Avenue on the southwest and Maxwell Street and High Street on the North received the highest raw TMI density score in the entire study area. The TMI density score of 67 per acre was about 8.5 times the average TMI density score. Transit service corresponds with the highest levels of service in the city.
- High TMI scores exist along the Versailles Road corridor, including Red Mile, Cardinal Valley, and Gardenside. Route 8 serves Versailles Road. In fact, the CBG that surrounds Hillcrest Memorial Park scored second highest in the analysis. The raw TMI density value of 44 per acre is about 5 times the average for the county. These areas are also strong ridership producers (see **Figure 2-38**).
- Southeast Lexington, outside of New Circle Road, has large swaths of CBGs that are in the Medium, Medium/High, and High categories. Subareas in this area include Kirklevington Park, Southeastern Hills, and Richmond Road. Transit routes 5, 3, 18, 1, and 11 serve these areas and result in some pockets of strong ridership. These areas present a challenge, however, because

the most direct route to get to this area of Lexington is down the Tates Creek Road corridor which generally has low ridership.

- The Douglass Park subarea has areas with high TMI scores, particularly within the area Route 2 deviates into from Georgetown Road. It should be noted that this area has partial bi-directional service, which sometimes creates excessively long walking distances in one direction.
- The Winburn/Radcliff subarea has higher TMI scores than most subareas. Winburn Drive, which is served at the end-of-line on Route 6, has particularly high TMI scores. Route 17 operates nearby, although at limited headways and not during the midday.
- The Eastland subarea scores high on the TMI scale. Route 7 operates a large loop through this area.

Figure 2-22: Transit Market Index (2018 ACS)



Source: US Census ACS (2018)

Accessibility Analysis

One of the highest priorities in operating transit service is to simply provide riders with access to the places they need and want to go, such as to jobs, retail, healthcare, or schools. Making these connections for riders in a reasonable timeframe is also essential. Here, Lextran is evaluated in terms of accessibility using two approaches. The first method considers accessibility as a function of distance travelled over time. Isochrones, lines of equal travel times, were created for Lexington using the Fall 2019 Lextran GTFS dataset. The second method uses the subareas defined earlier in this report to calculate the number of jobs that are within 60 minutes using transit. The number of jobs reachable from each subarea over several time periods are considered to show accessibility for workers with different schedules.

The methodology for this section involved creating isochrones, which are used here to show the potential geographic reach of a Lextran transit rider at different times of the day. GTFS data were used from Fall 2019 to calculate the exact hypothetical time a passenger could reach different parts of the city on different routes. The public transit network was supplemented with the Lexington street network so that the calculated isochrones could model transfers, even when the transfers do not occur at the same bus stop. In other words, this analysis has the ability to model relatively complex passenger movements involving:

1) Walking to a bus stop and boarding a transit vehicle
2) Alighting at a different location along the route
3) Walking to another bus stop to board an additional bus route

The high precision of this method, however, also makes it sensitive to differences in departure times. For instance, the results of running this analysis may produce dramatically different results for 8:03AM compared to 8:04AM if the 8:03AM makes a critical connection and the 8:04AM scenario does not. It is therefore important to interpret the results of this analysis with the knowledge that not every model run produces the most beneficial travel time for every location.

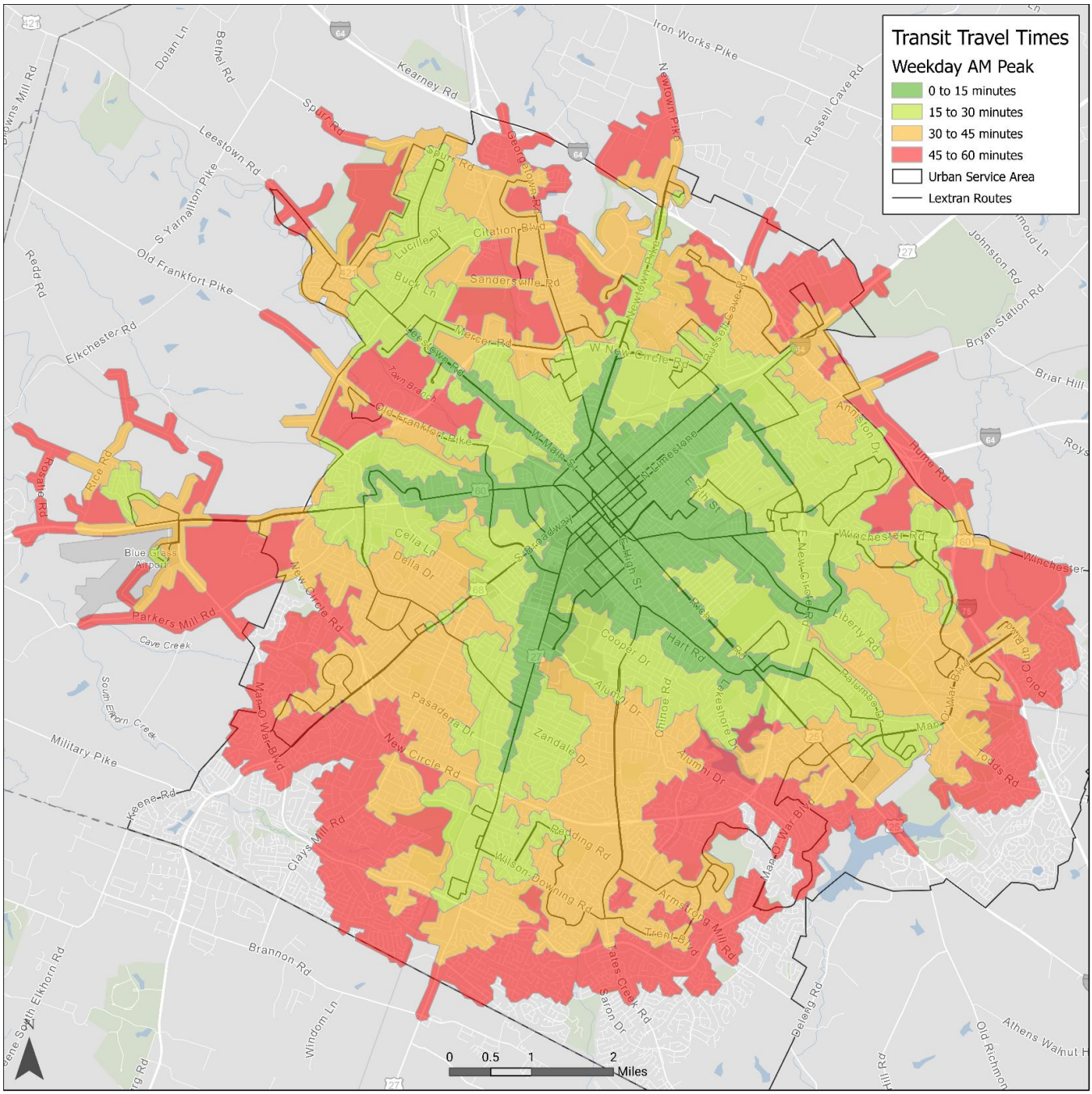
Figure 2-23 shows the possible distance travelled in 15, 30, 45, and 60 minutes from the downtown transit center using a combination of walking and public transit at 8AM on a weekday in the Fall of 2019. Additionally, **Figure 2-24** shows how far a rider could travel at 10PM, also on a weekday. The Downtown Transit Center was chosen because of the hub and spoke orientation of the transit network, making it the most important single location in the transit system. **Figure 2-23** shows the highly radial structure of both the transit network as well as the street network that transit relies on.

Here are some key takeaways regarding the isochrone analysis:

- Several arterial corridors have access to/from the Downtown Transit Center within 15 minutes. The 30-minute isochrone reveals a similar pattern, while the 45 and 60-minute isochrones have a more dispersed pattern with nearly the entire Lextran system reachable at 60 minutes.
- Most of the routes in the system have several deviations off the major roadway. While this gives more passengers quick access to a bus stop, it also restricts the distance that vehicles are able to travel within a fixed headway. The isochrone map shows that the largest isochrones are also along routes that don't have as many deviations from the major corridor. Reducing the number and length of deviations increases the distance that routes can travel, at the cost of increasing pedestrian walk time, which is an important trade-off for Lextran to consider.
- **Figure 2-24** shows the relative accessibility after the Lextran system has reduced frequencies for late service. Although the overall pattern appears similar to the AM Peak map, the late

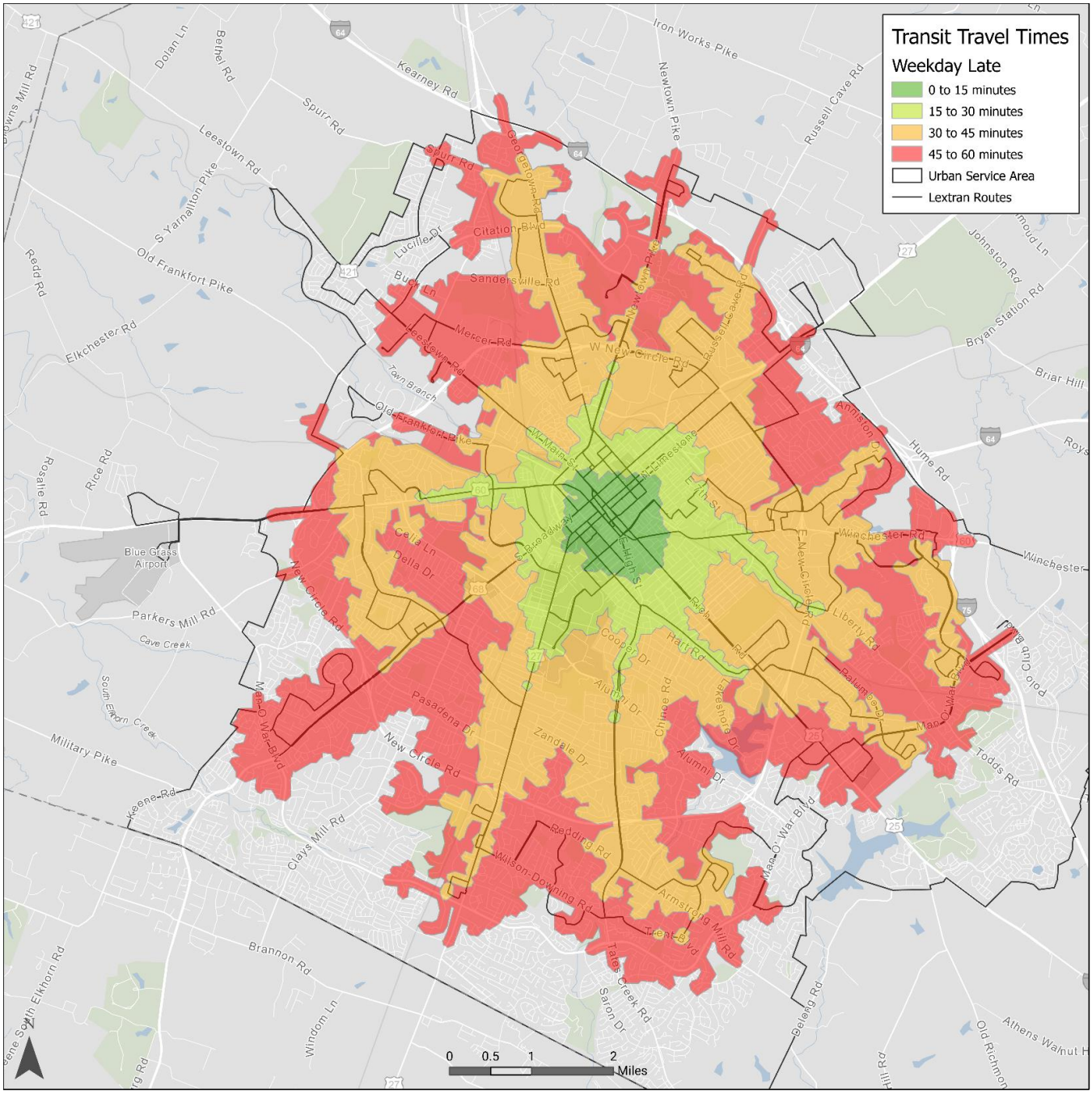
weekday service map shows the extent to which access in Lexington is scaled back in the evening. Midday service (not shown) results in similar isochrones to the AM Peak due to the fact that Lextran tends to operate consistent all-day headways on most of its core routes.

Figure 2-23: Weekday Peak Period (8AM) Peak Transit Travel Time Isochrones



Source: US Census ACS (2018) and Lextran GTFS (Fall 2019)

Figure 2-24: Late Evening (10PM) Weekday Transit Travel Time Isochrones



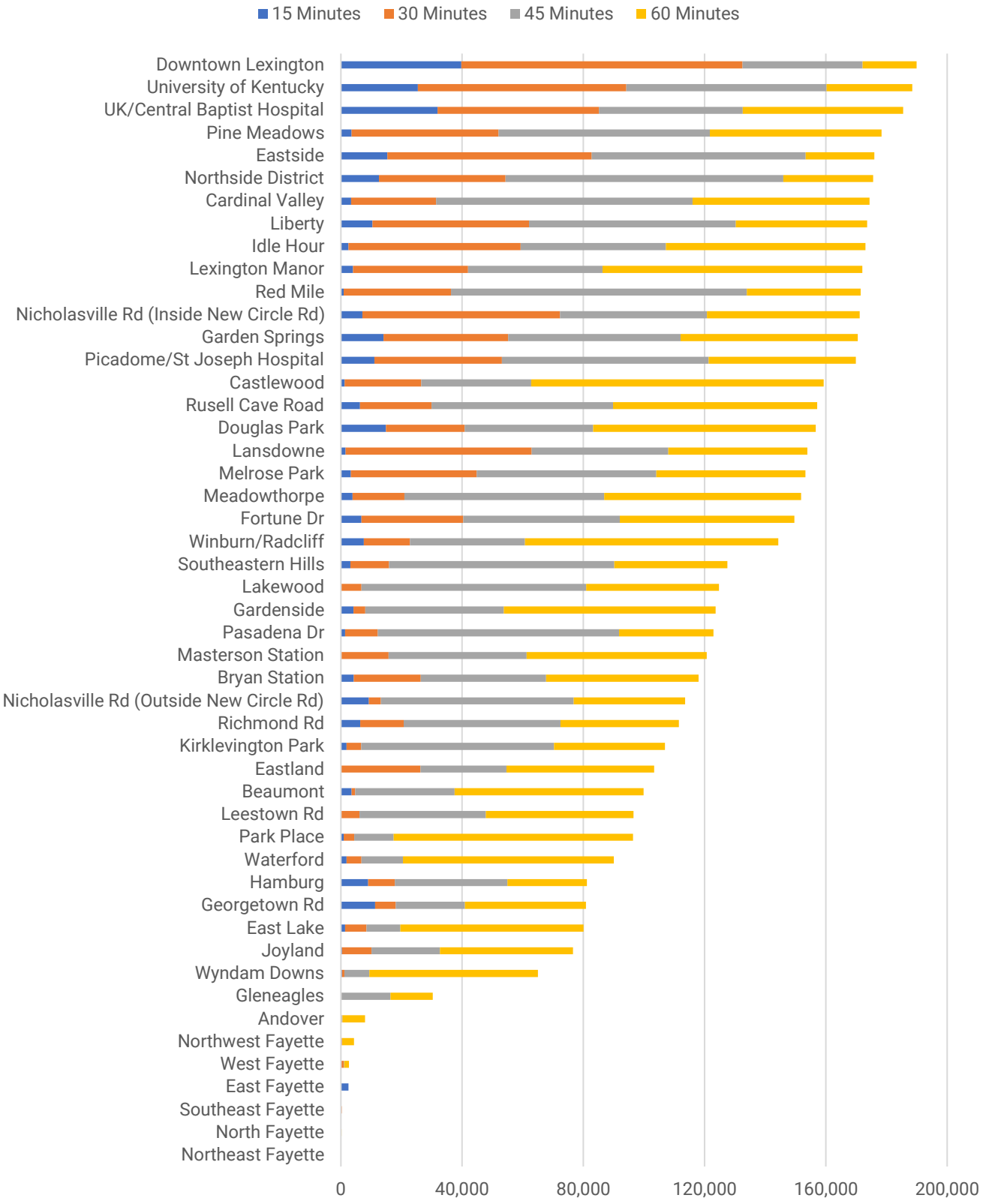
Source: US Census ACS (2018) and Lextran GTFS (Fall 2019)

The second effort regarding accessibility focuses squarely on accessibility to jobs for different regions of Lexington. This analysis utilized the subarea structure shown previously in **Figure 2-8**. More specifically, a central location for each of the subareas was chosen to calculate travel times to every CBG in the county. For every CBG that was accessible within 15, 30, 45, and 60-minute thresholds, the number of jobs in the CBG were aggregated to create a total jobs accessible metric. The results of this analysis are shown below for AM peak in **Figure 2-25**. For this particular analysis, a range of times is selected, and the accessibility model calculates the total number of accessible jobs in one-minute increments. The model then returns the maximum value for every location. The results shown below represent the maximum number of jobs within the range from 7AM-8AM (AM peak). In other words, the model is built with the assumption of potential passengers being "schedule-aware" by choosing a specific time that maximizes the distance travelled and resulting number of jobs reachable in the 15, 30, 45, and 60-minute thresholds. In addition, **Table 2-24** shows the 60-minute job figure compared to the subarea population density, low-income household density, as well as minority population density.

Using these methods to define and calculate accessibility, the following highlights emerged from studying **Figure 2-25** and **Table 2-24**:

- The results of this analysis show that central Lexington has an advantage in terms of access to jobs compared to other areas. The top three subareas in terms of job accessibility are Downtown Lexington (189,927 jobs), University of Kentucky (188,457 jobs), and UK/Central Baptist Hospital (185,445 jobs). The results show that starting from each of these subareas, one could access over 90% of all jobs in the county within an hour using a combination of walking and public transit.
- The subareas of Pine Meadows, Eastside, and Northside District are close behind in terms of accessible jobs and are also very close to downtown. The subareas with the highest number of accessible jobs outside of central Lexington are Cardinal Valley to the west and Liberty and Idle Hour to the east.
- In general, most areas with high job access also have higher population density, low-income household density, and minority population density. However, some subareas do contrast with this trend. Kirklevington Park, for instance, has much higher population density, low-income household density, and minority density compared to the number of jobs accessible. The Eastland subarea also has much lower access to jobs compared to the population density demographics. Joyland has relatively high low-income household density, but low number of jobs accessible. Finally, Richmond Road has one of the higher densities of low-income households and minority population compared to the number of jobs accessible within 60 minutes.

Figure 2-25: Subarea Walk/Transit Access to Jobs During AM Peak (7AM-8AM)



Source: US Census ACS (2018) and Lextran GTFS (Fall 2019)

Table 2-24: Subarea Walk/Transit Access to Jobs Compared to Population

Subarea	Accessible Jobs within 60 mins	2018 Population Density	2018 Low Income HH Density	2018 Minority Population Density
Downtown Lexington	189,927	9.84	2.33	2.66
University of Kentucky	188,457	16.18	1.51	3.53
UK/Central Baptist Hospital	185,445	4.38	0.51	0.53
Pine Meadows	178,311	6.94	1.24	1.16
Eastside	175,989	9.01	0.55	0.72
Northside District	175,560	12.20	1.65	5.77
Cardinal Valley	174,376	10.87	1.14	4.62
Liberty	173,594	4.78	0.49	0.99
Idle Hour	173,078	4.75	0.57	0.90
Lexington Manor	172,004	4.70	0.63	1.95
Red Mile	171,457	12.13	2.77	4.71
Nicholasville Rd (Inside New Circle Rd)	171,127	5.53	0.31	0.85
Garden Springs	170,483	5.95	0.29	0.67
Picadome/St Joseph Hospital	169,906	5.55	0.31	0.58
Castlewood	159,238	8.09	0.83	1.47
Russell Cave Road	157,103	3.34	0.56	1.43
Douglas Park	156,614	6.11	0.78	4.05
Lansdowne	153,864	5.97	0.40	0.46
Melrose Park	153,211	1.68	0.17	0.56
Meadowthorpe	151,837	6.36	0.27	2.07
Fortune Dr	149,567	3.21	0.03	0.65
Winburn/Radcliff	144,284	5.22	0.41	3.83
Southeastern Hills	127,524	7.86	0.70	2.41
Lakewood	124,705	3.82	0.05	0.12
Gardenside	123,609	6.06	0.68	1.95
Pasadena Dr	122,869	6.42	0.11	0.52
Masterson Station	120,704	6.13	0.12	1.34
Bryan Station	117,953	5.21	0.20	0.86
Nicholasville Rd (Outside New Circle Rd)	113,556	3.55	0.19	0.59
Richmond Rd	111,511	8.02	0.65	3.29
Kirklevington Park	106,908	12.49	1.17	3.53
Eastland	103,360	4.95	0.70	1.98
Beaumont	99,848	3.69	0.08	0.85
Leestown Rd	96,536	3.34	0.11	1.02
Park Place	96,379	5.43	0.33	1.09
Waterford	90,017	8.21	0.29	1.14
Hamburg	81,169	2.36	0.05	0.59
Georgetown Rd	80,818	1.46	0.04	0.57
East Lake	80,079	4.45	0.14	1.23
Joyland	76,532	3.59	0.35	0.83
Wyndam Downs	64,981	7.41	0.06	0.82
Gleneagles	30,307	5.62	0.16	1.46
Andover	7,938	4.56	0.08	0.64
Northwest Fayette	4,310	0.16	0.00	0.05
West Fayette	2,642	0.45	0.00	0.04
East Fayette	2,492	0.15	0.00	0.01
Southeast Fayette	318	0.07	0.00	0.00
North Fayette	243	0.06	0.00	0.01
Northeast Fayette	15	0.13	0.00	0.04

Source: US Census ACS (2018) and Lextran GTFS (Fall 2019)

Figure 2-26 gives a geographic perspective of jobs accessibility in Lexington. Instead of using jobs accessible in time increments at the subarea level however, **Figure 2-26** shows the number of jobs accessible within 60 minutes at the CBG level. The total number of accessible jobs for every CBG was calculated using a combination of walking and public transit. The resulting image shows that job accessibility is strongly correlated with geographic location in Lexington.

Additionally, **Figure 2-26** includes data regarding the low income and minority status of each CBG. More specifically, every CBG that has a greater proportion of low-income households or minority population than the average for Fayette County is distinguished using a hatched fill overlay. **Table 2-25** shows details on the number of CBGs within the urban service area that are designated as low income and/or minority, as well as the average number of accessible jobs.

Table 2-25: Accessible Jobs by Equity Status within the Urban Service Area

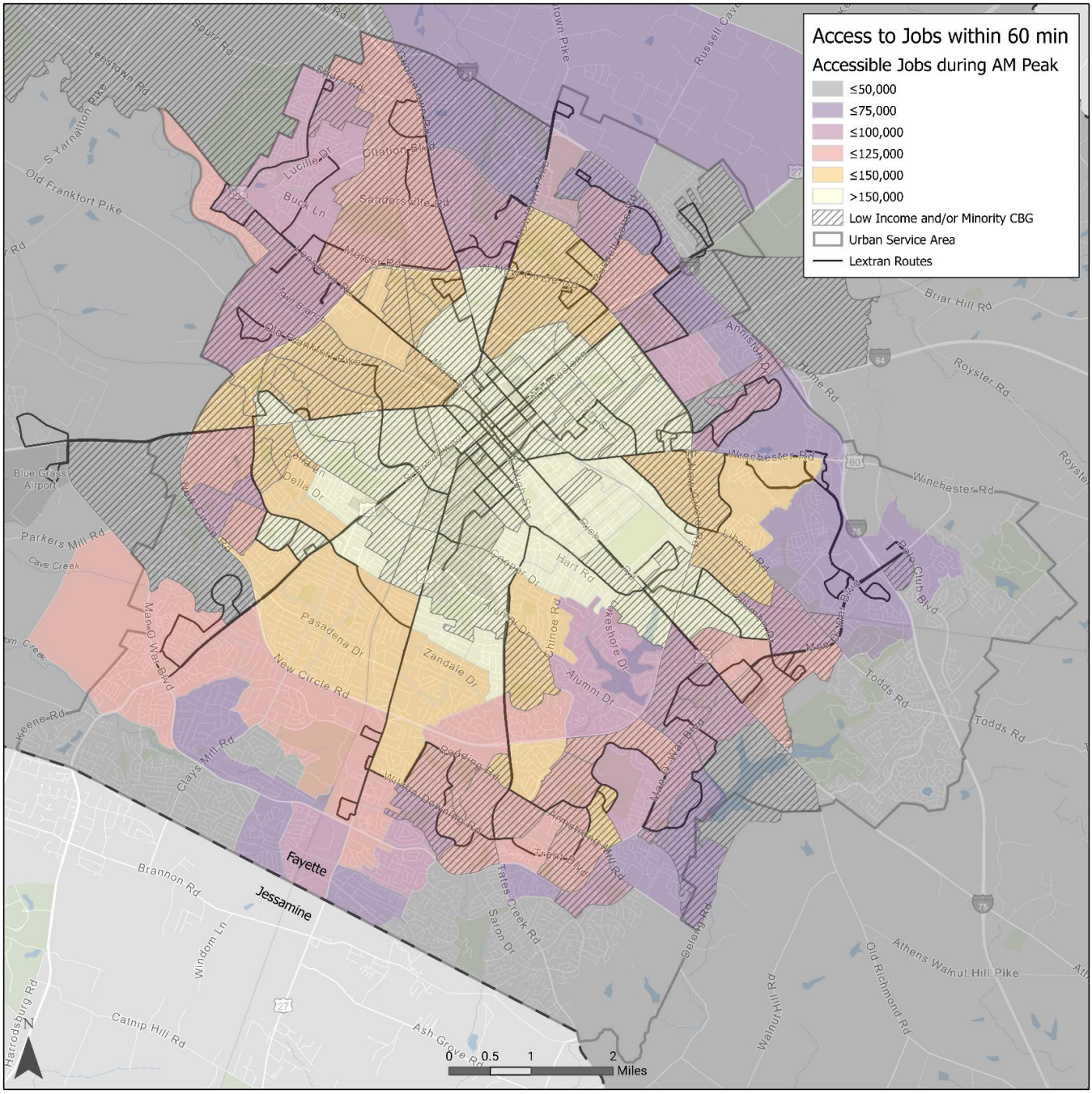
Equity Status	Number of CBGs	Total Population	Average Accessible Jobs
Low Income and/or Minority	100	149,724	119,553
Not Low Income or Minority	93	146,025	96,011

Source: US Census ACS (2018) and Lextran GTFS (Fall 2019)

Here are some of the key findings on accessible jobs and equity status:

- The radial orientation of the city, which in turn has influenced the public transit network, makes travel to downtown much easier and quicker than crosstown travel. Much of the travel using public transit necessitates going to the transit center and transferring before continuing in another direction, so many crosstown travel movements exceed 60 minutes and are not included in the job count.
- Referencing **Table 2-25**, there are approximately the same number of equity CBGs within the urban service area as non-equity CBGs. The total population is also similar when comparing equity and non-equity areas. When considering the number of jobs accessible by equity CBG and non-equity CBGs, it is clear that equity CBGs have comparatively more access to jobs.

Figure 2-26: Lexington Access to Jobs and Equity Areas



Source: US Census ACS (2018) and Lextran GTFS (Fall 2019)

2.4.4. Service Area Travel Patterns

Location-based services (LBS) is a term that can be applied to any software services that utilize geographic data. Within the transportation industry, LBS has been utilized with increasing frequency to understand how people travel within various timeframes and areas. Some of the most common applications of LBS are found in cell phones and other mobile devices that track location for a variety of end-user functions. In this section, data from one of the leading providers of LBS data (AirSage) is used to reveal travel patterns in Lexington, which aids in evaluating current and future transit networks.

The LBS data utilized in this study is in a trip matrix format using CBG as the geographical unit, with an origin zone, a destination zone, and the number of trips occurring between the two. Two entire months of data were obtained for this analysis: April 2019 and April 2020, which enable calculation of travel pattern differences between pre-pandemic and pandemic conditions. Other datapoints included in the trip matrices are hour of day (0-24), day of week (Monday-Thursday, Friday, Saturday, and Sunday), and trip purpose. The trip purposes are created by AirSage based on algorithms that make assumptions of home and work locations, and therefore can assign trip type (e.g. home to work, work to home, home to other, etc.). Home locations are determined by where the mobile device spending the majority of the night hours over the period of a month. Work locations, conversely, are the locations where the mobile device spends the majority of traditional working hours. An important caveat is that while many trips are assigned some combination of home, work, and other location, some trips are assigned a trip type that begins and ends at the same location (e.g. home to home). While initially counter-intuitive, this type of trip simply signifies a movement that starts and ends at the home location without stopping at an intermediate location long enough to trigger a trip end. An example of this situation could be where a person leaves their home only to stop at a gas station for 5 minutes, and then returns home.

This section is subdivided into two separate sections on LBS Total Trip Activity and LBS Travel Patterns. The section on LBS Total Trip Activity shows the aggregate number of trip ends (origins + destinations) to reveal the total attractiveness of an area. The LBS Travel Patterns section considers specific pairings of particularly high trip activity to show actual movement between areas. Each section concludes with a section of key findings.

LBS Total Trip Activity

The total number of trip ends were summed for the AirSage LBS dataset from April 2019 and April 2020 to quantify and map the overall demand for travel in Fayette and Jessamine counties. **Table 2-26** shows the average number of weekday (Monday-Thursday) trips over a 24-hour period, as well as the change year over year. The LBS data show that in April of 2019 an average weekday had about 1,019,665 daily trips. In April 2020, that figure dropped by about 51%, to 499,811 trips. Although many of the trip purposes decreased in similar proportion, some exhibited a more significant decrease. The greatest decrease occurred in work-related trip purposes, such as work to other and home to work, which is indicative of the mandatory shutdowns in place during this time period. The trip purpose of home-to-home and home-to-other decreased the least. Overall, all trip types realized a drastic decrease in trips. However, work trips appear to have decreased the most with many workers working from home or not working at all.

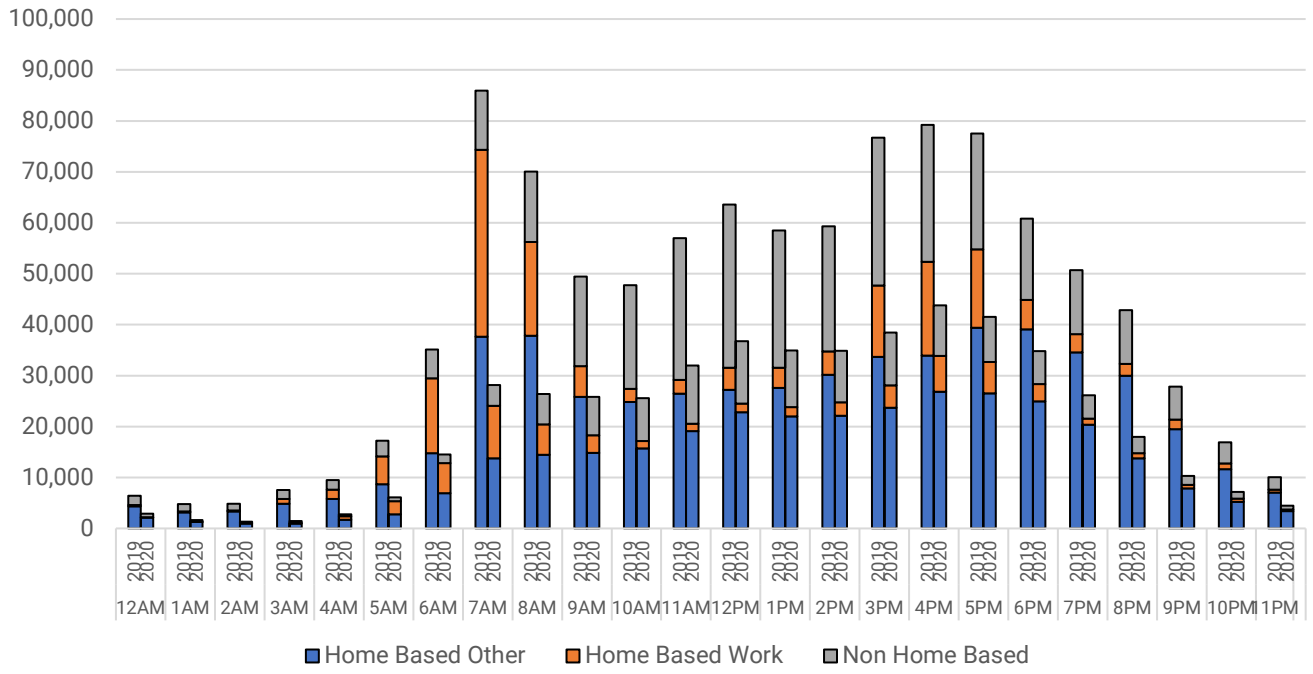
Table 2-26: LBS Trips by Trip Purpose

Trip Purpose	April 2019		April 2020		2019 to 2020 Change	
	Trips	Percent of Total	Trips	Percent of Total	Trips	Percent Decrease
Home to Home	167,856	16.46%	124,254	24.86%	-43,602	-25.98%
Home to Other	176,891	17.35%	95,261	19.06%	-81,630	-46.15%
Home to Work	91,768	9.00%	33,306	6.66%	-58,462	-63.71%
Other to Home	186,434	18.28%	94,573	18.92%	-91,860	-49.27%
Other to Other	206,543	20.26%	81,777	16.36%	-124,766	-60.41%
Other to Work	30,571	3.00%	12,245	2.45%	-18,326	-59.95%
Work to Home	74,235	7.28%	29,871	5.98%	-44,365	-59.76%
Work to Other	51,389	5.04%	15,501	3.10%	-35,888	-69.84%
Work to Work	33,977	3.33%	13,023	2.61%	-20,954	-61.67%
Total	1,019,665	-	499,811	-	-519,853	-50.98%

Source: AirSage NWTM (April 2019 and April 2020)

Figure 2-27 shows the number and types of weekday trips over a 24-hour period for the years 2019 and 2020. Similar to the previous figure, a dramatic reduction in all trips is evident when comparing the two years of data. These figures, however, highlight the change in trip distribution at different times of the day. A large increase in daily trips occurs in the 7AM-8AM hour in the 2019 dataset. The 2020 dataset, however, shows a much more modest increase in AM peak trips, supporting larger-scale trends of limited commuting trips resulting from the COVID-19 pandemic.

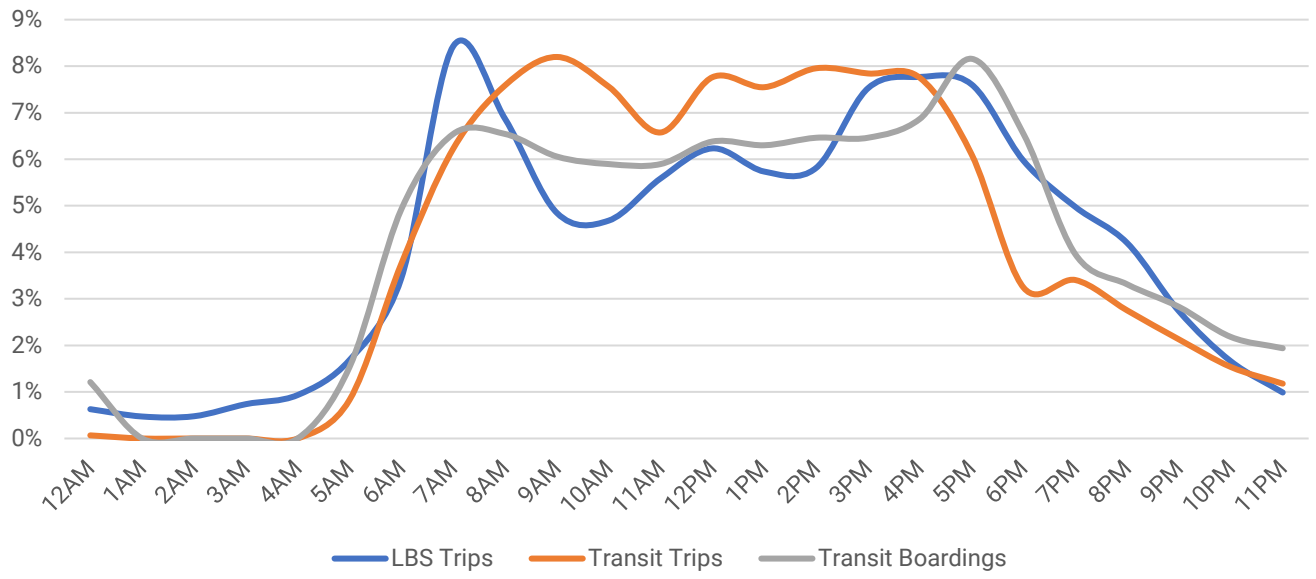
Figure 2-27: April 2019 and April 2020 Weekday Trips by Purpose by Hour



Source: AirSage NWTM (April 2019 and April 2020)

Figure 2-29 shows the weekday April 2019 LBS trips compared to the number of transit trips and transit boardings over the same period. Transit trips are defined here as the total number of trips taken by all routes in the system per hour. Transit boardings is simply the number of passengers in a given hour. All three variables are plotted in terms of percentage of daily totals to show the distribution on a single axis. Overall, all three variables track an expected diurnal pattern of 24-hour activity. Trip activity increases dramatically around 5AM before reaching an AM peak, after which trips reduce and level off before a PM peak is seen around 5PM to 6PM. Differences in the dataset include a slightly higher and earlier AM peak in LBS trips than in the transit trips. Also, LBS trips decrease more rapidly after the AM peak, while transit trips are still increasing. Both LBS trips and transit boardings are higher later in the PM peak than transit trips as well. Differences in the distribution lead to the conclusion that it may be beneficial to extend the span of service to earlier and later in the day to capture potential latent demand as indicated by the high number of LBS trips in the AM Peak and high number of transit trips in the PM peak. A closer examination of these hourly trends on a subarea basis could potentially point to areas that Lextran should evaluate for service span expansion.

Figure 2-28: Average Weekday LBS Trips, Transit Trips, and Transit Boardings by Hour



Source: AirSage NWTM (April 2019) and Lextran APC Data (Spring 2019)

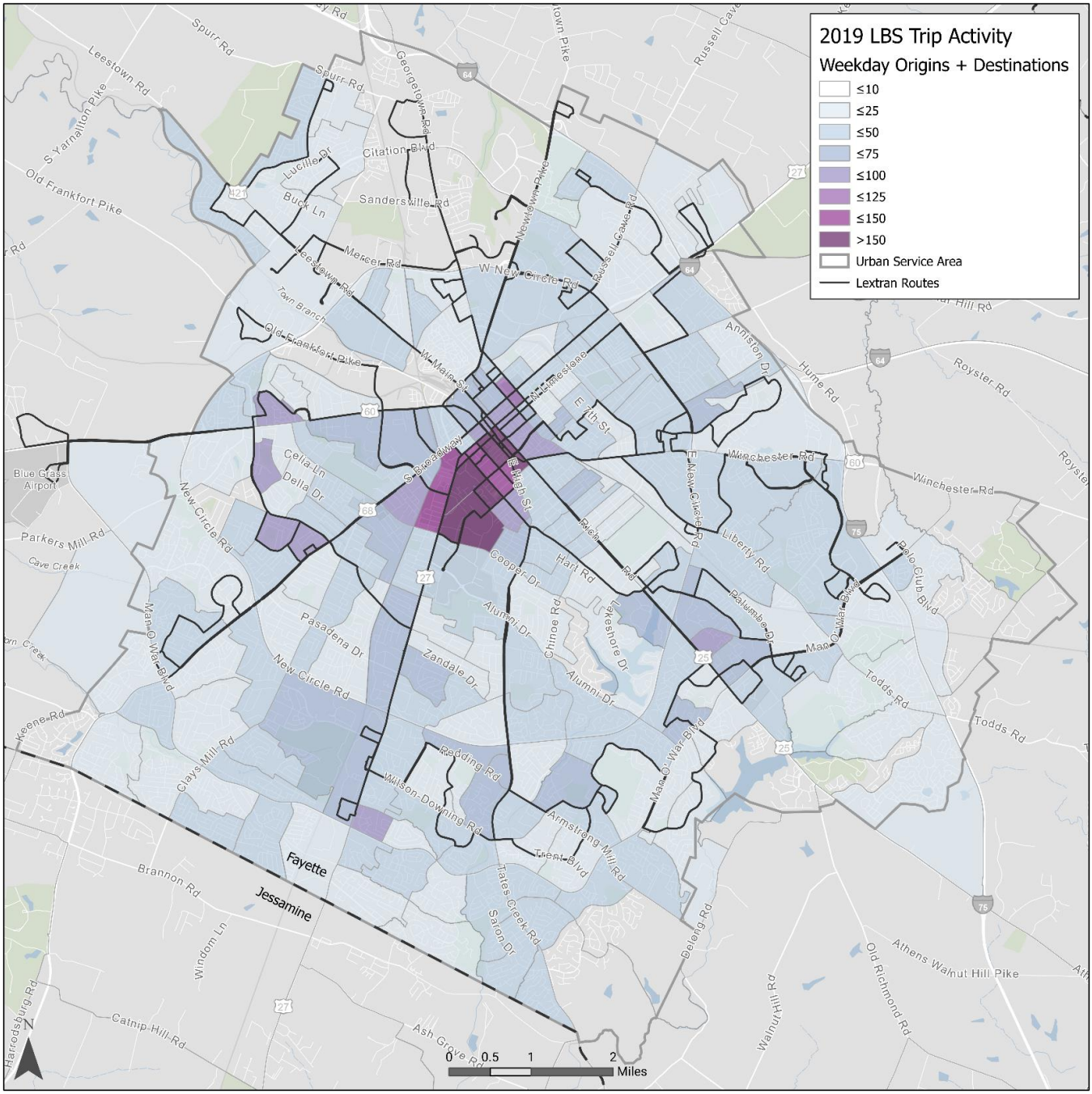
LBS data are also used here to show geographic trends in Lexington. **Figure 2-29** shows the distribution of total trips ends (total origins + destinations), regardless of trip type. By adding all origins and destinations, the map shows the total attractiveness of an area. CBGs that have a high level of trip end density are places that people want to go, and therefore should be considered for higher level of transit service. **Figure 2-30** shows the same results for the April 2020 dataset, and **Figure 2-31** shows the total change from 2019 to 2020.

Overall, the 2019 weekday total trip activity is concentrated in CBGs in the University of Kentucky subarea, and southern CBGs of the Downtown Lexington subarea. The 2020 dataset is largely consistent with the 2019 in terms of proportion, although the total trips are much lower than in 2019, consistent with fewer trips overall. The change map shows that the greatest decreases in activity were in the University of Kentucky and Nicholasville Rd (Outside New Circle Rd), where a large decrease in activity had occurred in response to COVID-19.

Examination of the LBS total trip activity data results in several findings:

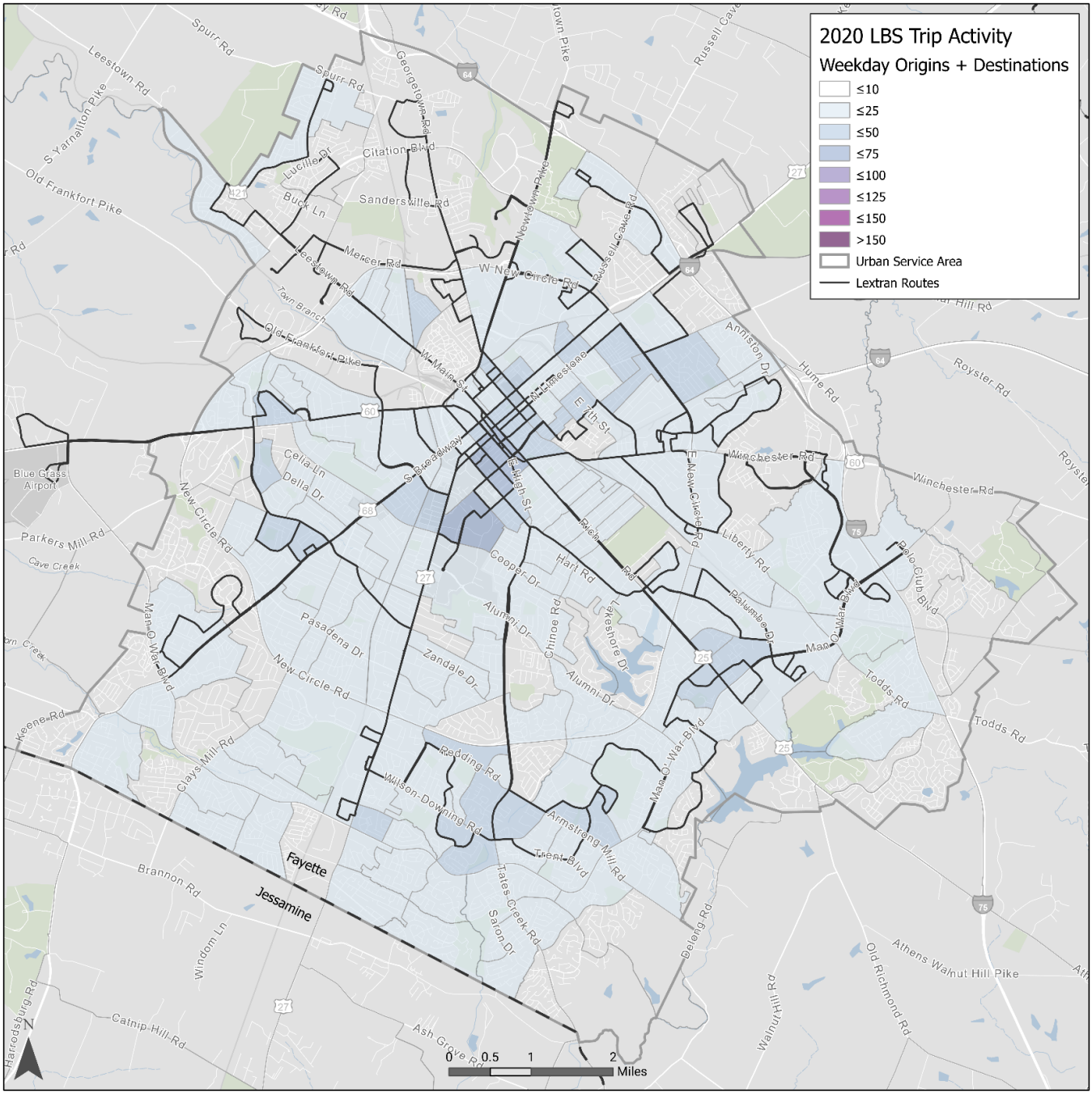
- The University of Kentucky subarea lost a total of almost 95,000 trip ends (origins + destinations), the largest of any subarea. The subarea with the second most loss in trip activity was Nicholasville Road (Outside New Circle Road), where a single CBG had approximately 33,500 fewer trip ends in April 2020 than in April 2019.
- A comparison of LBS and transit service provided shows that there are a higher proportion of LBS trips occurring the AM Peak than in the transit service provided. This suggests that the transit service provided may benefit from an earlier AM peak.
- A comparison of the transit boardings and transit service provided shows a higher proportion of transit boardings in the PM peak than in the transit service provided. This suggests that the transit service provided may benefit from a later PM peak.

Figure 2-29: April 2019 Weekday Trip Activity (Origins + Destinations)



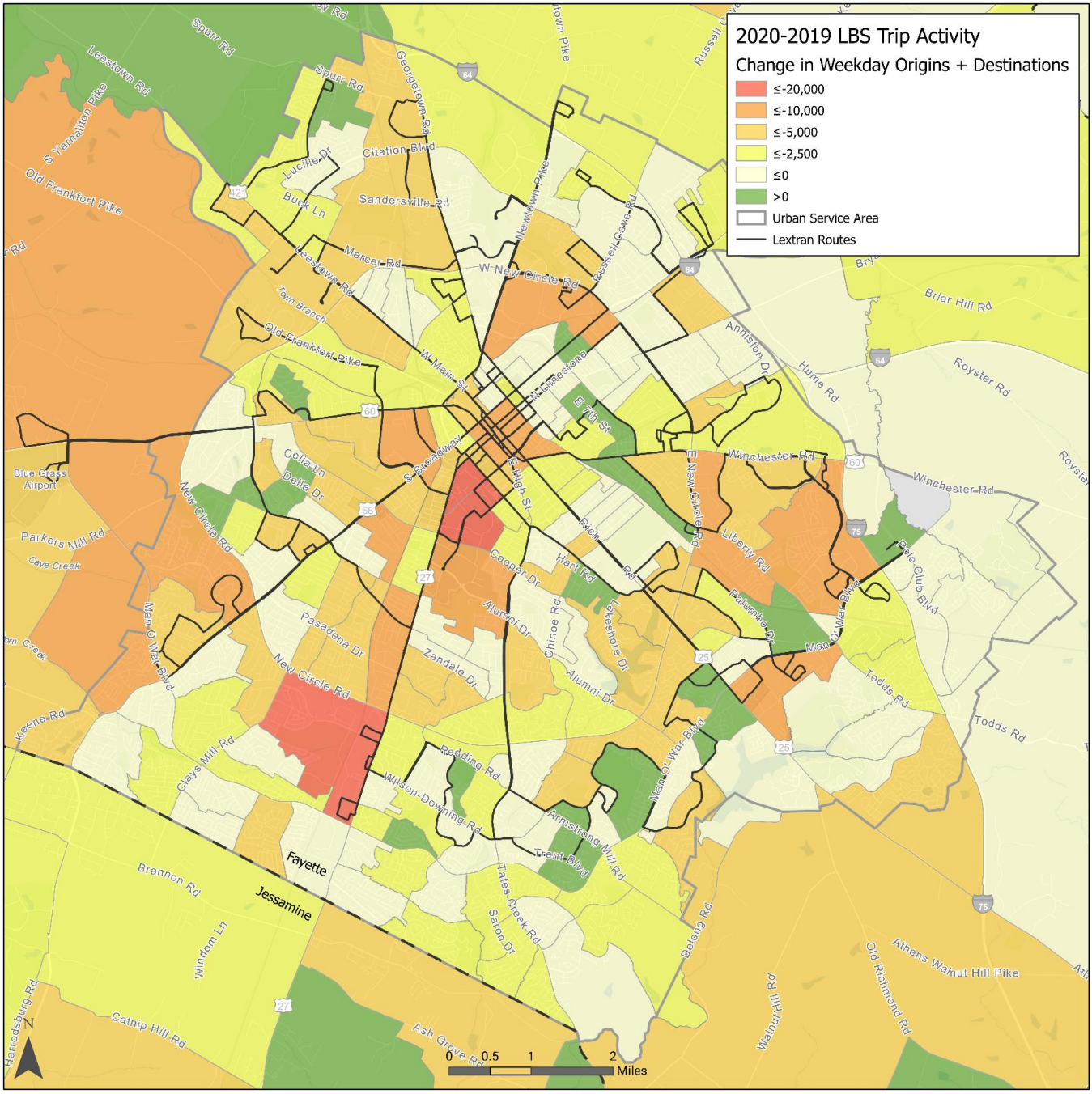
Source: AirSage NWTM (April 2019)

Figure 2-30: April 2020 Weekday Trip Activity (Origins + Destinations)



Source: AirSage NWTM (April 2020)

Figure 2-31: Change in Weekday Trip Activity (2020 Origins + Destinations – 2019 Origins + Destinations)



Source: AirSage NWTM (April 2019 and April 2020)

LBS Travel Patterns

The total number of trips as calculated with LBS data show the total attractiveness of a particular area. However, calculating the trip flows from one location to another shows the attractiveness of specific travel movements. This type of analysis is particularly useful when evaluating existing and potential transit routes. A better understanding of how people travel in Lexington can aid in the adjustments of existing routes or development of new routes.

This section uses the LBS data to highlight the greatest interactions of travel patterns. To quantify and summarize travel patterns, this section makes use of subareas as the geographical unit. Trips from each of the subareas were added together and the trip interactions were calculated for every subarea-to-subarea combination. Once total trips were calculated, they were normalized by the area of each subarea. This is done to calculate a trip density, which standardizes the size of each of the subareas (sizes of subareas within the urban service area range from about 270 acres to 3,650 acres). **Table 2-27** shows the top 25 travel patterns in terms of trip density. Total trips are shown as well, color coded to show the greatest volumes. Distances between the centroid of each subarea were also calculated to give a general sense of how far apart subareas are from one another. A person-trip mile variable was created and added to the table by multiplying the distance between each subarea and the corresponding trip volume, thereby representing the cumulative mileage of trip flows. This metric is useful in evaluating a particular trip pairing for potential transit service because these trips are much less likely to be accomplished by active transport modes such was walking or biking. Finally, transit options have been included to show the likely path that would be taken to accomplish the respective travel movement. In general, transit trips that require a transfer are less desirable than those that do not. Transit trips that require long distances of out of direction are less desirable as well.

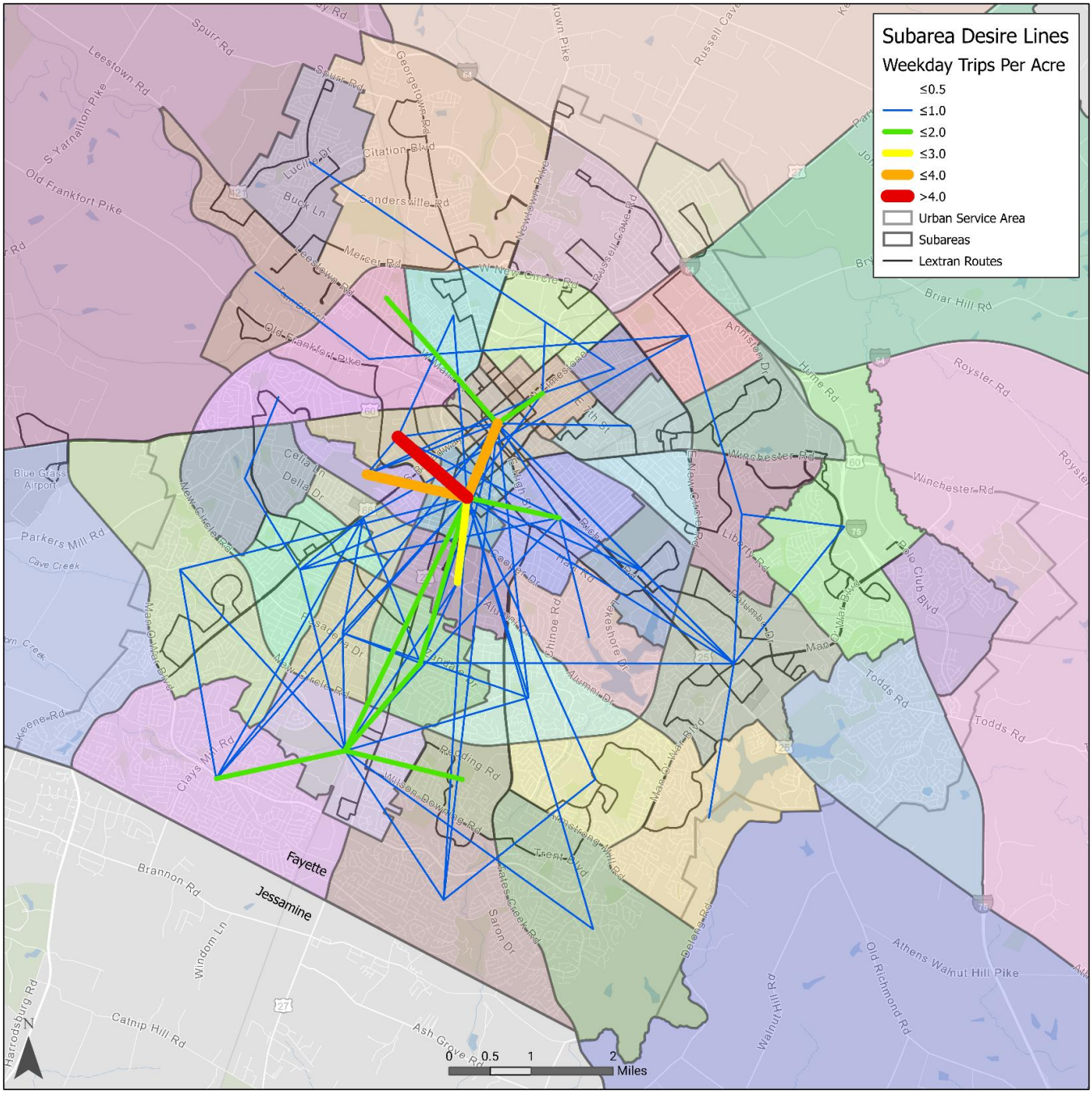
In addition to **Table 2-27**, a geographic representation of the LBS data travel patterns is shown cartographically in **Figure 2-32**, where weekday trips are shown in terms of trip density. Key findings regarding key travel patterns are summarized as part of the travel market discussion in the following section.

Table 2-27: Top 25 Subarea to Subarea Average Weekday Trip Counts by Trip Density

Rank	Subarea 1	Subarea 2	Trip Density	Trip Volume	Person-Trip Miles	Transit Options
1	University of Kentucky	Red Mile	4.54	6,041	6,779	15
2	University of Kentucky	Pine Meadows	3.77	4,222	5,303	15
3	University of Kentucky	Downtown Lexington	3.1	3,622	3,537	1, 3, 5, 16, 27, 51
4	University of Kentucky	UK/Central Baptist Hospital	2.05	2,989	3,102	14, 16, 27, 3, 5
5	University of Kentucky	Eastside	1.6	2,980	3,421	1, 3, 11, 51
6	University of Kentucky	Nicholasville Rd (Inside New Circle Rd)	1.32	2,324	5,276	5, 16
7	Nicholasville Rd (Outside New Circle Rd)	Nicholasville Rd (Inside New Circle Rd)	1.17	2,973	4,188	5
8	Nicholasville Rd (Outside New Circle Rd)	Kirklevington Park	1.12	2,367	3,482	3
9	University of Kentucky	Nicholasville Rd (Outside New Circle Rd)	1.08	2,255	4,831	5, 3
10	Northside District	Downtown Lexington	1.07	1,083	715	6, 7
11	Wyndam Downs	Nicholasville Rd (Outside New Circle Rd)	1.05	4,579	7,353	No Routes in Wyndam Downs
12	Meadowthorpe	Downtown Lexington	1.01	798	3,159	12
13	Picadome/St Joseph Hospital	Pasadena Dr	0.97	1,127	1,608	16 transfer to 13 (circuitous)
14	University of Kentucky	Southeastern Hills	0.96	1,876	10,356	14 transfer to 3
15	Wyndam Downs	Picadome/St Joseph Hospital	0.94	3,132	11,427	No Routes in Wyndam Downs
16	Waterford	Nicholasville Rd (Outside New Circle Rd)	0.91	3,510	7,351	3
17	University of Kentucky	Richmond Rd	0.87	2,414	7,211	5 transfer to 11
18	Nicholasville Rd (Inside New Circle Rd)	Downtown Lexington	0.84	1,364	4,094	5, 16
19	Pine Meadows	Downtown Lexington	0.84	824	1,409	13
20	Eastside	Downtown Lexington	0.83	1,433	1,968	1, 11, 3, 51
21	University of Kentucky	Pasadena Dr	0.82	1,155	5,066	16
22	University of Kentucky	Garden Springs	0.78	1,406	3,123	16
23	University of Kentucky	Douglas Park	0.78	1,118	9,264	5 or 16 transfer to 2
24	Nicholasville Rd (Outside New Circle Rd)	Beaumont	0.77	3,177	10,904	5 transfer to 13 (circuitous)
25	Picadome/St Joseph Hospital	Nicholasville Rd (Inside New Circle Rd)	0.73	1,094	2,083	13 transfer to 5

Source: AirSage NWTM (April 2019)

Figure 2-32: Subarea to Subarea Average Weekday Trip Densities



Source: AirSage NWTM (April 2019)

Key Activity Center Travel Markets

An analysis of activity center travel patterns was conducted to further delineate key travel markets in Lexington-Fayette County. For this analysis, activity centers were identified based on employment characteristics using the subarea definitions referenced throughout this report. The following criteria were used to screen each subarea to identify the primary employment and retail centers located throughout the region:

- Total Jobs: Greater than 3,000 total jobs.
- Job Density: Greater than 3 jobs per acre
- Ratio of jobs to population: Greater than 150% of the county average, or 0.93.

The screening yielded 16 activity centers, as identified in **Table 2-28** and **Source:** US Census ACS (2018) and LEHD (2017)

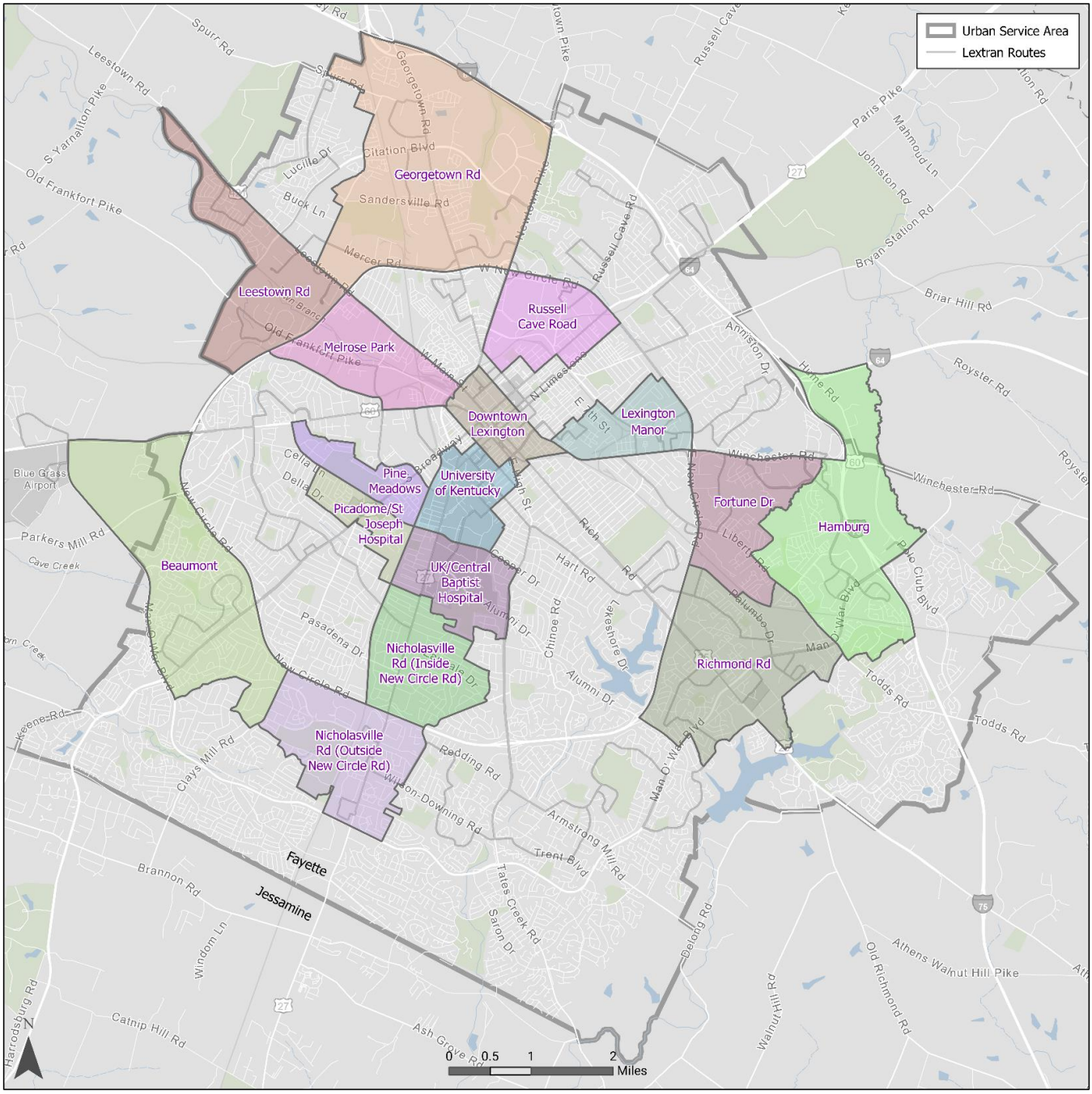
Figure 2-33. Collectively, these subareas contain 72% of the total county employment base. The University of Kentucky, Downtown Lexington, and UK/Central Baptist Hospital subareas form the top tier of activity centers. The remaining 13 activity centers include healthcare facilities, regional retail centers, office parks and industrial/warehouse employment centers.

Table 2-28: Lexington Activity Centers

Activity Center	Total Jobs	Jobs / Population Ratio	Job Density	Primary Activity Generator Types
University of Kentucky	14,810	1.40	22.7	University
Downtown Lexington	11,718	2.30	22.7	Office / Retail / Civic
UK/Central Baptist Hospital	17,849	5.04	22.1	Healthcare / University
Picadome/St Joseph Hospital	4,771	2.13	11.8	Healthcare
Pine Meadows	3,552	1.09	7.6	Retail / Healthcare
Richmond Rd	15,869	0.94	7.5	Healthcare / Retail / Office / Industrial
Nicholasville Rd (Outside New Circle Rd)	9,684	1.89	6.7	Retail
Russell Cave Road	5,524	1.91	6.4	Retail / Industrial / Technical College
Nicholasville Rd (Inside New Circle Rd)	6,819	1.12	6.2	Retail
Lexington Manor	3,640	1.15	5.4	Retail / Industrial / Warehouse
Fortune Dr	4,852	1.36	4.4	Retail / Industrial / Warehouse
Georgetown Rd	15,732	2.96	4.3	Industrial / Warehouse
Beaumont	11,441	1.16	4.3	Retail / Office
Hamburg	9,078	1.57	3.7	Retail
Leestown Rd	5,162	1.11	3.7	Industrial / Warehouse / Civic
Melrose Park	3,290	1.96	3.3	Industrial / Warehouse / Retail

Source: US Census ACS (2018) and LEHD (2017)

Figure 2-33: Lexington Activity Centers



Source: Nelson\Nygaard

Using the methodology described in the previous section, weekday LBS data from April 2019 was used to identify the primary travel markets to and from the activity centers. Subarea pairs with total weekday trip volumes greater than 1,000 are identified in **Table 2-29** through **Table 2-31** on the following pages, organized by activity center to activity center pairs, activity center to non-activity center pairs, and internal markets. In each table, trip density and person trip miles are also provided to provide indicators of potential transit productivity. Subareas highlighted in bold in the 'Top Subarea Pairs' column indicate that the subarea has above-average low income and/or minority population density. Finally, transit trip paths are provided to identify Lextran's current service offerings to these markets. Key findings are summarized below:

General Observations

- Lextran generally serves the top travel markets effectively, providing direct service to 18 of the top 25 activity-center based markets as measured by trip density.
- The three most prominent activity centers, University of Kentucky, Downtown, and UK/Central Baptist Hospital are all well served with many transit options. As indicated in **Table 2-27** in the previous section, the University of Kentucky is involved in the top six regional travel patterns, all of which currently have transit that accomplishes these movements. UK's internal travel demand is well-served by Routes 14, 15, and 27 (on weekends). As noted later in this document, the UK subarea accounts for more than 30% of the total network ridership productivity. The UK campus is generally well integrated into the rest of the transit network, although several high-volume markets do not currently have a direct connection. These include Beaumont, Hamburg, and Richmond Road.
- Nicholasville Road, extending from Downtown nearly to the Fayette County line, is the region's key commercial corridor, as evidenced by the presence of five contiguous activity centers along its entire length. Nearly 70,000 weekday travel movements occur within these subareas. Accordingly, Lextran provides its most frequent core route along this corridor.
- Several prominent travel markets are closely located to one another but require lengthy and indirect transit trips due to the lack of direct crosstown connections. Travel markets located on either side of the city can generally be facilitated via a direct path with a single transfer downtown. On the other hand, travel markets located along the periphery of the city oftentimes lack direct paths, forcing customers to travel downtown to make a transfer just to return outbound in generally the same direction to reach their destination. These are markets that Lextran is probably not capturing. Several notable examples include:
    - Nicholasville Road - Beaumont / (3,200 trips)
    - Fortune Drive / Richmond Road (1,900 trips)
    - Beaumont / Gardenside (1,300 trips)
    - Fortune Drive / Bryan Station (1,300 trips)
    - Nicholasville Road / Lansdowne (1,000 trips)

Activity Center to Activity Center Markets

- The top activity center to activity center travel markets are generally well served with direct transit service. However, the extent to which the interior of some subareas is served varies considerably. Further analysis at the CBG-level will be required to understand specific service adjustments within each subarea.
- Several notable high-volume subarea pairs do not currently have direct service. These include UK-oriented markets such as Richmond Road / UK (2,400 trips) and Beaumont / UK (2,200

trips), and crosstown markets such as Nicholasville Road / Beaumont (3,200 trips) and Fortune Drive / Richmond Road (1,900 trips).

Activity Center to Non-Activity Center

- Two of the top activity center to non-activity center markets, Downtown/Wyndam Downs and Hamburg/Andover, do not have any existing transit connections. Andover and Wyndam Downs, however, tend to be low density residential communities with higher average household incomes.
- Wyndam Downs and West Fayette register as top travel markets without current service connectivity to Beaumont. While there are several nodes of multi-family housing in Wyndam Downs that warrant investigation for service, these areas are generally low-density and difficult to serve with fixed-route transit. Crosstown access to Nicholasville Rd corridor is another potential need. This travel movement could potentially be served by either extending Route 5 or Route 13.
- A contiguous line of subareas along the Fayette-Jessamine County line show strong trip volumes tied to the Beaumont and Nicholasville Road subareas. From west to east, these include Beaumont, Wyndam Downs, Nicholasville Road, Waterford, Park Place, and Southeastern Hills. Collectively, interactions between these subareas totals about 50,000 daily trips. Man o' War Boulevard provides a fairly direct east-west path between these areas, however access to adjacent destinations is difficult in some locations due to development patterns.

Internal Subarea Markets:

- In terms of trip density, the two most prominent internal activity center markets are UK and Downtown Lexington. As noted earlier, UK's internal market is very well served. Downtown, as the site of Lextran's central transfer hub, is also densely covered. Lextran previously operated a rubber-tire trolley service to provide additional circulation through downtown, though this service was discontinued in 2016.
- Richmond Road also exhibits high internal trip densities. Local core routes 1 and 11 both provide circulation within the subarea. Route 18 provides additional crosstown service across the subarea.
- In the remaining activity centers, Lextran's attempts to provide circulation through deviations and one-way loops. While most of these activity centers do not have high enough trip volumes to warrant dedicated circulator routes, existing alignments should be evaluated to ensure key activity generators are effectively served.

Non-Activity Center to Non-Activity Center

- Trip volumes between subareas without a defined activity center origin or destination were also evaluated. Of the subarea pairs with total trip volumes greater than 1,000, many are located in south Lexington along the Jessamine County line, further supporting the potential need for better crosstown access in this area. These subarea pairs include:
    - Waterford and Southeastern Hills (1,900 trips)
    - Wyndam Downs and Garden Springs (1,900 trips)
    - Waterford and Park Place (1,800 trips)
    - Waterford and Garden Springs (1,600 trips)
    - Wyndam Downs and Waterford (1,100 trips)

Table 2-29: Activity Center to Activity Center Top Travel Markets

Activity Center	Top Subarea Pairs	Trip Density	Trip Volume	Person-Trip Miles	Transit Options
Beaumont	Nicholasville Rd (Outside N.C.)	2.39	3,177	9,491	5 transfer to 13
	University of Kentucky	2.80	2,210	7,974	3/5/16 transfer to 13
	Nicholasville Rd (Inside N.C.)	0.29	1,107	3,480	5/16 transfer to 13
Downtown Lexington	**University of Kentucky**	3.10	3,622	3,537	1, 3, 5, 16, 27, 51
	Richmond Rd	0.43	1,480	6,072	1, 11
	Nicholasville Rd (Inside N.C.)	0.39	1,364	4,182	5, 16
Fortune Dr	Hamburg	0.71	2,522	3,175	10
	Richmond Rd	0.58	1,866	3,399	18 transfer to 10 & 1/11 transfer to 10
Georgetown Rd	**Richmond Rd**	0.32	1,183	8,350	1/11 transfer to 2/4/22
Hamburg	**Richmond Rd**	1.33	2,782	5,959	18
	Fortune Dr	0.71	2,522	3,175	10
	University of Kentucky	0.96	1,488	6,858	3/5/16 transfer to 10
Leestown Rd	Melrose Park	0.58	1,398	2,438	12
Melrose Park	Leestown Rd	0.58	1,398	2,438	12
Nicholasville Rd (Inside N.C.)	Nicholasville Rd (Outside N.C.)	1.17	2,973	4,188	5
	University of Kentucky	1.09	2,324	4,867	5, 16
	Richmond Rd	0.33	1,632	6,233	1/11 transfer to 5/16
	Downtown Lexington	0.39	1,364	4,182	5, 16
	Beaumont	0.29	1,107	3,480	13 transfer to 5/16
	Picadome/St Joseph Hospital	0.73	1,094	2,083	13 transfer to 5
	UK/Central Baptist Hospital	0.52	1,001	1,083	5, 16
Nicholasville Rd (Outside N.C.)	Beaumont	2.39	3,177	9,491	13 transfer to 5
	Nicholasville Rd (Inside N.C.)	1.17	2,973	4,188	5
	University of Kentucky	0.49	2,255	7,720	5, 3
	Richmond Rd	0.95	1,641	7,968	18 transfer to 3 & 1/11 transfer to 5
	UK/Central Baptist Hospital	0.72	1,582	3,904	5
Picadome/St Joseph Hospital	Nicholasville Rd (Inside N.C.)	0.73	1,094	2,083	5 transfer to 13
Pine Meadows	**University of Kentucky**	3.77	4,222	5,303	15
Richmond Rd	Hamburg	1.33	2,782	5,959	18
	University of Kentucky	0.59	2,414	9,237	11/1 transfer to 5
	Fortune Dr	0.58	1,866	3,399	10 transfer to 18 & 10 transfer to 1/11
	Nicholasville Rd (Outside N.C.)	0.95	1,641	7,968	3 transfer to 18 & 5 transfer to 1/11
	Nicholasville Rd (Inside N.C.)	0.33	1,632	6,233	5/16 transfer to 1/11
	Downtown Lexington	0.43	1,480	6,072	1, 11
	UK/Central Baptist Hospital	0.36	1,287	4,516	5/16 transfer to 1/11
	Georgetown Rd	0.32	1,183	8,350	2/4/22 transfer to 1/11
UK/Central Baptist Hospital	**University of Kentucky**	2.05	2,989	3,102	5, 14, 16, 27
	Nicholasville Rd (Outside N.C.)	0.72	1,582	3,904	5
	Richmond Rd	0.36	1,287	4,516	1/11 transfer to 5/16
	Nicholasville Rd (Inside N.C.)	0.52	1,001	1,083	5, 16
University of Kentucky	Pine Meadows	3.77	4,222	5,303	15
	Downtown Lexington	3.10	3,622	3,537	1, 3, 5, 16, 27, 51
	UK/Central Baptist Hospital	2.05	2,989	3,102	14, 16, 27, 3, 5
	Richmond Rd	0.59	2,414	9,237	5 transfer to 11/1
	Nicholasville Rd (Inside N.C.)	1.09	2,324	4,867	5, 16
	Nicholasville Rd (Outside N.C.)	0.49	2,255	7,720	5, 3
	Beaumont	2.80	2,210	7,974	13 transfer to 3/5/16
	Hamburg	0.96	1,488	6,858	10 transfer to 3/5/16

Source: AirSage NWTM (April 2019)

Table 2-30: Activity Center to Non-Activity Center Top Travel Markets

Activity Center	Top Subarea Pairs	Trip Density	Trip Volume	Person-Trip Miles	Transit Options
Beaumont	Wyndam Downs	1.00	3,866	9,993	No Routes in Wyndam Downs
	West Fayette	0.48	2,042	5,371	Limited Service in West Fayette
	Garden Springs	0.45	1,699	2,484	13
	Gardenside	0.34	1,282	1,744	3 transfer to 13
	Waterford	0.84	1,243	6,400	8 transfer to 13
Downtown Lexington	Wyndam Downs	1.50	2,423	13,373	No Routes in Wyndam Downs
	Waterford	0.86	1,612	9,417	3
	Eastside	0.83	1,433	1,968	1, 11, 3
	Northside District	1.07	1,083	715	6, 7, 9
	Lansdowne	0.60	1,083	3,642	3
Fortune Dr	Waterford	0.69	1,606	9,537	3 transfer to 10
	Bryan Station	0.92	1,319	2,995	17 transfer to 6 transfer to 10
Georgetown Rd	**Eastland**	0.41	1,049	5,272	7 transfer to 2
	Idle Hour	0.26	1,026	5,692	1/11 transfer to 2
	Masterson Station	0.20	1,004	1,499	22 & 12 transfer to 2
Hamburg	Andover	1.29	2,506	7,220	No Routes in Andover
	Gleneagles	0.41	1,443	2,329	10 (does not serve interior of origin)
	Bryan Station	0.40	1,379	4,139	17/7 transfer to 10
	East Lake	0.38	1,032	4,036	18
	Masterson Station	0.57	1,010	7,963	12 transfer to 10
Leestown Rd	Wyndam Downs	0.52	1,022	6,324	No Routes in Wyndam Downs
Melrose Park	Bryan Station	0.42	1,018	3,979	12 transfer to 6 transfer to 17
Nicholasville Rd (Inside N.C.)	Wyndam Downs	0.97	1,804	5,156	No Routes in Wyndam Downs
	Waterford	0.30	1,579	4,577	3 transfer to 5
	Park Place	0.73	1,480	5,721	3 transfer to 5
	East Lake	0.32	1,094	4,365	18 transfer to 3
	Lansdowne	0.46	1,056	1,462	3 transfer to 5
	Pasadena Dr	0.55	1,021	1,039	16
	Garden Springs	0.45	1,005	1,867	16
Nicholasville Rd (Outside N.C.)	Wyndam Downs	1.05	4,579	7,353	No Routes in Wyndam Downs
	Waterford	2.00	3,510	7,645	3
	Park Place	1.34	2,403	8,949	3
	Kirklevington Park	1.12	2,367	3,482	3
	Garden Springs	0.63	1,666	3,788	16 transfer to 5
	Eastside	0.41	1,456	5,611	1/11 transfer to 5
	Lansdowne	1.03	1,391	3,237	3 transfer to 5
	Pasadena Dr	0.59	1,289	1,851	5 (does not serve interior of origin)
	Southeastern Hills	0.28	1,154	3,547	3
	West Fayette	1.07	1,132	5,656	Limited Service in West Fayette
	Andover	0.60	1,002	6,683	No Routes in Andover
Picadome/St Joseph Hospital	Wyndam Downs	0.94	3,132	11,427	No Routes in Wyndam Downs
	Pasadena Dr	0.97	1,127	1,608	16 transfer to 13
Richmond Rd	Andover	0.84	2,316	5,205	No Routes in Andover
	East Lake	0.52	2,090	3,980	18
	Eastside	1.43	2,009	5,568	1, 11
	Waterford	1.96	1,891	8,625	3 transfer to 18 & 3 transfer to 1/11
	Idle Hour	0.63	1,867	2,916	1, 11
	Southeastern Hills	0.28	1,591	3,496	18
	Winburn/Radcliff	0.48	1,414	7,858	4/6 transfer to 1/11
	Red Mile	0.38	1,096	5,410	13/8/15 transfer to 1/11
	Bryan Station	0.70	1,071	4,318	16 transfer to 13

Table 2-30: Activity Center to Non-Activity Center Top Travel Markets

Activity Center	Top Subarea Pairs	Trip Density	Trip Volume	Person-Trip Miles	Transit Options
Russell Cave Road	Masterson Station	0.31	1,249	4,328	22 (serves boundary) & 12 transfer to 4/6
	Winburn/Radcliff	0.44	1,124	1,428	17, 6, 4
University of Kentucky	**Red Mile**	4.54	6,041	6,779	15
	Eastside	1.60	2,980	3,421	1, 3, 11, 51
	Waterford	0.68	2,076	10,191	3
	Southeastern Hills	0.54	1,876	7,073	3
	Wyndam Downs	0.56	1,855	8,512	No Routes in Wyndam Downs
	Park Place	0.69	1,772	9,702	3
	Garden Springs	0.58	1,406	3,119	16
	Lansdowne	0.91	1,303	3,320	3
	Pasadena Dr	0.52	1,155	2,588	16
	Douglas Park	0.42	1,118	2,492	2 transfer to 5

Source: AirSage NWTM (April 2019)

Table 2-31: Activity Center Internal Travel Markets

Activity Center	Top Subarea Pairs	Trip Density	Trip Volume	Person-Trip Miles	Transit Options
University of Kentucky	**University of Kentucky**	44.79	29,213	n/a	14, 15, 27
Richmond Rd	**Richmond Rd**	7.65	16,130	n/a	1, 11, 18
Beaumont	Beaumont	3.45	9,179	n/a	13
Nicholasville Rd (Outside N.C.)	Nicholasville Rd (Outside N.C.)	5.09	7,332	n/a	5
Downtown Lexington	**Downtown Lexington**	12.35	6,382	n/a	many
Nicholasville Rd (Inside N.C.)	Nicholasville Rd (Inside N.C.)	5.23	5,771	n/a	5
Hamburg	Hamburg	2.07	5,090	n/a	10, 18
Fortune Dr	Fortune Dr	4.33	4,825	n/a	10
Georgetown Rd	Georgetown Rd	1.05	3,843	n/a	2, 22
Leestown Rd	Leestown Rd	2.60	3,625	n/a	12, 22
Russell Cave Road	**Russell Cave Road**	3.97	3,453	n/a	4, 6
Pine Meadows	**Pine Meadows**	7.04	3,298	n/a	13
UK/Central Baptist Hospital	**UK/Central Baptist Hospital**	3.85	3,118	n/a	5, 16
Picadome/St Joseph Hospital	Picadome/St Joseph Hospital	6.70	2,707	n/a	13
Lexington Manor	**Lexington Manor**	3.40	2,298	n/a	9
Melrose Park	Melrose Park	2.26	2,258	n/a	12

Source: AirSage NWTM (April 2019)

2.5. Fixed-Route Service Assessment

Fixed-route bus service was evaluated to determine the performance of existing service in terms of ridership productivity, cost efficiency and effectiveness, and reliability. This section provides the findings of the fixed-route service performance assessment.

2.5.1. Ridership Productivity

Ridership productivity is the primary performance metric that transit agencies use to measure success. This section provides a summary of Lextran's fixed-route ridership productivity and trends at the system, route, and stop level.

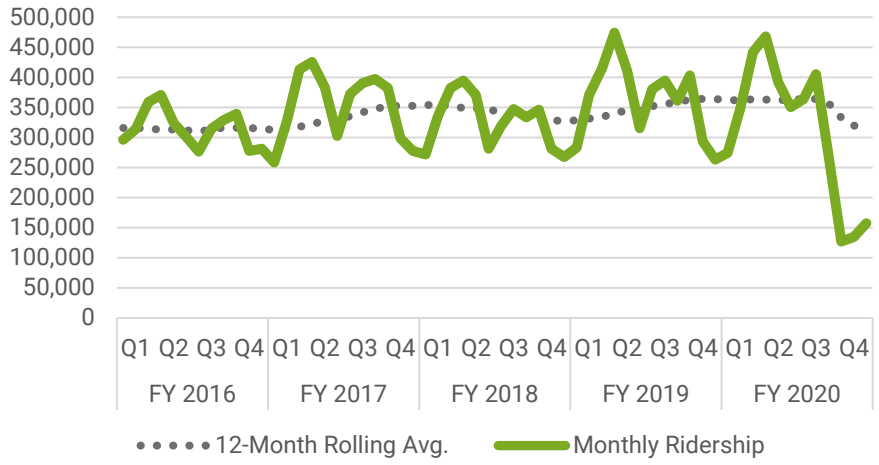
Annual Ridership Trends

National Transit Database (NTD) reports were used to determine Lextran's annual bus ridership productivity between FY16 and FY20. As shown in **Table 2-32**, Lextran's annual ridership increased 15% between FY16 and FY19, but then lost its gains of the previous four years in FY20 due to the impacts of the COVID-19 pandemic. **Figure 2-34** illustrates Lextran's monthly ridership trend over the five-year period. Like many transit agencies, Lextran's ridership follows a seasonal pattern, with ridership peaking in the fall and spring and declining in the summer and winter months. This pattern is especially pronounced in Lexington due to the significant impact of the UK routes on Lextran's total ridership. Over the course of the five-year period, Lextran's monthly ridership peaked in February 2020 before bottoming out in April 2020. As of June 2020, Lextran began realizing a modest recovery in monthly ridership.

Table 2-32: Lextran Annual Fixed-Route Ridership, FY16 – FY20

Year	Annual Ridership	Pct Chg
FY 2016	3,783,730	-
FY 2017	4,231,394	12%
FY 2018	3,932,501	-7%
FY 2019	4,364,637	11%
FY 2020	3,735,557	-14%
FY16 – 19	**580,907**	**15%**
FY16 – 20	**-48,173**	**-1%**

Figure 2-34: Lextran Fixed Route Monthly Ridership Trend, FY16 – FY20



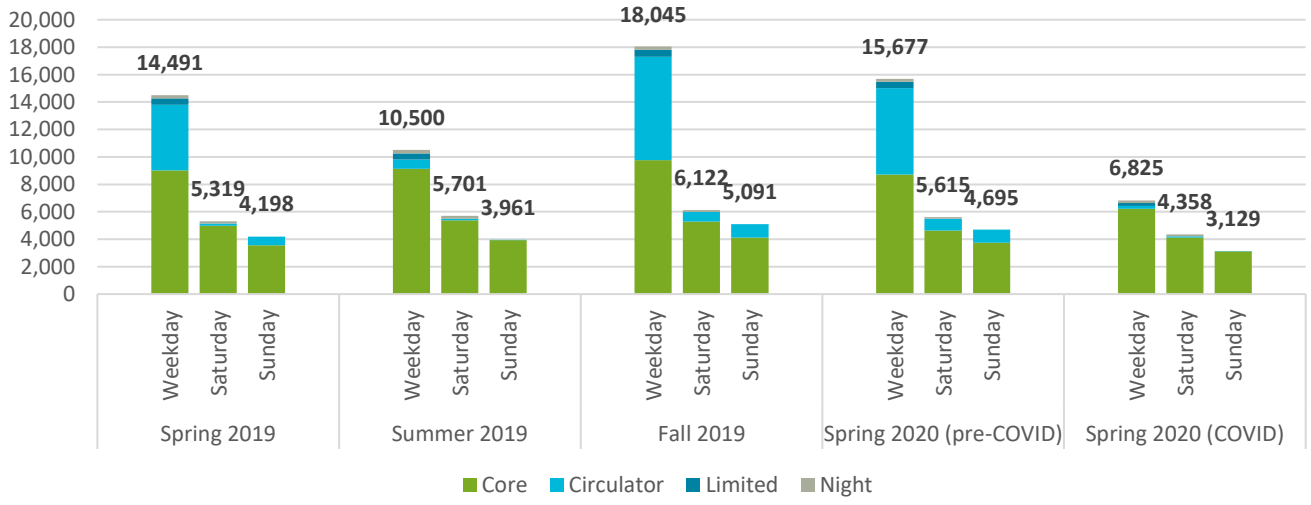
Source: Annual NTD Reports (2016-2018); NTD Monthly Module Adjusted Data Release (July 2020)

Ridership Productivity by Service Class

As noted in earlier sections of this report, Lextran organizes its fixed routes into service classifications: core, circulator, and limited. For this analysis, Lextran's nighttime routes were split out from the limited class to understand the unique characteristics of that market. Using Automatic Passenger Counter (APC) data provided by Lextran between January 2019 and June 2020, ridership by service class was evaluated over the five schedule mark-up, or bid, periods during that timeframe. Key observations are noted below:

- As shown in **Figure 2-35**, Lextran's average daily weekday ridership peaked during the Fall 2019 bid period at just over 18,000 passengers per day. Just over half of that total was attributed to the core routes, 42% was attributed to circulator routes, and the remaining 4% was attributed to limited and night routes.
- Average Saturday and Sunday ridership productivity was about a third of weekday ridership in Fall 2019. On weekends, when UK classes are not in session, circulator ridership dropped significantly. On Saturdays, 86 percent of ridership was produced by core routes, 11 percent by circulator routes, and 2 percent by night routes. On Sundays, core routes accounted for 80 percent of total ridership versus 20 percent for circulator routes.
- Like weekends, summer ridership is heavily influenced by UK-oriented ridership. On an average weekday during the summer 2019 bid period, total system ridership was about 60 percent of the preceding fall 2019 total. About 90 percent of the weekday system ridership was produced by core routes, 6 percent by circulator, and 6 percent by limited and night routes. Saturday circulator ridership experienced an uptick beginning in Fall 2019 with the introduction of Route 27 serving the UK campus.
- The shutdowns related to the COVID-19 pandemic caused a 56 percent drop in weekday ridership relative to the spring 2020 bid period immediately preceding Lextran's service reductions in March. During the period of reduced service between March and June 2020, core ridership accounted for 91 percent of the total system ridership. Weekends, however, did not sustain as significant of an impact, with a 22 percent reduction on Saturdays and 33 percent reduction on Sundays. This may be partly attributed to the fact that weekend service levels were generally unchanged.

Figure 2-35: Average Daily Ridership by Day of Week and Service Type, Spring 2019 Bid – Spring 2020 Bid



Source: Lextran APC Data (Spring 2019 Bid Period through June 30, 2020)

Ridership Productivity by Route

This section explores ridership on a route-level basis for the Fall 2019 bid period. **Figure 2-36** displays each Lextran route in rank order by average daily ridership for weekdays, Saturdays, and Sundays. **Table 2-33** documents these same figures by day of week and percentage of system total for each route. Key findings are summarized below:

Weekdays

- As demonstrated in **Figure 2-36**, Lextran's ridership is heavily influenced by a single route, Route 14 - UK Blue and White, which accounts for nearly a third of the system ridership at just over 5,500 passengers per day during the Fall 2019 bid period. Another UK campus circulator, Route 15 - Red Mile, is ranked second at 1,800 passengers per day. Together, these two routes produce 41 percent of Lextran's average weekday ridership.
- After the two UK circulator routes, Lextran's core routes account for the next 13 routes by rank order of ridership production. Out of these 25 routes that operate on weekdays, 95 percent of total system ridership is produced by these 15 routes.
- Of the core routes, Route 5 - Nicholasville Road is the strongest performer, at 1,700 daily passengers, or 10 percent of the system total. Other top-tier ridership producers include routes 3 - Tate's Creek Road, 8 - Versailles Road, 6 - North Broadway, and 7 - North Limestone, which collectively produce about 21 percent of the system total.
- There are two notable under-performing routes in the Lextran system that produce fewer than 25 passengers on an average weekday. These include Route 24 – Old Frankfort Pike and 17 - Northside Connector. Both routes provide peak-only service at 70-minute headways through lower-density areas. Route 24 predominantly serves light industrial areas along Old Frankfort Pike, while Route 17 connects two retail centers in northeast Lexington via a circuitous route through low-density residential neighborhoods.
- Other notable under-performers with fewer than 250 daily passengers include 16 – Southland Drive (54 passengers) and Route 22 – Mercer Road (232 passengers). Each of the Night routes (51, 52, 58, 59) also produce less than 100 daily passengers.

Weekends

- On the core routes, Saturday ridership is about half of average weekday ridership, and Sunday ridership is about 40 percent of weekdays. Routes that retain at least 60 percent of their ridership on weekends relative to their weekday baseline include routes 6 (on Saturdays), 8 (on Sundays), and Route 12 (on Saturdays).
- On Saturdays, Route 5 generates the highest average daily ridership at just under 800 passengers, followed by routes 3, 6, 27, and 8. Collectively, the top five Saturday routes produce 48 percent of the daily system ridership.
- On Sundays, Route 27 – UK Yellow Route, a UK weekend-only circulator route, is the top-performer with nearly 900 daily boardings, or 17 percent of total systemwide ridership. Route 5 produces about 600 boardings, followed by Route 8 at approximately 550 boardings. Notably, Route 8 produces more ridership on Sundays relative to Saturdays. These top three routes produce about 40 percent of the total systemwide ridership on Sundays.
- Weekday night service tends to be about twice as productive than Saturdays. For example, Route 58 has 85 average weekday riders compared to only 29 on Saturdays.

Figure 2-36: Average Daily Ridership by Route and Day of Week (Fall 2019)

Source: Lextran APC Data (Fall 2019 Bid Period – 8/11/2019 to 12/21/2019)

Table 2-33: Average Daily Ridership by Route and Day of Week (Fall 2019)

Route		Weekday		Saturday		Sunday	
		Avg Daily Boardings	Pct. of System Total	Avg Daily Boardings	Pct. of System Total	Avg Daily Boardings	Pct. of System Total
Core							
1	Woodhill	536	3%	249	4%	206	4%
2	Georgetown Road	475	3%	235	4%	194	4%
3	Tates Creek Road	1,109	6%	632	10%	355	7%
4	Newtown Pike	637	4%	372	6%	265	5%
5	Nicholasville Road	1,730	10%	791	13%	609	12%
6	North Broadway	911	5%	555	9%	402	8%
7	North Limestone	798	4%	462	8%	357	7%
8	Versailles Road	915	5%	471	8%	566	11%
9	Eastland	631	3%	356	6%	280	5%
10	Hamburg Pavilion	715	4%	418	7%	265	5%
11	Richmond Road	566	3%	304	5%	265	5%
12	Leestown Road	331	2%	212	3%	169	3%
13	South Broadway	411	2%	235	4%	185	4%
	Core Subtotal	**9,765**	**54%**	**5,292**	**86%**	**4,118**	**81%**
Circulator							
14	UK Blue and White Routes	5,513	31%	*n/a*	*n/a*	*n/a*	*n/a*
15	Red Mile	1,873	10%	108	2%	102	2%
17	Northside Connector	24	0%	*n/a*	*n/a*	*n/a*	*n/a*
18	Centre Parkway Connector	125	1%	95	2%	*n/a*	*n/a*
27	UK Yellow Road	*n/a*	*n/a*	489	8%	871	17%
	Circulator Subtotal	**7,535**	**42%**	**692**	**11%**	**973**	**19%**
Limited							
16	Southland Drive	54	0%	*n/a*	*n/a*	*n/a*	*n/a*
21	Airport/Keenland	198	1%	*n/a*	*n/a*	*n/a*	*n/a*
22	Mercer Road	232	1%	*n/a*	*n/a*	*n/a*	*n/a*
24	Old Frankfort Pike	23	0%	*n/a*	*n/a*	*n/a*	*n/a*
	Limited Subtotal	**507**	**3%**	*n/a*	*n/a*	*n/a*	*n/a*
Night							
51	Night - Woodhill Drive	53	0%	36	1%	*n/a*	*n/a*
52	Night - Georgetown Road	42	0%	26	0%	*n/a*	*n/a*
58	Night - Versailles Road	85	0%	29	0%	*n/a*	*n/a*
59	Night - Eastland	58	0%	47	1%	*n/a*	*n/a*
	Night Subtotal	**238**	**1%**	**138**	**2%**	*n/a*	*n/a*
	SYSTEM TOTAL	**18,045**		**6,122**		**5,091**	

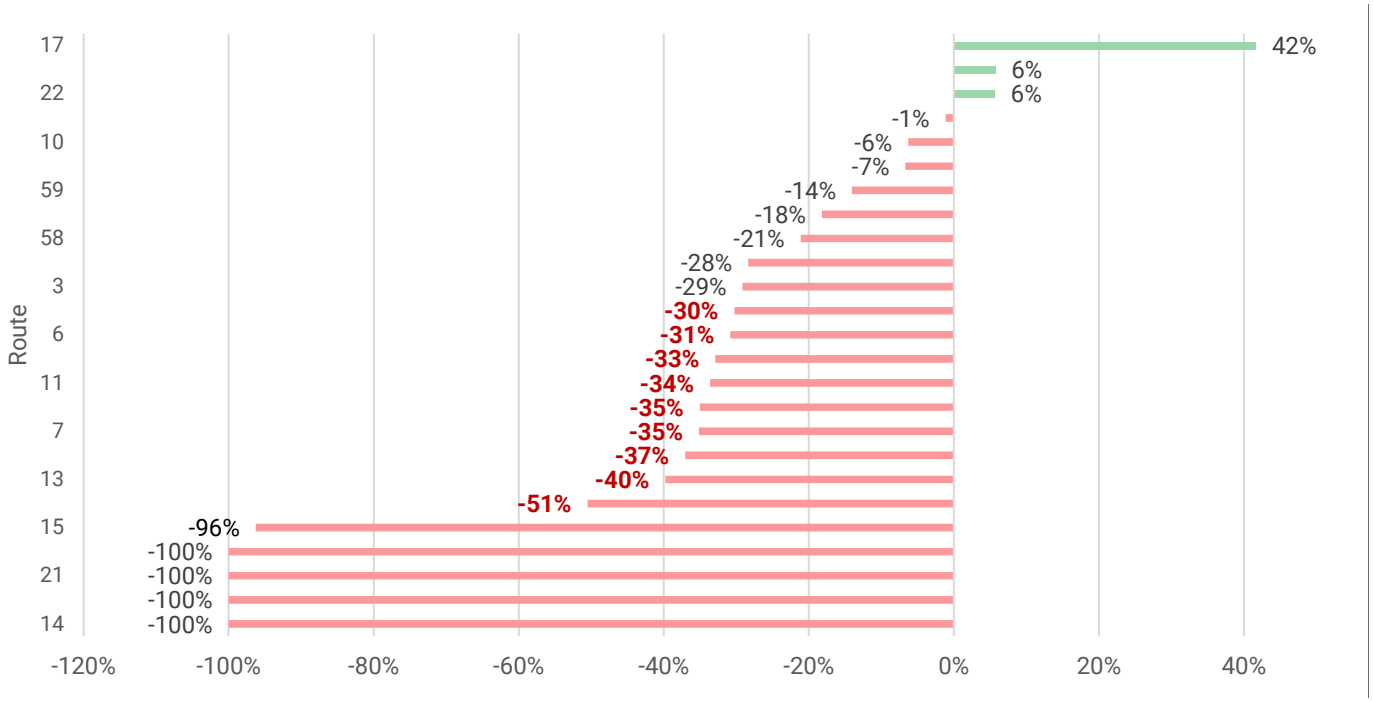
Source: Lextran APC Data (Fall 2019 Bid Period)

COVID-19 Pandemic Ridership Impacts

Route-level ridership data was used to assess the impacts of the pandemic-related shutdowns and service reductions on Lextran's ridership productivity. **Figure 2-37** depicts the percent change in average weekday ridership by route before (December 22nd, 2019 to March 18th, 2020) and after (March 19th, 2020 to June 30th, 2020) Lextran instituted service reductions in March 2020. Notable findings include:

- While total systemwide weekday ridership dropped by 56% during the COVID period, among the routes that maintained service (excluding UK route 15), the ridership loss was 27%.
- Of the 20 non-UK routes that continued operating after March 18th, nine operated on reduced weekday schedules, as indicated by red percentages in the chart below. Routes operating on reduced schedules saw a total ridership loss of 36% versus a loss of 17% for routes that were not adjusted. The two highest ridership routes prior to the pandemic, routes 5 and 3, saw the greatest impact among the routes that maintained a normal weekday schedule. This likely points to the large influence of UK-related ridership among the customer base of these routes.
- Identifying routes that performed above average during the COVID period is potentially instructive in determining corridors with essential jobs and services or the prevalence of mobility disadvantaged communities. For example, Route 8, which serves areas indicative of high transit propensity, ridership impacts were negligible before and after the onset of the pandemic.
- Several routes showed a marginal increase in ridership during the COVID period. Route 17, which connects several low-income communities outside of New Circle Road with retail centers and provides transfer opportunities to the rest of the system, increased 42%. Route 22, which serves an Amazon distribution center and other employment centers, increased 6%. Route 52, a night route, also increased 6%, while the rest of the night routes performed at or above average.

Figure 2-37: Ridership Percent Change by Route, Spring 2020 Bid Period, Before and After COVID Service Reductions



Source: Lextran APC Data (Spring 2019 Bid Period)

Stop-Level Ridership Productivity

A stop level performance assessment was conducted to evaluate ridership productivity throughout the Lextran network. The stop level data presented in **Figure 2-38** through **Figure 2-40** represents total average daily boardings for weekdays, Saturdays, and Sundays. The data was collected through APCs installed aboard Lextran buses during the Fall 2019 bid period.

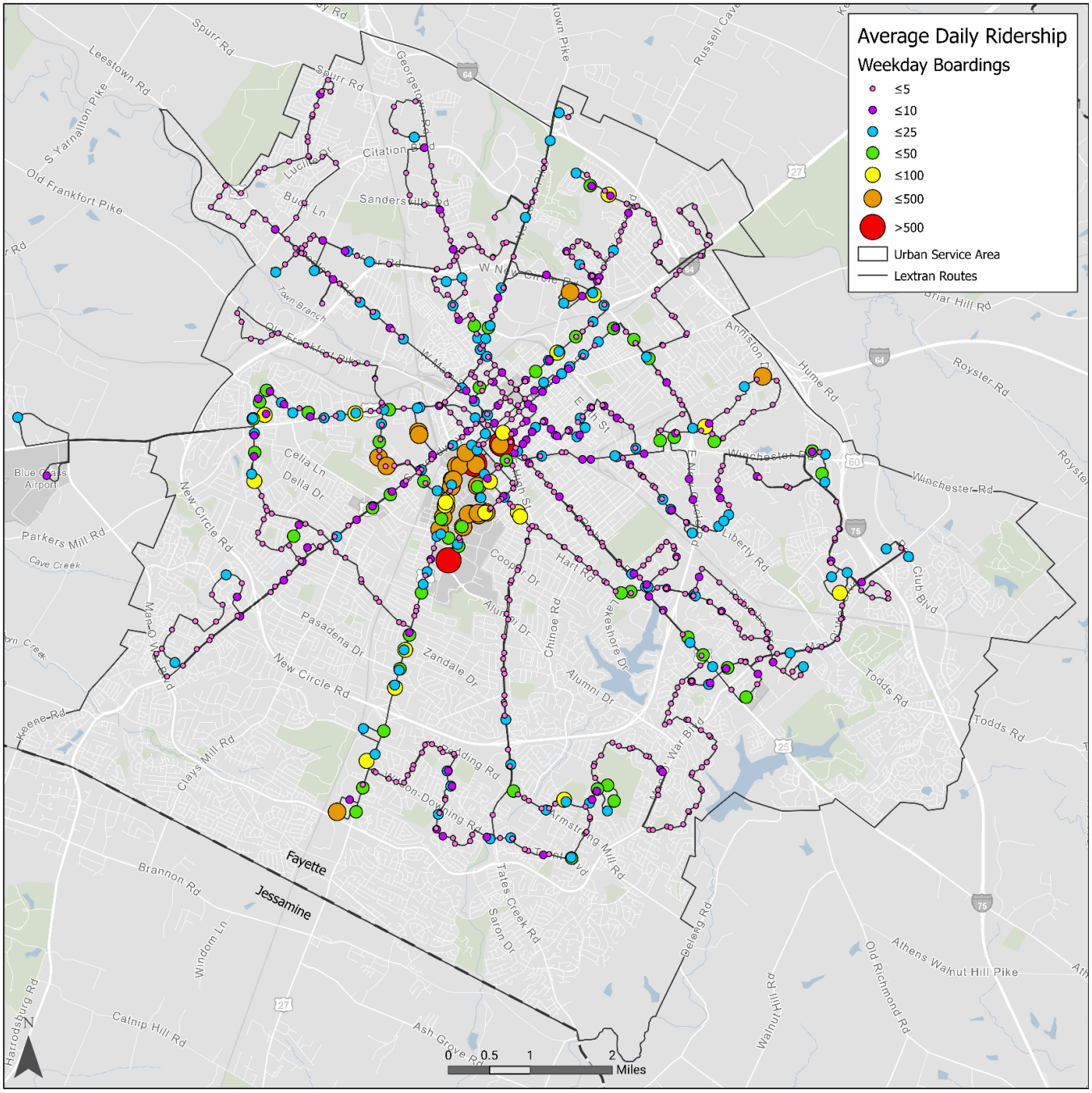
Out of the top 25 stops in the Lextran system in terms of weekday ridership productivity, 24 are either the downtown transit center or a stop that serves a UK circulator route in the UK and Red Mile subareas. The top 25 stops in the system that do not serve the transit center or UK routes are listed in **Table 2-34**.

Table 2-34: Top 25 Stops by Average Weekday Ridership Volume

Rank	Stop	Weekday	Saturday	Sunday	Subarea	Routes
1	Walmart at Nichols Park Dr	243	133	65	Nicholasville Rd (Outside New Circle Rd)	3, 5
2	Walmart at North Park Marketplace	120	75	51	Russell Cave Road	4, 17
3	Anniston Drive at August Drive	102	67	51	Eastland	7, 59
4	Eastland Parkway at Continental Square IB	86	48	0	Eastland	7, 59
5	Euclid Avenue at Rose Lane OB	83	19	10	University of Kentucky	1, 3, 51
6	Kentucky Clinic OB	82	16	11	University of Kentucky	5, 14
7	Nicholasville Road at Zandale Drive	73	32	22	Nicholasville Rd (Inside New Circle Rd)	5
8	Fayette Mall	72	69	34	Nicholasville Rd (Outside New Circle Rd)	3, 5
9	Nicholasville Road at Larkin Road	72	43	33	Nicholasville Rd (Inside New Circle Rd)	5
10	Kentucky Clinic IB	71	10	10	University of Kentucky	5, 14
11	Winburn Drive at McCullough Drive IB	70	40	34	Winburn/Radcliff	6
12	Euclid Avenue at Kroger OB	67	38	30	Eastside	1, 3, 51
13	Euclid Avenue at LaFayette Avenue IB	64	39	33	Eastside	1, 3, 51
14	Centre Parkway at Appian Way	60	34	0	Southeastern Hills	3
15	East Main Street at 137 Main Street	58	24	27	Downtown Lexington	2, 6, 7, 11, 24
16	Devonport Drive at Village Drive IB	58	24	23	Cardinal Valley	8, 21, 58
17	New Circle at Housing Authority IB	57	35	23	Russell Cave Road	6
18	Alysheba Way at Backyard Burgers	54	44	23	Hamburg	10, 18
19	Versailles Road at 1510 Versailles Road IB	54	43	56	Red Mile	8, 21, 58
20	Alexandria Drive at Kroger	52	25	30	Gardenside	8, 58
21	North Broadway at Loudon Ave IB	51	30	23	Russell Cave Road	6
22	Newtown Pike at Ash St IB	49	21	12	Douglas Park	4, 22
23	Centre Pkwy at Bold Bidder Dr	48	30	10	Southeastern Hills	3, 18
24	Eastland Drive at Eastland Shopping Center	48	39	20	Lexington Manor	9
25	Nicholasville Road at South Park Shopping Center	46	24	21	Nicholasville Rd (Outside New Circle Rd)	5

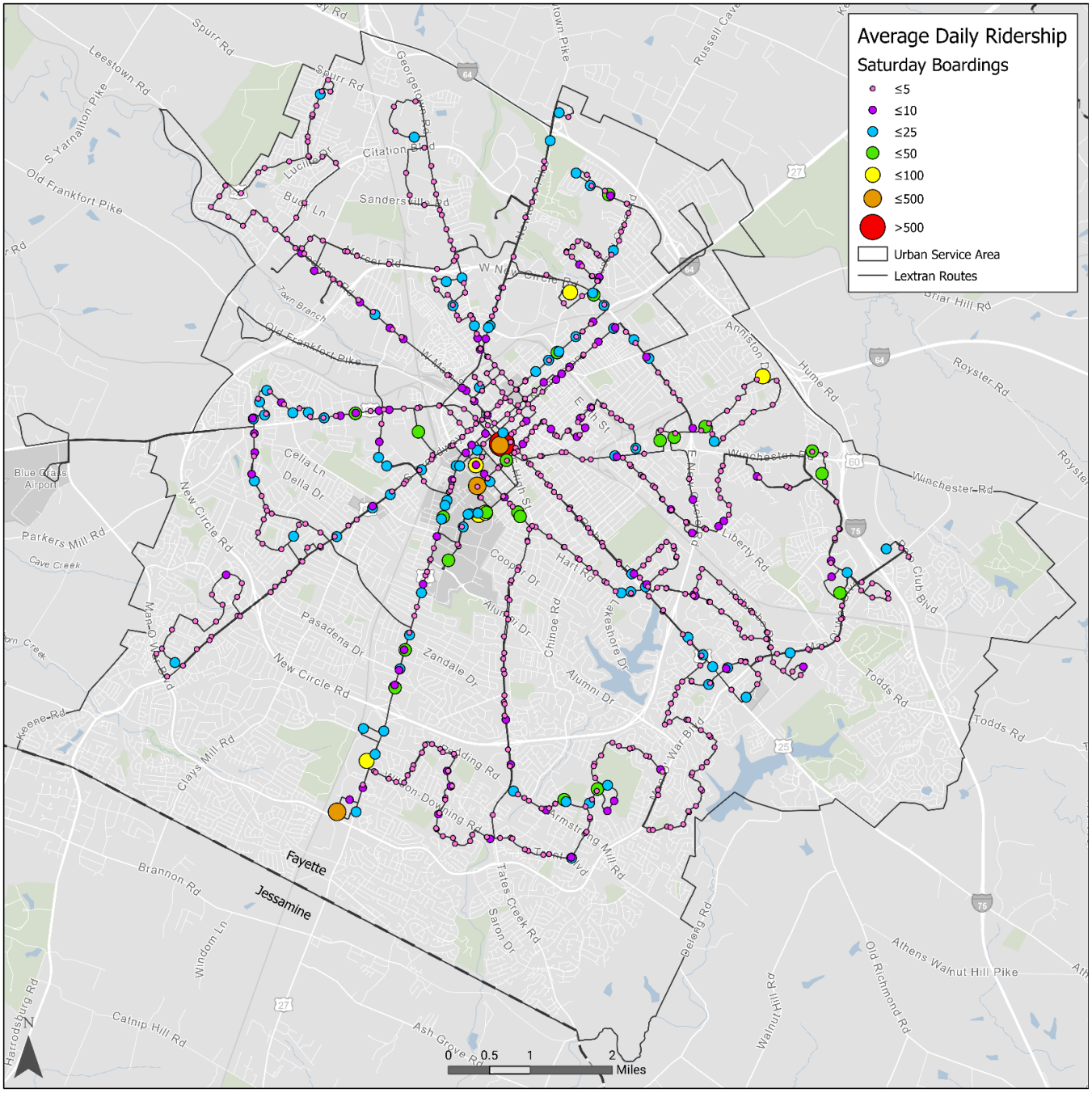
Source: Lextran APC Data (Fall 2019 Bid Period) Note: Excludes downtown transit center and UK circulator-served stops.

Figure 2-38: Weekday Average Daily Ridership (Fall 2019)



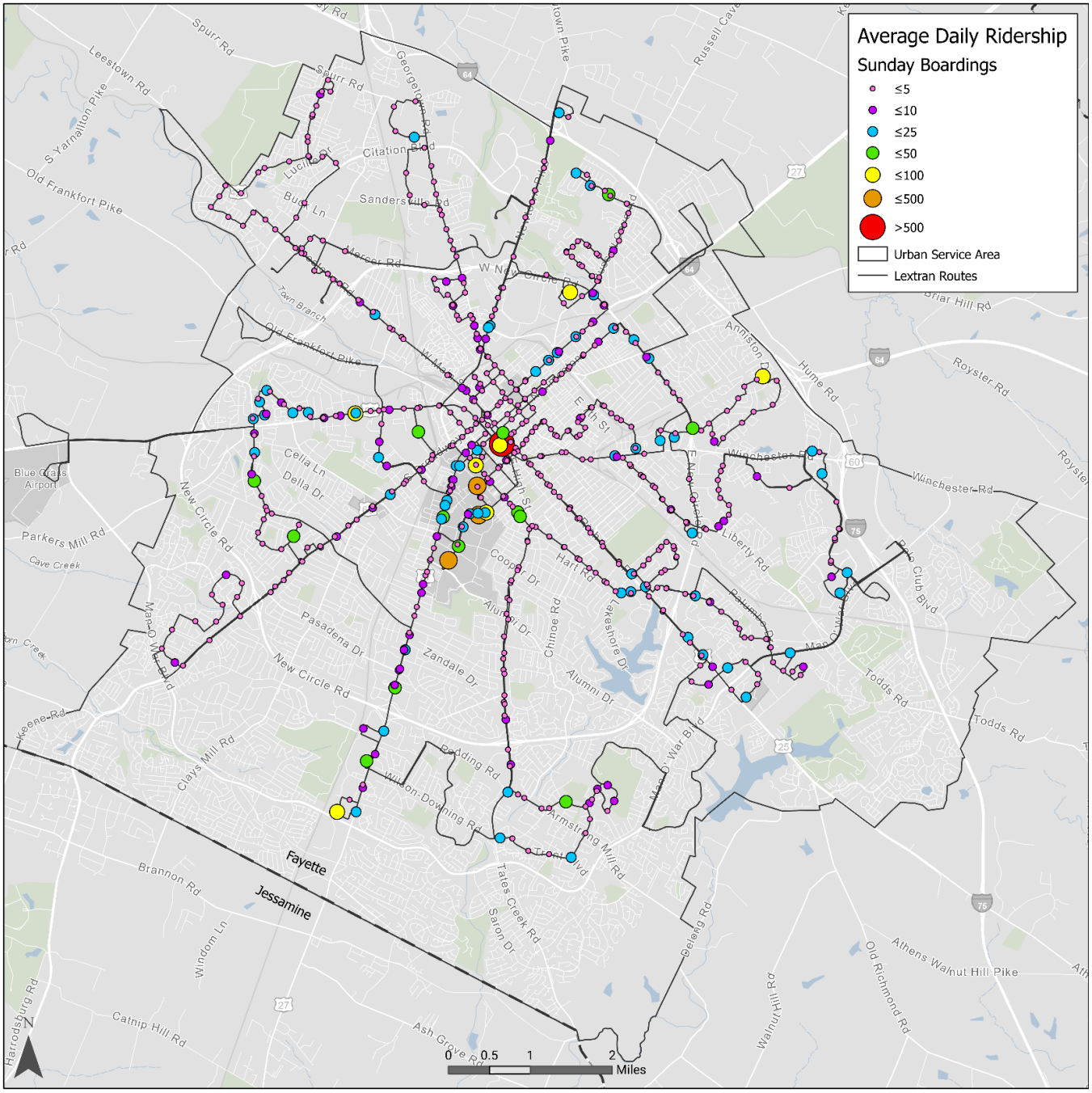
Source: Lextran APC Data (Fall 2019 Bid Period)

Figure 2-39: Saturday Average Daily Ridership (Fall 2019)



Source: Lextran APC Data (Fall 2019 Bid Period)

Figure 2-40: Sunday Average Daily Ridership (Fall 2019)



Source: Lextran APC Data (Fall 2019 Bid Period)

To understand the spatial distribution of ridership activity across the Lextran service area, stop-level ridership was aggregated by subarea. Lextran's ridership activity is heavily influenced by the UK-oriented circulator routes, which carry about 40% of the total weekday ridership. As such, about 30% of total weekday ridership activity occurs within the UK subarea. On weekends, this proportion drops to 10% on Saturdays and 12% on Sundays.

The downtown transit center also skews the ridership distribution, as the hub-and-spoke network design causes the vast majority of transfers to occur at this location. As a result, the Downtown Lexington subarea accounts for 24% of the total weekday ridership activity and nearly 40% on weekends. About 92% of the Downtown Lexington subarea ridership occurs at the transfer center. Once ridership activity at the transfer center is eliminated, the Downtown Lexington subarea only accounts for 6% of the total weekday ridership activity and 5% of the total weekend activity.

To account for the disproportionate amount of ridership activity attributed to the UK circulator routes (Routes 14, 15, and 27) and the downtown transit center, aggregate subarea ridership was adjusted by eliminating the UK route and transfer center ridership. **Table 2-35** displays the adjusted and unadjusted total ridership activity in each subarea and percentage of total service area ridership by weekday, Saturday, and Sunday. Key observations are summarized below:

- After subtracting the UK routes and transit center activity, the UK subarea still accounts for the largest share of ridership activity in the Lextran service area, at approximately 550 boardings per average weekday, or 8% of the adjusted total. On weekends, the percentage share of the UK activity drops to 4%.
- The Russel Cave Road subarea north of downtown also accounts for about 8% of the total weekday ridership activity, followed by Nicholasville Road (outside New Circle Road), Richmond Road, and Downtown Lexington. Together with the UK subarea, these five subareas comprise about a third of the total systemwide weekday and Saturday ridership activity and about 30% of the total Sunday activity.
- The top 10 subareas account for 56% of the total systemwide ridership productivity. Of these subareas, five are located outside of New Circle Road (Winburn/Radcliff, Eastland, Richmond Road, Southeastern Hills, and Nicholasville Road - outside of New Circle Road).
- In total, about 3,981 weekday boardings occur inside New Circle Road, or about 60% of the weekday total versus 2,650 that occur outside. A similar distribution is observed on weekends.

Table 2-35: Adjusted and Unadjusted Ridership Activity by Subarea (Fall 2019)

Subarea	Adjusted						Unadjusted					
	Weekday		Saturday		Sunday		Weekday		Saturday		Sunday	
University of Kentucky	548	8%	151	4%	109	4%	5,334	30%	638	10%	628	12%
Russell Cave Road	502	8%	306	9%	218	9%	502	3%	306	5%	218	4%
Nicholasville Rd (Outside New Circle Rd)	460	7%	275	8%	158	6%	460	3%	275	4%	158	3%
Richmond Rd	385	6%	205	6%	136	5%	385	2%	205	3%	136	3%
Downtown Lexington	371	6%	177	5%	132	5%	4,378	24%	2,304	38%	1,784	35%
Eastland	321	5%	190	6%	144	6%	321	2%	190	3%	144	3%
Cardinal Valley	292	4%	140	4%	142	6%	292	2%	140	2%	142	3%
Southeastern Hills	291	4%	169	5%	74	3%	291	2%	169	3%	74	1%
Winburn/Radcliff	277	4%	167	5%	119	5%	277	2%	167	3%	119	2%
Nicholasville Rd (Inside New Circle Rd)	253	4%	128	4%	96	4%	253	1%	128	2%	96	2%
Lexington Manor	234	4%	137	4%	101	4%	234	1%	137	2%	101	2%
Douglas Park	233	4%	113	3%	82	3%	233	1%	113	2%	82	2%
Red Mile	230	3%	133	4%	139	6%	1,213	7%	207	3%	205	4%
Eastside	220	3%	111	3%	88	4%	220	1%	111	2%	88	2%
Northside District	186	3%	87	3%	64	3%	186	1%	87	1%	64	1%
Idle Hour	183	3%	104	3%	89	4%	183	1%	104	2%	89	2%
Hamburg	182	3%	145	4%	73	3%	182	1%	145	2%	73	1%
Gardenside	140	2%	54	2%	62	2%	140	1%	54	1%	62	1%
All Others[2]	138	2%	49	1%	42	2%	138	1%	49	1%	42	1%
Georgetown Rd	117	2%	33	1%	28	1%	117	1%	33	1%	28	1%
Liberty	117	2%	50	1%	43	2%	117	1%	50	1%	43	1%
Garden Springs	115	2%	53	2%	51	2%	115	1%	53	1%	51	1%
UK/Central Baptist Hospital	97	1%	43	1%	29	1%	1,550	9%	78	1%	416	8%
Kirklevington Park	86	1%	45	1%	10	0%	86	0%	45	1%	10	0%
Fortune Dr	82	1%	34	1%	28	1%	82	0%	34	1%	28	1%
Melrose Park	79	1%	43	1%	30	1%	79	0%	43	1%	30	1%
Bryan Station	74	1%	44	1%	33	1%	74	0%	44	1%	33	1%
Leestown Rd	73	1%	23	1%	19	1%	73	0%	23	0%	19	0%
Park Place	71	1%	38	1%	56	2%	71	0%	38	1%	56	1%
Beaumont	64	1%	40	1%	26	1%	64	0%	40	1%	26	1%
Waterford	56	1%	29	1%	0	0%	56	0%	29	0%	0	0%
Pine Meadows	43	1%	26	1%	20	1%	72	0%	27	0%	21	0%
Castlewood	41	1%	28	1%	25	1%	41	0%	28	0%	25	0%
Picadome/St Joseph Hospital	40	1%	17	0%	13	1%	40	0%	17	0%	13	0%
Masterson Station	35	1%	23	1%	17	1%	35	0%	23	0%	17	0%

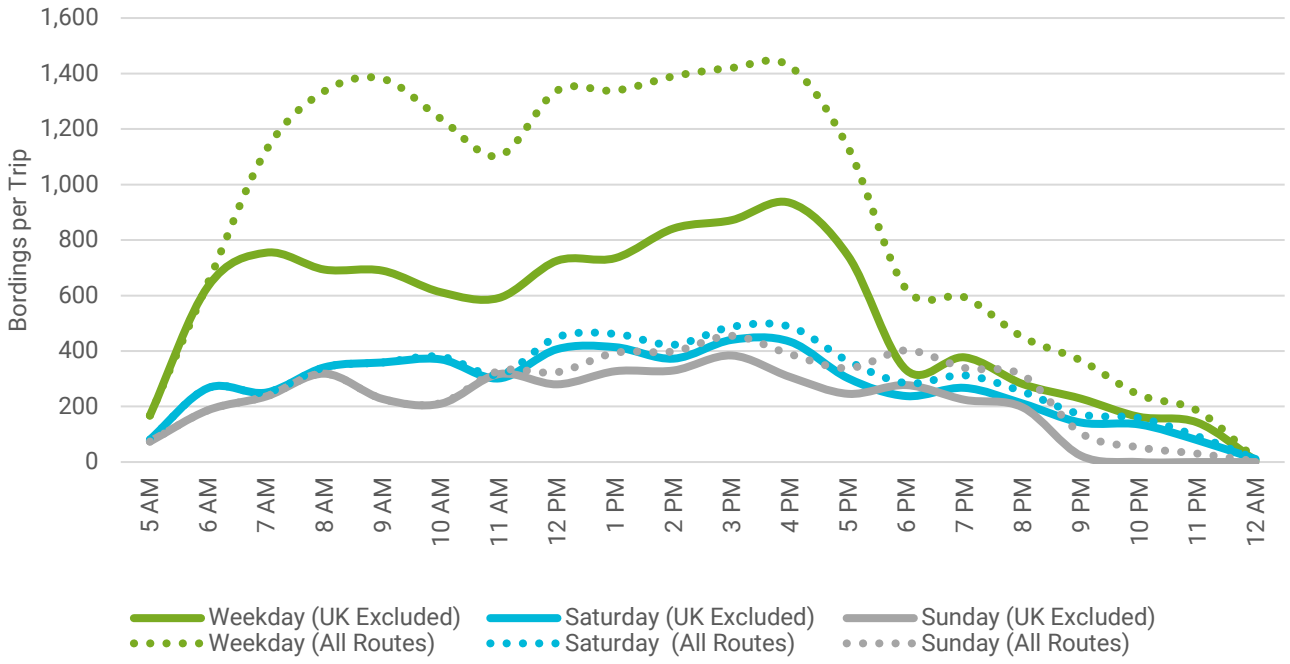
Source: Lextran APC Data (Fall 2019 Bid Period)

[2] Others include Lansdowne, Gleneagles, North Fayette, East Lake, Northwest Fayette, Pasadena Dr, Meadowthorpe, Lakewood, Joyland, West Fayette, Northeast Fayette subareas.

Ridership Productivity by Time of Day

Productivity by time of day is an important metric to evaluate how well service levels are meeting demand throughout the course of a day. **Figure 2-41** depicts hourly systemwide ridership productivity for weekdays, Saturdays, and Sundays in Fall 2019. Two sets of trendlines are provided for each day to illustrate the impact of the UK routes (routes 14, 15, 27) on systemwide productivity, with dotted lines denoting system productivity inclusive of all routes. Weekday ridership productivity follows a traditional AM/PM peaking pattern, although the UK ridership causes the total systemwide peak hour to shift later in the morning the 9AM hour versus 7AM for the remainder of the routes. The PM peak occurs during the 4PM hour, with ridership trailing off thereafter. On weekends, the productivity curves are relatively similar, with demand gradually building throughout the day before peaking during the 3PM hour.

Figure 2-41: Hourly Boardings by Day of Week (Fall 2019)

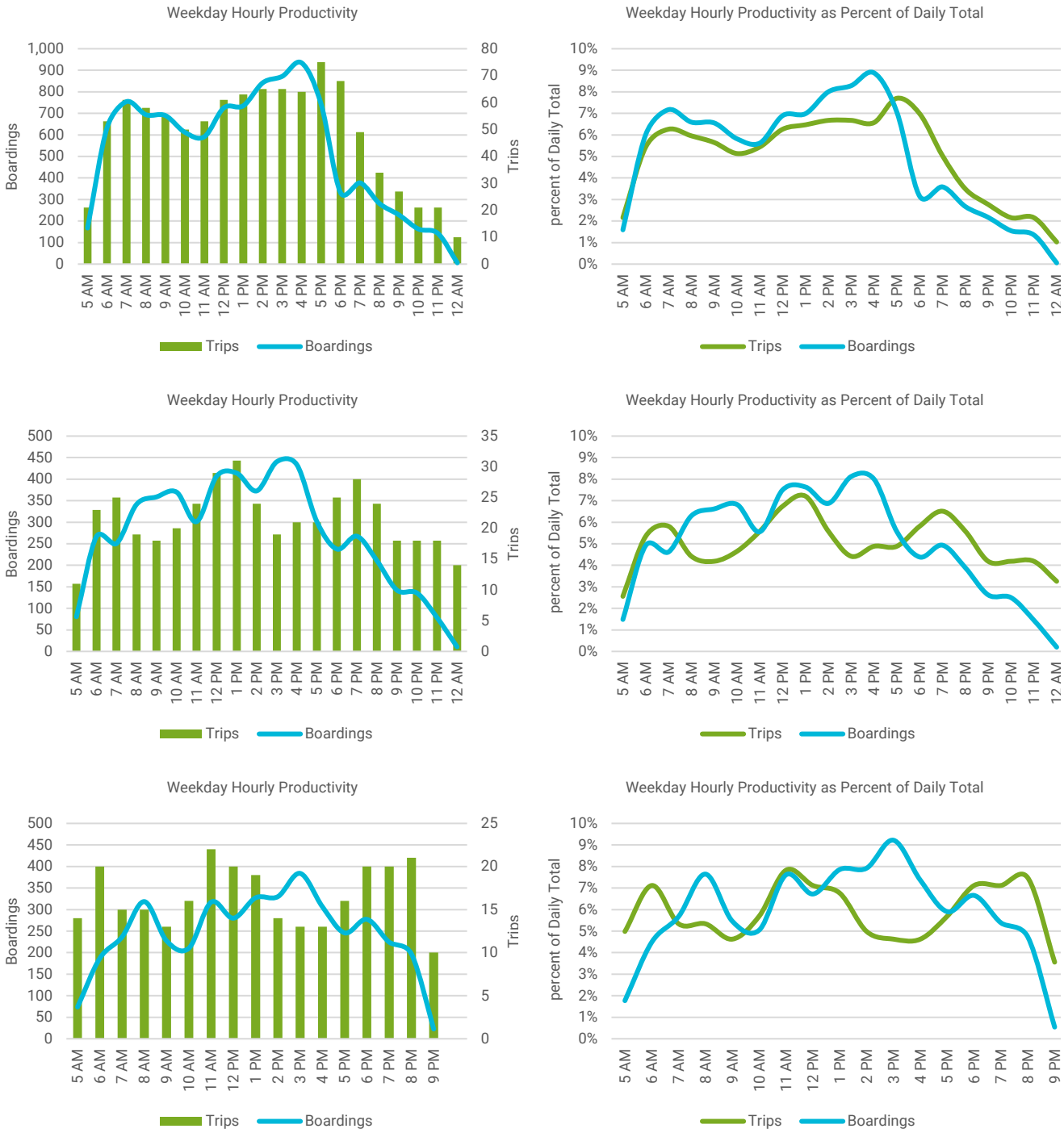


Source: Lextran APC Data (Fall 2019 Bid Period)

The charts displayed in **Figure 2-42** illustrate hourly boardings and bus trips by day of week for all routes in the Lextran system, with the UK campus (Routes 14, 15, 27) routes excluded. The "hourly productivity charts" on the left side of the figure depict total hourly supply (bus trips) in bars and demand (boardings) for each hour of the day. The "hourly productivity by percent of daily total" charts on the right side of the figure depict supply and demand as a percentage of the daily totals for both bus trips and boardings. Higher relative productivity is indicated where the orange line (boardings) exceeds the blue line (trips).

On weekdays, the supply and demand curves are relatively well-aligned, with higher productivity throughout the daytime periods. Demand drops off sharply at the end of the PM peak when service levels scale back to 70-minutes across most routes. On weekends, when most routes operate at 70-minute headways all-day, hourly demand as a percentage of the daily total tends to be highest in the morning and afternoons, when supply tends to decrease. Demand in the evenings tends to decrease more rapidly compared to supply.

Figure 2-42: Hourly Ridership Productivity by Day of Week, UK Campus Routes Excluded (Fall 2019)



Source: Lextran APC Data (Fall 2019 Bid Period)

Transfer Activity

Transfer activity measures the movement of passengers between two routes. This information can help inform the development of routes that better serve customer travel patterns through strategies such as interlining, through-routing, or alignment modifications. Transfer data generated from Lextran's on-board fareboxes for calendar year 2019 was analyzed to determine total transfer volumes and transfer rates as a percentage of total ridership for each route in the network. It is important to note, however, that transfers are not printed for some types of fares, such as UK ID cards, Wheels ID cards, or 30-day passes. As a result, the transfers issued from fareboxes under count the actual number of transfers in the system. Key findings are summarized below:

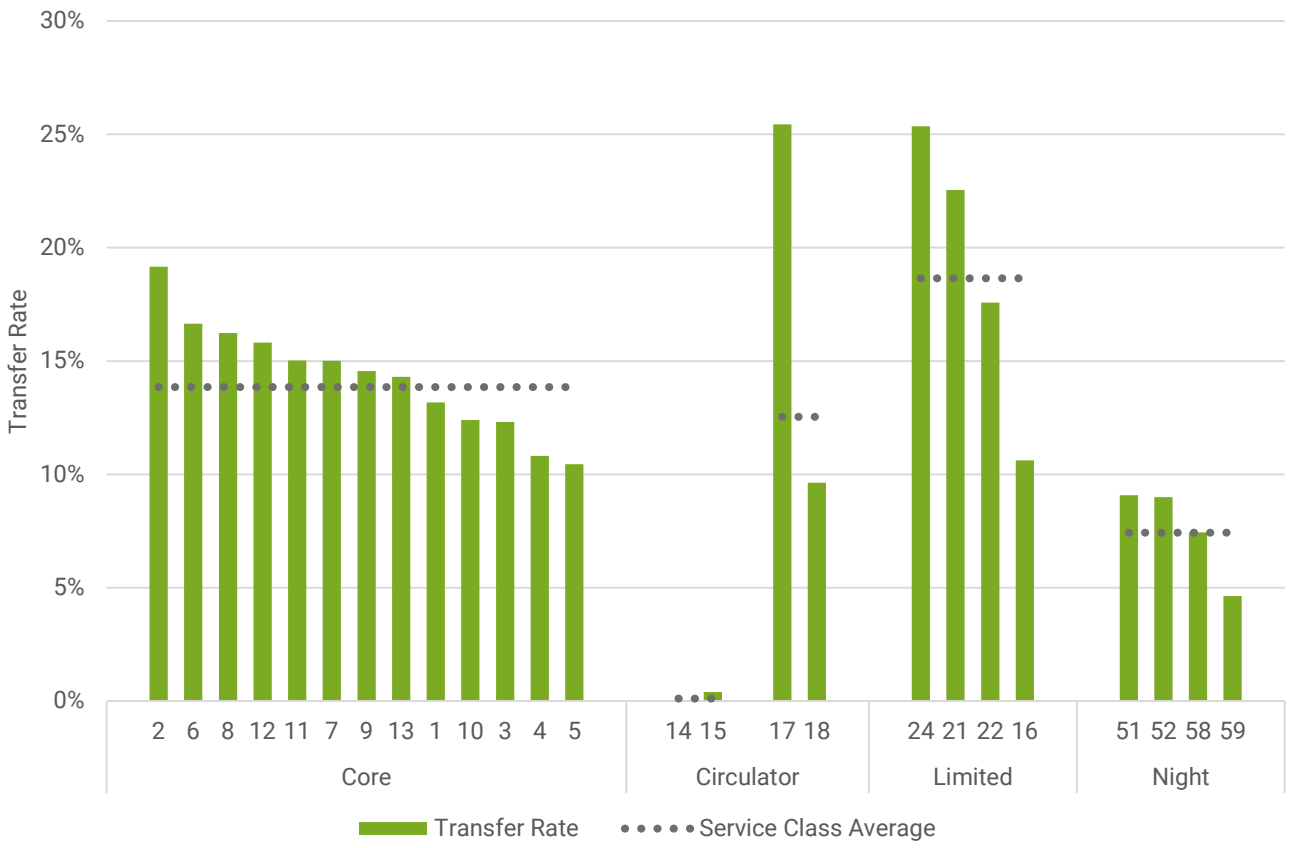
- The top ten transfer pairs in the Lextran network, measured by total transfers both to and from each route, are identified in **Table 2-36**. Route 5 accounts for six of the top ten route pairs. Collectively, the top ten route pairs account for just under a quarter of total systemwide transfer activity.
- **Table 2-37** presents a matrix summarizing route-to-route transfer activity measured by percentage of transfers from the originating route to the destination route. For example, of the 21,119 transferring passengers originating from Route 1, 4% transferred to Route 2. As noted above, Route 5 attracted the largest number of transfers, at 13% of the total transfers issued, which is indicative of the many employment, retail, and healthcare services opportunities within the Nicholasville Road corridor. Other routes with large transfer volumes include routes 3, 8, and 10, each with 8% of total transfers.
- Transfer rates for each route, or the total transfers per total passenger boardings, are depicted in **Figure 2-43**. Lextran's limited routes have the highest average transfer rates, with 19% of passengers transferring, followed by the core routes at 14%, non-UK circulator routes at 13%, and night routes at 7%. Routes 14 and 15, serving the UK campus and adjacent areas, generated little transfer activity. Routes 17 and 24 had the highest transfer rates in the system at 25%.

Table 2-36: Top 10 Route Pairs by Total Transfer Activity, January 1, 2019 – December 31, 2019

Route Pair	Total Annual Transfers	Percent of Total Annual Transfers
8 / 5	12,848	3%
6 / 5	12,527	3%
5 / 3	11,191	3%
8 / 6	10,756	3%
7 / 5	10,257	2%
9 / 5	10,147	2%
10 / 7	8,365	2%
8 / 3	8,148	2%
9 / 8	7,705	2%
10 / 5	7,530	2%

Source: Lextran, January 1, 2019 – December 31, 2019

Figure 2-43: Transfer Rate by Route, January 1, 2019 – December 31, 2019



Source: Lextran, January 1, 2019 – December 31, 2019

Table 2-37: Lextran Route-to-Route Transfer Activity, Percent of Total Route Transfers Used

Route		Total Transfers Used	To Route																								
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	21	22	24	51	52	58	59
From Route	1	20,119		4%	9%	11%	14%	4%	11%	5%	4%	12%	4%	8%	4%	0%	0%	0%	0%	0%	5%	3%	1%	0%	1%	1%	0%
	2	27,801	4%		9%	7%	16%	7%	8%	11%	11%	6%	8%	3%	8%	0%	0%	0%	0%	0%	1%	1%	0%	0%	0%	0%	0%
	3	38,272	7%	6%		5%	16%	8%	4%	10%	9%	7%	5%	3%	6%	0%	0%	0%	0%	2%	1%	5%	0%	0%	1%	1%	1%
	4	20,566	8%	4%	7%		12%	5%	13%	10%	7%	8%	5%	4%	4%	0%	0%	1%	3%	0%	6%	1%	0%	1%	0%	2%	2%
	5	49,203	4%	6%	10%	6%		10%	9%	11%	10%	9%	6%	3%	3%	0%	1%	0%	0%	0%	2%	2%	0%	1%	1%	2%	2%
	6	45,987	3%	4%	9%	3%	17%		3%	13%	8%	7%	10%	4%	9%	0%	0%	0%	1%	0%	1%	4%	1%	1%	0%	1%	1%
	7	35,507	7%	5%	5%	11%	17%	3%		7%	4%	15%	5%	6%	5%	0%	0%	1%	0%	0%	4%	3%	1%	0%	1%	1%	0%
	8	45,878	3%	8%	9%	8%	16%	11%	5%		9%	7%	8%	3%	6%	0%	0%	1%	0%	0%	1%	3%	0%	0%	0%	0%	0%
	9	27,879	3%	8%	9%	7%	18%	9%	5%	13%		6%	6%	3%	8%	0%	0%	1%	0%	0%	1%	3%	0%	0%	0%	1%	0%
	10	25,504	7%	4%	9%	9%	13%	7%	13%	7%	4%		4%	4%	3%	0%	0%	1%	0%	2%	5%	1%	1%	2%	1%	2%	1%
	11	24,456	2%	9%	9%	5%	14%	11%	6%	11%	8%	6%		3%	7%	0%	0%	0%	0%	2%	0%	5%	1%	0%	0%	0%	0%
	12	14,935	13%	3%	5%	8%	13%	7%	13%	5%	5%	9%	5%		5%	0%	0%	1%	0%	0%	5%	1%	1%	0%	0%	0%	1%
	13	17,969	3%	10%	10%	6%	8%	12%	6%	11%	11%	5%	7%	4%		0%	1%	0%	0%	0%	1%	3%	0%	1%	0%	0%	0%
	14	12	33%	0%	0%	8%	25%	8%	0%	0%	0%	0%	0%	0%	0%		25%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	15	1,205	2%	1%	3%	1%	59%	1%	1%	5%	1%	1%	1%	1%	20%	0%		0%	0%	0%	2%	0%	0%	1%	0%	0%	0%
	16	2,154	5%	4%	5%	8%	15%	8%	10%	12%	4%	13%	4%	4%	4%	0%	0%		0%	0%	4%	0%	0%	0%	0%	0%	0%
	17	1,780	0%	0%	0%	32%	0%	23%	23%	0%	22%	0%	0%	0%	0%	0%	0%	0%		0%	0%	0%	0%	0%	0%	0%	0%
	18	2,989	8%	0%	53%	0%	0%	0%	0%	0%	0%	15%	23%	0%	0%	0%	0%	0%	0%		0%	0%	0%	0%	0%	0%	0%
	21	9,987	4%	4%	5%	13%	16%	8%	12%	5%	5%	12%	4%	5%	3%	0%	0%	1%	0%	0%		1%	0%	0%	0%	0%	0%
	22	8,691	5%	1%	15%	3%	10%	9%	9%	13%	13%	4%	11%	2%	4%	0%	0%	0%	0%	0%	1%		0%	0%	0%	0%	0%
	24	1,625	7%	4%	6%	4%	15%	9%	7%	5%	9%	12%	15%	3%	2%	0%	0%	0%	0%	0%	1%	2%		0%	0%	0%	0%
	51	1,363	0%	0%	23%	7%	5%	17%	0%	0%	0%	5%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		9%	18%	15%
	52	1,138	0%	0%	14%	4%	9%	9%	0%	0%	1%	4%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	12%		18%	28%
	58	1,730	0%	0%	9%	12%	17%	13%	0%	0%	0%	6%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	11%	9%		21%
	59	746	0%	0%	10%	3%	16%	5%	0%	0%	0%	8%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	10%	15%	32%	
Total		**427,496**	**5%**	**5%**	**8%**	**7%**	**13%**	**7%**	**7%**	**8%**	**7%**	**8%**	**6%**	**4%**	**5%**	**0%**	**0%**	**0%**	**0%**	**0%**	**2%**	**3%**	**0%**	**1%**	**1%**	**1%**	**1%**

Source: Lextran, January 1, 2019 – December 31, 2019

2.5.2. Key Performance Indicators

In addition to ridership productivity, a series of metrics were derived from system service and ridership statistics to assess the performance of each of Lextran's fixed-route service by average weekday, Saturday, and Sunday for the Fall 2019 service period. Fixed-route service performance was evaluated using the following categories of key performance indicators:

- **Service Productivity** measures how many passengers are served per unit of service provided (e.g. hours, miles, or peak vehicles). Performance metrics for service productivity include:
    - Unlinked passenger trips per bus trip
    - Unlinked passenger trips per revenue hour
    - Unlinked passenger trips per revenue mile
- **Service Efficiency** measures how efficiently Lextran deploys its assets. Measures include:
    - Average Speed in Revenue Service
    - Revenue Hours per Platform Hours
    - Revenue Miles per Platform Miles
- **Financial Performance** indicators measure cost and revenue relative to service output and utilization. Financial performance is generally measured through cost effectiveness and efficiency metrics. Cost effectiveness measures how much an agency spends per passenger trip, while cost efficiency measures the cost required to provide a unit of service (e.g. vehicle hours or miles), those measures include:
    - Cost per unlinked passenger trip
    - Net cost (or subsidy) per unlinked passenger trip
    - Farebox recovery ratio
    - Net cost per revenue hour
    - Net cost per revenue mile
- **Route Performance Index:** The Route Performance Index (RPI) is a composite indicator that combines three individual variables (passenger trips per revenue hour, passengers per revenue trip, and cost per passenger trip) into a single metric. The RPI is calculated through a three-step process: 1) each of the three individual variables are normalized by service class, 2) the three normalized scores are averaged to create a single composite score, and 3) the route composite score is divided by the average of all route composite scores within the service class. An index value greater than 1.0 indicates the route performs above average compared to all other routes within the service class, while a value less than 1.0 indicates under-performance.
- **Reliability** is a key element of service quality. Reliability is generally measured by on-time performance as a percentage of trips departing within a specified time window relative to scheduled departure time. On-time performance (OTP) is the performance metric for reliability.

The following sections present the results of the KPI analysis. For each group of KPIs, routes are evaluated relative to their service class benchmarks by day of week.

Baseline Service Statistics

Service summary reports from the Fall 2019 bid period were obtained from Lextran to determine existing bus operating requirements in terms of one-way trips, peak buses, and revenue and non-revenue hours and miles. These operating statistics, along with ridership data, O&M cost data, and revenue data, form the basis for the KPI assessment. **Table 2-38** summarizes Lextran's system-level operating statistics by day of the week. A full listing of service requirements by route is provided in Appendix A-3.

Table 2-38: Baseline Service Statistics by Day of Week (Fall 2019)

Day / Service Class	One-Way Trips	Platform Hours	Platform Miles	Revenue Hours	Revenue Miles	Peak Buses
Weekday						
Core	702	458	4,544	444	4,281	32
Circulator	458	198	1,718	194	1,604	15
Limited	90	54	602	50	533	5
Night	24	12	155	11	147	4
Subtotal	**1,274**	**722**	**7,018**	**699**	**6,564**	**52**
Saturday						
Core	386	253	2461	246	2345	16
Circulator	93	48	440	46	408	4
Night	24	12	155	11	147	4
Subtotal	**503**	**313**	**3,056**	**303**	**2,900**	**20**
Sunday						
Core	354	207	2118	202	1993	13
Circulator	71	34	242	32	225	3
Subtotal	**425**	**241**	**2,360**	**234**	**2,218**	**16**

Source: Lextran Service Statistics (Fall 2019 Bid Period)

Key Performance Indicators by Service Class and Route

A full listing of key performance indicators by route and day of week is provided on the following pages in **Table 2-39** through **Table 2-41**. The metrics are color coded by KPI rankings within each service class, as described below:

- **Very Good:** Greater than service class average plus one standard deviation.
- **Good:** Between service class average and plus one standard deviation.
- **Satisfactory:** Between service class average and minus one standard deviation.
- **Unsatisfactory:** Less than service class average minus one standard deviation.

For on-time performance, color coding is based on Lextran's established OTP policy of 90% on-time departures from each scheduled timepoint:

- **Very Good:** Greater than 95% OTP.
- **Good:** Between 90% and 95% OTP.
- **Satisfactory:** Between 80% and 90% OTP.
- **Unsatisfactory:** Less than 80% OTP.

The sections following the KPI tables summarize key findings related to each performance metric category.

Table 2-39: Weekday Fixed Route Key Performance Indicators (Fall 2019)

Key:	Very Good	Good	Satisfactory	Unsatisfactory
	> Avg + 1 Std. Dev.	Between Avg. and Avg. + 1 Std. Dev.	Between Avg. and Avg. - 1 Std. Dev.	< Avg. - 1 Std. Dev.

Route #	Route Name	Route Perf. Index	Average Daily Boardings	Boardings / Revenue Hour	Boardings / Revenue Mile	Boardings / One-Way Trip	Farebox Recovery Ratio	Cost / Boarding	Net Cost / Boarding	Net Cost / Revenue Hour	Net Cost / Revenue Mile	On-Time Perf.
Core												
1	Woodhill Drive	0.6	536	18.6	1.9	10.3	4%	$6.02	$5.77	$107.42	$10.78	90%
2	Georgetown Road	0.5	475	17.2	1.8	9.9	4%	$6.42	$6.17	$105.98	$11.20	85%
3	Tates Creek Road	1.2	1,109	19.2	1.7	20.5	5%	$6.01	$5.72	$109.73	$10.01	86%
4	Newtown Pike	0.8	637	20.5	2.0	11.4	4%	$5.47	$5.24	$107.68	$10.69	82%
5	Nicholasville Road	1.5	1,730	26.0	3.1	16.5	5%	$4.10	$3.91	$101.67	$12.13	84%
6	North Broadway	1.7	911	29.8	3.4	16.9	8%	$3.63	$3.33	$99.19	$11.26	93%
7	North Limestone	1.6	798	28.2	3.2	16.0	8%	$3.85	$3.55	$100.04	$11.27	91%
8	Versailles Road	2.0	915	32.9	3.4	19.1	10%	$3.37	$3.04	$100.14	$10.34	96%
9	Eastland	1.1	631	22.9	3.1	13.1	5%	$4.51	$4.28	$97.91	$13.36	95%
10	Hamburg Pavilion	0.5	715	15.5	1.6	12.1	3%	$7.20	$6.95	$107.73	$10.91	84%
11	Richmond Road	0.9	566	20.9	2.0	11.8	5%	$5.42	$5.14	$107.43	$10.36	97%
12	Leestown Road	0.0	331	14.0	1.2	7.9	3%	$8.48	$8.19	$114.97	$9.50	88%
13	South Broadway	0.7	411	19.7	1.9	10.8	5%	$5.73	$5.47	$107.78	$10.49	91%
	Average	**1.0**	**751**	**22.0**	**2.3**	**13.9**	**5%**	**$5.04**	**$4.78**	**$105.15**	**$10.90**	**89%**
Circulator												
14	UK Blue and White Routes	1.8	5,513	45.9	6.1	19.1	0%	$2.26	$2.26	$103.97	$13.74	
15	Red Mile	1.5	1,873	36.6	4.8	14.4	0%	$2.85	$2.84	$104.00	$13.57	77%
17	Northside Connector	0.0	24	3.0	0.2	1.6	2%	$40.20	$39.54	$120.36	$9.18	90%
18	Centre Parkway Connector	0.6	125	8.4	0.6	5.2	3%	$14.67	$14.26	$120.18	$8.91	89%
	Average	**1.0**	**1,884**	**38.9**	**4.7**	**16.5**	**0%**	**$2.74**	**$2.72**	**$105.89**	**$12.80**	**85%**
Limited												
16	Southland Drive	0.4	54	4.3	0.5	2.5	1%	$25.25	$25.01	$108.76	$11.66	72%
21	Airport/Keenland	1.6	198	12.8	1.0	7.1	6%	$9.36	$8.82	$113.26	$9.10	86%
22	Mercer Road	2.0	232	16.3	1.5	9.3	3%	$7.02	$6.78	$110.75	$10.25	90%
24	Old Frankfort Pike	0.0	23	2.8	0.3	1.5	1%	$38.73	$38.44	$106.94	$12.28	85%
	Average	**1.0**	**127**	**10.1**	**1.0**	**5.6**	**3%**	**$11.31**	**$10.95**	**$110.40**	**$10.42**	**83%**
Night												
51	Night - Woodhill Drive	0.7	53	18.7	1.6	8.8	3%	$6.35	$6.16	$115.18	$9.57	77%
52	Night - Georgetown Road	0.0	42	15.3	1.1	7.0	3%	$8.29	$8.08	$123.34	$8.59	88%
58	Night - Versailles Road	2.2	85	30.0	1.9	14.2	7%	$4.34	$4.04	$121.18	$7.86	88%
59	Night - Eastland	1.1	58	20.5	2.0	9.7	3%	$5.53	$5.38	$110.06	$10.61	93%
	Average	**1.0**	**60**	**21.2**	**1.6**	**9.9**	**4%**	**$5.77**	**$5.55**	**$117.40**	**$9.00**	**87%**

Source: Lextran APC Data and Service Statistics (Fall 2019 Bid Period)

Table 2-40: Saturday Fixed Route Key Performance Indicators (Fall 2019)

Key:	Very Good	Good	Satisfactory	Unsatisfactory
	> Avg + 1 Std. Dev.	Between Avg. and Avg. + 1 Std. Dev.	Between Avg. and Avg. - 1 Std. Dev.	< Avg. - 1 Std. Dev.

Route #	Route Name	Route Perf. Index	Average Daily Boardings	Boardings / Revenue Hour	Boardings / Revenue Mile	Boardings / One-Way Trip	Farebox Recovery Ratio	Cost / Boarding	Net Cost / Boarding	Net Cost / Revenue Hour	Net Cost / Revenue Mile	On-Time Perf.
Core												
1	Woodhill Drive	0.3	249	15.7	1.6	8.9	7%	$7.13	$6.65	$104.37	$10.47	97%
2	Georgetown Road	0.3	235	15.0	1.6	8.7	5%	$7.35	$7.01	$104.94	$11.19	85%
3	Tates Creek Road	1.1	632	19.3	1.7	18.6	5%	$6.00	$5.68	$109.58	$9.83	89%
4	Newtown Pike	0.9	372	20.1	2.1	11.3	7%	$5.53	$5.16	$103.76	$10.66	90%
5	Nicholasville Road	2.3	791	32.6	4.4	23.3	10%	$3.18	$2.86	$93.16	$12.51	85%
6	North Broadway	1.8	555	30.1	3.4	16.8	8%	$3.61	$3.30	$99.35	$11.12	94%
7	North Limestone	1.8	462	29.8	3.4	17.1	9%	$3.62	$3.30	$98.27	$11.22	96%
8	Versailles Road	1.8	471	29.9	3.1	17.4	13%	$3.71	$3.22	$96.06	$10.01	96%
9	Eastland	1.2	356	22.8	3.1	13.2	6%	$4.52	$4.25	$96.87	$13.29	87%
10	Hamburg Pavilion	0.4	418	15.0	1.6	11.9	4%	$7.28	$7.01	$105.18	$11.51	92%
11	Richmond Road	0.8	304	20.0	1.9	11.3	5%	$5.66	$5.36	$107.50	$10.31	100%
12	Leestown Road	0.0	212	13.6	1.2	7.9	3%	$8.66	$8.39	$114.57	$9.67	97%
13	South Broadway	0.3	235	15.5	1.5	8.7	4%	$7.22	$6.95	$108.00	$10.76	98%
	Average	**1.0**	**407**	**21.5**	**2.3**	**13.7**	**6%**	**$5.14**	**$4.80**	**$103.33**	**$10.84**	**93%**
Circulator												
15	Red Mile	1.0	108	13.3	1.7	5.1	0%	$7.87	$7.84	$104.38	$13.36	100%
18	Centre Parkway Connector	0.0	95	7.0	0.5	4.3	2%	$17.68	$17.34	$121.28	$8.99	91%
27	UK Yellow Road	2.0	489	20.2	3.0	9.8	0%	$5.01	$5.01	$100.96	$15.16	81%
	Average	**1.0**	**231**	**15.1**	**1.7**	**7.4**	**1%**	**$7.19**	**$7.14**	**$107.57**	**$12.11**	**86%**
Night												
51	Night - Woodhill Drive	1.3	36	12.7	1.1	6.0	3%	$9.35	$9.03	$114.77	$9.54	76%
52	Night - Georgetown Road	0.0	26	9.5	0.7	4.3	1%	$13.38	$13.23	$125.13	$8.71	85%
58	Night - Versailles Road	0.3	29	10.2	0.7	4.8	4%	$12.71	$12.15	$124.41	$8.07	89%
59	Night - Eastland	2.4	47	16.6	1.6	7.8	2%	$6.83	$6.71	$111.38	$10.73	92%
	Average	**1.0**	**35**	**12.3**	**0.9**	**5.8**	**3%**	**$9.96**	**$9.69**	**$118.87**	**$9.12**	**85%**

Source: Lextran APC Data and Service Statistics (Fall 2019 Bid Period)

Table 2-41: Sunday Fixed Route Key Performance Indicators (Fall 2019)

Key:	Very Good	Good	Satisfactory	Unsatisfactory
	> Avg + 1 Std. Dev.	Between Avg. and Avg. + 1 Std. Dev.	Between Avg. and Avg. - 1 Std. Dev.	< Avg. - 1 Std. Dev.

Route #	Route Name	Route Perf. Index	Average Daily Boardings	Boardings / Revenue Hour	Boardings / Revenue Mile	Boardings / One-Way Trip	Farebox Recovery Ratio	Cost / Boarding	Net Cost / Boarding	Net Cost / Revenue Hour	Net Cost / Revenue Mile	On-Time Perf.
Core												
1	Woodhill Drive	0.4	206	13.1	1.3	7.4	3%	$8.55	$8.31	$108.86	$10.94	96%
2	Georgetown Road	0.3	194	12.5	1.3	7.2	3%	$8.81	$8.57	$107.47	$11.29	93%
3	Tates Creek Road	1.2	355	22.6	1.9	12.7	4%	$5.25	$5.02	$113.29	$9.49	85%
4	Newtown Pike	0.8	265	17.2	1.8	9.8	4%	$6.44	$6.18	$106.06	$11.13	93%
5	Nicholasville Road	2.5	609	39.3	4.2	22.6	9%	$2.79	$2.53	$99.60	$10.77	90%
6	North Broadway	1.5	402	25.9	3.0	14.9	8%	$4.16	$3.83	$99.30	$11.43	91%
7	North Limestone	1.3	357	23.0	2.6	13.2	6%	$4.68	$4.39	$101.22	$11.59	96%
8	Versailles Road	2.3	566	36.6	3.7	21.0	11%	$3.04	$2.72	$99.56	$10.19	97%
9	Eastland	0.9	280	18.2	2.5	10.4	4%	$5.68	$5.44	$99.10	$13.38	90%
10	Hamburg Pavilion	0.8	265	16.9	1.5	9.8	4%	$6.94	$6.69	$112.85	$9.80	96%
11	Richmond Road	0.8	265	16.9	1.7	9.5	5%	$6.65	$6.32	$107.09	$10.53	99%
12	Leestown Road	0.0	169	10.8	0.9	6.3	2%	$10.90	$10.64	$115.19	$9.78	96%
13	South Broadway	0.2	185	12.1	1.2	6.9	3%	$9.22	$8.93	$108.40	$10.88	92%
	Average	**1.0**	**317**	**20.4**	**2.1**	**11.6**	**5%**	**$5.47**	**$5.20**	**$106.02**	**$10.74**	**93%**
Circulator												
15	Red Mile	0.0	102	12.6	1.6	4.9	0%	$8.34	$8.31	$104.47	$13.38	100%
27	UK Yellow Road	2.0	871	35.9	5.4	17.4	0%	$2.81	$2.81	$100.96	$15.16	84%
	Average	**1.0**	**487**	**30.1**	**4.3**	**13.7**	**0%**	**$3.39**	**$3.39**	**$101.84**	**$14.66**	**92%**

Source: Lextran APC Data and Service Statistics (Fall 2019 Bid Period)

Service Productivity Findings

- The composite RPI provides insight into the overall best performing routes with consideration of both service productivity and financial performance factors. Based on the RPI, Routes 8, 6, and 7 are the top performing core routes on weekdays, followed by Routes 5, 3, and 9. These six routes generate about 62% of the total core ridership. Routes 10 and 12 are the bottom performing routes as measured by the RPI.
- Weekday service productivity as measured by boardings per revenue hour varies significantly by service class. The circulator routes are the most productive on weekdays at 39 boardings per hour, followed by night routes (21 per hour), core (22 per hour) and limited (10 per hour).
- Among the circulator routes, weekday performance varies drastically between Routes 14 and 15 (service in and around UK) and Routes 17 and 18 (crosstown routes outside of New Circle Road). Routes 14 and 15 combine for about 98% of the circulator weekday ridership and 41% of the system weekday ridership.
- Aside from average daily boardings, the core service class has nearly identical productivity metrics on weekdays and Saturdays. Sundays perform almost as well as weekday and Saturday service on the core routes. On Saturdays, the core routes are the most productive at 22 boardings per hour, followed by the circulators (15 per hour), and night routes (12 per hour). On Sundays, the circulators are the most productive at 30 boardings per hour while the core routes operate at 20 boardings per hour.
- While overall core route productivity is only slightly lower on weekends compared to weekdays, there is a wider range in productivity among individual routes, with some routes performing better on weekends in terms of boardings per revenue hour. In general, the routes with the highest weekday ridership (Routes 3, 5, 6, 7, 8, 10) are more productive on Saturday and/or Sunday compared to weekdays in terms of boardings per revenue hour. This finding may point to a need to provide enhanced service on several routes on weekends to serve latent demand.

Table 2-42: Service Productivity Metrics by Service Class (Fall 2019)

Day / Service Class	Average Daily Boardings	Boardings / Revenue Hour	Boardings / Revenue Mile	Boardings / One-Way Trip
Weekday				
Core	9,765	22.0	2.3	13.9
Circulator	7,535	38.9	4.7	16.5
Limited	507	10.1	1.0	5.6
Night	238	21.2	1.6	9.9
Subtotal	**18,045**	**25.8**	**2.7**	**14.2**
Saturday				
Core	5,292	21.5	2.3	13.7
Circulator	692	15.1	1.7	7.4
Night	138	12.3	0.9	5.8
Subtotal	**6,122**	**20.2**	**2.1**	**12.2**
Sunday				
Core	4,118	20.4	2.1	11.6
Circulator	973	30.1	4.3	13.7
Subtotal	**5,091**	**21.7**	**2.3**	**12.0**

Source: Lextran APC Data and Service Statistics (Fall 2019 Bid Period)

Service Efficiency Findings

- In general, scheduled operating speeds do not vary much between service days, with weekday speeds averaging 9.4 MPH systemwide. As noted in the peer analysis, Lextran's average speed is slower than its peers. While this is certainly influenced in part by the large volume of campus circulator service that Lextran operates relative to the total system revenue hours and miles, the core and limited average speeds are also lower than the peer average.
- Circulator service operates the slowest of the service classes. This is likely because of the high ridership volume and frequent stops indicative of the UK campus shuttle routes.
- Lextran tends to operate very efficiently in terms of the ratio between revenue and non-revenue service operated. Revenue hours and miles compared to platform hours and miles do not have significant variation across days in service. Efficiency varies slightly in these categories, however, as one would expect, limited service has more deadhead compared to other types of service. It should be noted that end-of-line layovers are included in the calculation of revenue hours. On weekends, many routes have extensive layovers to facilitate timed transfers at Downtown Transit Center.

Table 2-43: Service Efficiency Metrics by Service Class (Fall 2019)

Day / Service Class	Average Speed in Revenue Service (MPH)	Revenue Hours / Platform Hours	Revenue Miles / Platform Miles
Weekday			
Core	9.6	0.97	0.94
Circulator	8.3	0.98	0.93
Limited	10.6	0.94	0.89
Night	13.0	0.94	0.95
Subtotal	**9.4**	**0.97**	**0.94**
Saturday			
Core	9.5	0.97	0.95
Circulator	8.9	0.96	0.93
Night	13.0	0.94	0.95
Subtotal	**9.6**	**0.97**	**0.95**
Sunday			
Core	9.9	0.97	0.94
Circulator	6.9	0.95	0.93
Subtotal	**9.5**	**0.97**	**0.94**

Source: Lextran APC Data and Service Statistics (Fall 2019 Bid Period)

Financial Performance Findings

- The systemwide cost per boarding and net cost per boarding are both more effective on weekdays compared to Saturdays and Sundays due to the higher ridership the system experiences on weekdays, especially on the circulator routes. The cost per boarding and net cost per boarding increases significantly on the circulator routes from weekday to Saturday.
- Revenue derived from multi-trip pass products, such as the UK Free City Transit, are not accounted for in Lextran's route-level farebox revenue. As such, the UK campus circulators (Routes 14 and 27) do not register farebox revenue and Route 15 registers minimal revenue as most passengers using this route do so using the Blupass. However, due to their high ridership, these routes are among the most effective network with an average net cost per boarding of less than $3.00 on weekdays.
- The core routes perform best in terms of weekday farebox recovery ratio (5%), followed by night (4%), limited (3%), and finally circulator service (0%).
- Among the core service class, Routes 5, 6, 7, 8 and 9 are the top weekday performers. Routes 6, 7, and 8 are the only routes to have farebox recovery ratios at 8% or above, as well as cost less than $4.00 per boarding.
- Several circulator and limited routes are notable under-performers with very high average costs per boarding. On weekdays, Routes 17 and 27 have a net cost of nearly $40.00 per passenger boarding. Route 16 has a net cost of about $25.00 per boarding, while Route 18 has a net cost of $15.00 per boarding. These routes warrant consideration of alignment modifications, service reductions, or new service delivery strategies to provide more cost-effective mobility for the markets they serve.

Table 2-44: Financial Performance Metrics by Service Class (Fall 2019)

Day / Service Class	Farebox Recovery Ratio	Cost / Boarding	Net Cost / Boarding	Net Cost / Revenue Hour	Net Cost / Revenue Mile
Weekday					
Core	5%	$5.04	$4.78	$105.15	$10.90
Circulator	0%	$2.74	$2.72	$105.89	$12.80
Limited	3%	$11.31	$10.95	$110.40	$10.42
Night	4%	$5.77	$5.55	$117.40	$9.00
Subtotal	**4%**	**$4.26**	**$4.10**	**$105.93**	**$11.28**
Saturday					
Core	6%	$5.14	$4.80	$103.33	$10.84
Circulator	1%	$7.19	$7.14	$107.57	$12.11
Night	3%	$9.96	$9.69	$118.87	$9.12
Subtotal	**5%**	**$5.48**	**$5.18**	**$104.55**	**$10.93**
Sunday					
Core	5%	$5.47	$5.20	$106.02	$10.74
Circulator	0%	$3.39	$3.39	$101.84	$14.66
Subtotal	**4%**	**$5.08**	**$4.85**	**$105.45**	**$11.14**

Source: Lextran APC Data and Service Statistics (Fall 2019 Bid Period)

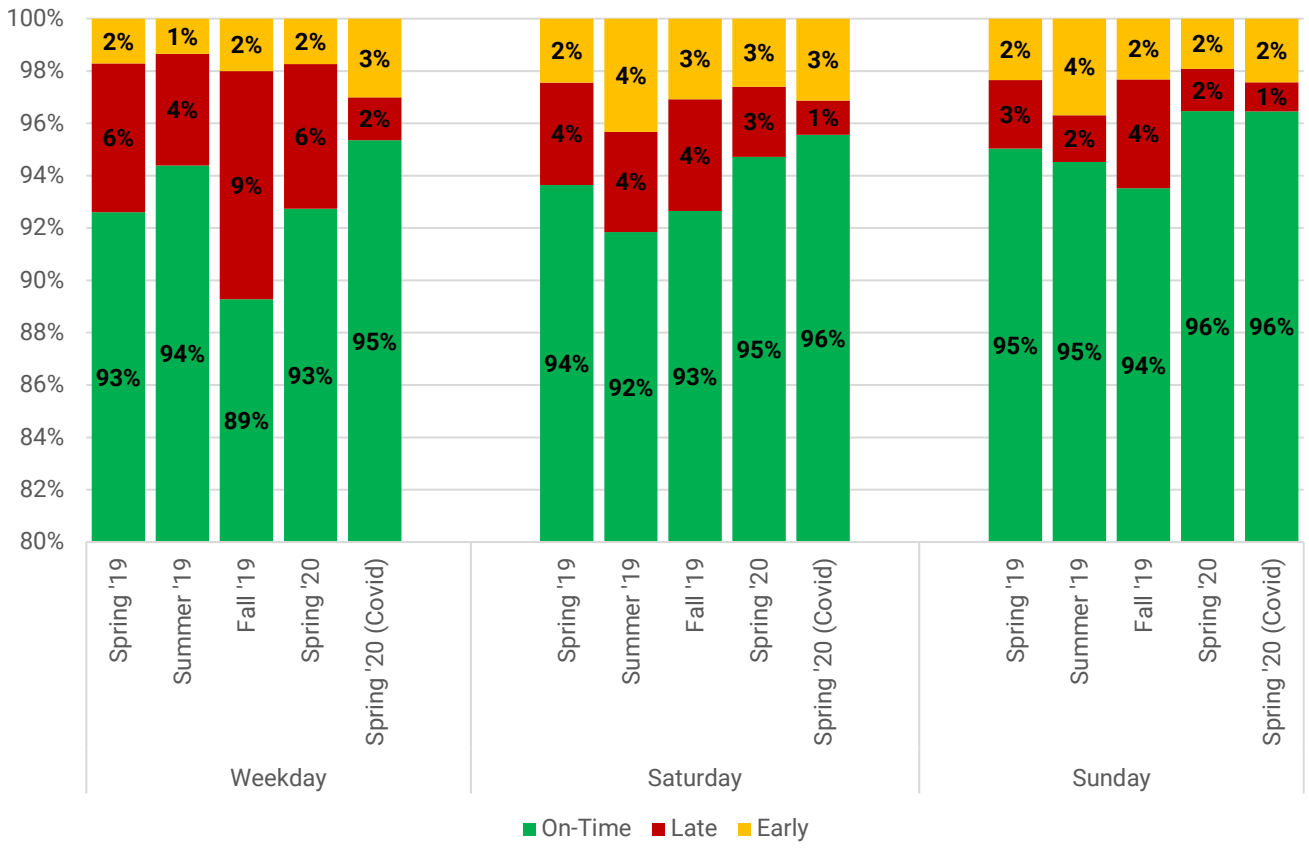
Reliability Assessment

Reliability, as measured by on-time performance (OTP), is a key indicator of service quality. At Lextran, a bus is considered "on-time" if it departs a designated timepoint no more than one minute early or seven minutes late. Lextran has established a target of 90% minimum on-time performance for all routes.

Reliability was calculated using Automatic Vehicle Location (AVL) data provided by Lextran for the period beginning January 1st, 2019 through June 30th, 2020 and summarized by bid period. As depicted in **Figure 2-44**, Lextran's OTP was generally near or above its established target over the five bid periods evaluated. Weekday OTP ranged between a low of 89% in Fall 2019 and a high of 95% in Spring 2020 (post COVID service reductions). Saturday OTP ranged between 92% in Summer 2019 and 96% in Spring 2020. Sunday OTP ranged between 94% and 96%.

A sensitivity analysis was performed to measure the impact of a narrower OTP policy threshold. Two hypothetical scenarios were evaluated based on Fall 2019 data: an on-time definition of 1) one minute early to five minutes late, and 2) zero minutes early to five minutes late. Under the first scenario, systemwide weekday OTP dropped to 84%, with late departures increasing from 9% to 14%. Under the second scenario, OTP dropped to 69%, with early departures increasing from 2% to 17%.

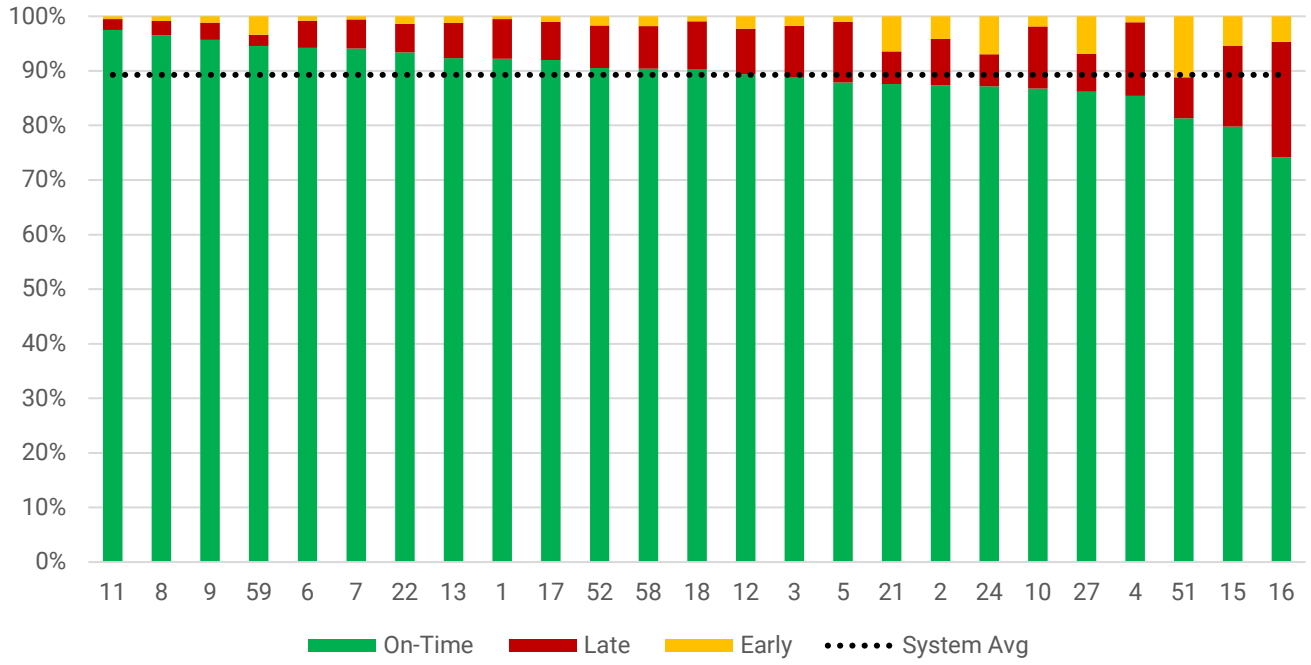
Figure 2-44: System On-Time Performance by Bid Period and Day of Week (Spring 2019 – Spring 2020)



Source: Lextran AVL Data (January 1st, 2019 through June 30th, 2020)

Route level OTP was analyzed for the Fall 2019 bid period, as depicted in **Figure 2-45**. As noted above, the systemwide average OTP was 89% during that period, which is slightly below Lextran's policy target of 90%. In Fall 2019, 12 routes fell below this target, though only five more than 5% under. These include Routes 4, 51, 15, and 16. A further analysis of route-level OTP is documented in the Route Assessment Summary Matrix documented in Appendix A-4 of this report.

Figure 2-45: On-Time Performance by Route (Fall 2019)



Source: Lextran AVL Data (Fall 2019 Bid Period)

Like many systems, Lextran's OTP tends to vary throughout the day due to many factors including traffic congestion and passenger volumes. **Table 2-45** provides average OTP by time period in Fall 2019. On weekdays, systemwide OTP is lowest during the PM peak, at 78%, and highest during the early AM period, at 95%. On weekends, OTP tends to be the lowest during the nighttime period. **Table 2-46** through **Table 2-48** display this information at a more granular level. On weekdays, OTP on most routes is lowest during the 5 PM and 6 PM hours. Several routes indicate "hot spots" throughout the day where OTP is below Lextran's policy of 90%. These include Routes 4 and 10 during the AM peak, Route 15 during the midday through the early evening, Route 16 during the midday through the PM peak, and Route 51 during the late evening hours.

Table 2-45: System On-Time Performance by Time of Day (Fall 2019)

Day	Early AM	AM Peak	Midday	PM Peak	Evening	Night	Daily Avg
Weekday	95%	94%	92%	78%	89%	91%	89%
Saturday	95%	97%	92%	92%	93%	87%	93%
Sunday	95%	96%	95%	95%	92%	69%	94%

Source: Lextran AVL Data (Fall 2019 Bid Period)

Table 2-46: Weekday Hourly On-Time Performance by Route (Fall 2019)

Route	5 AM	6 AM	7 AM	8 AM	9 AM	10 AM	11 AM	12 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM	12 AM
1	95%	100%	96%	96%	98%	98%	99%	97%	97%	97%	86%	85%	65%	80%	93%	96%	95%			
2	95%	93%	90%	88%	94%	88%	93%	89%	87%	96%	89%	78%	64%	72%	96%	95%	38%			
3	97%	96%	92%	92%	93%	95%	98%	95%	89%	89%	83%	77%	68%	72%	91%	94%	92%	90%	93%	84%
4	98%	99%	90%	74%	82%	92%	93%	90%	91%	92%	90%	82%	55%	64%	82%	91%	96%	92%	92%	76%
5	93%	98%	98%	90%	90%	94%	92%	88%	86%	88%	88%	77%	59%	71%	92%	96%	98%	98%	96%	95%
6	100%	98%	99%	100%	99%	99%	98%	96%	98%	95%	95%	89%	81%	81%	87%	93%	89%	92%	93%	94%
7	97%	92%	97%	97%	97%	96%	96%	94%	91%	91%	92%	90%	94%	93%	93%	97%	100%			
8	98%	99%	97%	99%	99%	97%	98%	96%	96%	96%	96%	96%	89%	94%	96%	97%	97%			
9	99%	99%	98%	99%	99%	98%	97%	97%	98%	99%	96%	92%	84%	86%	94%	95%	100%			
10	89%	94%	92%	85%	93%	90%	94%	94%	89%	91%	87%	85%	55%	66%	82%	91%	99%	95%	96%	90%
11	100%	99%	99%	99%	99%	100%	99%	99%	99%	98%	97%	95%	90%	94%	98%	97%	100%			
12	98%	99%	91%	95%	95%	99%	99%	98%	97%	90%	90%	81%	68%	71%	84%	91%	89%			
13	93%	98%	96%	92%	97%	95%	96%	90%	88%	87%	91%	92%	83%	86%	98%	97%	100%			
15		100%	92%	92%	88%	92%	88%	80%	77%	77%	73%	67%	47%	60%	74%	78%	85%	92%		
16		90%	94%	90%	90%	80%	93%	85%	87%	86%	84%	53%	25%	32%						
17		98%	98%	93%	94%				98%	96%	88%	89%	81%	28%						
18		98%	99%	98%	97%	96%	98%	98%	93%	94%	91%	84%	72%	70%	81%	91%				
21		99%	94%	91%	97%				85%	94%	89%	90%	82%	58%						
22	98%	96%	94%	94%	97%	99%	96%	90%	93%	91%	91%	96%	81%	91%	96%					
24	65%	88%	92%	95%	87%					91%	90%	85%	73%	89%						
27																			93%	80%
51																	78%	81%	83%	90%
52																	97%	90%	88%	84%
58																	95%	89%	92%	83%
59																	88%	97%	96%	92%

Source: Lextran AVL Data (Fall 2019 Bid Period)

Table 2-47: Saturday Hourly On-Time Performance by Route (Fall 2019)

Route	5 AM	6 AM	7 AM	8 AM	9 AM	10 AM	11 AM	12 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM	12 AM
1	94%	98%	99%	100%	99%	100%	99%	99%	99%	97%	94%	94%	96%	95%	94%	99%	100%			
2	100%	87%	79%	87%	83%	74%	80%	74%	71%	91%	93%	95%	100%	98%	95%	81%	100%			
3	91%	97%	98%	100%	100%	97%	92%	84%	91%	88%	93%	91%	84%	89%	94%	76%	95%	85%	74%	91%
4	70%	92%	98%	91%	89%	89%	87%	94%	88%	80%	93%	94%	96%	100%	97%	96%	96%	97%	84%	67%
5	100%	95%	99%	98%	99%	93%	66%	84%	83%	89%	88%	82%	72%	70%	85%	92%	95%	85%	90%	93%
6	100%	98%	100%	96%	98%	98%	94%	97%	99%	97%	93%	98%	91%	95%	94%	95%	97%	89%	89%	77%
7	100%	95%	99%	98%	99%	98%	96%	92%	84%	99%	99%	100%	96%	97%	100%	99%	100%			
8	100%	98%	94%	95%	99%	98%	97%	92%	100%	99%	94%	98%	94%	95%	93%	98%				
9	92%	94%	95%	85%	84%	82%	80%	84%	78%	85%	86%	99%	93%	94%	92%	97%				
10	100%	99%	100%	99%	96%	97%	90%	95%	91%	88%	97%	98%	96%	85%	90%	99%	99%	96%	87%	81%
11	100%	100%	100%	100%	100%	98%	98%	100%	100%	99%	100%	100%	100%	99%	100%	100%				
12	100%	96%	99%	100%	99%	98%	93%	98%	97%	94%	98%	100%	98%	96%	92%	97%	100%			
13	100%	100%	100%	99%	100%	99%	98%	100%	93%	99%	97%	96%	98%	98%	98%	98%	50%			
15						99%	100%	100%	100%	100%	100%	100%	100%	100%						
18		97%	95%	95%	98%	100%	99%	95%	90%	91%	84%	94%	87%	89%	86%	92%				
27							100%	85%	79%	80%	77%	72%	84%	89%	78%	89%	81%	90%	90%	
51																	82%	81%	76%	74%
52																	98%	94%	82%	69%
58																	100%	97%	82%	87%
59																	100%	98%	87%	85%

Source: Lextran AVL Data (Fall 2019 Bid Period)

Table 2-48: Sunday Hourly On-Time Performance by Route (Fall 2019)

Route	5 AM	6 AM	7 AM	8 AM	9 AM	10 AM	11 AM	12 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM	12 AM
1	97%	92%	99%	100%	100%	99%	99%	98%	100%	100%	99%	99%	98%	99%	95%	92%	82%			
2	97%	94%	93%	94%	99%	95%	94%	94%	95%	96%	96%	96%	92%	91%	85%	94%	77%			
3	91%	89%	96%	99%	97%	96%	98%	66%	85%	86%	92%	90%	88%	84%	92%	93%	75%			
4	100%	98%	100%	99%	99%	97%	97%	97%	89%	100%	93%	91%	96%	92%	97%	94%	66%			
5	100%	98%	99%	99%	98%	99%	96%	89%	93%	89%	89%	79%	88%	88%	92%	98%	86%			
6	100%	99%	100%	100%	100%	100%	100%	99%	92%	92%	96%	94%	81%	92%	92%	90%	71%			
7	98%	97%	97%	99%	99%	100%	97%	100%	98%	97%	99%	100%	100%	97%	94%	87%	88%			
8	100%	98%	100%	100%	100%	100%	100%	100%	100%	99%	99%	97%	96%	94%	95%	94%	77%			
9	89%	95%	91%	86%	86%	88%	86%	88%	92%	90%	98%	92%	91%	97%	94%	96%	89%			
10	96%	96%	100%	99%	99%	100%	100%	100%	100%	95%	99%	100%	99%	96%	99%	96%	94%			
11	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	99%	95%	74%			
12	89%	94%	94%	95%	97%	95%	100%	93%	92%	99%	100%	100%	99%	95%	95%	98%	93%			
13	85%	82%	88%	97%	85%	85%	81%	81%	97%	97%	98%	98%	99%	100%	98%	97%	94%			
15						97%	98%	100%	100%	100%	100%	100%	100%	100%						
27							100%	87%	88%	85%	83%	88%	97%	96%	89%	81%	74%	82%	88%	71%

Source: Lextran AVL Data (Fall 2019 Bid Period)

2.5.3. Route-Level Service Assessment

A route-level performance assessment was conducted to provide an in-depth analysis of service performance for each fixed route in the Lextran network. As the COA moves into the recommendations phase, the findings of the route-level performance assessment will help inform the development of strategies for improving efficiency and effectiveness throughout the system. This section provides a summary of recent service changes and an overview of the route performance summary matrix, found in Appendix A-4, which documents key findings derived from various datasets.

Summary of Recent Service Changes

Since its last COA was conducted in 2015, Lextran has implemented several service changes. Key service changes are summarized by year in **Table 2-49**.

Table 2-49: Service Change Summary, 2016 - 2020

Date	Changes
2016 Service Changes	
	• Downtown trolley service suspended • Added Sunday service on core routes • Modified Route 16 to service downtown, parts of Nicholasville Road, and new healthcare facilities at Turfland Mall • Enhanced service levels on routes 5, 8, and 15 • Implemented open-door service on Route 21 • Adjustments to Route 13
2017 Service Changes	
May	• Implemented routes 22 (Mercer Road) and 24 (Old Frankfort Pike) • Adjustments to Route 2, Route 12, Route 6, Route 20, Route 25, Route 5 • Added second pulse at Downtown Transit Center to reduce congestion and account for planned reduction of bus bays / space due to Town Branch construction. Two pulses created: "Connect Green" and "Connect Blue". Four routes moved to "Connect Blue" pulse: 1, 7, 21, 24
August	• Four additional routes moved to "Connect Blue" pulse: 4, 10, 12, 16.
December	• Schedule changes to routes 3 and 10
2018 Service Changes	
May	• Route 2 routing adjustments to avoid railroad grade crossing. End of line moved to Innovation Dr. • Route 4 routing adjustments to avoid railroad grade crossing. • Route 10 routing adjustments to serve Douglass High School. Provided extended service hours to Polo Club. • Route 18 routing adjustments to serve Pleasant Ridge Drive and Bryant Road.
August	• Added Route 27 on UK campus
December	• "Combo" routes transitioned to independent routes.
2019 Service Changes	
June	• Minor schedule and alignment changes to route 4. • Minor schedule change to route 22.
2020 Service Changes	
March	• Service reductions were implemented in March 2020 due to the COVID-19 pandemic and related shutdowns. Initially, weekday service was reduced on nine of Lextran's core routes and UK shuttle routes. Routes 16, 21, and 24 were suspended. Weekend service levels were left unchanged.
July	• Lextran began restoring service in July 2020. Normal weekday service resumed on routes 2, 4, 6, 7, 9, and July 13th. Normal weekday service was resumed to routes 1, 11, 12,13, and 16 on August 9th.

Route Performance Summary Matrix

A variety of datasets and tools were developed to support this COA effort. In addition to the datasets summarized in previous sections of this report, an interactive, web-based tool was developed to provide greater insight into Lextran's service productivity and market environment. The Lextran Service and Market Assessment Dashboard contains the following components:

- Ridership Performance Dashboard
- On-Time Performance Dashboard
- Market Assessment Dashboard
- Travel Patterns Dashboard

The Route Performance Summary Matrix provided in Appendix A-4 integrates key data points and observations derived from these datasets and tools. The routes were evaluated based on several key criteria:

- **Trends**
  - Is performance trending up or down?
  - Is performance trend above or below average?
  - Are weekday/weekend trends similar?
- **Key Performance Indicators**
  - What is weekday performance rating?
  - What are outliers?
  - Do weekends outperform weekdays?
- **Geographic Ridership Productivity**
  - What % of ridership occurs at Downtown Transit Center?
  - Where are highest productivity segments?
  - Are there any segments with very low productivity?
  - Are there any areas where weekend productivity patterns significantly deviate from weekday?
- **Temporal Ridership Productivity**
  - Does demand curve generally follow system average?
  - Are there any outlier trips with very high/very low productivity?
  - Are there any trip patterns with very high/very low productivity?
  - Are there any trips/times where weekend productivity patterns significantly deviate from weekday?
- **Capacity**
  - Where does max load point occur?
  - Are there any stops or route segments where overcrowding occurs?
- **Reliability**
  - Is route above or below system on-time performance target?
  - What time of day do on-time performance issues tend to occur?
  - At what locations (timepoints) do on-time performance issues tend to occur at?

2.6. Paratransit Service Assessment

This section provides the findings of the performance assessment of Lextran's Wheels paratransit service.

2.6.1. Paratransit Service Overview

Lextran partners with the Bluegrass Area Chapter of the American Red Cross to provide paratransit service to eligible disabled citizens. Lextran's paratransit service, marketed as Wheels, is a shared ride, door-to-door, public transportation service available 365 days a year. Service hours are 5:00 AM to 12:00 AM Monday through Saturday and 5:00 AM to 9:00 PM on Sundays.

Paratransit trips are booked by phone through Wheels dispatch. Reservations are accepted as early as 14 days in advance or up to 5:00 PM the day before the trip is to be scheduled. A 30-minute pick-up window is provided at the time of booking. Reservations may be cancelled by 4:30 PM the day before the scheduled pick-up.

Wheels fares are determined based on trip origin and destination points. When both the origin and destination are within three-fourths (3/4) of a mile of a Lextran fixed route, the fare is $1.60 each way. If the origin or the destination are further than three-fourths (3/4) of a mile from a Lextran fixed route, the premium fare is $2 each way.

2.6.2. Ridership Productivity

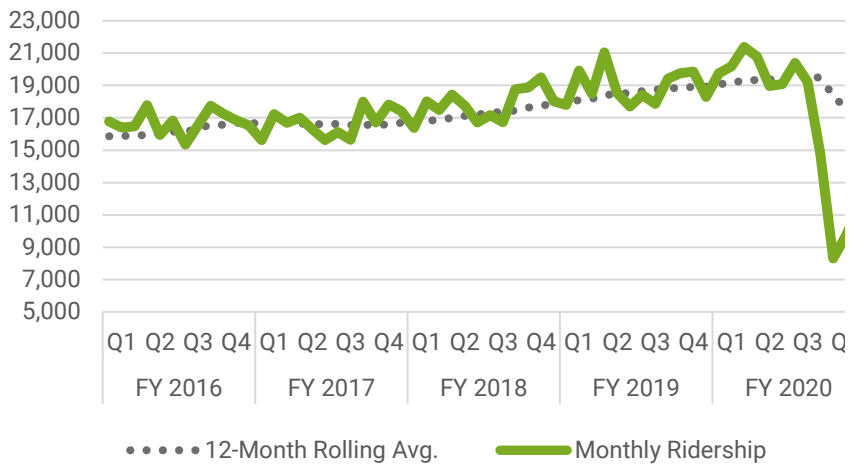
Annual Ridership Trends

National Transit Database (NTD) reports were used to determine Wheels ridership productivity between FY16 and FY20. As shown in **Table 2-50**, Wheels ridership increased 13% between FY16 and FY19, but then decreased 10% in FY20 due to the impacts of the COVID-19 pandemic. These figures generally follow Lextran's fixed route ridership trends over the five-year period, although paratransit ridership experienced a slightly smaller decrease in ridership.

Table 2-50: Lextran Annual Fixed-Route Ridership, FY16 – FY20

Year	Annual Ridership	Pct Chg
FY 2016	200,484	--
FY 2017	200,255	0%
FY 2018	213,830	7%
FY 2019	227,095	6%
FY 2020	203,962	-10%
FY16 – FY19	**26,611**	**13%**
FY16 – FY20	**3,478**	**2%**

Figure 2-46: Lextran Fixed Route Monthly Ridership Trend, FY16 – FY20



Source: Annual NTD Reports (2016-2018); NTD Monthly Module Adjusted Data Release (July 2020)

Daily Ridership by Trip Type

As shown in **Table 2-51** and **Figure 2-47**, Wheel's average daily weekday ridership prior to COVID was 903 trips per day. Both Saturday and Sunday average daily trips were about half of weekday trips, at 453 and 428, respectively. During COVID, average weekday trips dropped by 38% to 562 trips per day, while Saturday and Sunday trips dropped by 32% and 49%, respectively.

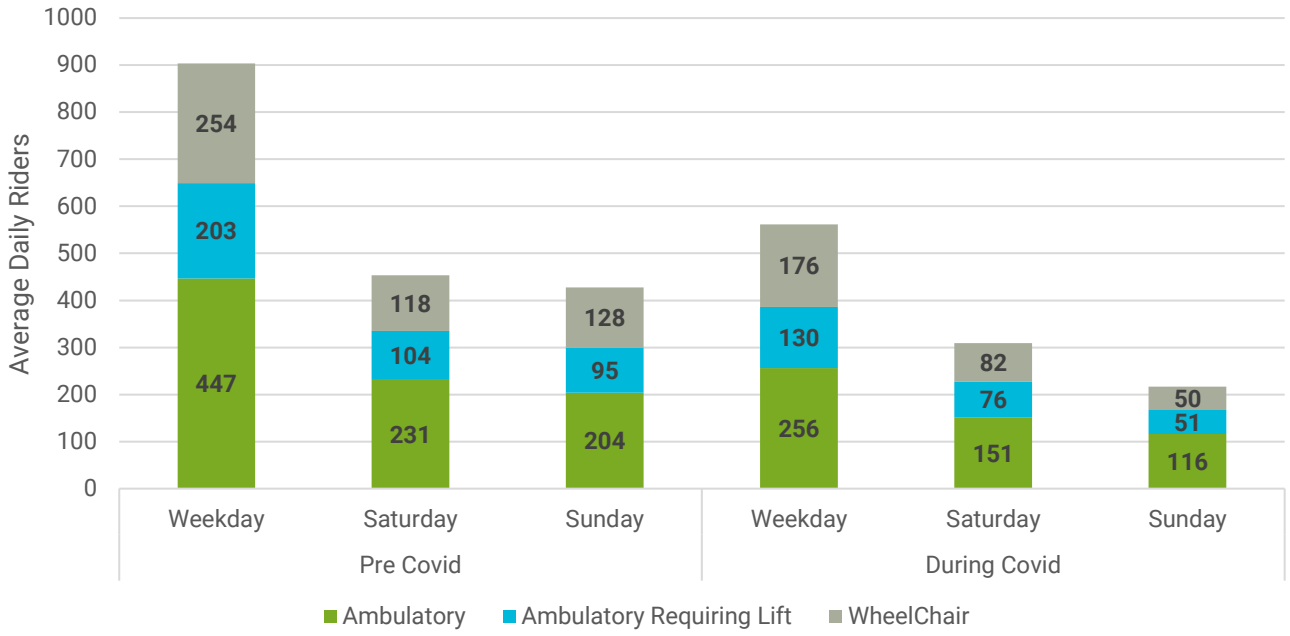
Wheels classifies trips by mobility type to distinguish ambulatory, ambulatory requiring lift, and wheelchair customers. On weekdays during the pre-COVID period, about 49% of Wheels trips were classified as ambulatory, 22% were ambulatory requiring lift, and 28% were wheelchair. The distribution of trips by mobility type on Saturdays and Sundays is similar to weekdays. During COVID, the proportion of ambulatory trips dropped slightly with a corresponding increase in wheelchair and ambulatory requiring lift trips.

Table 2-51: Wheels Ridership by Day of Week and Mobility Type, Before and During COVID

Time Period	Day of Week	Ambulatory	Ambulatory Requiring Lift	Wheelchair	Total
Pre-Covid (3/1/19 – 2/29/20)	Weekday	447	203	254	**903**
	Saturday	231	104	118	**453**
	Sunday	204	95	128	**428**
During Covid (3/1/20 – 10/24/20)	Weekday	256	130	176	**562**
	Saturday	151	76	82	**309**
	Sunday	116	51	50	**217**

Source: Lextran Wheels Ridership Data, March 2019 – October 2020

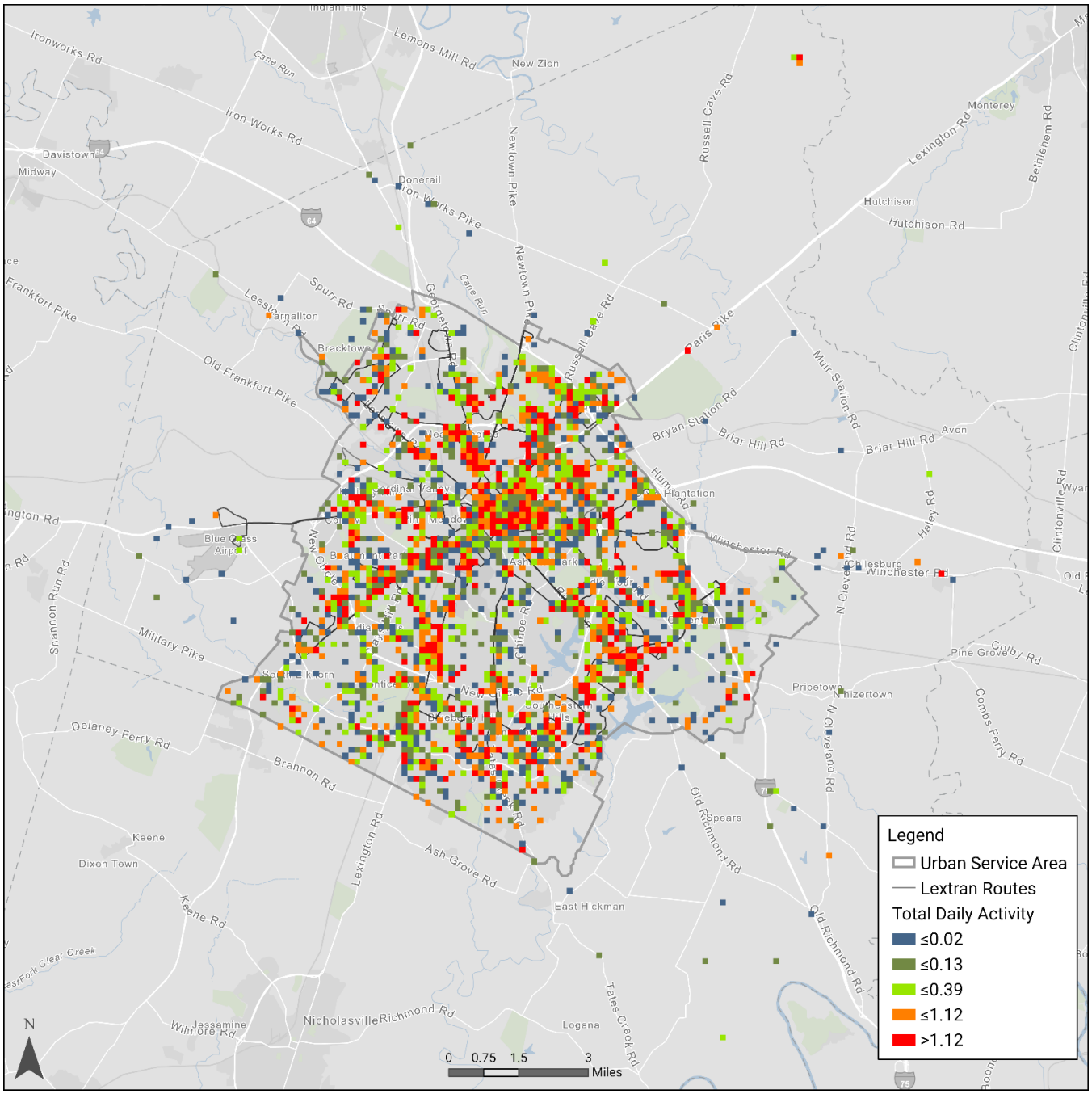
Figure 2-47: Wheels Ridership by Day of Week and Mobility Type, Before and During COVID



Origin-Destination Ridership Analysis

Paratransit origin-destination records were used to analyze the distribution of trip activity across Fayette County for the pre-COVID period between March 2019 and February 2020. Average weekday origins and destinations were aggregated into 1/8-mile square grids to identify areas of ridership intensity, as shown in **Figure 2-48**. Nearly all trip activity occurred within the Urban Service Area, with only 1% occurring elsewhere throughout the county.

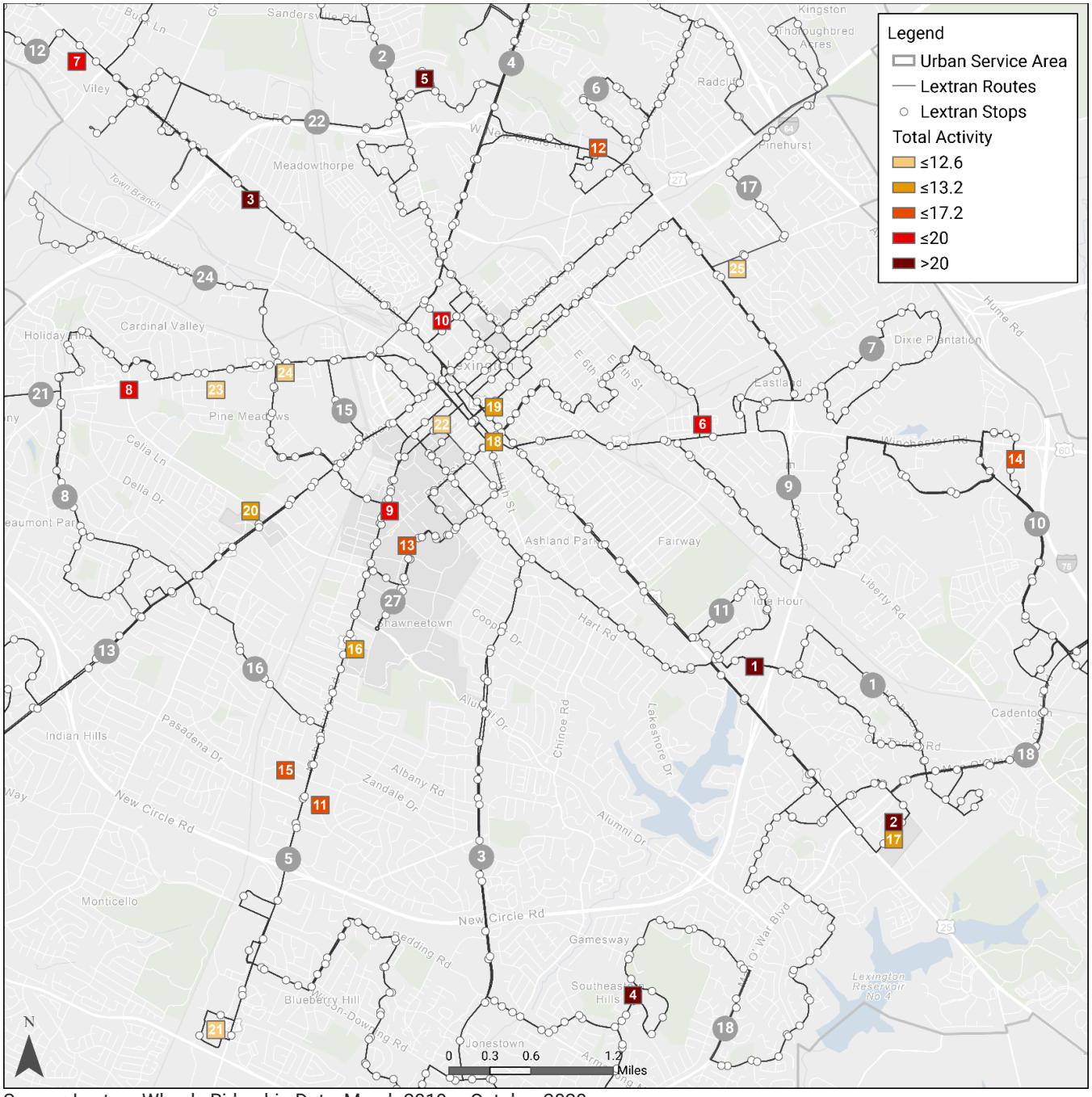
Figure 2-48: Average Weekday Paratransit Trip Origins and Destinations, March 2019 – February 2020



Source: Lextran Wheels Ridership Data, March 2019 – October 2020

Each of the top 25 paratransit origins and destinations are located within the Urban Service Area, as shown in **Figure 2-49** and listed in **Table 2-52.** These 25 locations encompass nearly 434 daily origins and destinations, or 24% of the average weekday trip activity. The top origins and destinations are predominantly dialysis or medical facilities (14), while the remaining are multifamily or senior housing (6), shopping centers (4), and employment agencies (1).

Figure 2-49: Top 25 Average Weekday Paratransit Origins and Destinations by Total Activity



Source: Lextran Wheels Ridership Data, March 2019 – October 2020

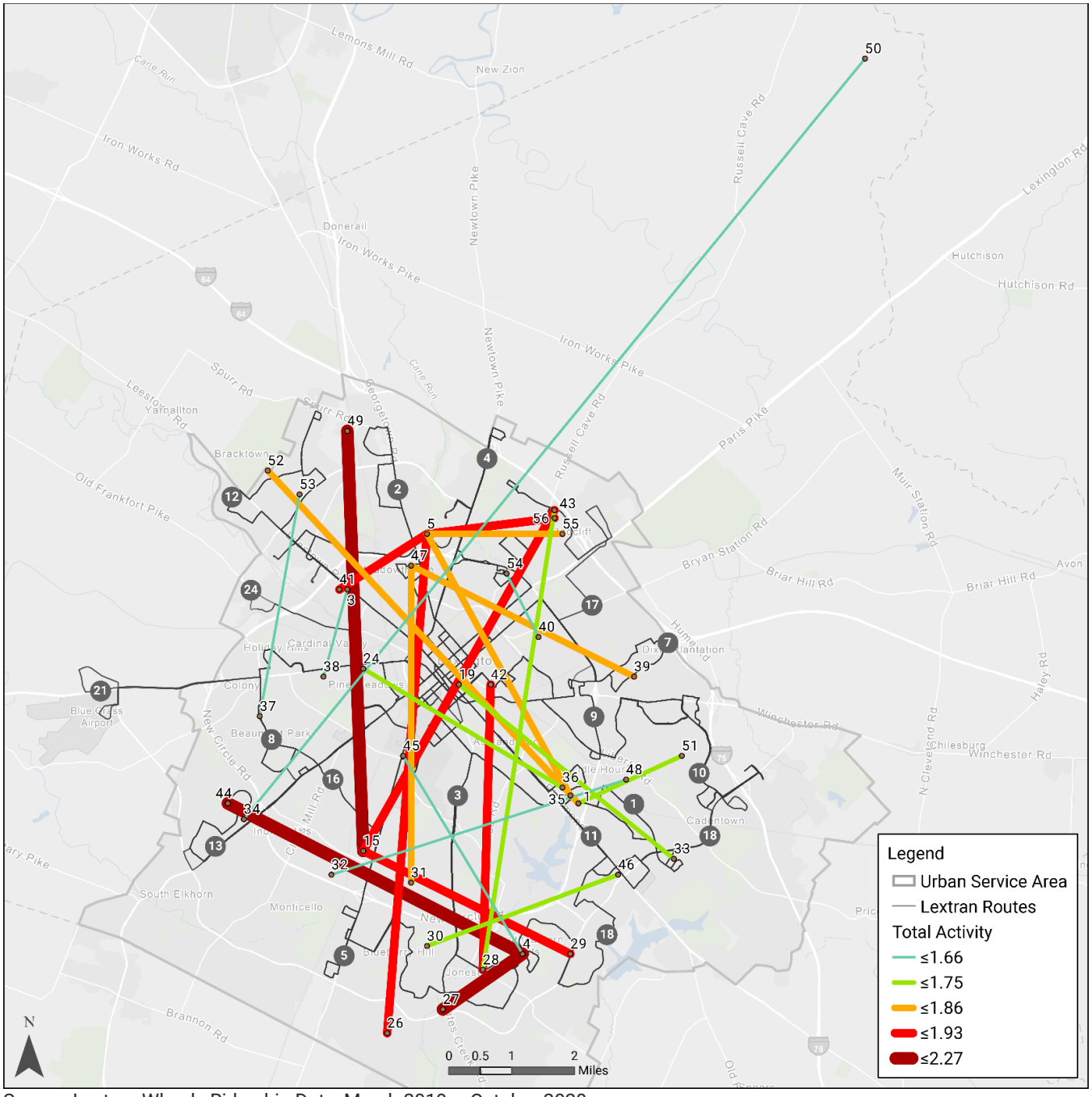
Table 2-52: Top 25 Average Weekday Paratransit Origins and Destinations by Total Activity

Grid Number	Trip by Origin	Trip by Destination	Total Activity	Location	Type
1	21	21	41	Life Lane @ E New Circle Rd	Medical / Senior Center
2	15	15	30	Eagle Creek Drive @ Richmond Road	Medical / Dialysis
3	13	14	27	Leestown Rd @ Louie Pl	Medical / Kidney Care
4	12	12	24	Centre Pkwy, Briarwood Apartments	Apartment
5	10	10	20	Whipple Court	Employment Agency
6	10	10	20	Winchester Rd @ Loudon Ave	Dialysis
7	10	9	19	Leestown Rd @ Venture Ct	Dialysis
8	9	9	18	Versailles Rd @ Mason Headley Rd	Medical / Hospital
9	9	9	18	Limestone @ Virginia Ave	Medical / Hospital
10	9	9	18	Tower Plaza @ W 2nd St	Senior Housing
11	8	9	17	Professional Heights Dr @ E Lowry Ln	Medical / Dialysis
12	9	7	16	W New Circle Rd @ Boardwalk	Shopping
13	9	8	16	Veterans Dr @ Complex Dr	Medical / Hospital
14	8	7	15	Walmart @ Grey Lag Way	Shopping
15	6	7	13	W Lowry Ln @ Regency Rd	Senior Day Care
16	7	6	13	Nicholasville Rd @ Cherokee Park	Medical / Hospital
17	6	6	13	N Eagle Creek Dr @ Eagle View Ln	Medical / Hospital
18	7	6	13	Rose St @ Water St, Rose Tower Apartments	Apartment
19	6	6	13	E Short St @ Deweese St, Central Christian Church Apartments	Apartment
20	6	6	13	Harrodsburg Rd @ Bob-O-Link Dr	Medical / Hospital
21	7	6	13	Walmart @ Nicholasville Rd	Shopping
22	6	6	12	Maxwell St @ Martin Luther King Blvd	Medical / Hospital
23	6	6	12	Hill Rise Dr @ Hill Rise Ct	Nursing Home
24	5	5	11	Sparta Ct	Medical / Care Center
25	5	5	10	Kroger @ Bryan Station Rd	Shopping
Total	**219**	**215**	**434**		

Source: Lextran Wheels Ridership Data, March 2019 – October 2020

Figure 2-50 shows the top 25 weekday trip pairs for the pre-COVID period. For top 25 trip pairs, the total average daily activity is 45 trips. Compared to the average weekday trip volume of 903 during this period, these top 25 trip pairs only contributed 5% of total daily ridership. There were 21,110 identical trip pair combinations, most of which had average daily activity of less than 0.2 (which is one round trip every ten days).

Figure 2-50: Top 25 Average Weekday Origin-Destination Trip Pairs



Source: Lextran Wheels Ridership Data, March 2019 – October 2020

Given the high cost of providing paratransit trips, it is important to identify opportunities where it may be feasible to shift eligible ambulatory customers to fixed routes. For this to be possible, both the paratransit trip origin and destination must be near a fixed route and located in areas with adequate sidewalk access. Ideally, both the origin and destination would be located along a single route to avoid transfers.

To analyze this potential, the top 50 ambulatory trip pairs were spatially joined to the fixed-route stops at a 1/8-mile distance. While nearly all trip pairs were located near a fixed-route stop, only three pairs were identified where both the origin and destination were within the 1/8 mile of stops on the same route: two trip pairs along Route 9 and one pair along Route 12. For these three trip pairs, the total average daily ridership was about 3 trips.

2.6.3. Key Performance Indicators

Paratransit performance was evaluated based on NTD data collected between 2015 and 2019. As shown in **Table 2-53,** the quantity of service operated increased over the five-year period. Revenue hours increased 20%, revenue miles increased 12%, and the peak vehicle requirement increased 24% between 2015 and 2019.

Table 2-53: Wheels Paratransit Operating Statistics, 2015 - 2019

Year	Platform Hours	Platform Miles	Revenue Hours	Revenue Miles	Peak Vehicles
2015	125,519	1,696,215	108,925	1,455,827	41
2016	134,127	1,786,261	116,165	1,530,661	42
2017	131,909	1,796,280	115,693	1,537,735	43
2018	144,309	1,911,161	127,399	1,635,660	46
2019	146,599	1,893,274	130,573	1,633,937	51

Source: Annual NTD Reports (2014-2018)

Lextran's paratransit ridership increased 20% between 2015 and 2019. Passenger trips per revenue hour remained stable over the five-year period, while passenger trips per revenue mile increased by 8%. Average trip length decreased by 5% between 2016 and 2019.[3]

Table 2-54: Wheels Paratransit Productivity, 2015 - 2019

Year	Passenger Trips	Passenger Miles[3]	Average Trip Length[3]	Passenger Trips per Hour	Passenger Trips per Mile
2015	189,959	4,346,261	22.9	1.74	0.13
2016	200,484	1,509,868	7.5	1.73	0.13
2017	200,255	1,628,073	8.1	1.73	0.13
2018	213,830	1,708,502	8.0	1.68	0.13
2019	227,095	1,632,813	7.2	1.74	0.14

Source: Annual NTD Reports (2014-2018)

Lextran's paratransit operating expenses increased by 25% over the five-year period, a rate commensurate with increases in ridership and service levels. On a per passenger trip basis, however, operating expenses only increased by 5%. Operating expenses per revenue hour increased by 4%, while operating expenses per revenue mile increased by 11%. Fare revenue decreased by 4%.

Table 2-55: Wheels Paratransit Financial Performance, 2015 - 2019

Year	Total Operating Expense	Operating Expense per Passenger Trip	Farebox Recovery	Operating Expense per Revenue Hour	Operating Expense per Revenue Mile
2015	$4,841,495	$25.49	6.3%	$44.45	$3.33
2016	$5,082,100	$25.35	6.2%	$43.75	$3.32
2017	$5,133,427	$25.63	6.1%	$44.37	$3.34
2018	$5,730,391	$26.80	5.8%	$44.98	$3.50
2019	$6,058,442	$26.68	6.1%	$46.40	$3.71

Source: Annual NTD Reports (2014-2018)

[3] Passenger Miles and Average Trip Length values likely a data reporting error in 2015.

2.7. Vanpool Service

Since late 2012, Lextran has managed a vanpool program on behalf of the LFUCG through a third-party service contract currently operated by Commute with Enterprise. Through this program, vanpool customers pay fares directly to the service contractor, with the balance of operating costs subsidized by Lextran at a rate of $400 per vanpool per month. Revenue sources for this subsidy include contributions from the LFUCG, which established a fund of approximately $224,000 in 2012 to offset vanpool costs over the life of the program, and FTA Section 5307 grants.

2.7.1. Current Vanpool Service

Currently, there are four vanpools in service, as identified in **Table 2-56** and shown in **Figure 2-51**. Three of the vanpools originate in Richmond, just south of Lexington, and one originates in Middletown, a suburb to the east of Louisville. In Lexington, two of the Richmond vanpools are destined for the Federal Medical Center – Lexington, a Federal Bureau of Prisons healthcare facility on Leestown Road. One Richmond vanpool is destined for the Lexington Veterans Affairs (VA) Medical Center facility on Veterans Drive. The Middletown vanpool is destined for the VA Medical Center facility on Leestown Road. Each vanpool currently operates Monday through Friday.

Table 2-57 identifies the capacity of the vanpools currently in operation. Based on the capacity of the vehicles that are currently in use and the characteristics each route, the vanpools service currently operates at a capacity of 10 passengers per revenue hour and .21 passengers per revenue mile.

Table 2-56: Active Vanpools (valid summer 2020)

Employer	Origin City	Worksite Address	One-Way Mileage	Monthly Mileage	One-Way Trip Time	Capacity
Lexington VA Medical Center (Cooper Division)	Richmond, KY	1101 Veterans Dr, Lexington, Kentucky	39	1,685	80 min	15
Lexington VA Medical Center (Leestown Road VA)	Middletow, KY	2250 Leestown Rd, Lexington, Kentucky	59	2,550	60 min	7
Federal Bureau of Prisons - Lexington	Richmond, KY	3301 Leestown Road, Lexington, Kentucky	35	2,093	35 min	7
Federal Bureau of Prisons - Lexington	Richmond, KY	3301 Leestown Road, Lexington, Kentucky	37	1,609	45 min	7

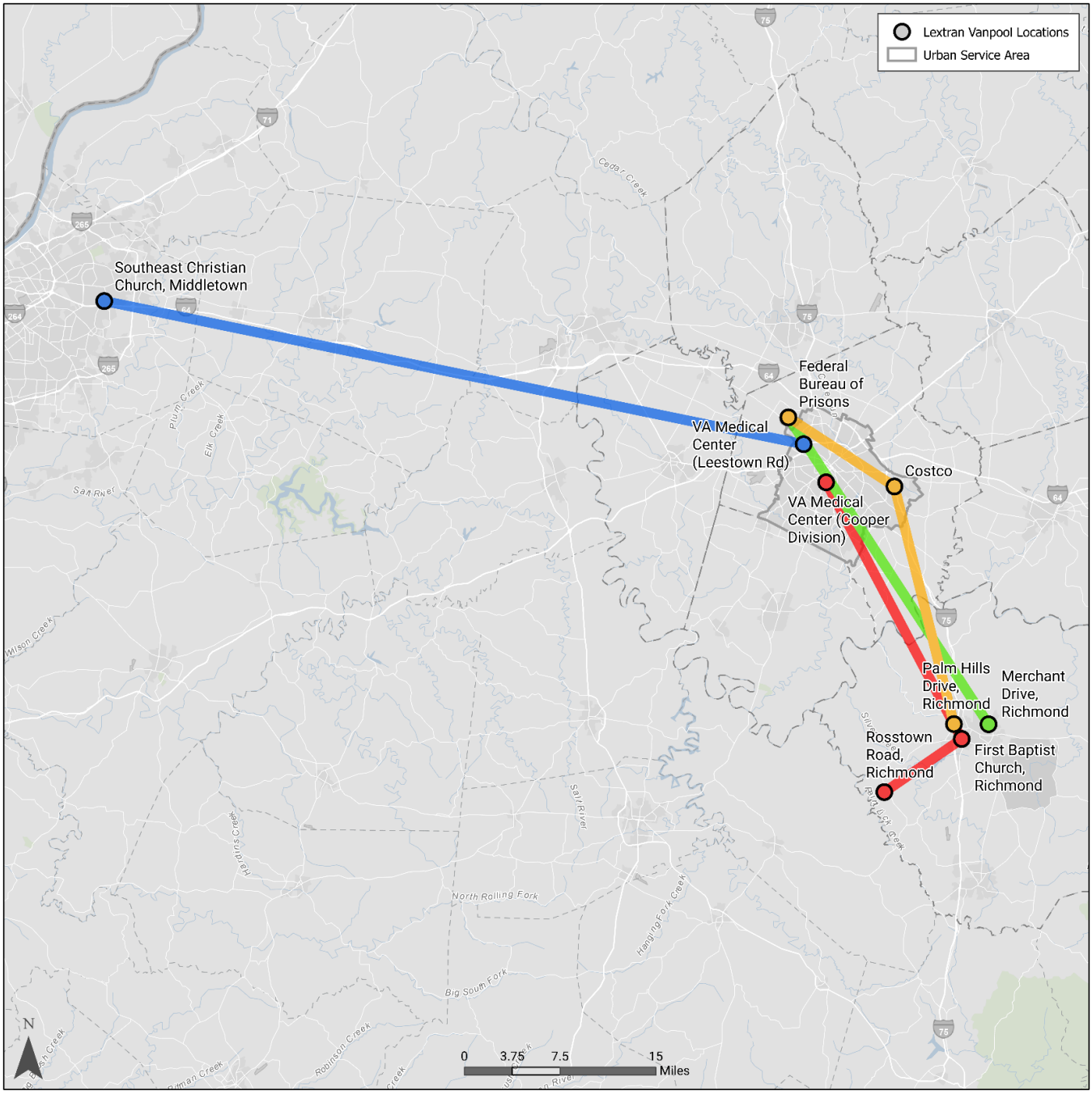
Source: Lextran

Table 2-57: Vanpool Capacity

Employer	Origin City	Capacity / Revenue Hour	Capacity / Revenue Mile
Lexington VA Medical Center (Cooper Division)	Richmond, KY	11	0.39
Lexington VA Medical Center (Leestown Road VA)	Middletown, KY	7	0.12
Federal Bureau of Prisons - Lexington	Richmond, KY	12	0.20
Federal Bureau of Prisons - Lexington	Richmond, KY	9	0.19
	Vanpool Total	**10**	**0.21**

Source: Lextran

Figure 2-51: Existing Lextran Vanpools



Source: Lextran

2.7.2. Vanpool Key Performance Indicators

Vanpool performance was evaluated based on NTD data collected between 2015 and 2019. As shown in **Table 2-58**, Lextran's vanpool productivity has experienced a steady decline since 2015, the first full year that it was under Lextran's management. In 2019, Lextran operated 8 vanpools. As noted above, this number has continued to decline through 2020.

Vanpool passenger volume decreased by about 51% between 2015 and 2019 to a low of roughly 20,000 annual trips in 2019. Annual passenger miles traveled has decreased by about 49%, consistent with the decrease in ridership, although this figure is offset by an increase in average vanpool trip length. Productivity in terms of passenger trips per hour and mile were 6.3 and 0.15, respectively, in 2019. Productivity per revenue hour has increased 8% since 2015, while productivity per revenue mile has decreased 6%.

An analysis of monthly NTD reports between Q1 FY2016 and Q4 FY2020 indicate a continued downward trend in vanpool ridership. Over this period, Lextran's annual vanpool ridership declined 68%, for an average annual decrease of 14%.

Table 2-58: Vanpool Productivity, 2015 - 2019

Year	Vanpools Operated	Passenger Trips	Passenger Miles	Average Trip Length	Passenger Trips per Hour	Passenger Trips per Mile
2015	16	43,153	1,573,293	36.5	5.86	0.16
2016	12	35,308	1,506,495	42.7	6.08	0.16
2017	9	26,488	1,005,814	38.0	5.61	0.16
2018	10	24,842	926,080	37.3	5.90	0.15
2019	8	20,971	798,788	38.1	6.34	0.15

Source: NTD Annual Reports, 2014 - 2018

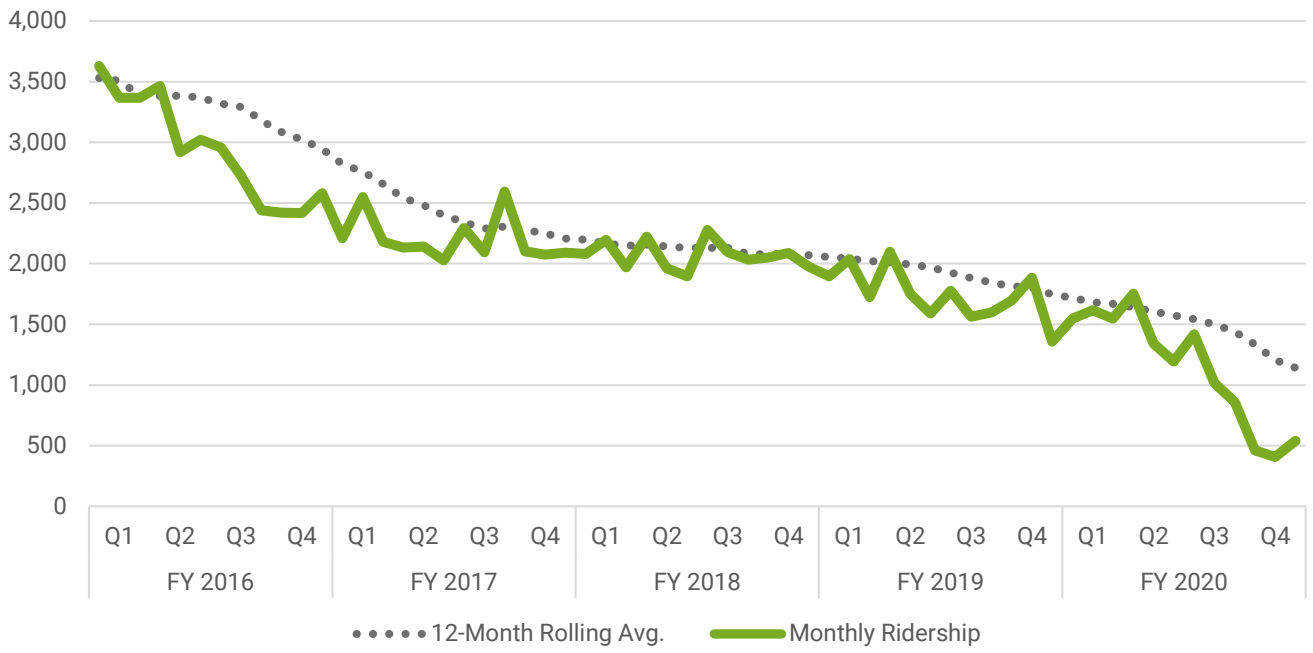
Financial metrics for Lextran's vanpool service are provided in **Table 2-59**. The average cost per passenger trip was $2.96 in 2019, a 30% increase since 2015. Operating expenses per revenue hour also increased over this period to $18.77 in 2019. Farebox revenue exceed operating costs in three out of the five years evaluated.

Table 2-59: Vanpool Financial Performance, 2015 - 2019

Year	Total Operating Expense	Operating Expense per Passenger Trip	Farebox Recovery	Operating Expense per Revenue Hour	Operating Expense per Revenue Mile
2015	$98,976	$2.29	146%	$13.45	$0.36
2016	$135,912	$3.85	104%	$23.41	$0.62
2017	$109,793	$4.15	79%	$23.25	$0.65
2018	$134,092	$5.40	56%	$31.84	$0.80
2019	$62,052	$2.96	130%	$18.77	$0.44

Source: NTD Annual Reports, 2014 - 2018

Figure 2-52: Vanpool Monthly Ridership Trend, FY2016 – FY2020



Source: NTD Monthly Module Adjusted Data Release (July 2020)

3. Fixed Route Action Plan

3.1 Introduction

This chapter details the COA's fixed-route recommendations and is organized into the following sections:

- **Section 3.2** provides an overview of the plan development process and assumptions used to identify near-term, mid-term, and long-term fixed-route service recommendations.
- **Section 3.3** summarizes the public and stakeholder outreach process that informed the development and refinement of the service recommendations.
- **Sections 3.4 through 3.6** detail the near-term, mid-term, and long-term service recommendations, including route alignments, service plans, and cost estimates.
- **Section 3.7** provides an assessment of the potential impacts of the proposed recommendations, including a Title VI assessment of the near-term plan.
- **Section 3.8** provides a summary supporting recommendations and implementation strategies.

3.2 Planning Process & Assumptions

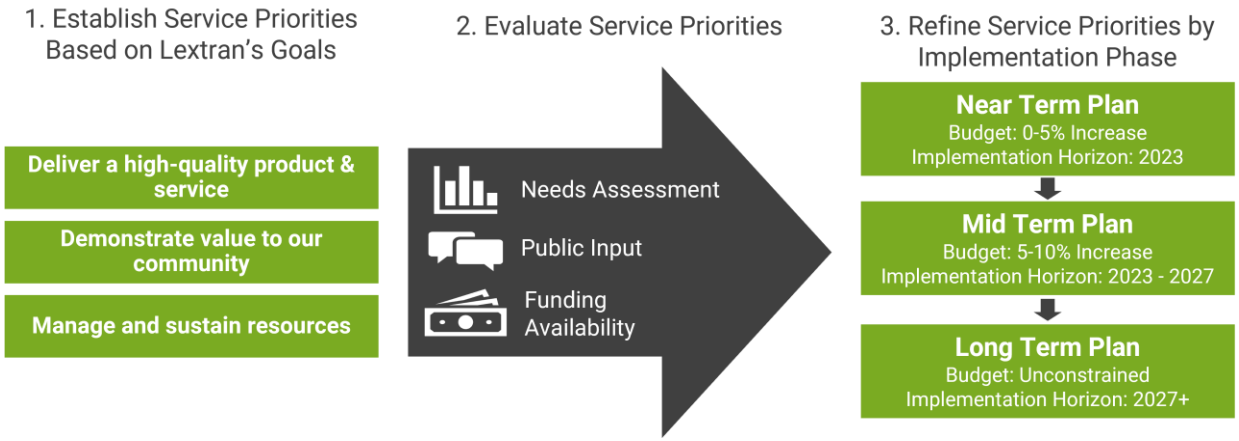
Recommendations for adjusting Lextran's fixed-route network were developed through a series of service design workshops with Lextran staff. This process involved developing goals and guiding principles, drafting conceptual service plans, and refining the plans based on input from Lextran staff, riders, community members, and stakeholders.

3.2.1 Plan Development & Phasing

Phased recommendations to improve Lextran's fixed-route network were developed based on the general framework illustrated in **Figure 3-1**. As a starting point, system needs were inventoried based on the existing conditions assessment, focus groups with Lextran staff, and rider feedback received through the on-board survey. Based on these needs, the project team developed draft service concepts for presentation to the public and stakeholders in early spring of 2022.

A review of public feedback and budget considerations informed the refinement and prioritization of service improvements into three plan horizons. The near-term and mid-term plans are cost constrained, meaning that the proposed recommendations were tied to fixed budget targets. Service priorities outside of Lextran's existing budget capacity were included in an unconstrained Long-Term Plan. These improvements are contingent upon future funding availability.

Figure 3-1: COA Planning Process



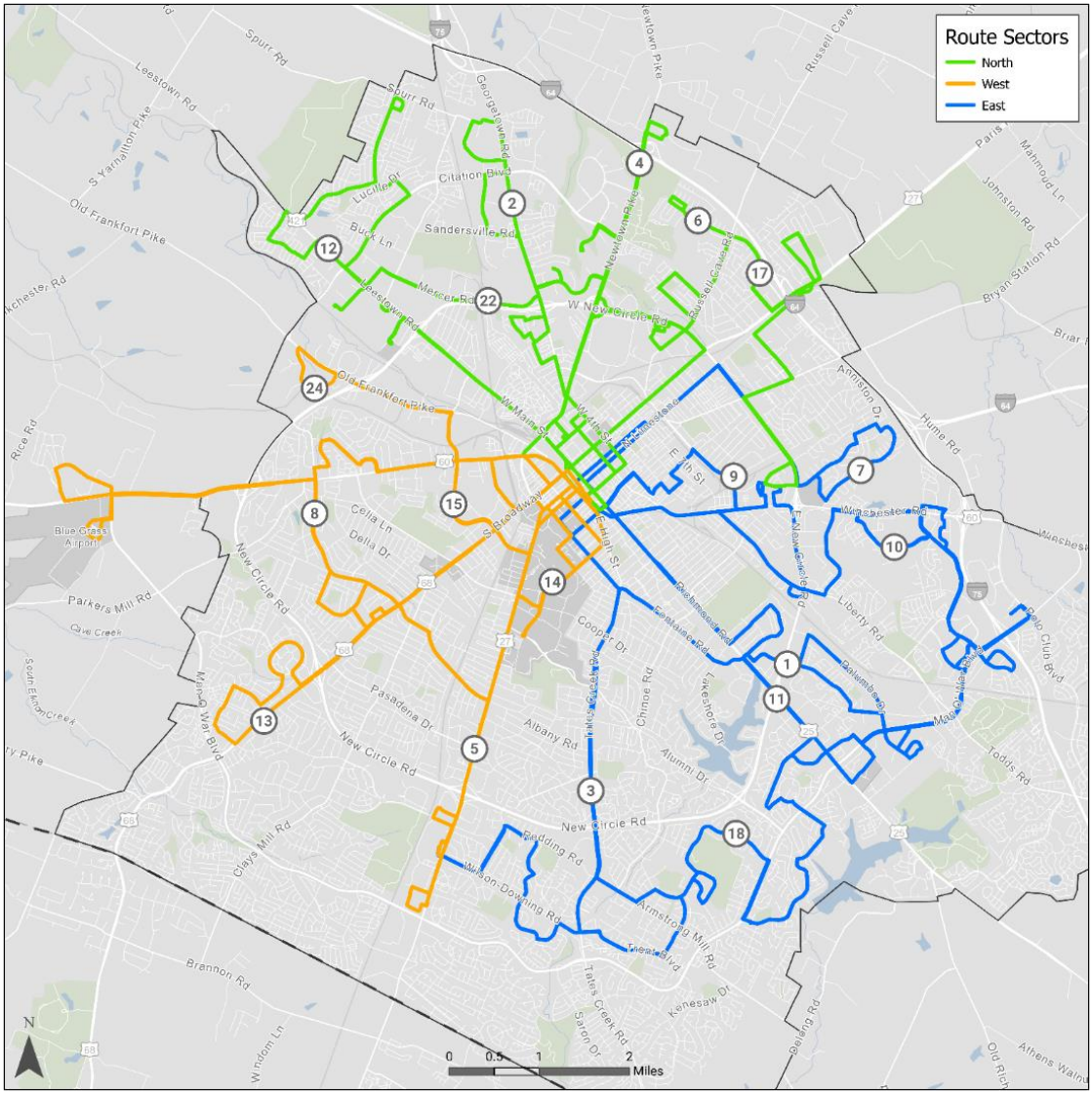
3.2.2 Network Sectors

The fixed-route service recommendations presented in this chapter are organized by geographic sector. Grouping routes into sectors allows Lextran to address mobility needs at an appropriate scale, greater than the route level but more local than a system level. The existing routes included in each sector are identified below and illustrated in **Figure 3-2**. Night routes were addressed separately.

Table 3-1: Routes by Planning Sector

North Sector	East Sector	West Sector
• Route 2: Georgetown Road • Route 4: Newtown Pike • Route 6: North Broadway • Route 12: Leestown Road • Route 17: Northside Connector • Route 22: Mercer Road	• Route 1: Woodhill Drive • Route 3: Tates Creek Road • Route 7: North Limestone • Route 9: Eastland • Route 10: Hamburg Pavilion • Route 11: Richmond Road • Route 18: Centre Parkway Connector	• Route 5: Nicholasville Road • Route 8: Versailles Road • Route 13: South Broadway • Route 14: UK Blue and White • Route 15: Red Mile • Route 16: Southland Drive • Route 24: Old Frankfort Pike

Figure 3-2: Routes by Planning Sector



3.2.3 Service Needs & Priorities

Fixed-route needs and priorities were identified based on the findings of the market and service assessments and input received from the community. A summary of the priorities that guided the development of the COA recommendations are summarized below for each planning sector.

North Sector

- Preserve and enhance service to equity communities such as St. Martin's Village, Winburn/Radcliff, and Joyland.
- Preserve front-door service to the North Park Marketplace shopping center and improve direct connection to downtown in both directions of travel.
- Improve underperforming Route 17: Northside Connector through better connections and transfer opportunities and new weekend service.
- Prepare for growth at the future Dairy Farm Development along north Georgetown Road.
- Right-size underutilized service outside of New Circle Road and reallocate resources to serve higher-ridership areas of Lexington.

East Sector

- Preserve and enhance service to equity communities such as Eastland, Southeastern Hills, and the Richmond Road corridor.
- Prepare for future development at Polo Club Boulevard in the Hamburg area.
- Improve direct access and travel times to key shopping and employment centers located in the Hamburg and Polo Club Boulevard areas.
- Provide more direct and efficient service in Southeastern Hills and Centre Parkway neighborhoods.
- Improve the underperforming Route 18: Centre Parkway Connector through more direct and frequent service, new weekend service, and new connections to the Nicholasville Road corridor.

West Sector

- Preserve and enhance service to equity communities such as Cardinal Valley and Gardenside by providing a new direct connection to Nicholasville Road.
- Improve crosstown access and frequency between Versailles Road and Nicholasville Road via Southland Drive.
- Provide new service to Dunbar High School with select morning and afternoon trips.

3.2.4 Proposed Service Standards

Lextran has developed service standards that guide the planning and monitoring of fixed-route service in Fayette County. The standards are published in its Title VI Program Plan and include minimum guidelines for headways and hours of operation by service type. Lextran currently classifies its routes by three service types: Core, Limited, and Circulator. It is recommended that Lextran amend its service standards to reflect its current service typologies and service profile more accurately by adding two new service classifications and adjusting the minimum span and headway guidelines. The recommended service standards are provided in **Table 3-2** and serve as the baseline for the service recommendations presented in this chapter.

Table 3-2: Existing and Proposed Service Standards

Service Type	Description	Days of Service	Day	Existing Service Standards				Proposed Service Standards			
				Minimum Span	Minimum Headway			Minimum Span	Minimum Headway		
					Peak	Base	Eve		Peak	Base	Eve
Core	All-day local service to/from transit center.	Mon-Sun	Wkd	5:30 AM - 12:30 AM	70	70	70	5:30 AM - 12:30 AM	35	35	70
			Sat	5:30 AM - 12:30 AM	70	70	70	5:30 AM - 12:30 AM	70	70	70
			Sun	6:00 AM - 9:30 PM	70	70	70	6:00 AM - 9:30 PM	70	70	70
Core Frequent	All-day frequent local service to/from transit center.	Mon-Sun	Wkd	*Proposed New Service Type*				5:30 AM - 12:30 AM	15	15	70
			Sat					5:30 AM - 12:30 AM	70	70	70
			Sun					6:00 AM - 9:30 PM	70	70	70
Crosstown	All-day local service without connection to transit center.	Mon-Sun	Wkd	*Proposed New Service Type*				7:00 AM - 9:00 PM	70	70	70
			Sat					7:30 AM - 8:30 PM	70	70	70
			Sun					7:30 AM - 8:30 PM	70	70	70
Limited	Peak-period, weekday-only service to/from transit center.	Mon-Fri	Wkd	6:00 AM – 7:00 PM	70	70	--	6:00 AM - 7:00 PM	70	--	--
Circulator	Activity center-based service.	Varies	Wkd	Varies based on demand	Varies based on demand			Varies based on demand	Varies based on demand		
			Sat								
			Sun								

3.3 Public Outreach

The project team conducted public and stakeholder engagement to better understand the mobility needs of Lextran riders and community stakeholders. Outreach was conducted during two phases of the study. The first phase occurred during the existing conditions assessment task and involved an on-board survey (OBS) of Lextran riders. The second phase occurred after draft service recommendations were developed to solicit feedback on the proposed changes. This section summarizes the findings of the on-board survey and public outreach activities that informed the development of the study's final recommendations. Outreach activities conducted throughout the project are listed in **Table 3-3**.

Table 3-3: Fixed-Route Public & Stakeholder Outreach Activities

Outreach Phases and Activities	Date
Phase 1: Existing Conditions	**April – May 2021**
On-Board Survey	April – May 2021
Phase 2: Draft Recommendations	**February – April 2022**
Internal Engagement	February 2022
Public Comment Period	February – April 2022
Digital Engagement & Online Survey	March – April 2022
Public Open Houses Douglass Park Lextran Administrative Office Gainesway Community Center Village Branch Library	March 2022 Mar 9, 2PM Mar 9, 6PM + live streamed Mar 10, 10AM Mar 10, 3PM)
Transit Center Pop-up Events	March 2022

In addition to these outreach activities, the project team relied on community engagement summaries documented in previous plans and studies conducted by Lextran, the Lexington-Fayette Urban County Government (LFUCG), and the Lexington Area Metropolitan Planning Organization. Key findings from these documents are summarized in **Table 2-8**, which can be found in Chapter 2 of this document.

3.3.1 Phase 1 Outreach Summary

Phase 1 of public outreach focused on collecting data on Lextran's existing ridership base and how riders currently use the transit network to travel throughout Lexington. ETC Institute, a data collection firm specializing in community surveys, assisted in this effort by conducting a tablet-based intercept survey between April 19 and April 30, 2021. The OBS produced a total of 1,276 usable surveys, reaching the sample goal of 13% of average daily ridership. A total of 27 questions were included in the OBS and generally fell into one of the following categories:

- Location information (home, origin, destination, boarding, alighting)
- Trip information (transfers, fares, frequency of travel)
- Passenger information (employment, demographics, income)
- Customer satisfaction information (transit service, cleanliness, safety)

The results of the OBS were summarized in the 2021 Lextran Passenger On-Board Survey Final Report by ETC Institute, attached to this report as Appendix A-5. Additional analysis based on the OBS data can be found in Appendix A-6. The OBS report and additional survey data analysis were utilized throughout the remainder of the COA in a variety of applications. Location and trip information were

utilized throughout the route planning process to assist in decisions regarding route alignment and service needs. Passenger information was utilized to detect disparate impacts and disproportionate burdens and are discussed in greater detail in Section 3.6.3. Satisfaction information was utilized to shape how resources were distributed to improve the rider experience.

The results of the customer satisfaction component of the OBS are shown in **Table 3-4**, with key findings detailed below:

- Lextran service is generally very well received by riders, shown by the high satisfaction scores for nearly all categories.
- Service availability scored the lowest in satisfaction, weekdays at 80%, Saturdays (56%), and Sundays (50%). This indicates that although passengers desire additional service on all days, they are substantially less satisfied with service on weekends. Sunday service is less satisfactory to passengers than Saturday service. The project team recognized the need for additional weekend service, especially on Sundays, in crafting service recommendations.

Table 3-4: On-Board Survey Customer Satisfaction Findings

Please rate your satisfaction with…	Satisfied	Neutral	Dissatisfied
Lextran service overall	87%	11%	2%
Cleanliness of buses	86%	11%	3%
Safety on-board buses	89%	10%	1%
How safe you feel waiting at stops	80%	16%	3%
Courtesy of bus drivers	86%	13%	2%
Courtesy of customer service	84%	13%	2%
Helpfulness of customer service	83%	15%	2%
Availability of bus service on Weekdays	80%	14%	5%
Availability of bus service on Saturdays	56%	21%	23%
Availability of bus service on Sundays	50%	22%	28%
Average	**78%**	**15%**	**7%**

Source: Lextran 2021 On-Board Survey

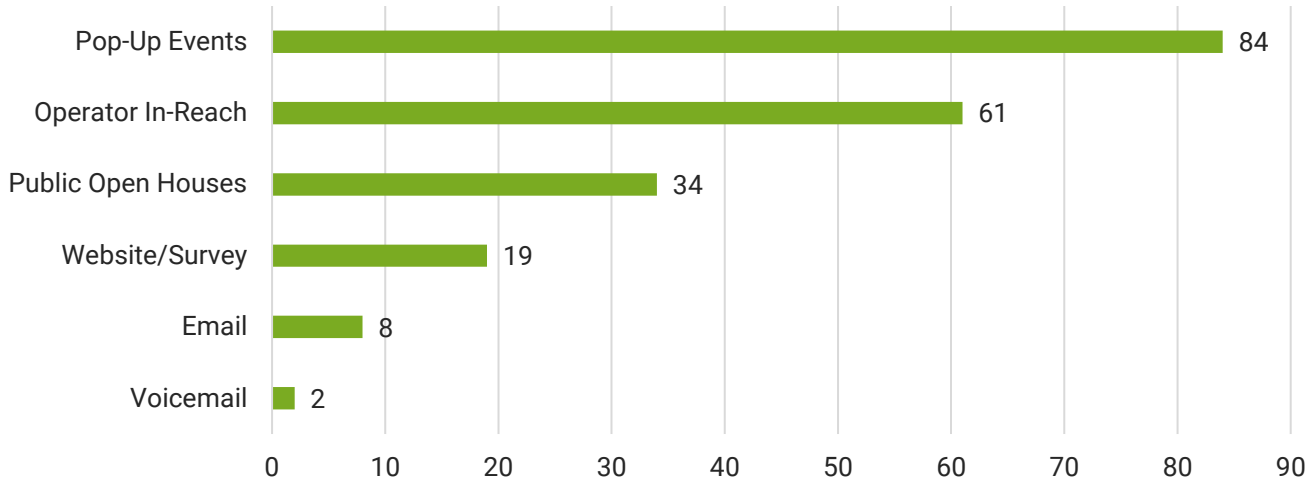
3.3.2 Phase 2 Outreach Summary

Lextran conducted a public comment period between February 23 and April 1, 2022, to collect feedback on the draft COA recommendations. Public feedback was collected through the following activities:

- **Internal Staff Listening Sessions:** Project team members held a series of listening sessions with Lextran staff, including operators, maintenance staff, and supervisors, to solicit feedback on the proposed recommendations.
- **Digital Engagement & Online Survey:** At the beginning of the public outreach phase, the project team launched a website and interactive "Story Map" summarizing the proposed recommendations. The website included an online survey for digital comment submission.
- **Transit Center Pop-Up Events:** The most heavily visited single location in the transit system is the Lextran Transit Center located in downtown Lexington. The project team emphasized in-person interaction at the transit center to engage the public in a one-on-one setting. The project team was able to discuss the initial COA recommendations with riders and distribute flyers for additional information and feedback if riders did not have time to engage.
- **Public Open Houses:** Lextran hosted four public open houses to further engage the public. Each public open house began with a presentation of the COA describing the study process, including existing conditions and a summary of the draft recommendations. Project team members were present at each open house to field questions and receive additional feedback. The open houses were held at several locations throughout Lexington and during daytime and evening hours to offer numerous options to engage. The second open house, hosted at Lextran Administrative Offices, was live streamed on Facebook to reach those who could not attend in person.

The volume of comments received from public outreach is summarized in **Figure 3-3**. The in-person pop-up events garnered the largest response with a total of 84 comments. It should be noted that although there were only 19 surveys collected via the website, there were a total of 637 website views from February 23rd through April 1st, for an average of 17 views per day.

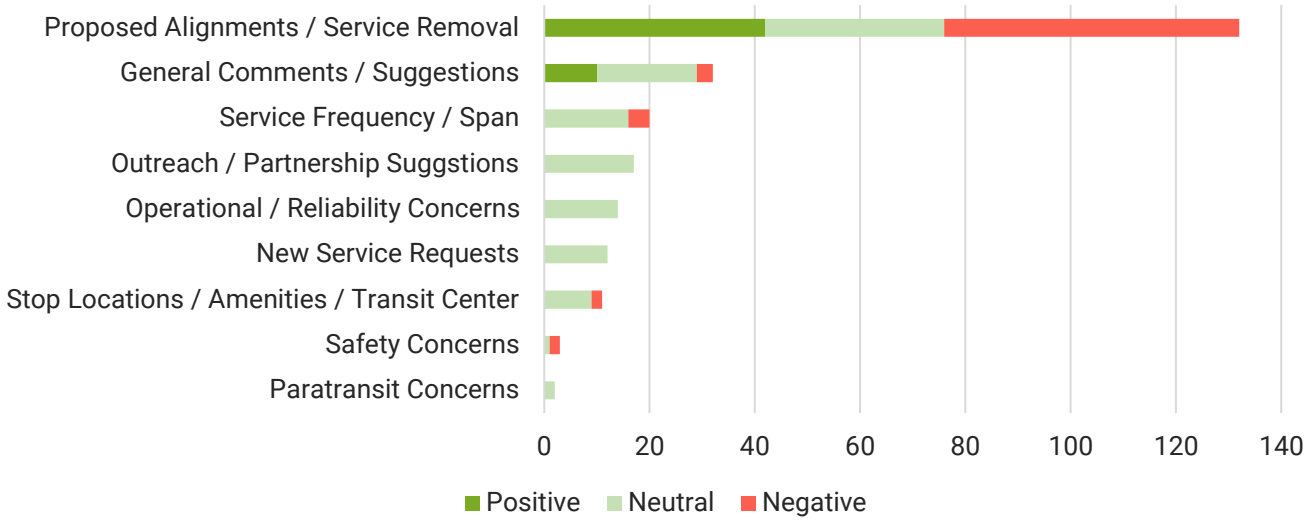
Figure 3-3: Public Comments by Outreach Activity



General Comment Themes

Public comments were grouped into nine thematic categories, shown below in **Figure 3-4**. The proposed alignments and service removals garnered the most responses, both positive and negative, with 132 total comments.

Figure 3-4: Public Comments by Topic



Comments by Sector and Route

Public Outreach comments were also categorized by route to quantify the relative satisfaction of each proposed recommendation. The project team used the specific feedback provided for each route to refine the initial draft recommendations. Comments received by sector and route are summarized in **Table 3-5**. Key comment themes by sector are summarized below.

- **North Sector:** The north sector recommendations involved changes to routes 2, 4, 6, and 22. The draft service plan also proposed a new route, Route 23, and restructuring of Route 17. Of the 57 total comments received for these routes in the North sector, 74% were positive or neutral. Some concerns regarding the frequency of service on Georgetown Road and Newtown Pike were raised by the public. Operators were concerned about their ability to maintain schedules on the revised Route 6 to North Park Marketplace.
- **East Sector:** The east sector recommendations involved changes to routes 1, 3, 7, 9, 10, 11, and 18. The east sector received 69 comments, which was the most out of the three sectors. Of the comments on the east sector, 51% were positive or neutral. The proposed changes to Route 11, which initially suggested removal of service to the Idle Hour neighborhood received the most negative feedback. Route 18 also received several negative comments, but also received an equal number of positive comments.
- **West Sector:** Of the three sectors, west sector included the fewest proposed service changes. The most significant proposed changes in this sector involve routes 8 and 13 and the removal of Route 16 (which is recommended to be replaced in part by the revised Route 8). Of the 40 comments received in this sector, 63% were positive or neutral. The proposed change eliminating Route 16 and serving Southland Drive with Route 8 received high amounts of both positive and negative feedback.

Table 3-5: Draft Recommendations Comments by Route

Sector / Route	Positive	Neutral	Negative	Total	Key Concerns
North Sector	**9**	**34**	**14**	**57**	
Route 2	--	7	2	9	• Need new stops closer to Citation Blvd and at entrance to Rood & Riddle Hospital • 70-minute service on Georgetown Road outside New Circle Road is insufficient • Operators suggest removing service from St. Martin's Village
Route 4	2	4	5	11	• Prefer Hollow Creek served with existing Route 6 via Broadway. • Russell Cave Road residents cut off from direct food access • 70-minute service on Newtown Pike outside New Circle Road is insufficient
Route 6	6	7	6	19	• Insufficient running time • Dislike Hollow Creek / Winburn restructuring
Route 12	--	4	--	4	• Reconsider low productivity segments during evenings
Route 17	--	3	--	3	• Generally positive feedback
Route 22	1	7	--	8	• Need more evening and weekend service
Route 23	--	2	1	3	• Reduced headways outside of New Circle Road
East Sector	**19**	**16**	**34**	**69**	
Route 1	--	1	5	6	• Loss of service on Palumbo Drive • Loss of service to Euclid Kroger
Route 3	5	3	--	8	• Generally positive feedback
Route 7	2	3	3	8	• Eastland Shopping Center turning movements • Anniston and Augusta neighborhoods cut off from Kroger access
Route 9	2	3	2	7	• Concerned with realignment and impacts to Anniston and Augusta neighborhoods (lack of Kroger access) • Need later service on Route 9 • Eastland Shopping Center turning movements
Route 10	2	3	2	7	• Concerned with Liberty Road / Fortune Drive realignment
Route 11	1	3	15	19	• Loss of service to Idle Hour neighborhood
Route 18	7	--	7	14	• Loss of service to Buckhorn Dr.
West Sector	**13**	**12**	**15**	**40**	
Routes 8 / 16	12	6	13	31	• Less direct service to VA / UK • Loss of front-door service to Turfland Mall • Connection to Route 5 requires crossing Nicholasville Road
Route 13	1	4	2	7	• Loss of front-door service to Turfland Mall • Restore service to 35-minute headways
Route 24	--	2	--	2	• Generally positive feedback

3.4 Near-Term Plan

The near-term plan involves a significant restructuring of the Lextran bus network to enhance service quality and access across Lexington. This section describes the proposed Near-Term service plans, supporting operational recommendations to enhance efficiency and effectiveness, and estimated resource requirements.

The proposed weekday and weekend system maps are provided in **Figure 3-5** and **Figure 3-6** on the following pages. Highlights of the near-term plan include:

More Direct Service

- The revised Route 6: North Broadway will create bi-directional, front-door service at the North Park Marketplace shopping center. This route is also extended to serve the Bryan Station and Joyland neighborhoods, providing direct service to the New Circle Road Kroger, North Park Marketplace shopping center, and downtown.
- Route 18: Centre Parkway Crosstown is streamlined to provide faster crosstown travel times without the need to transfer downtown.
- Route 10: Hamburg Pavilion is streamlined to remain on Winchester Road between downtown and the Hamburg area, providing more direct service and faster travel times.

Prepare for Future Development

- Route 2: Georgetown Road is revised to remain on Georgetown Road to provide sufficient running time to access the new Kearney Ridge and Dairy Farm developments.
- Route 10: Hamburg Pavilion is streamlined to provide sufficient running time to eventually access the future Baptist Health Hospital facility on Polo Club Drive.

Better Connections

- Route 8: Versailles Road is extended to connect to Nicholasville Road, providing new connections to Route 5 and the Kroger at Lowry Lane.
- Route 18: Centre Parkway Crosstown is extended west to the Nicholasville Road Wal-Mart.
- Segments of Route 17: Northside Connector is consolidated with the revised Route 6: North Broadway to provide a new direct connection to downtown.

More Consistent Evening & Weekend Service

- Route 18: Centre Parkway Crosstown service is expanded to seven days a week with increased weekday and weekend frequencies.
- The revised Route 8: Versailles Road, which is extended to Southland Drive, will provide new weekend service along this corridor with increased weekday and weekend frequencies.
- The revised Route 6: North Broadway will operate during the weekday evening and weekend periods, providing new service during these times to the Bryan Station and Joyland neighborhoods

Figure 3-5. Near-Term Weekday Daytime Route Network

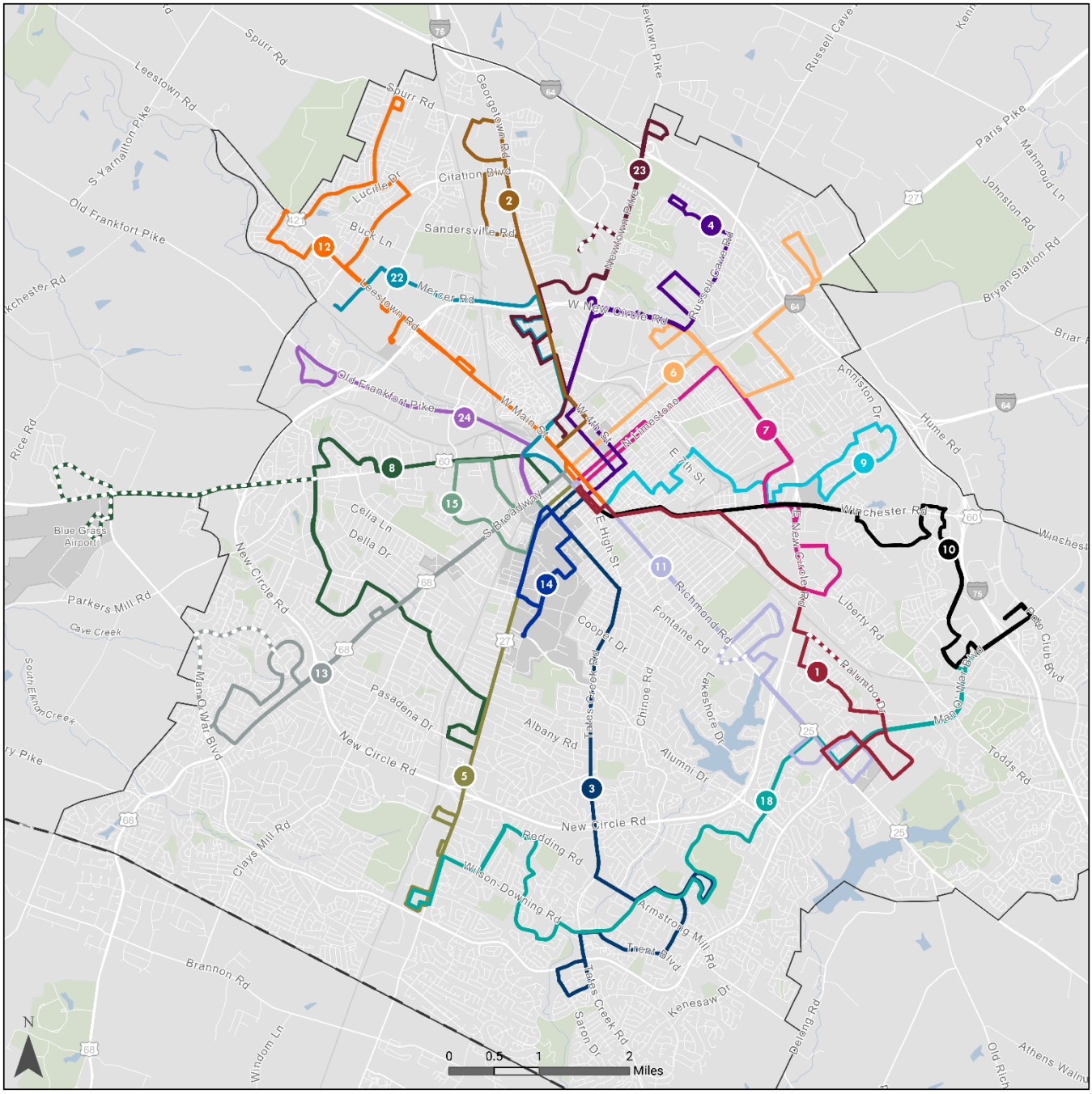
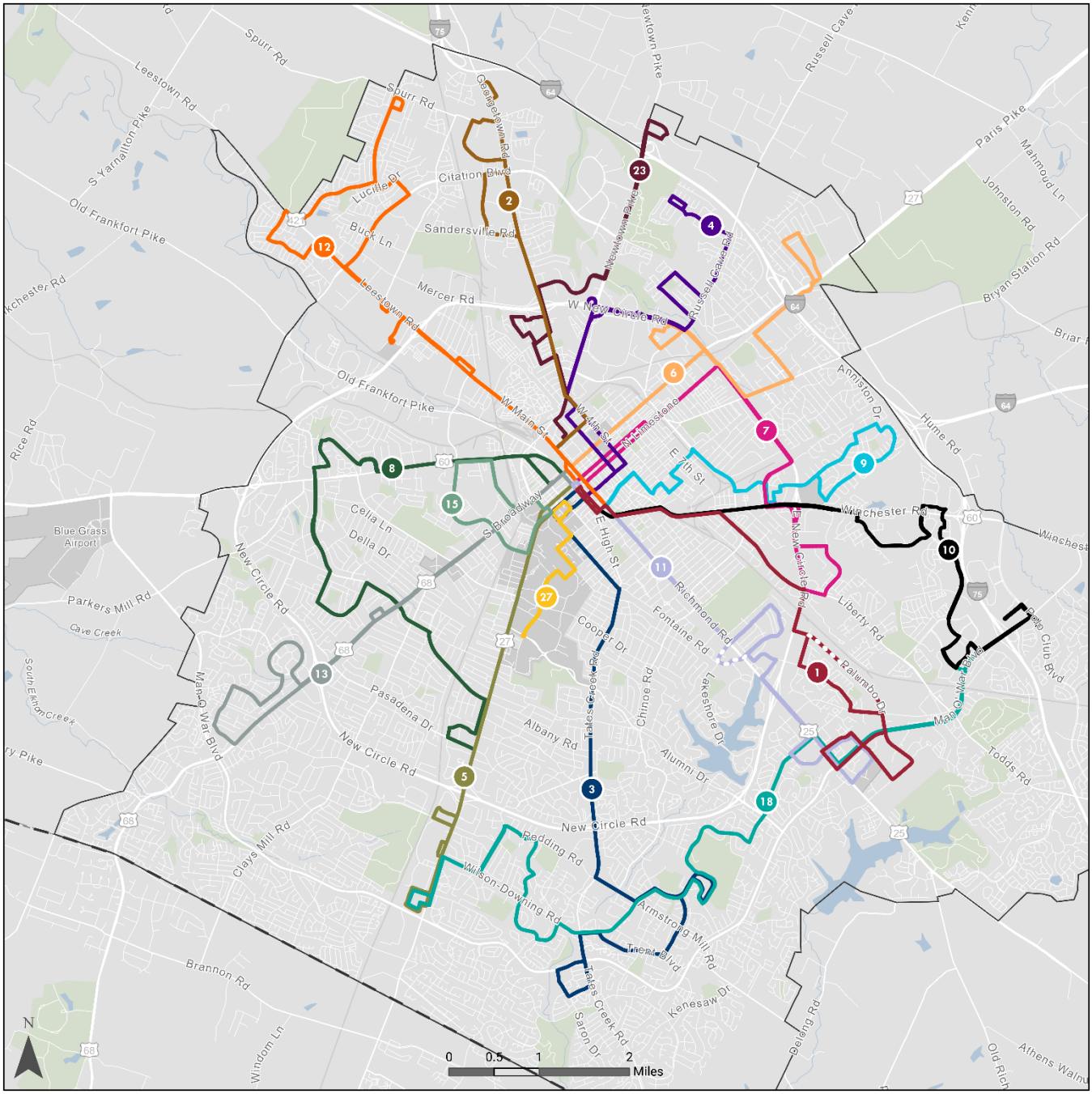


Figure 3-6. Near-Term Weekend Daytime Route Network



Note: Route 1 Woodhill Drive does not operate Palumbo Drive pattern on Sundays

3.4.1 Proposed Near-Term Service Plans

The proposed near-term service plans are detailed in **Table 3-6** through **Table 3-8**. These tables provide the assumed span of service and frequency by time of day. The existing service plans are provided for comparison purposes. Routes with new or improved services in the near-term plan are highlighted in green. Routes that are proposed for discontinuation or consolidation with other routes are highlighted in red. Following these tables are descriptions and maps for each route that is proposed for modification in the near-term.

Table 3-6: Near-Term Proposed Weekday Service Plans

Route	Route Name	Existing								Near Term Proposed							
		Span of Service		Frequency						Span of Service		Frequency					
		Start	End	Early	AM	Mid	PM	Eve	Nite	Start	End	Early	AM	Mid	PM	Eve	Nite
1	Woodhill Drive	5:20 AM	9:20 PM	35	35	35	35	60	70	5:20 AM	9:20 PM	35	35	35	35	60	70
2	Georgetown Road	5:43 AM	8:59 PM	35	35	35	35	60	--	5:43 AM	8:59 PM	70	70	70	70	70	--
3	Tates Creek Road	5:26 AM	10:10 PM	35	35	35	35	60	--	5:26 AM	12:15 AM	35	35	35	35	60	70
	via Pimlico Pkwy	9:30 PM	12:15 AM	--	--	--	--	--	70	Pattern Discontinued							
4	South Newtown Pike	5:38 AM	12:15 AM	35	35	35	35	60	60	5:38 AM	12:15 AM	35	35	35	35	60	60
5	Nicholasville Road	5:33 AM	12:15 AM	15	15	17	17	45	60	5:33 AM	12:15 AM	15	15	17	17	45	60
6	North Broadway	5:44 AM	12:20 AM	35	35	35	35	60	70	5:44 AM	12:20 AM	35	35	35	35	60	70
7	North Limestone	5:30 AM	9:20 PM	35	35	35	35	60	70	5:30 AM	9:20 PM	35	35	35	35	60	70
8	Versailles Road	5:44 AM	8:44 PM	20	30	25	30	70	70	5:44 AM	8:44 PM	35	35	35	35	60	--
	via Bluegrass Airport	6:20 AM	6:04 PM	--	70	--	70	--	--	6:20 AM	6:04 PM	--	70	--	70	--	--
9	Eastland	5:50 AM	9:10 PM	35	35	35	35	60	70	5:50 AM	9:10 PM	35	35	35	35	60	70
10	Hamburg Pavilion	5:21 AM	9:20 PM	30	35	35	35	70	--	5:21 AM	12:20 AM	35	35	35	35	70	70
	via Alysheba	8:00 PM	12:20 AM	--	--	--	--	70	70	Pattern Discontinued							
11	Richmond Road	5:52 AM	9:05 PM	35	35	35	35	60	70	5:52 AM	9:05 PM	35	35	35	35	60	70
12	Leestown Road	5:28 AM	9:15 PM	70	35	70	35	70	70	5:28 AM	9:15 PM	70	35	70	35	70	70
13	South Broadway	5:58 AM	9:05 PM	35	35	60	35	60	70	5:58 AM	9:05 PM	35	35	35	35	60	70
14	UK Blue (CW)	6:40 AM	11:54 PM	--	6	6	6	12	12	6:40 AM	11:54 PM	--	6	6	6	12	12
	UK White (CC)	6:40 AM	11:54 PM	--	6	6	6	12	12	6:40 AM	11:54 PM	--	6	6	6	12	12
15	Red Mile	1:24 PM	4:50 PM	--	24	24	24	36	24	1:24 PM	4:50 PM	--	24	24	24	36	24
16	Southland Drive	6:35 AM	7:00 PM	--	70	70	70	70	--	Route Discontinued. Replaced with revised Route 8.							
17	Northside Connector	6:22 AM	5:59 PM	70	70	70	70	70	70	Route Discontinued. Replaced with revised Route 6.							
18	Centre Parkway Crosstown	6:48 AM	9:05 PM	--	75	75	75	75	75	6:48 AM	9:05 PM	--	45	45	45	70	70
22	Mercer Road	5:36 AM	8:10 PM	70	70	70	70	70	--	5:36 AM	8:10 PM	70	70	70	70	70	--
23	North Newtown Pike	New Route in Near-Term								5:38 AM	12:15 AM	70	70	70	70	70	70
24	Old Frankfort Pike	5:59 AM	7:05 PM	70	70	--	70	70	--	5:59 AM	7:05 PM	70	70	--	70	70	--
51	Night - Woodhill Drive	9:30 PM	12:30 AM	--	--	--	--	--	60	9:30 PM	12:30 AM	--	--	--	--	--	60
52	Night - Georgetown Road	9:30 PM	12:30 AM	--	--	--	--	--	60	9:30 PM	12:30 AM	--	--	--	--	--	60
58	Night - Versailles Road	9:30 PM	12:30 AM	--	--	--	--	--	60	9:30 PM	12:30 AM	--	--	--	--	--	60
59	Night - Eastland	9:30 PM	12:30 AM	--	--	--	--	--	60	9:30 PM	12:30 AM	--	--	--	--	--	60

Table 3-7: Near-Term Proposed Saturday Service Plans

Route	Route Name	Existing								Near Term Proposed							
		Span of Service		Frequency						Span of Service		Frequency					
		Start	End	Early	AM	Mid	PM	Eve	Nite	Start	End	Early	AM	Mid	PM	Eve	Nite
1	Woodhill Drive	5:38 AM	9:20 PM	70	70	70	70	70	70	5:38 AM	9:20 PM	70	70	70	70	70	70
2	Georgetown Road	5:48 AM	8:59 PM	70	70	70	70	70	--	5:48 AM	8:59 PM	70	70	70	70	70	--
3	Tates Creek Road	5:23 AM	8:00 PM	70	70	70	70	70	--	5:23 AM	12:00 AM	70	70	70	70	70	70
	via Pimlico Pkwy	7:35 PM	12:00 AM	--	--	--	--	70	60	Pattern Discontinued							
4	South Newtown Pike	5:50 AM	12:20 AM	70	70	70	70	70	70	5:50 AM	12:20 AM	70	70	70	70	70	70
5	Nicholasville Road	5:47 AM	12:20 AM	60	70	70	70	70	60	5:47 AM	12:20 AM	60	70	70	70	70	60
6	North Broadway	5:48 AM	12:15 AM	70	70	70	70	70	70	5:48 AM	12:15 AM	70	70	70	70	70	70
7	North Limestone	5:45 AM	9:15 PM	70	70	70	70	70	70	5:45 AM	9:15 PM	70	70	70	70	70	70
8	Versailles Road	5:44 AM	8:59 PM	70	70	70	70	70	--	5:44 AM	8:59 PM	70	70	70	70	70	--
9	Eastland	5:53 AM	8:59 PM	70	70	70	70	70	--	5:53 AM	8:59 PM	70	70	70	70	70	--
10	Hamburg Pavilion	5:40 AM	12:20 AM	70	70	70	70	70	70	5:40 AM	12:20 AM	70	70	70	70	70	70
11	Richmond Road	5:50 AM	8:59 PM	70	70	70	70	70	--	5:50 AM	8:59 PM	70	70	70	70	70	--
12	Leestown Road	5:48 AM	9:10 PM	70	70	70	70	70	70	5:48 AM	9:10 PM	70	70	70	70	70	70
13	South Broadway	5:58 AM	9:05 PM	70	70	70	70	70	70	5:58 AM	9:05 PM	70	70	70	70	70	70
15	Red Mile	10:07 AM	6:14 PM	--	--	24	24	--	--	10:07 AM	6:14 PM	--	--	24	24	--	--
18	Centre Parkway Crosstown	7:24 AM	8:25 PM	--	75	75	75	75	--	7:24 AM	8:25 PM	--	70	70	70	70	--
23	North Newtown Pike	New Route in Near-Term								5:48 AM	8:59 PM	70	70	70	70	70	--
27	UK Yellow Route	12:00 PM	12:15 AM	--	--	15	15	15	15	12:00 PM	12:15 AM	--	--	15	15	15	15
51	Night - Woodhill Drive	9:30 PM	12:30 AM	--	--	--	--	--	60	9:30 PM	12:30 AM	--	--	--	--	--	60
52	Night - Georgetown Road	9:30 PM	12:30 AM	--	--	--	--	--	60	9:30 PM	12:30 AM	--	--	--	--	--	60
58	Night - Versailles Road	9:30 PM	12:30 AM	--	--	--	--	--	60	9:30 PM	12:30 AM	--	--	--	--	--	60
59	Night - Eastland	9:30 PM	12:30 AM	--	--	--	--	--	60	9:30 PM	12:30 AM	--	--	--	--	--	60

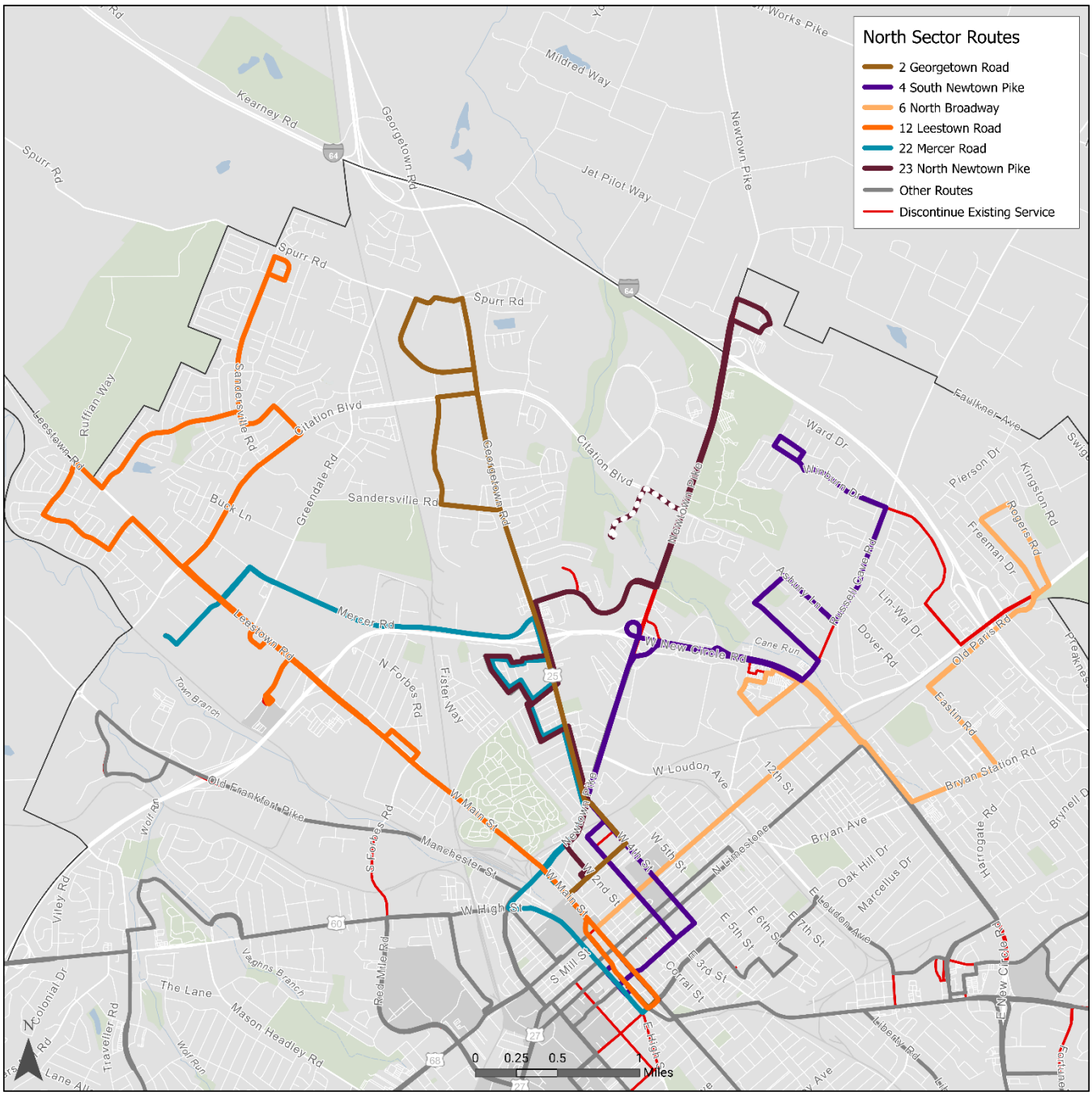
Table 3-8: Near-Term Proposed Sunday Service Plans

Route	Route Name	Existing								Near Term Proposed							
		Span of Service		Frequency						Span of Service		Frequency					
		Start	End	Early	AM	Mid	PM	Eve	Nite	Start	End	Early	AM	Mid	PM	Eve	Nite
1	Woodhill Drive	5:42 AM	9:20 PM	70	70	70	70	70	70	5:42 AM	9:20 PM	70	70	70	70	70	70
2	Georgetown Road	5:48 AM	9:15 PM	70	70	70	70	70	70	5:48 AM	9:15 PM	70	70	70	70	70	70
3	Tates Creek Road	5:53 AM	9:20 PM	70	70	70	70	70	70	5:53 AM	9:20 PM	70	70	70	70	70	70
4	South Newtown Pike	5:48 AM	9:15 PM	70	70	70	70	70	70	5:48 AM	9:15 PM	70	70	70	70	70	70
5	Nicholasville Road	5:50 AM	9:20 PM	70	70	70	70	70	60	5:50 AM	9:20 PM	70	70	70	70	70	60
6	North Broadway	5:44 AM	9:15 PM	70	70	70	70	70	70	5:44 AM	9:15 PM	70	70	70	70	70	70
7	North Limestone	5:45 AM	9:15 PM	70	70	70	70	70	70	5:45 AM	9:15 PM	70	70	70	70	70	70
8	Versailles Road	5:46 AM	9:15 PM	70	70	70	70	70	70	5:46 AM	9:15 PM	70	70	70	70	70	70
9	Eastland	5:53 AM	9:15 PM	70	70	70	70	70	70	5:53 AM	9:15 PM	70	70	70	70	70	70
10	Hamburg Pavilion	5:42 AM	9:25 PM	70	70	70	70	70	70	5:42 AM	9:25 PM	70	70	70	70	70	70
11	Richmond Road	5:47 AM	9:20 PM	70	70	70	70	70	70	5:47 AM	9:20 PM	70	70	70	70	70	70
12	Leestown Road	5:48 AM	9:20 PM	70	70	70	70	70	70	5:48 AM	9:20 PM	70	70	70	70	70	70
13	South Broadway	5:59 AM	9:10 PM	70	70	70	70	70	70	5:59 AM	9:10 PM	70	70	70	70	70	70
15	Red Mile	10:55 AM	7:02 PM	--	--	24	24	24	--	10:55 AM	7:02 PM	--	--	24	24	24	--
18	Centre Parkway Crosstown	New Sunday Service in Near-Term								7:24 AM	8:25 PM	--	70	70	70	70	--
23	North Newtown Pike	New Route in Near-Term								5:48 AM	9:15 PM	70	70	70	70	70	70
27	UK Yellow Route	12:00 PM	12:15 AM	--	--	15	15	15	15	12:00 PM	12:15 AM	--	--	15	15	15	15

North Sector Service Changes

The proposed north sector service plan represents a significant restructuring of existing route alignments. Except for Route 12: Leestown Road, all routes in this sector are proposed for modification. Route 17: Northside Connector will be discontinued and the neighborhoods of Bryan Station and Joyland will instead be covered by the revised Route 6: North Broadway. Significant changes for Georgetown Road corridor include service from three separate routes. The proposed North Sector route alignments are illustrated in **Figure 3-7**, followed by descriptions of each route modification.

Figure 3-7: Proposed North Sector Route Alignments



Route 2: Georgetown Road — *Near Term Plan*

Alignment Changes

Route 2 will be modified to stay on Georgetown Road instead of operating through St. Martins Village. Outside of New Circle Road, the alignment remains the same as the existing alignment. St. Martins Village is instead served by a combination of Route 22 Mercer Road and a new Route 23 North Newtown Pike, resulting in an increase in transit options on Georgetown Road up to New Circle Road.

Service Changes

Route 2 will change from operating 35-minute headways to operating 70-minute headways.

Service Plan

Span	Weekday	Saturday	Sunday
Svc Start	5:43 AM	5:48 AM	5:48 AM
Svc End	8:59 PM	8:59 PM	9:15 PM
Headway	**Weekday**	**Saturday**	**Sunday**
Early	70	70	70
AM	70	70	70
Mid	70	70	70
PM	70	70	70
Eve	70	70	70
Night	--	--	--

Proposed Alignment

Route 4: South Newtown Pike — *Near Term Plan*

Alignment Changes

Route 4 will maintain the existing alignment inside New Circle Road. Instead of continuing operation along Newtown Pike, however, Route 4 will travel on New Circle Road and operate the alignment of the existing Route 6 on Russell Cave Road north to the Winburn neighborhood.

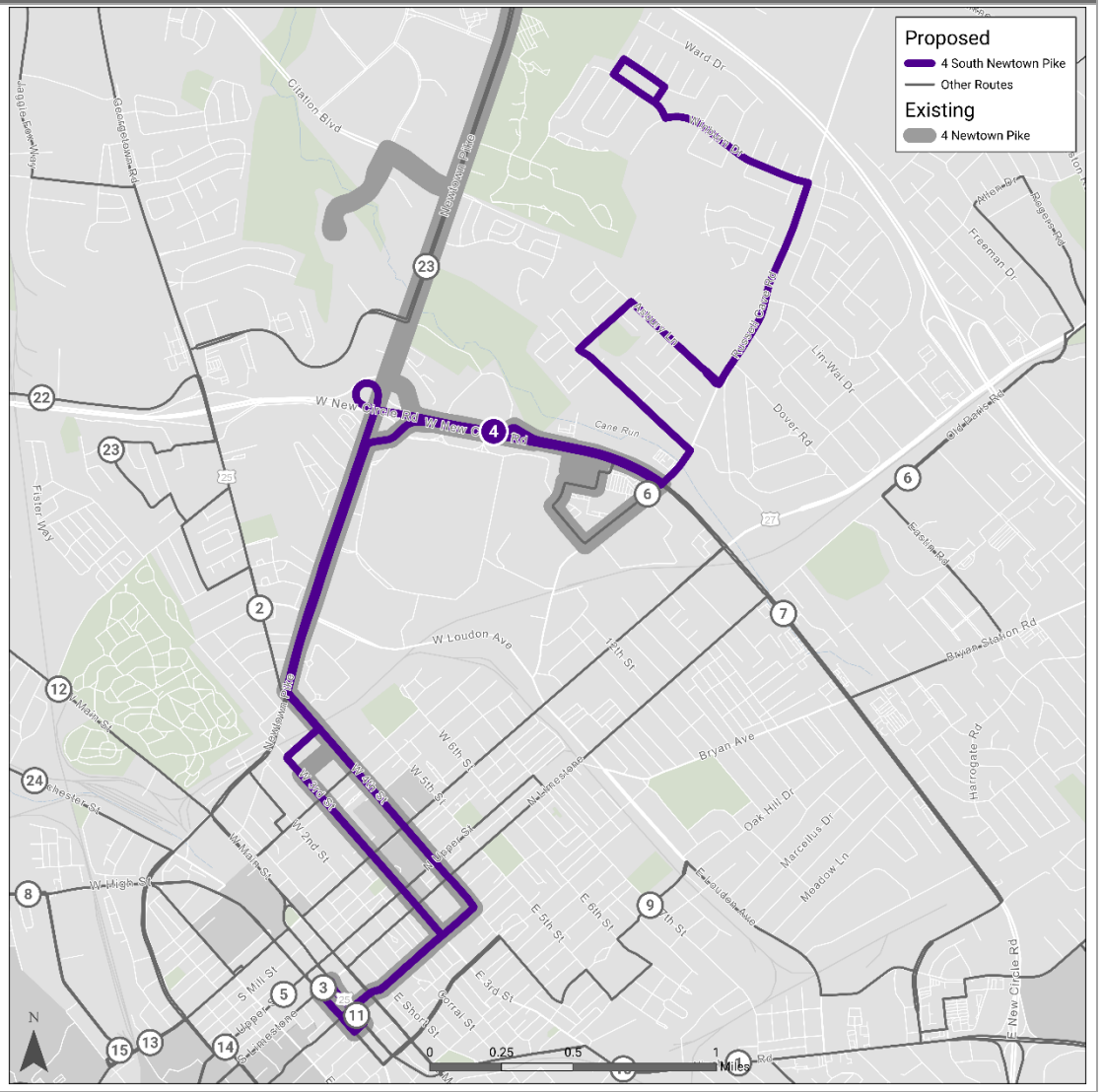
Service Changes

There are no proposed changes to the existing service span or headway.

Service Plan

Span	Weekday	Saturday	Sunday
Svc Start	5:38 AM	5:50 AM	5:48 AM
Svc End	12:15 AM	12:20 AM	9:15 PM
Headway	**Weekday**	**Saturday**	**Sunday**
Early	35	70	70
AM	35	70	70
Mid	35	70	70
PM	35	70	70
Eve	60	70	70
Night	60	70	--

Proposed Alignment



Route 6: North Broadway — *Near Term Plan*

Alignment Changes

Route 6 will operate along North Broadway to New Circle Road. Instead of turning north onto Russell Cave Road, however, Route 6 will operate south and serve Walmart at North Park Marketplace. Route 6 will then turn back onto New Circle Road before operating north on Bryan Station Road, resuming the existing Route 17 alignment to serve Eastin Road and Bryan Station High School and then Old Paris Road. Route 6 will terminate in Joyland at Mary Todd Park.

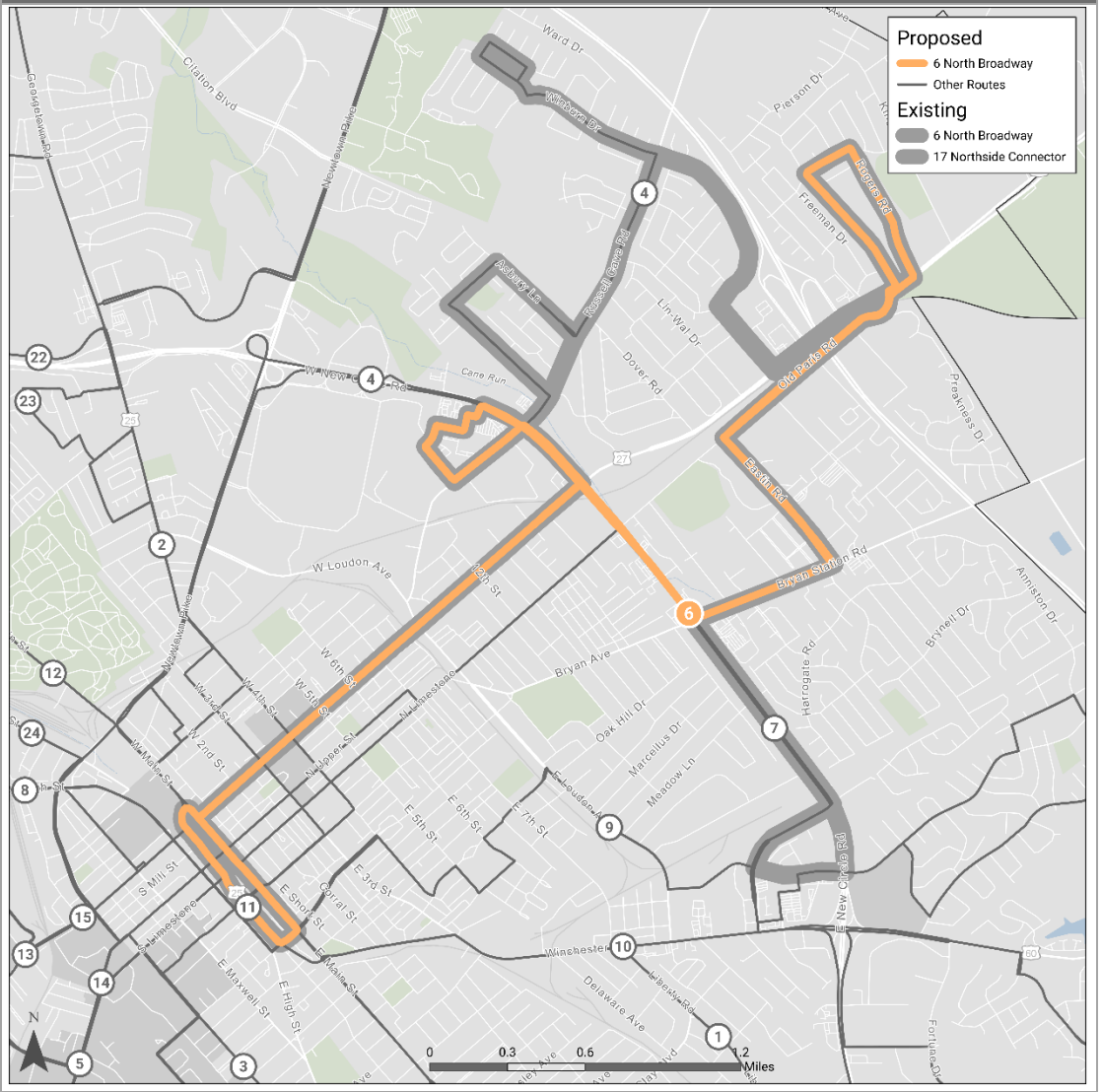
Service Changes

Route 6 will maintain 35-minute headways but will require three vehicles instead of the current two vehicles because of the additional running time. The headway and span for Route 6 will be maintained.

Service Plan

Span	Weekday	Saturday	Sunday
Svc Start	5:44 AM	5:48 AM	5:44 AM
Svc End	12:20 AM	12:15 AM	9:15 PM
Headway	**Weekday**	**Saturday**	**Sunday**
Early	35	70	70
AM	35	70	70
Mid	35	70	70
PM	35	70	70
Eve	60	70	70
Night	70	70	--

Proposed Alignment



Route 22: Mercer Road — *Near Term Plan*

Alignment Changes

Route 22 will discontinue service along Newtown Pike, instead operating on Georgetown Road to serve St Martins Village. The recommended route will pick up the existing alignment by turning onto Mercer Road from Georgetown Road.

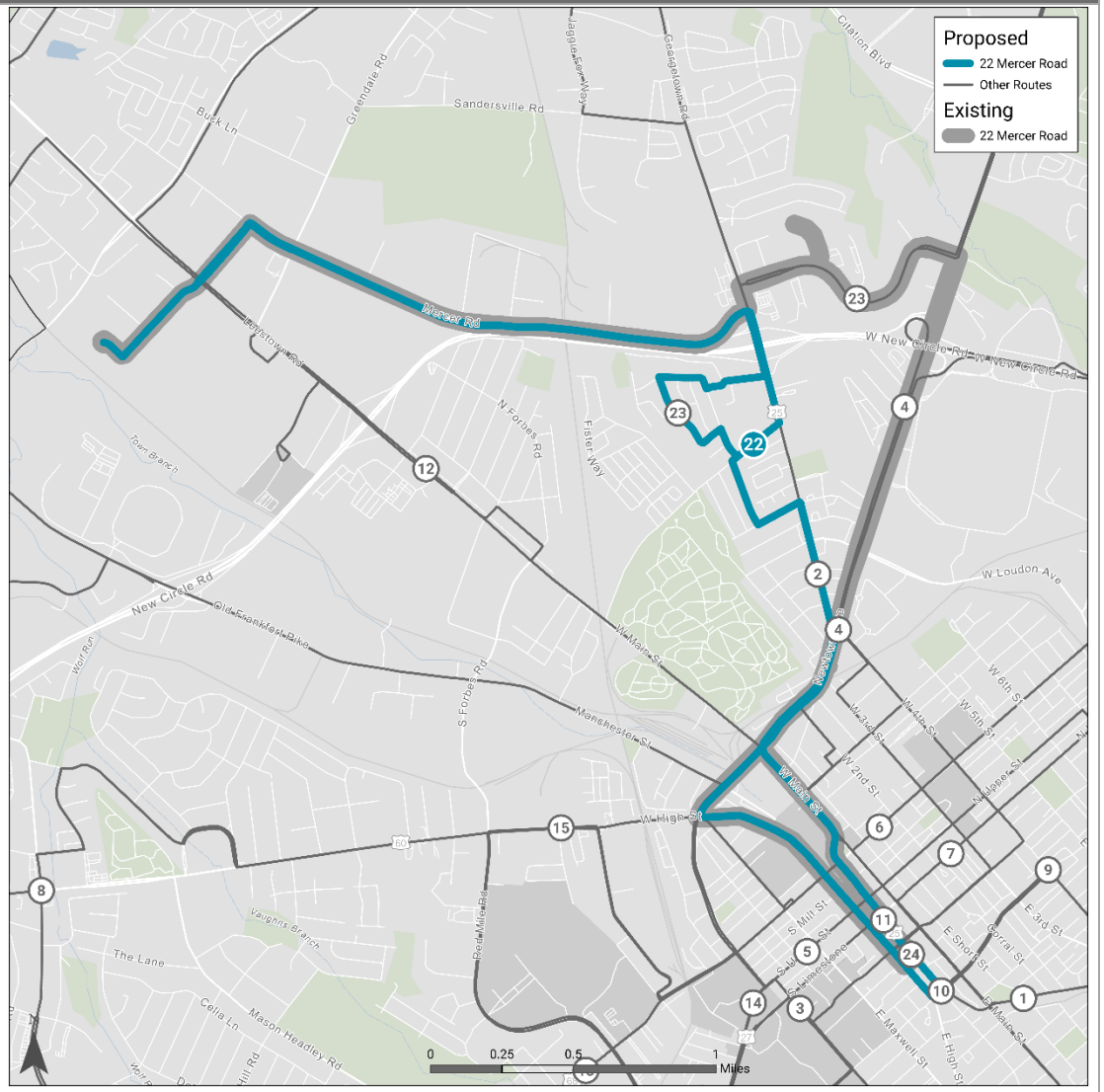
Service Changes

There are no proposed changes to the existing service span or headway.

Service Plan

Span	Weekday	Saturday	Sunday
Svc Start	5:36 AM	--	--
Svc End	8:10 PM	--	--
Headway	**Weekday**	**Saturday**	**Sunday**
Early	70	--	--
AM	70	--	--
Mid	70	--	--
PM	70	--	--
Eve	70	--	--
Night	--	--	--

Proposed Alignment



Route 23: North Newtown Pike (NEW) — *Near Term Plan*

Alignment Changes

Route 23 is a new route that will operate along Georgetown Road through St Martins Village. Route 23 will turn onto Nandino Boulevard where the existing Route 22 Mercer Road operates. Route 23 will then operate on Newtown Pike outside of New Circle Road. Select trips will operate to Eastern State Hospital to maintain the existing service provided by the current Route 4.

Service Changes

Route 23 is a new route that will operate 70-minute service. The section on Newtown Pike that is currently served by Route 4 will therefore be served with 70-minute service instead of 35-minute service.

Service Plan

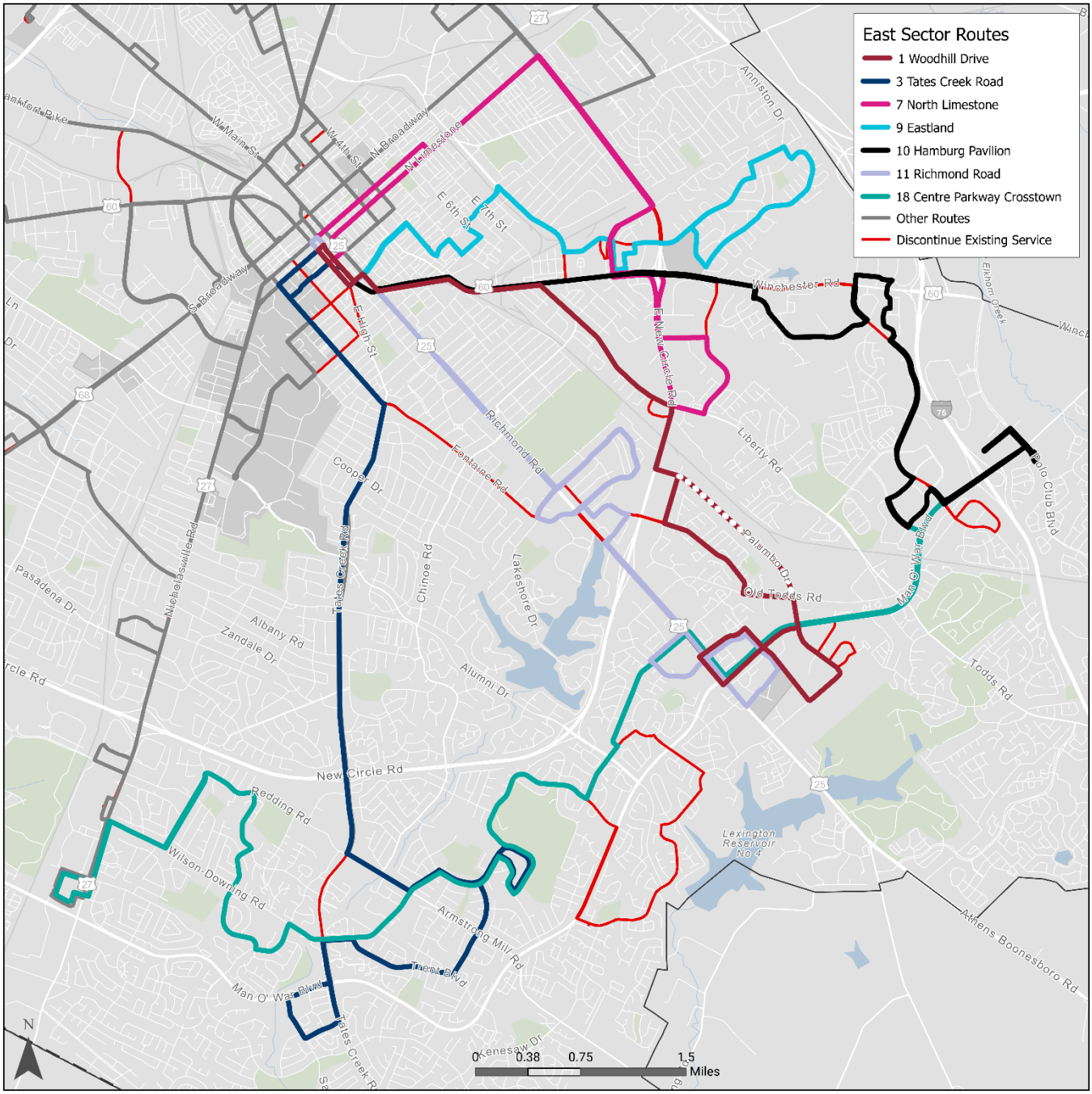
Span	Weekday	Saturday	Sunday
Svc Start	5:38 AM	5:48 AM	5:48 AM
Svc End	12:15 AM	8:59 PM	9:15 PM
Headway	**Weekday**	**Saturday**	**Sunday**
Early	70	70	70
AM	70	70	70
Mid	70	70	70
PM	70	70	70
Eve	70	70	70
Night	70	--	--

Proposed Alignment

East Sector Service Changes

The proposed east sector service plan represents a significant restructuring of existing route alignments. The proposed East Sector route alignments are illustrated in **Figure 3-8.** Each modified route is described in detail on the following pages.

Figure 3-8: Proposed East Sector Route Alignments



Route 1: Woodhill Drive — *Near Term Plan*

Alignment Changes

Route 1 will no longer operate along Euclid Avenue from the Transit Center. Instead, Route 1 will depart the Transit Center and head east, operating along Midland Avenue to Winchester Road, and then to Liberty Road. Route 1 will then serve a small section of New Circle Road before turning briefly onto Palumbo Drive. The end of line alignment will also be modified to operate west on Man O' War Boulevard to Richmond Road. Route 1 will turn east onto N Locust Hill Drive and then serve Rio Dosa Drive and Blazer Parkway before turning onto Yorkshire Boulevard and Palumbo Drive, at the outbound end of line. Route 1 will operate on Woodhill Drive in the inbound direction. Similar to the existing alignment, however, Route 1 will operate a reverse pattern in the afternoon by operating on Woodhill Drive in the outbound direction and Palumbo Drive in the inbound direction.

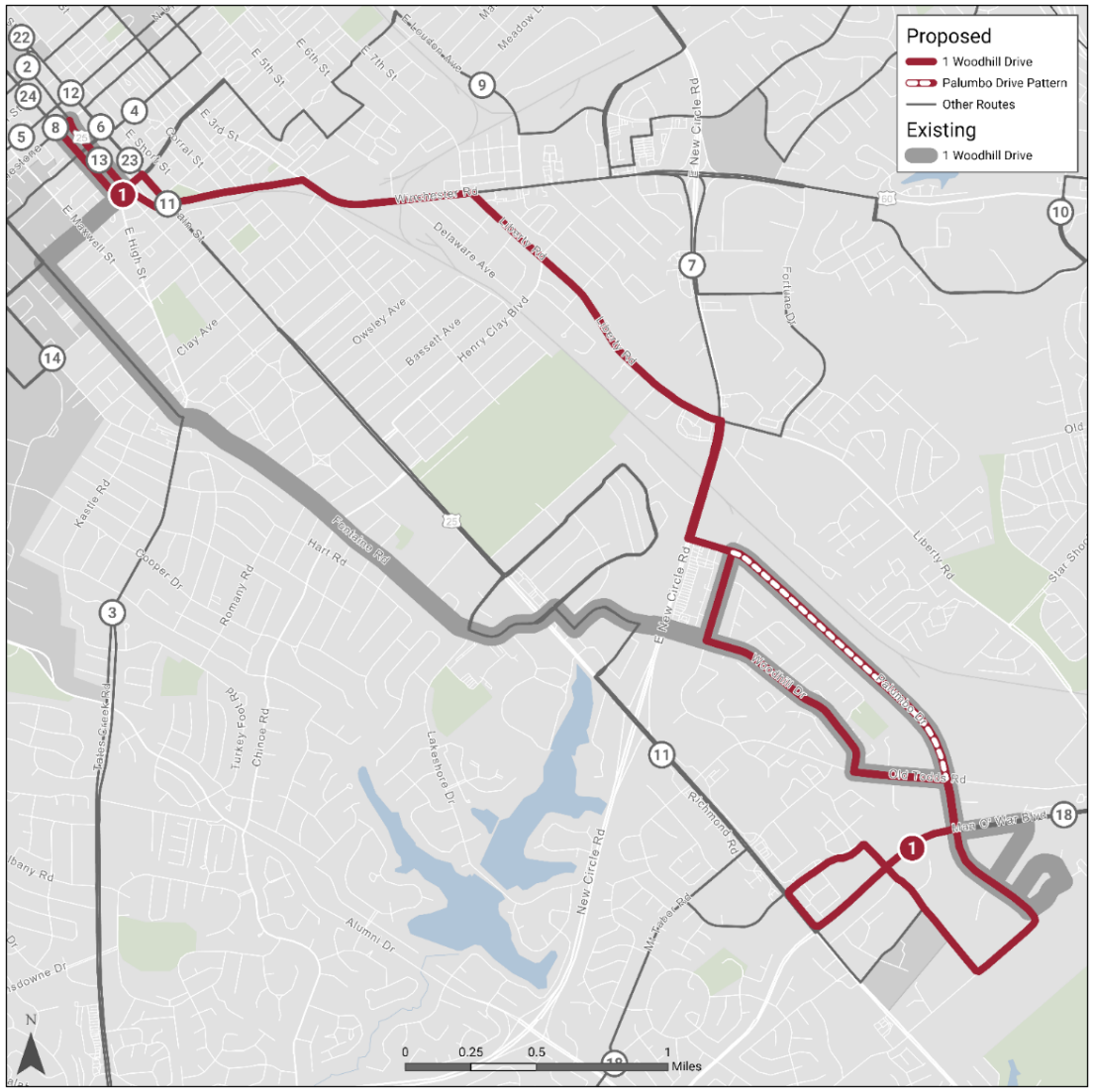
Service Changes

There are no proposed changes to the existing service span or headway.

Service Plan

Span	Weekday	Saturday	Sunday
Svc Start	5:20 AM	5:38 AM	5:42 AM
Svc End	9:20 PM	9:20 PM	9:20 PM
Headway	**Weekday**	**Saturday**	**Sunday**
Early	35	70	70
AM	35	70	70
Mid	35	70	70
PM	35	70	70
Eve	60	70	70
Night	--	--	--

Proposed Alignment



Route 3: Tates Creek Road — *Near Term Plan*

Alignment Changes

Route 3 will maintain the existing alignment from the Transit Center to New Circle Road. South of New Circle Road, Route 3 will maintain service along Armstrong Mill Road and Centre Parkway throughout the Southeastern Hills neighborhoods. Service will deviate from the existing alignment by turning onto Tates Creek Road from Appian Way to serve the Neighborhood Walmart on Saron Drive. After serving Walmart, Route 3 will begin the return trip, operating the same alignment as the outbound in the opposite direction. The remaining alignment of the existing Route 3 that operates through Whispering Hills and Kirklevington Park and then on to the Walmart on Nicholasville Road will be served by Route 18.

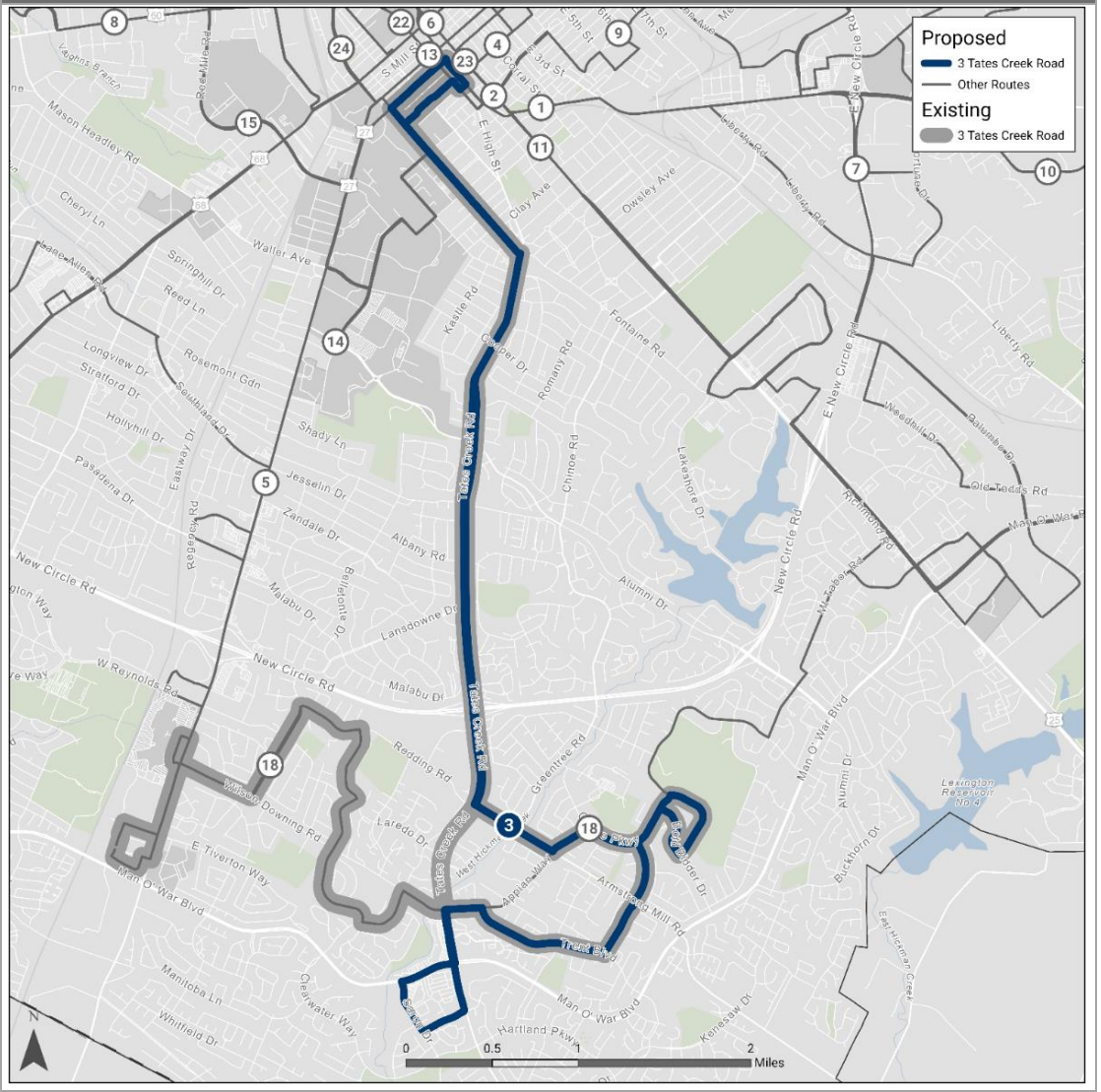
Service Changes

Route 3 will continue to operate 35-minute headways but will require 3 vehicles to do so rather than the current requirement of 4 vehicles.

Service Plan

Span	Weekday	Saturday	Sunday
Svc Start	5:26 AM	5:23 AM	5:53 AM
Svc End	12:15 AM	12:00 AM	9:20 PM
Headway	**Weekday**	**Saturday**	**Sunday**
Early	35	70	70
AM	35	70	70
Mid	35	70	70
PM	35	70	70
Eve	60	70	70
Night	70	70	--

Proposed Alignment



Route 7: North Limestone — *Near Term Plan*

Alignment Changes

Route 7 will operate the same alignment as the existing alignment on North Limestone and New Circle Road, until turning onto Industry Road. Route 7 will then turn onto Winchester Road briefly before operating on New Circle Road and turning around via Liberty Road, Fortune Drive, and Trade Center Drive. In summary, Route 7 North Limestone and Route 9 Eastland will switch end-of-line alignments to maintain more direct route orientation. The realignment creates a common transfer location at Eastland Shopping Center.

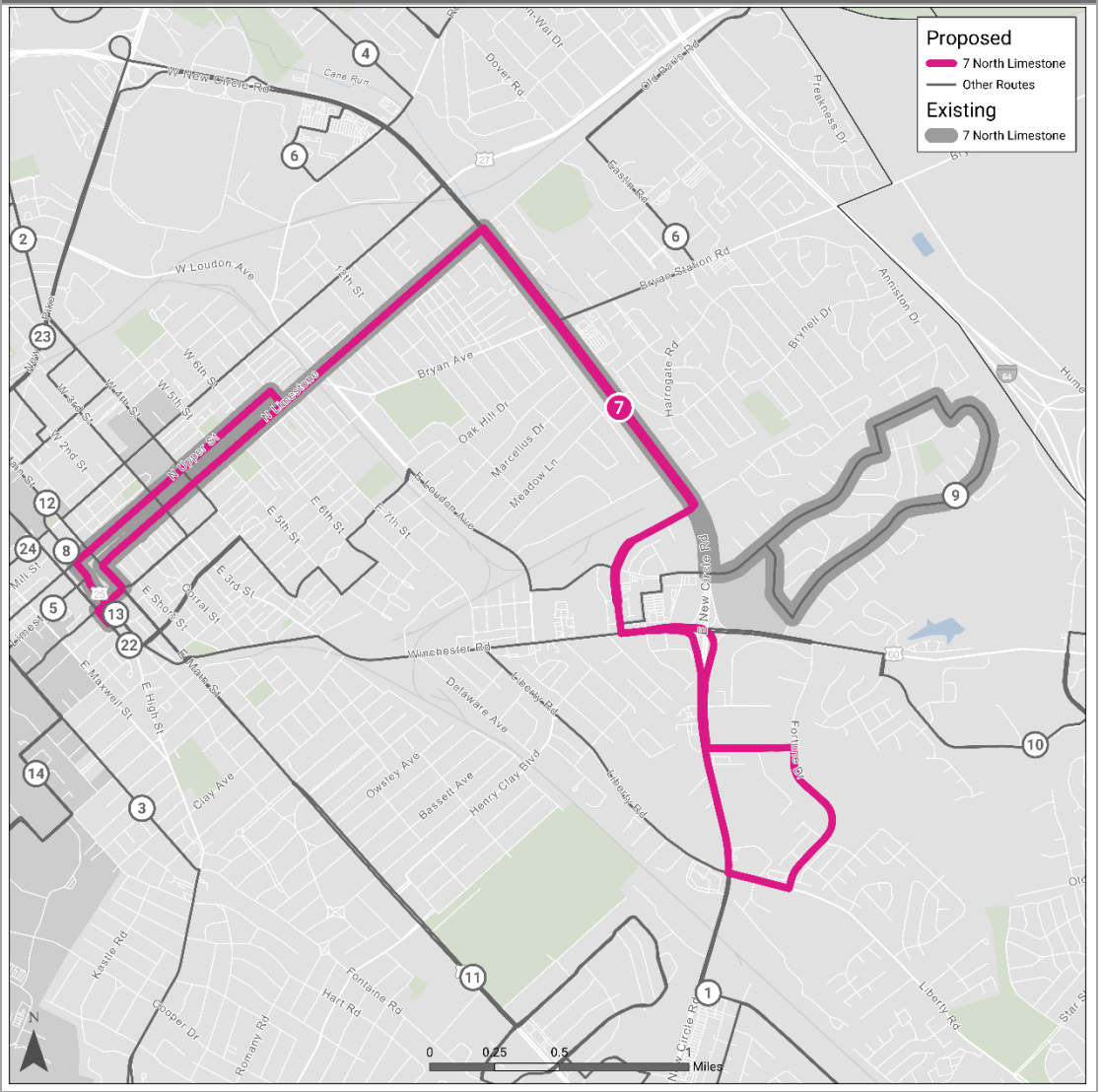
Service Changes

There are no proposed changes to the existing service span or headway.

Service Plan

Span	Weekday	Saturday	Sunday
Svc Start	5:30 AM	5:45 AM	5:45 AM
Svc End	9:20 PM	9:15 PM	9:15 PM
Headway	**Weekday**	**Saturday**	**Sunday**
Early	35	70	70
AM	35	70	70
Mid	35	70	70
PM	35	70	70
Eve	60	70	70
Night	--	--	--

Proposed Alignment



Route 9: Eastland Parkway — *Near Term Plan*

Alignment Changes

Route 9 will continue the existing alignment through the neighborhoods along Elm Tree Lane and Shropshire Avenue, and Loudon Avenue. Route 9 will deviate from the existing alignment by turning onto Eastland Drive and serve Eastland Shopping Center, and then Eastland Parkway. In summary, Route 9 Eastland and Route 7 North Limestone will switch end-of-line alignments to maintain more direct route orientation. By realigning routes 7 and 9, a common transfer location is created at Eastland Shopping Center.

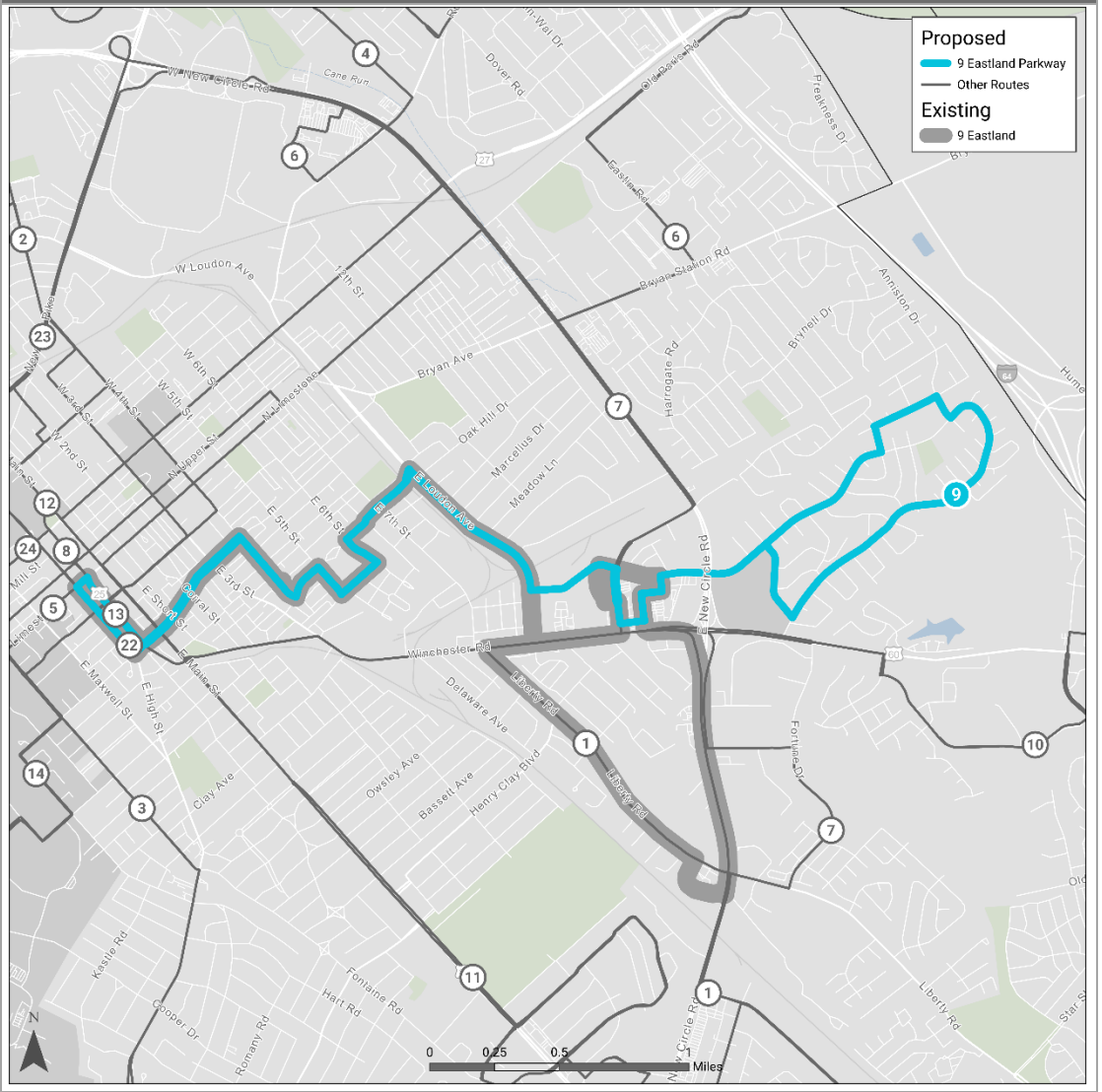
Service Changes

There are no proposed changes to the existing service span or headway.

Service Plan

Span	Weekday	Saturday	Sunday
Svc Start	5:50 AM	5:53 AM	5:53 AM
Svc End	9:10 PM	8:59 PM	9:15 PM
Headway	**Weekday**	**Saturday**	**Sunday**
Early	35	70	70
AM	35	70	70
Mid	35	70	70
PM	35	70	70
Eve	60	70	70
Night	--	--	--

Proposed Alignment



Route 10: Hamburg Pavilion — *Near Term Plan*

Alignment Changes

Route 10 will maintain the existing alignment to Winchester Road. Instead of deviating onto Liberty Road and Fortune Drive, however, Route 10 will continue operating on Winchester Road. Route 10 will pick up the existing alignment on Meeting Street, and continue to serve Social Security Administration, Lowes, and Walmart Supercenter. Service will continue on Sir Barton Way, Meijer, and Man O War Boulevard to Polo Club Drive. However, instead of a slightly different pattern on the inbound trip, Route 10 will operate the same alignment in the reverse direction, creating bi-directional service along the entirety of the route.

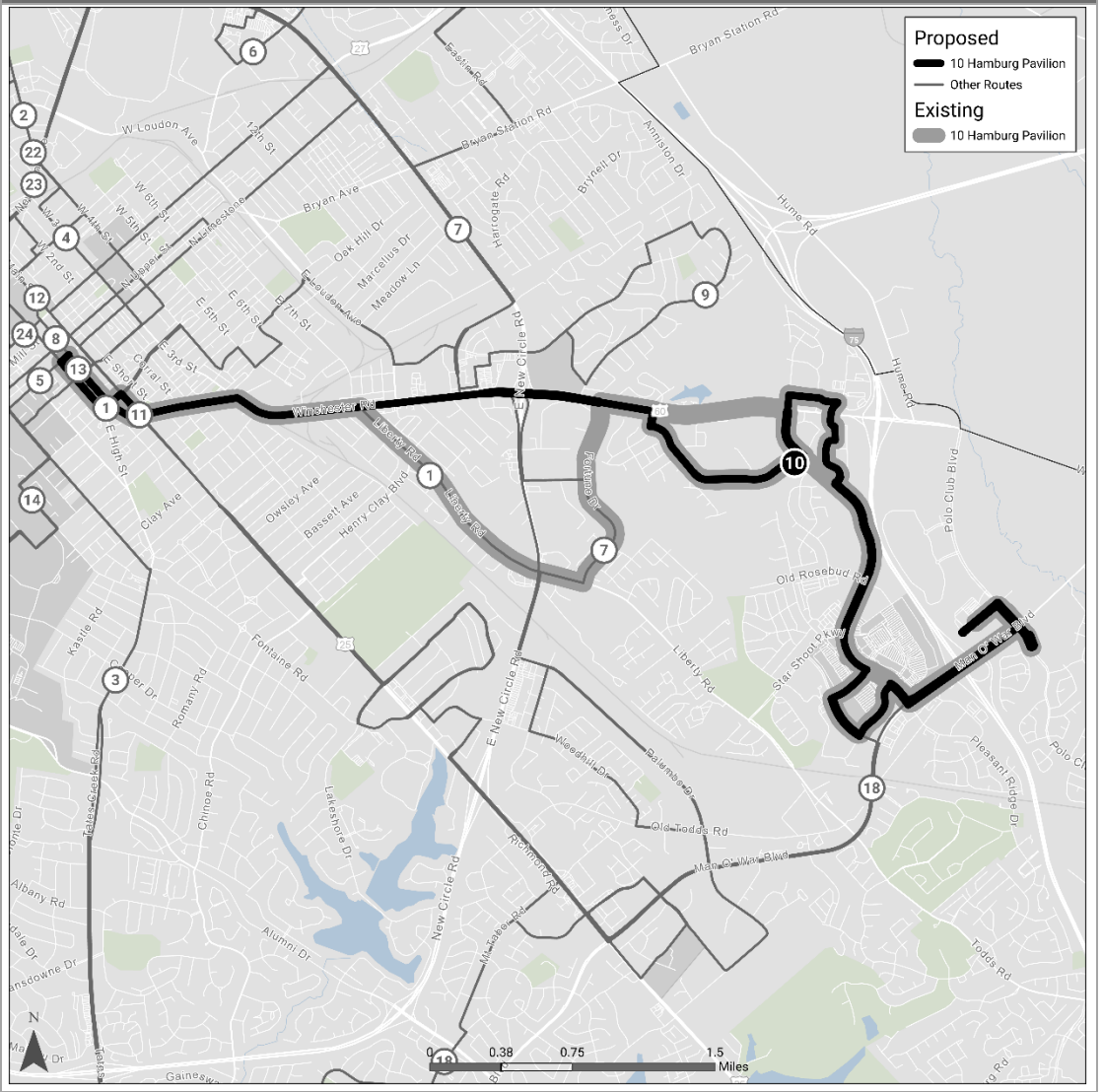
Service Changes

There are no proposed changes to the existing service span or headway.

Service Plan

Span	Weekday	Saturday	Sunday
Svc Start	5:21 AM	5:40 AM	5:42 AM
Svc End	12:20 AM	12:20 AM	9:25 PM
Headway	**Weekday**	**Saturday**	**Sunday**
Early	35	70	70
AM	35	70	70
Mid	35	70	70
PM	35	70	70
Eve	70	70	70
Night	70	70	--

Proposed Alignment



Route 11: Richmond Road — *Near Term Plan*

Alignment Changes

Route 11 will operate two patterns: Idle Hour and Lakeshore Drive. The majority of the route will maintain the existing alignment on Richmond Road. The Idle Hour pattern will serve the existing alignment on St Margaret Drive and St Ann Drive. The Lakeshore Drive pattern will serve Lakeshore Drive and Fontaine Drive. Both alignments will serve Life Lane before turning back onto Richmond Road to resume the existing alignment for the remainder of the route.

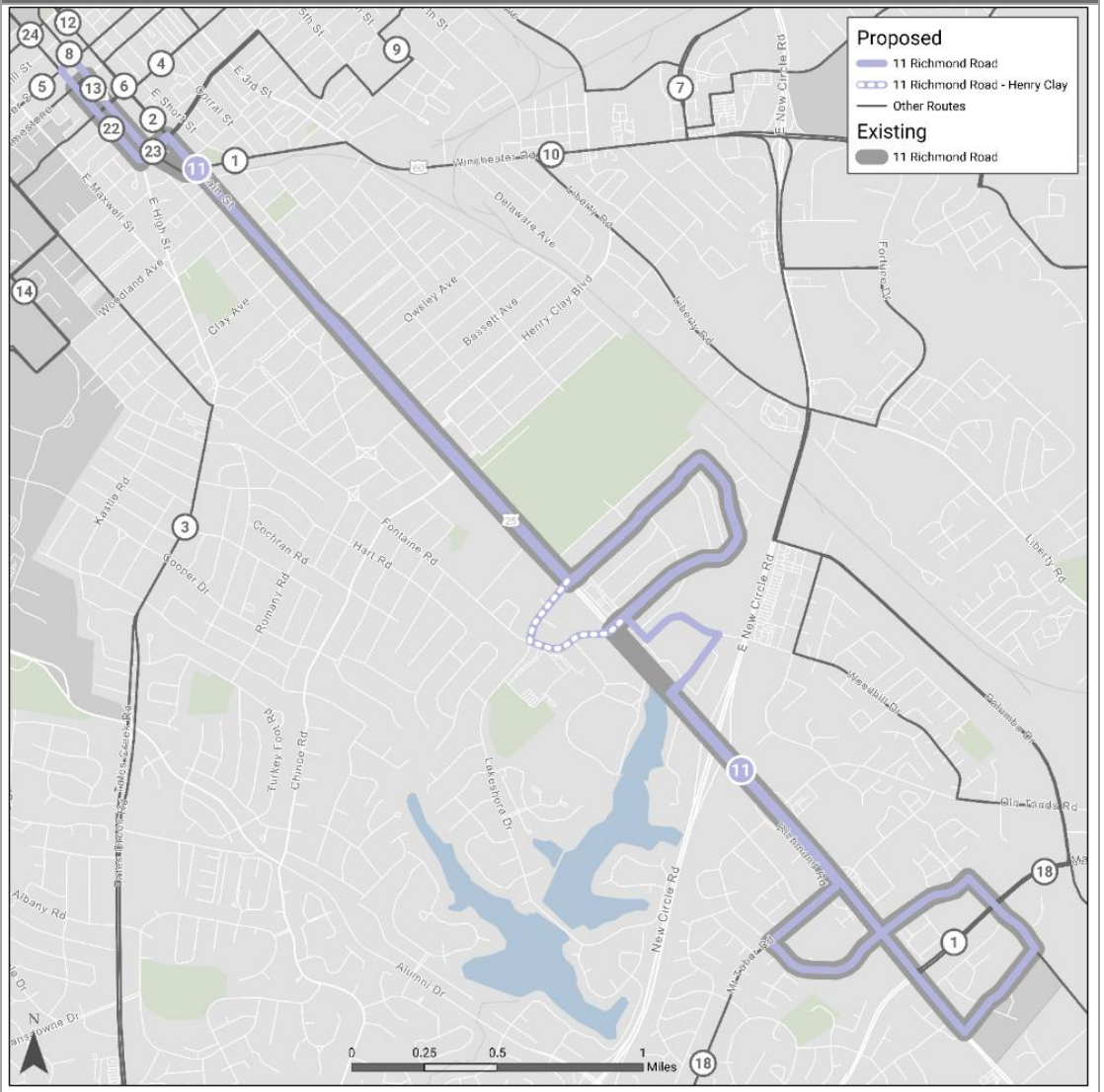
Service Changes

Each pattern of Route 11 will operate 70-minute service, creating combined 35-minute service for the majority of the route.

Service Plan

Span	Weekday	Saturday	Sunday
Svc Start	5:52 AM	5:50 AM	5:47 AM
Svc End	9:05 PM	8:59 PM	9:20 PM
Headway	**Weekday**	**Saturday**	**Sunday**
Early	35	70	70
AM	35	70	70
Mid	35	70	70
PM	35	70	70
Eve	60	70	70
Night	--	--	--

Proposed Alignment



Route 18: Centre Parkway Crosstown — *Near Term Plan*

Alignment Changes

Route 18 will operate from Hamburg to Nicholasville Road via Man O War Boulevard, Tabor Road, Yellowstone Pkwy, and Pimlico Parkway to Centre Parkway. The existing alignment outside of Man O War Blvd on Buckhorn Drive and Squires Road will be discontinued. From Centre Parkway, Route 18 will be extended to operate on segments of Route 3 that are discontinued, operating through the neighborhoods of Whispering Hills and Kirklevington Park to Walmart Supercenter on Nicholasville Road.

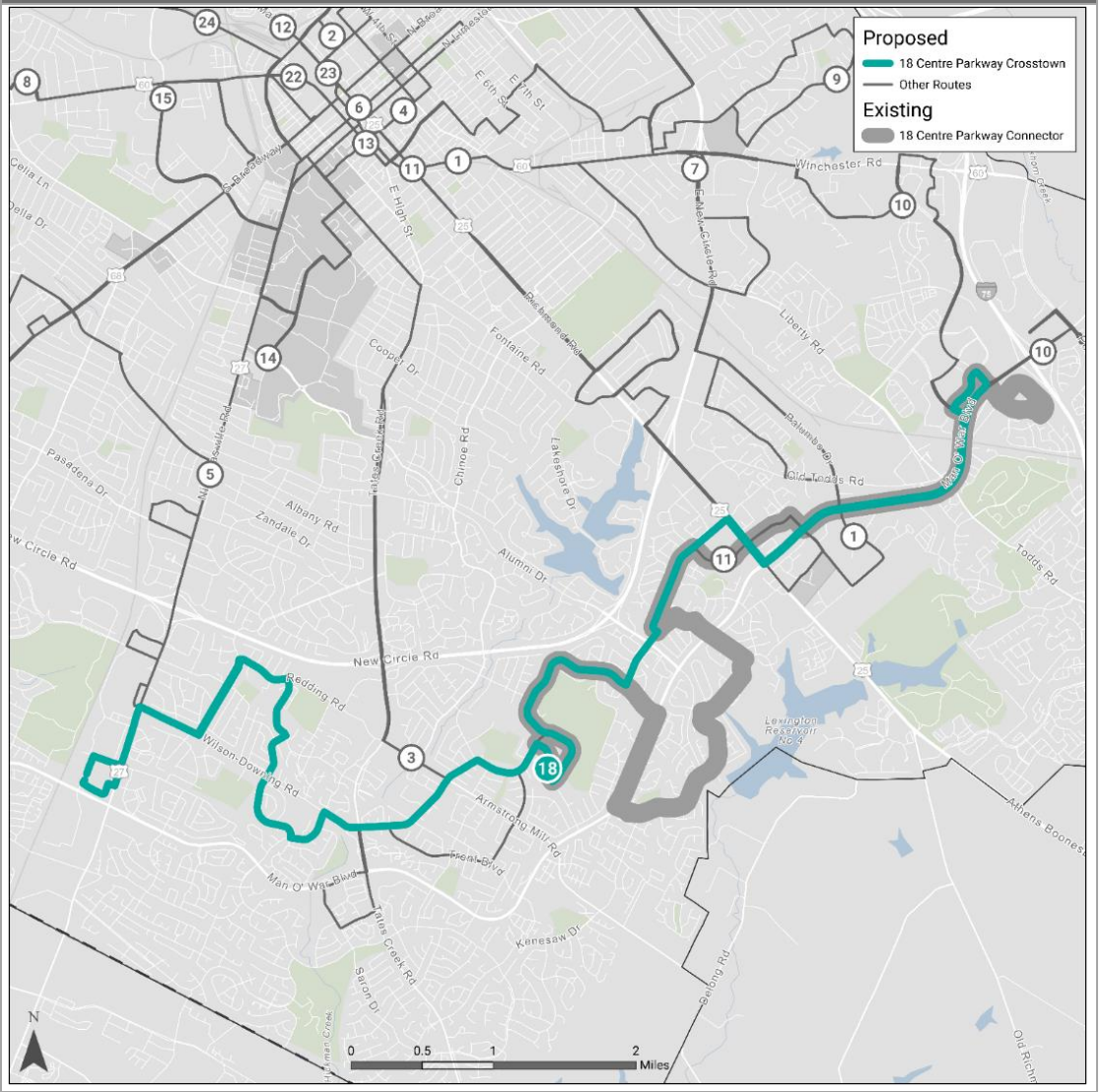
Service Changes

Route 18 currently operates 70-minute service with a single vehicle. The recommended route is improved to 45-minute headways using two vehicles. The proposed Route 18 will operate on Sundays, whereas Route 18 existing does not.

Service Plan

Span	Weekday	Saturday	Sunday
Svc Start	6:48 AM	7:24 AM	7:24 AM
Svc End	9:05 PM	8:25 PM	8:25 PM
Headway	**Weekday**	**Saturday**	**Sunday**
Early	--	--	--
AM	45	70	70
Mid	45	70	70
PM	45	70	70
Eve	70	70	70
Night	--	--	--

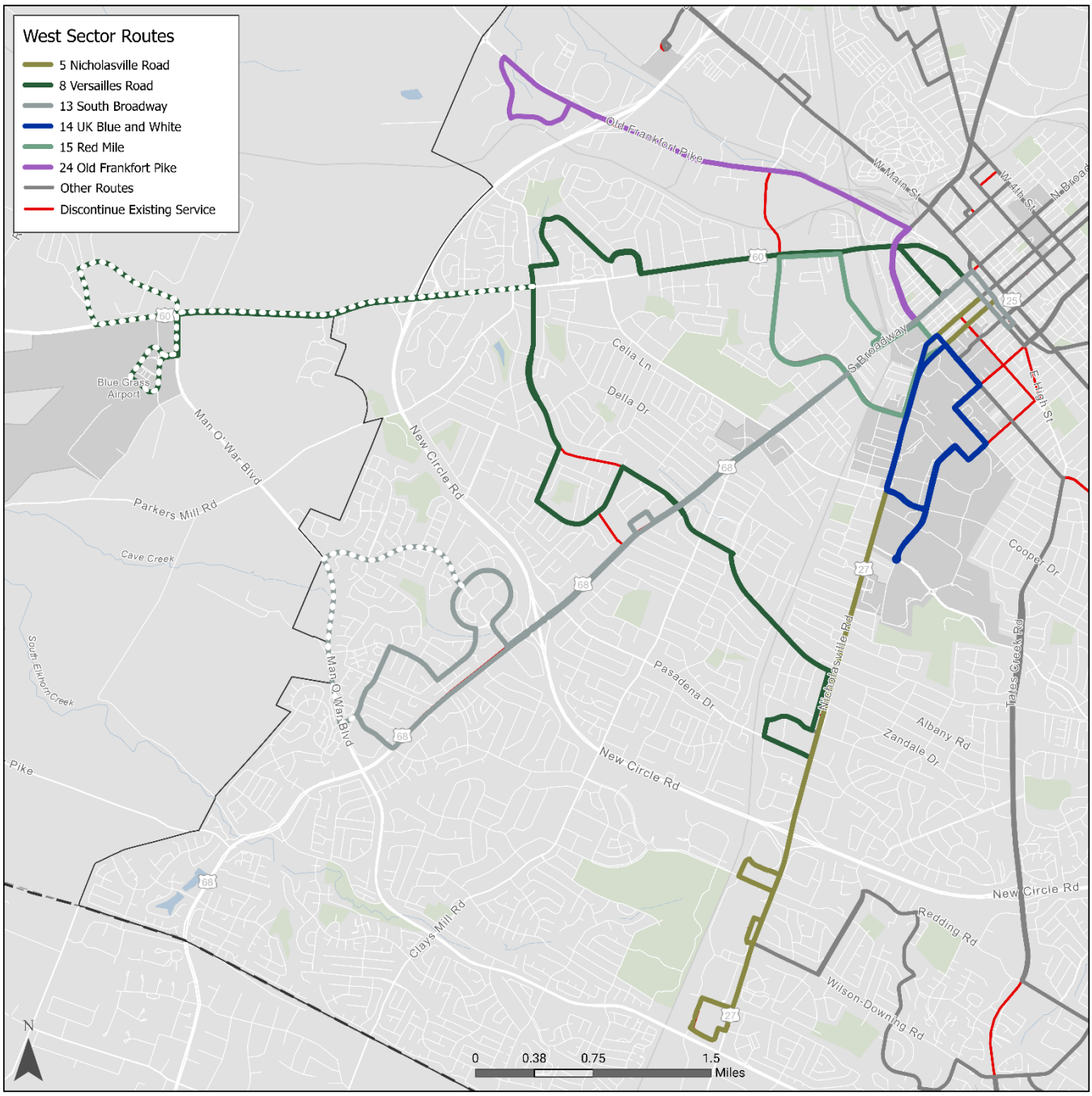
Proposed Alignment



West Sector Service Changes

Much of the existing west sector route network remains unchanged in the near-term plan. The most significant change is the proposed extension of Route 8: Versailles Road along Southland Drive and corresponding discontinuation of Route 16: Southland Drive. Route 5: Nicholasville Road, Route 14: UK Blue & UK White Routes, Route 15: Red Mile, and Route 27: UK Yellow Route are unchanged. The proposed West Sector route alignments are illustrated in **Figure 3-9.** Each modified route is described in detail on the following pages.

Figure 3-9: Proposed West Sector Route Alignments



Route 8: Versailles Road — *Near Term Plan*

Alignment Changes

Route 8 will maintain the existing alignment until reaching the Garden Springs neighborhood. Instead of terminating the route after serving Garden Springs Drive, Route 8 will travel east on Lane Allen Drive to Rosemont Garden and then Southland Drive. Route 8 will turn south onto Nicholasville Road and terminate at the Kroger on Lowry Lane. The second pattern of Route 8 will continue limited service to the Airport.

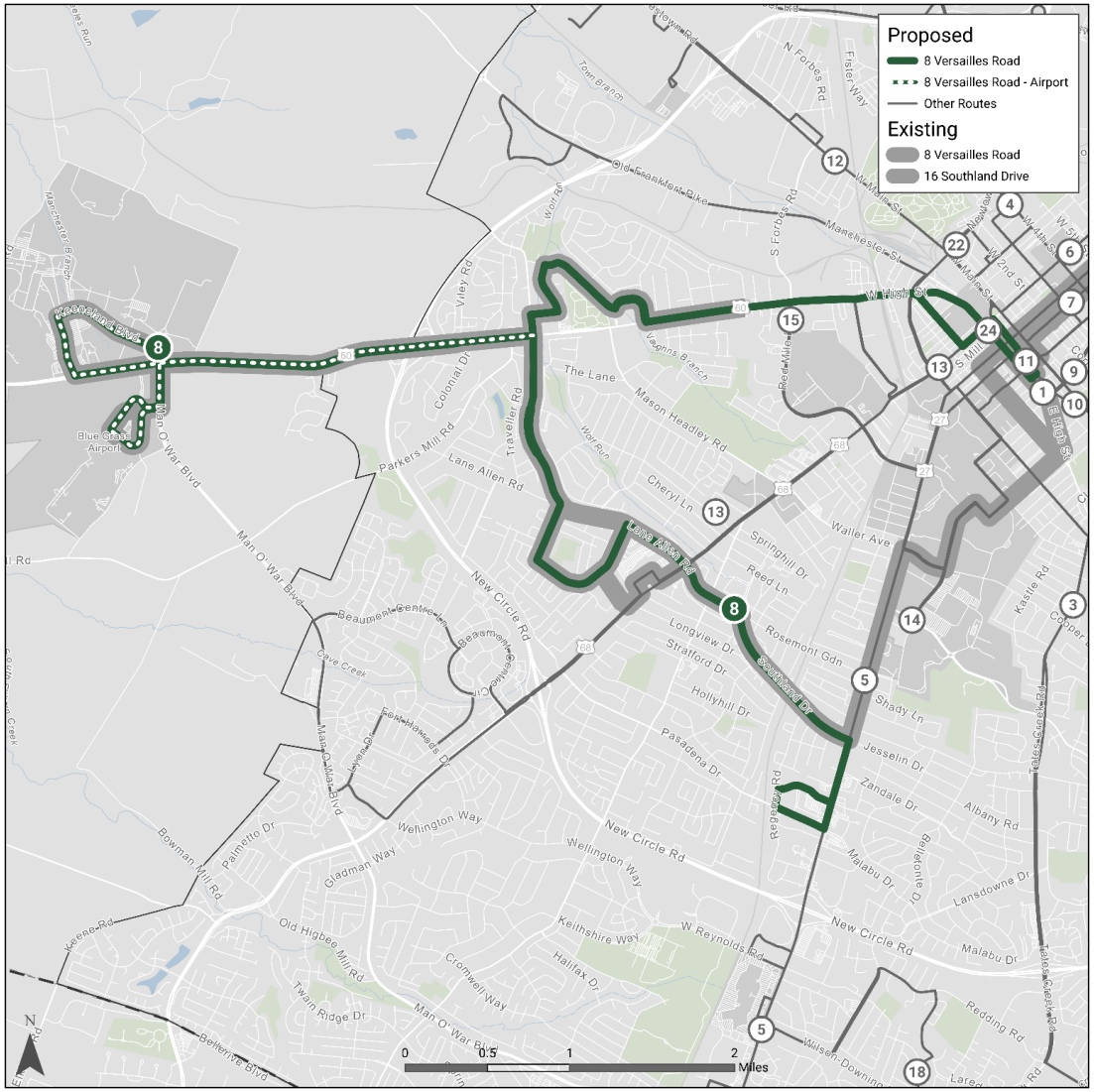
Service Changes

Route 8 headways vary throughout the day, but mostly operate 35-minute service. The recommended Route 8 will provide 35-minute service to Nicholasville Road, (requiring 3 vehicles) and 70-minute peak only service to Blue Grass Airport (requiring one vehicle). Service on Southland Drive is possible by discontinuing Route 16 service. It may be possible to operate additional midday trips to Southland Drive using the vehicle operating the peak only pattern to the Airport.

Service Plan

Span	Weekday	Saturday	Sunday
Svc Start	5:44 AM	5:44 AM	5:46 AM
Svc End	8:44 PM	8:59 PM	9:15 PM
Headway	**Weekday**	**Saturday**	**Sunday**
Early	35	70	70
AM	35	70	70
Mid	35	70	70
PM	35	70	70
Eve	60	70	70
Night	--	--	--

Proposed Alignment



Route 13: South Broadway — *Near Term Plan*

Alignment Changes

Route 13 will operate two patterns: Harrods Hill and Dunbar High School. The Harrods Hills pattern will operate the existing alignment. The Dunbar High School alignment will operate to Dunbar High School via Beaumont Centre Lane and Man O' War Boulevard.

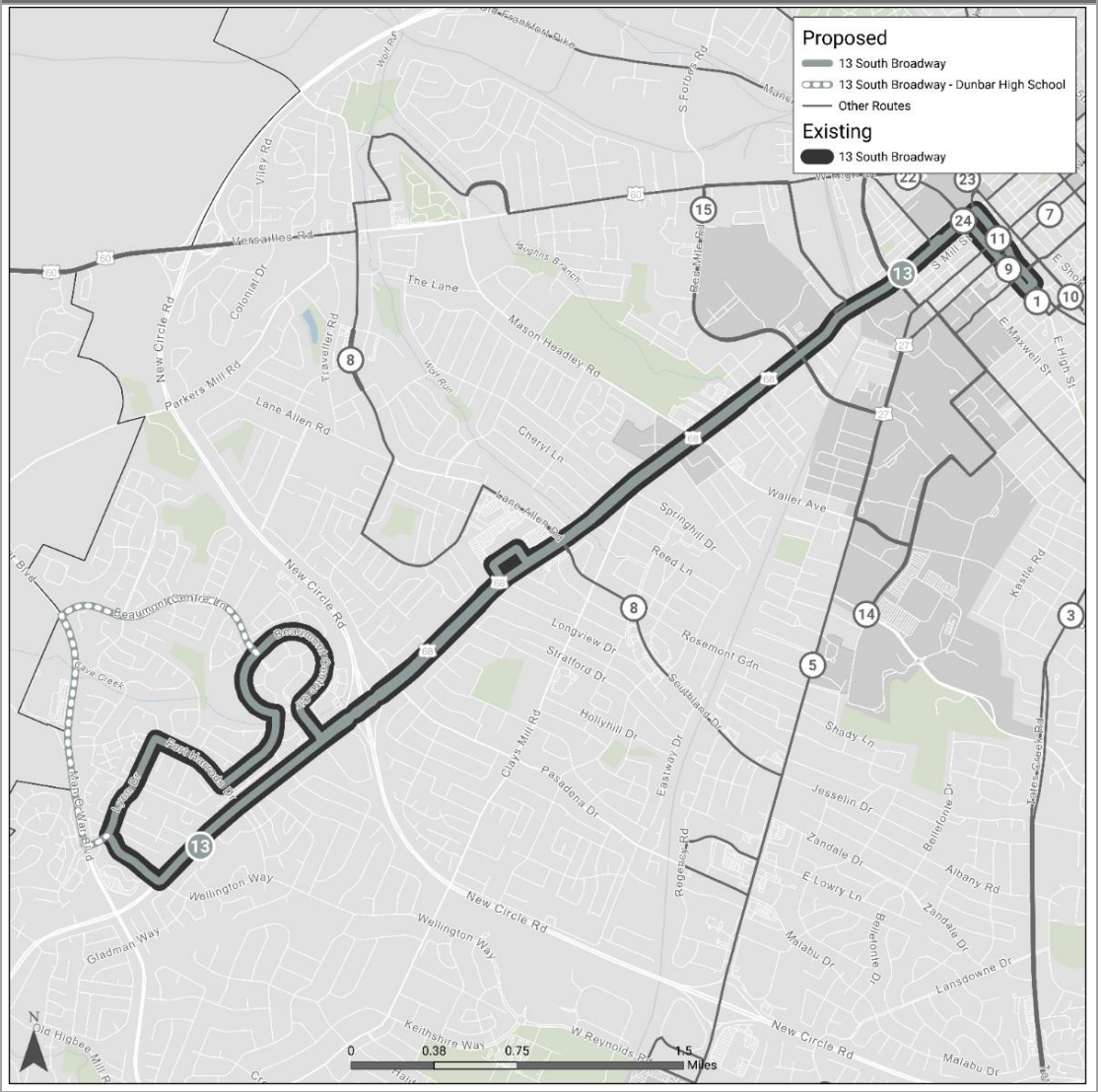
Service Changes

The recommended Route 13 will operate to Dunbar High School on select trips, thereby reducing headways to other end of line locations to 70 minutes during those times.

Service Plan

Span	Weekday	Saturday	Sunday
Svc Start	5:58 AM	5:58 AM	5:59 AM
Svc End	9:05 PM	9:05 PM	9:10 PM
Headway	**Weekday**	**Saturday**	**Sunday**
Early	35	70	70
AM	35	70	70
Mid	35	70	70
PM	35	70	70
Eve	60	70	70
Night	70	70	70

Proposed Alignment



Route 24: Old Frankfort Road — *Near Term Plan*

Alignment Changes

Route 24 will discontinue service on Red Mile Road, instead operating on Oliver Lewis Way and Manchester Street. The current service on Old Frankfort Pike is retained.

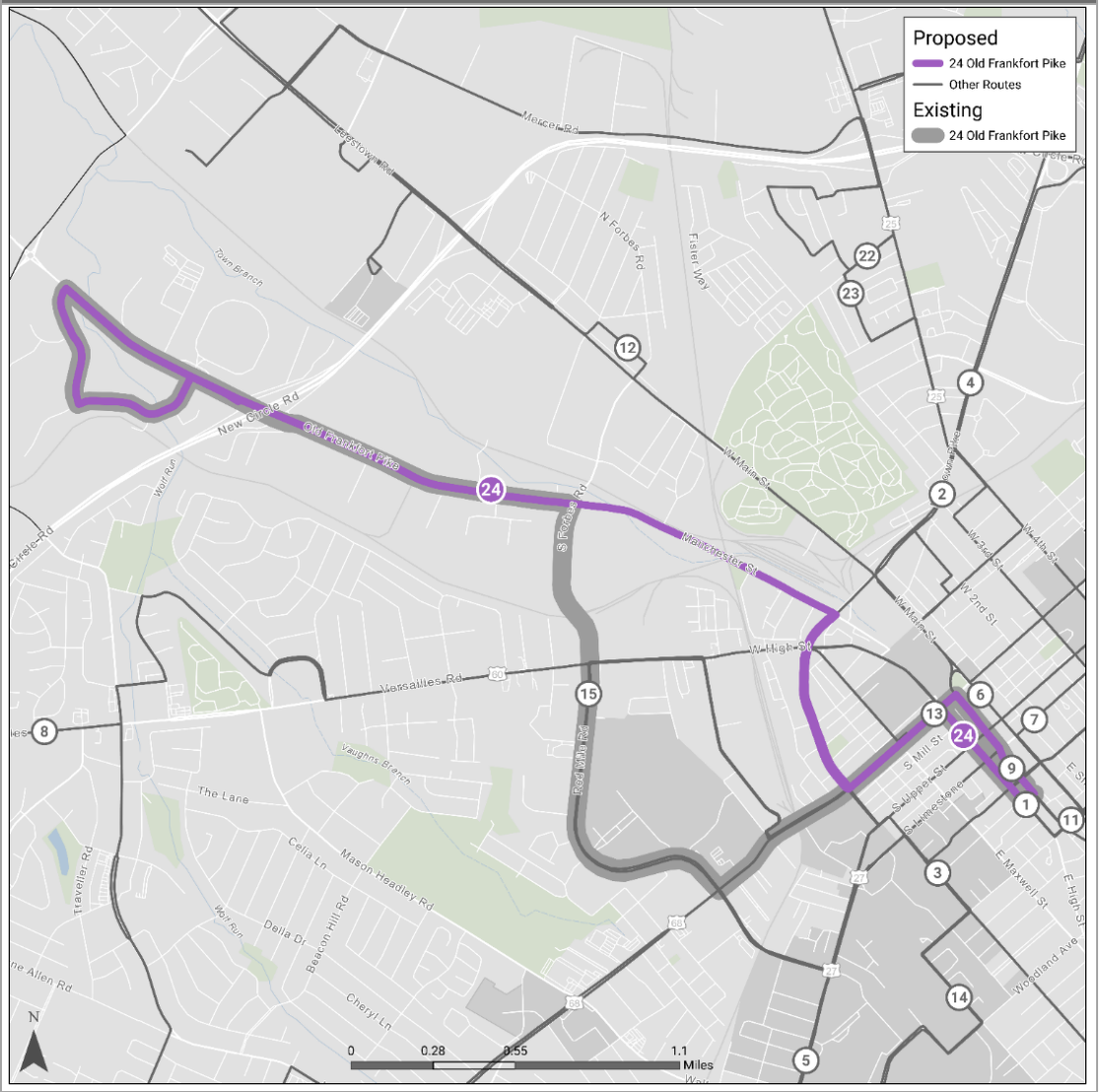
Service Changes

There are no proposed changes to the existing service span or headway. Route 24 will continue to operate peak only service.

Service Plan

Span	Weekday	Saturday	Sunday
Svc Start	5:59 AM	--	--
Svc End	7:05 PM	--	--
Headway	**Weekday**	**Saturday**	**Sunday**
Early	70	--	--
AM	70	--	--
Mid	--	--	--
PM	70	--	--
Eve	70	--	--
Night	--	--	--

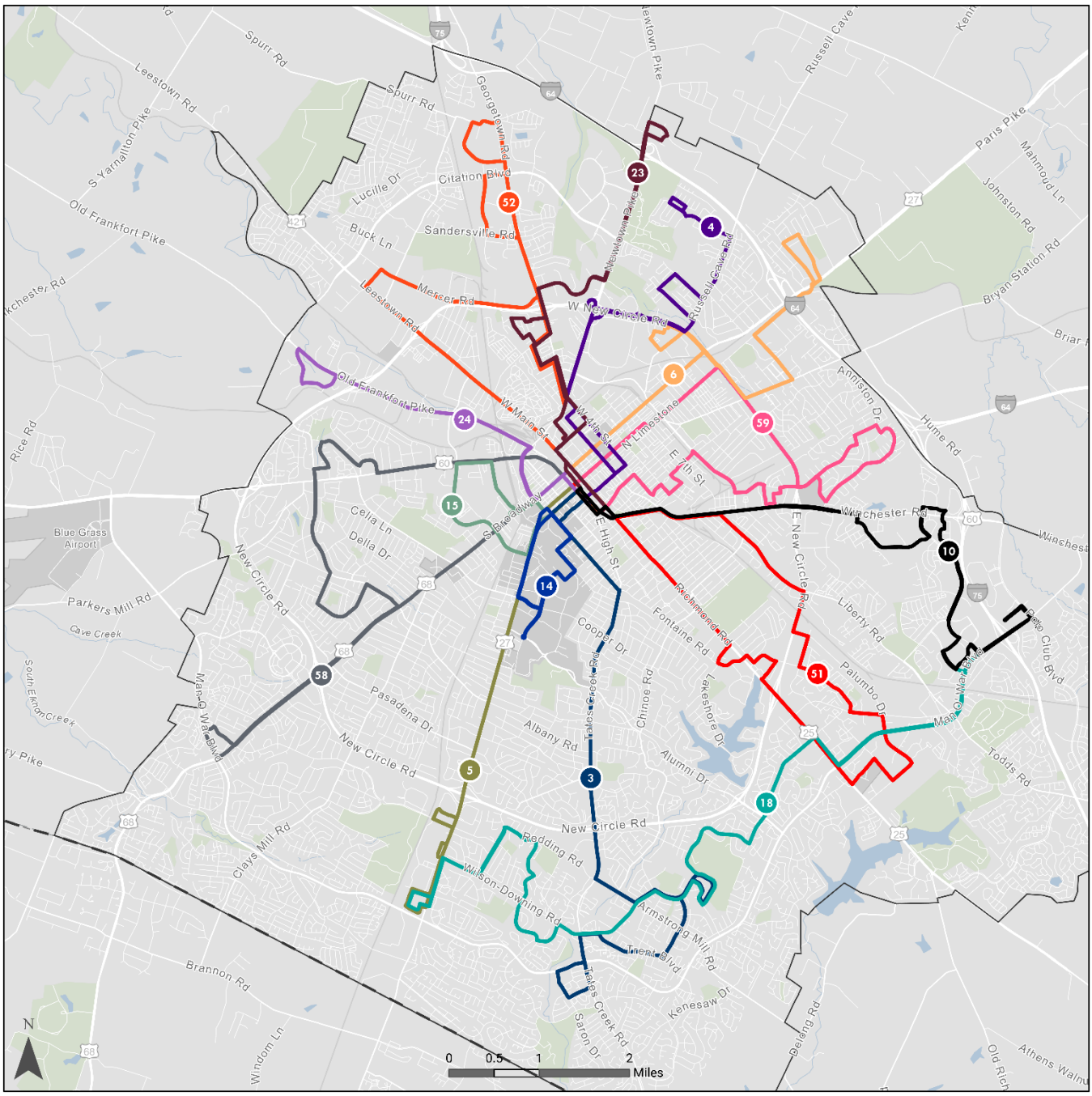
Proposed Alignment



Night Routes

The near-term plan retains much of the existing weekday and Saturday night route alignments and service plans. Route 51: Night Woodhill Drive is modified to accommodate the proposed revision to Route 1. Route 52: Night Georgetown Road, Route 58: Night Versailles Road, and Route 59: Night Eastland route alignments and service plans remain unchanged. The proposed night route alignments are illustrated in **Figure 3-10** and the modified Route 51 service plan is summarized on the following page.

Figure 3-10: Near-Term Weekday Night Route Network



Route 51: Night – Woodhill Drive

Near Term Plan

Alignment Changes

Route 51 is realigned to match the daytime service modifications for Route 1 Woodhill Drive. Instead of operating from the downtown transit center to Fontaine Road, Route 51 will serve Winchester Road and Liberty Road before reaching Woodhill Drive. The inbound alignment on Route 51 largely unchanged, serving the Richmond Road corridor before ending the alignment at the transfer center.

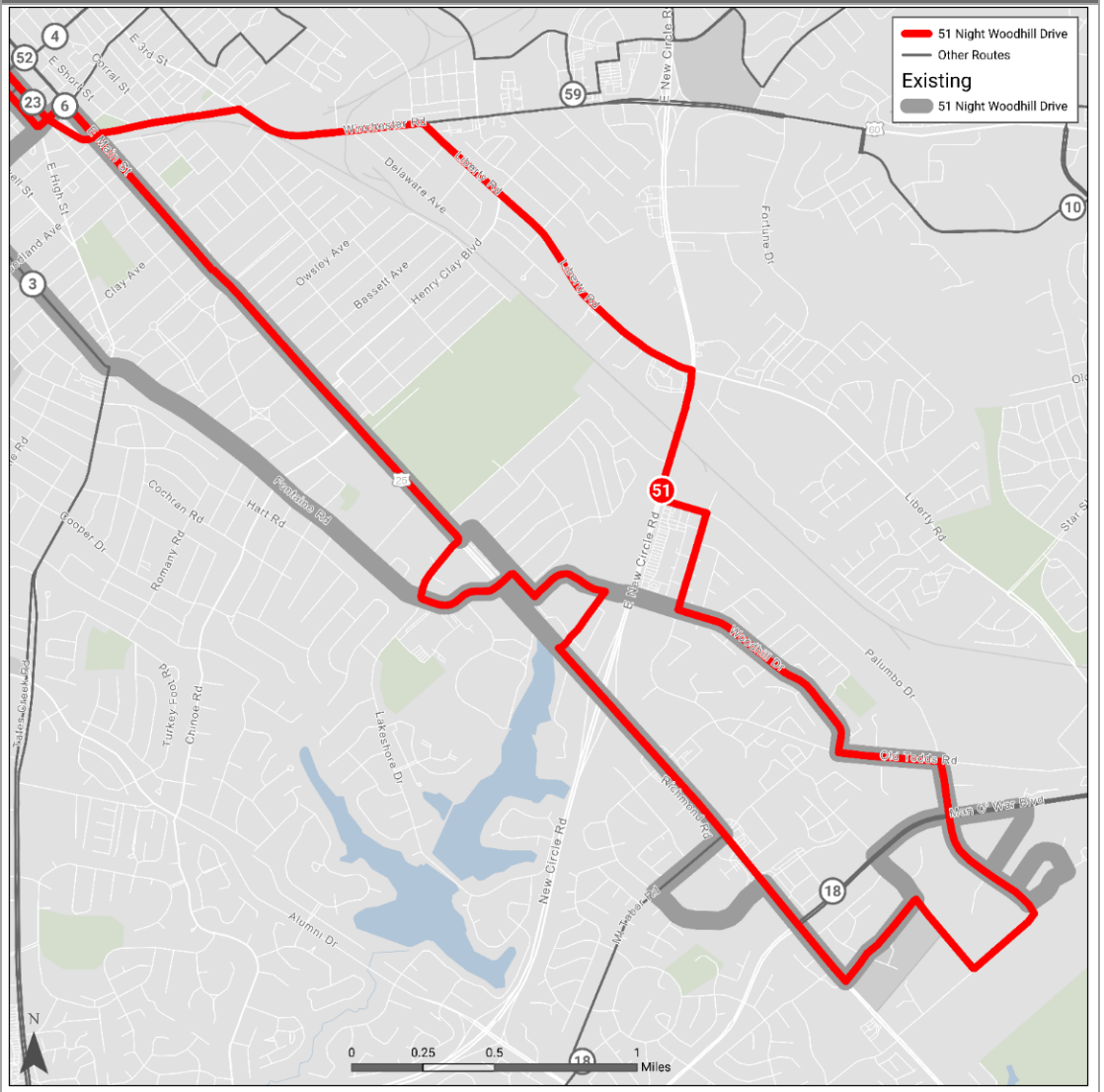
Service Changes

There are no proposed changes to the existing service span or headway.

Service Plan

Span	Weekday	Saturday	Sunday
Svc Start	9:30 PM	9:30 PM	--
Svc End	12:30 AM	12:30 AM	--
Headway	**Weekday**	**Saturday**	**Sunday**
Early	--	--	--
AM	--	--	--
Mid	--	--	--
PM	--	--	--
Eve	--	--	--
Night	60	60	--

Proposed Alignment



3.4.2 Operational & Scheduling Recommendations

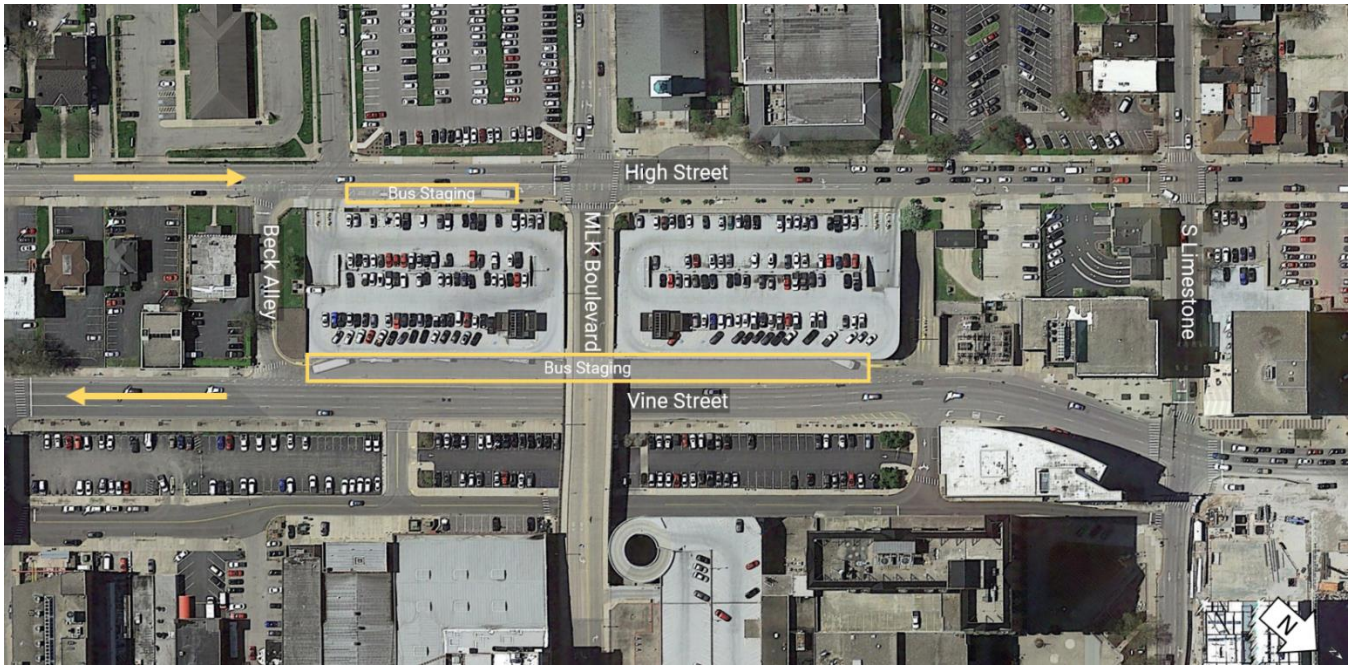
The project team evaluated Lextran's efficiency from a scheduling and operational perspective. This effort involved an evaluation of the downtown transit center operation, current scheduling procedures and "pulse" strategies, and potential interlining opportunities. This section summarizes the findings and recommendations of this assessment.

Downtown Transit Center Operations & Pulse Assignments

Lextran's Downtown Transit Center is located at 150 East Vine Street in downtown Lexington between Beck Alley and South Limestone. As illustrated in **Figure 3-11**, the transit center is co-located in a parking garage owned and operated by the Lexington & Fayette County Parking Authority (Lexpark), with the transit center located on the ground floor of the garage on Vine Street. Lextran currently leases its portion of the facility from Lexpark.

Currently, the Downtown Transit Center serves as a hub for 19 of Lextran's 26 routes (crosstown routes 17 and 18 and UK campus-oriented routes 14, 15, and 27 do not serve the transit center). The central location of the transit center in downtown Lexington lends well to radial design of Lexington's roadway network, as many of the city's major arterials intersect in this area. As such, Lextran has designed its schedules around a "pulse" model, where multiple routes meet at regular intervals to facilitate timed transfers for customers.

Figure 3-11: Downtown Transit Center Site



The Downtown Transit Center is linear in design, providing seven dedicated sawtooth bus bays along Vine Street. Three additional layover positions, including one equipped with an electric bus charging station, are located along a dedicated striped lane on High Street adjacent to the upper level of the parking garage between Beck Alley and MLK Boulevard. As Vine Street and High Street are one-way pairs, the Vine Street bays are accessed in the southbound direction of travel and the High Street positions are accessed in the northbound direction.

The Downtown Transit Center has long exceeded its design capacity of eight buses, leading to bus and pedestrian congestion and associated safety and operational challenges within the Vine Street loading area. To address these issues, Lextran split the weekday pulse into two groups in 2017, as identified in **Table 3-9** and described below:

- At no time are there more than nine buses at the transit center for any line up, utilizing each of the seven bays at the transit center and two on-street layover positions on High Street. There are two groups of lineups during the day: "Connect Blue" and "Connect Green".
- For late night service some routes are combined, which allows all routes to line up at the same time in a single group (nine total routes including five regular routes and four combined routes).
- On weekends, the first lineup at 6:00 AM has all routes meeting up for customer connections, this is accomplished by having some routes loop around and layover on adjacent streets. After that initial lineup, all routes split into their separate groups.

Implementation of the near-term service plan will likely require adjustments to the existing pulse strategy to accommodate the proposed route interlines described later in this section. Conceptual pulse and bus bay assignments are identified **Table 3-9**.

Table 3-9: Existing and Proposed Near-Term Pulse & Bay Assignments

Existing Pulse & Bay Assignments				Near-Term Pulse & Bay Assignments			
Bay	Connect Green	Connect Blue	Night	Bay	Connect Green	Connect Blue	Night
1	Route 2 Route 11	Route 1 Route 12	Route 51 Route 52	1	Route 2 Route 11	Route 1 Route 13	Route 51 Route 52
2	Route 3	Route 4		2	Route 3	Route 22	
3	Route 5	Route 5		3	Route 5	Route 5	
4	Route 8	Route 8 (Airport)	Route 58	4	Route 8	Route 8 (Airport)	Route 58
5	Route 6	Route 10		5	Route 10	Route 6	
6	Route 9	Route 7	Route 59	6	Route 7	Route 9	Route 59
7	Route 13 Route 22	Route 16 Route 24		7	Route 4 Route 12	Route 23 Route 24	

Yellow shading indicates proposed changes.

Weekend Pulse Strategy

On weekdays when service is running every 35 minutes, the separate lineup groups are close enough that wait times between the two groups are reasonable. However, when service is operating every 70 minutes in the evening and on weekends, the lineups are not equally spaced. Passengers from the first group transferring to the second group have a short wait, but passengers from the second group transferring to the first group must wait approximately one hour. Maintaining a pulse on weekends also creates long layovers on some routes and thereby diminishes operational efficiency. Given these challenges, the project team identified three alternative weekend pulse options:

Option 1 – Adjust Lineups to Evenly Space Weekend Pulses: When service is operating on a 70-minute schedule, consideration should be given to shifting the lineups so that they are equally spaced. In addition to the customer benefits of more evenly spacing transfer opportunities, shifting the lineups allows for more efficient operations by allowing for interlining.

Option 2 – Establish Single Weekend Pulse: As an alternative approach, Lextran could also consider redesigning the weekend pulse to enable all routes to meet at the same time. This could be accomplished by adjusting route layover times and utilizing High Street as a staging area for early arriving buses. In this scenario, routes with ample layover time would arrive at the Transit Center and unload passengers before immediately departing to layover on High Street. Routes with tighter schedules would unload passengers, layover at the Transit Center, and then load passengers and depart on the outbound trip. The earliest-arriving buses would then depart the High Street staging area and return to the Transit Center to load passengers before departing on the outbound trip. While a single pulse would improve convenience and travel times for many customers, Lextran should consider the following implications when evaluating the feasibility of this approach:

- Operating a single pulse on weekends would potentially eliminate any efficiency that could be gained from interlining. Up to two additional blocks would need to operate on weekends to unify all routes on a single pulse.
- Additional right-of-way would likely need to be secured along High Street to accommodate layover space for up to five buses.
- Operator restroom access would need to be considered for routes laying over on High Street.

Option 3 – Eliminate Weekend Pulse: A third option involves eliminating the weekend pulse. Instead of scheduling routes to pulse at the Transit Center, routes would be scheduled to arrive and depart based on their individual running time. Layover times would be accounted for in each route schedule but will not be influenced by the other routes. Headways may vary between routes based on unique running times throughout the day, causing passenger wait times at the Transit Center to vary as well. This approach would enable Lextran to minimize layover / recovery time and thereby improve overall efficiency. However, this approach could also create some connections that take much longer compared to the existing pulse system.

These three options present benefits and drawbacks from both a customer and operational perspective, as summarized in **Table 3-10**. Option 1 is the recommended near-term strategy as it balances operational efficiency and customer convenience within Lextran's existing available resources. Option 3 could be considered for future implementation when resources become available to improve weekend headways and deploy real-time passenger information systems.

Table 3-10: Benefits and Drawbacks of Weekend Pulse Options

Option	Benefits	Drawbacks
Option 1	• Half of route connections at Transit Center will not require a wait • Maximizes interlining opportunities and reduces cycle time inefficiencies • Minimizes vehicle requirements through interlining	• Half of route connections at Transit Center will require a 35-minute wait • Routes with cycle times that exceed the pulse interval will have excess layover time (although this is minimized through interlining)
Option 2	• All routes connect at the same time at Transit Center, minimizing wait times for connecting passengers • Easiest for passengers to understand and navigate the network	• Routes with cycle times that exceed the pulse interval will have excess layover time • Exceeds Transit Center bay capacity, requiring additional layover space on High Street • Requires more vehicles than Option 1
Option 3	• May marginally improve headways on some routes • Minimizes vehicle layover time at Transit Center and improves overall efficiency • Allows more flexibility for route changes as cycle times are not restricted to a pulse	• May marginally degrade headways on some routes (assuming no interlining or additional resource investments) • Transfer times at Transit Center will vary by route by time of day, creating more complicated trip planning and longer wait times for some passengers • Elimination of pulse is generally not well-suited for a hub and spoke network like Lextran unless routes operate on high frequencies

Interlining Opportunities

The proposed near-term service plans were reviewed to identify opportunities for increased operational efficiency through interlining. Interlining is a common practice in the transit industry that combines two or more routes that arrive and depart from a common terminus into a single operational schedule. By combining multiple routes with excess layover time, interlining allows a transit agency to deliver the same level of service with fewer vehicles and drivers. In some cases, interlining is used as a strategy to distribute layover time more evenly between routes. A review of the proposed service plans identified four interlining opportunities yielding a total annual cost savings of nearly $730,000.

- **Routes 3 and 6** on weekdays, Saturdays, and Sundays (saves one bus)
- **Routes 8 and 10** on weekdays, Saturdays, and Sundays (saves one bus)
- **Routes 5 and 18** on Saturdays and Sundays (saves one bus)
- **Routes 4 and 11** on weekdays, Saturdays, and Sundays (no bus savings, but improves layover distribution)

Table 3-11 summarizes the estimated cycle time, layover time, and buses required for each service period on weekdays, Saturdays, and Sundays for the three interlining pairs that are estimated to save vehicles.

Table 3-11: Proposed Interlining Pairs

Interline	Route	Day			Evening			Night			Buses Saved		
		Cycle Time	Layover Time	Buses	Cycle Time	Layover Time	Buses	Cycle Time	Layover Time	Buses	Day	Eve	Night
Weekday													
3-6	3	88	19	2.5	105	34	1.5	105	46	1.5	1.0	1.0	0.0
	6	88	18	2.5	105	32	1.5	105	39	1.5			
8-10	8	88	18	2.5	105	31	1.5	--	--	--	1.0	1.0	0.0
	10	88	12	2.5	105	37	1.5	70	15	1.0			
Saturday													
3-6	3	105	36	1.5	105	37	1.5	105	39	1.5	1.0	1.0	1.0
	6	105	45	1.5	105	33	1.5	105	40	1.5			
5-18	5	105	61	1.5	105	48	1.5	60	12	1.0	1.0	0.0	0.0
	18	105	23	1.5	105	23	1.5	--	--	--			
8-10	8	105	34	1.5	105	32	1.5	--	--	--	1.0	1.0	0.0
	10	105	38	1.5	105	41	1.5	70	13	1.0			
Sunday													
3-6	3	105	45	1.5	105	41	1.5	70	10	1.0	1.0	0.0	0.0
	6	105	41	1.5	105	42	1.5	70	7	1.0			
5-18	5	105	57	1.5	105	52	1.5	60	17	1.0	0.0	0.0	0.0
	18	105	23	1.5	105	23	1.5	--	--	--			
8-10	8	105	36	1.5	105	32	1.5	105	32	1.5	0.0	0.0	0.0
	10	105	47	1.5	105	45	1.5	105	45	1.5			

3.4.3 Near-Term Plan Operating Requirements & Costs

Operating requirements and costs for the near-term plan were developed based on the service plans described in the previous section and assume implementation of the proposed interlining pairs. Estimated system operating statistics and costs are provided in **Table 3-12** and route-level details are provided in **Table 3-13**. Daily figures were multiplied by 254 weekdays, 52 Saturdays, and 59 Sundays/holidays to arrive at annual totals. Operations and maintenance (O&M) costs were estimated by applying the projected systemwide annual vehicle revenue hours and miles by Lextran's unit cost per vehicle revenue hour ($72.48) and revenue mile ($3.40). Cost figures are reported in FY2022 dollars.

- **Peak Buses:** The proposed service plan requires a peak fleet of 49 buses on weekdays, a net decrease of three peak buses.
- **Revenue Hours:** The proposed service plan results in a net increase of approximately 4,000 annual revenue hours, a 1.9% increase over the existing network.
- **Revenue Miles:** The proposed service plan results in a net increase of approximately 89,900 annual revenue miles, a 4.1% increase over the existing network.
- **O&M Cost:** It is estimated that the near-term network will cost $23.3 million per year, a 2.7% increase over Lextran's fixed-route operating budget in FY2022.

Table 3-12: Near-Term Plan System Operating Requirements and O&M Costs

Svc Type	Annual Vehicle Revenue Hours	Annual Vehicle Revenue Miles	Daily Peak Vehicles	Annual O&M Cost
Weekday				
Core	100,800	1,164,400	27	$11,268,100
Frequent	17,300	157,700	5	$1,790,300
Crosstown	7,200	107,600	2	$887,300
Circulator	45,800	391,100	13	$4,650,900
Limited	4,100	44,600	2	$452,200
Night	3,000	40,400	0	$358,200
Subtotal	**178,200**	**1,905,800**	**49**	**$19,407,000**
Saturday				
Core	13,100	141,300	15	$1,429,000
Frequent	1,300	10,000	2	$131,700
Crosstown	1,000	14,500	2	$125,100
Circulator	1,700	15,500	3	$178,500
Night	600	8,300	0	$73,300
Subtotal	**17,700**	**189,600**	**21**	**$1,937,600**
Sunday				
Core	13,900	150,100	15	$1,519,200
Frequent	1,400	9,300	2	$129,900
Crosstown	1,100	15,700	2	$135,700
Circulator	1,900	17,300	3	$199,500
Subtotal	**18,300**	**192,400**	**21**	**$1,984,300**
Annual Total	**214,200**	**2,287,800**	**49**	**$23,328,900**
Change from Existing	**+4,000**	**+89,900**	**-3**	**+$617,500**
Percent Change from Existing	**+1.9%**	**+4.1%**	**-6%**	**+2.7%**

Table 3-13: Near Term Plan Operating Requirements by Route

Route	Route Name	Svc Type	Daily Vehicle Revenue Hours			Daily Vehicle Revenue Miles			Daily One-Way Trips			Peak Vehicles		
			Wkd	Sat	Sun	Wkd	Sat	Sun	Wkd	Sat	Sun	Wkd	Sat	Sun
1	Woodhill Drive	Core	29	16	16	329	184	189	50	28	28	2.0	1.0	1.0
2	Georgetown Road	Core	15	16	16	136	147	147	25	27	27	1.0	1.0	1.0
3	Tates Creek Road	Core	41	27	22	543	312	261	54	31	26	2.5	1.5	1.5
4	South Newtown Pike	Core	32	19	16	392	231	189	56	33	27	2.0	1.0	1.0
5	Nicholasville Road	Frequent	68	26	23	621	193	158	106	33	27	5.0	1.5	1.5
6	North Broadway	Core	40	29	23	415	258	211	53	33	27	2.5	1.5	1.5
7	North Limestone	Core	28	16	16	293	161	161	49	27	27	2.0	1.0	1.0
8	Versailles Road	Core	35	24	24	432	248	248	47	27	27	2.5	1.5	1.5
	via Bluegrass Airport	Limited	8	--	--	112	--	--	14	--	--	1.0	--	--
9	Eastland	Core	28	16	16	273	153	153	48	27	27	2.0	1.0	1.0
10	Hamburg Pavilion	Core	40	26	24	497	289	244	55	32	27	2.5	1.5	1.5
11	Richmond Road	Core	28	16	16	309	174	180	48	27	28	2.0	1.0	1.0
12	Leestown Road	Core	23	16	16	316	214	214	40	27	27	2.0	1.0	1.0
13	South Broadway	Core	27	16	16	295	170	170	47	27	27	2.0	1.0	1.0
14	UK Blue (CW)	Circulator	57	--	--	526	--	--	143	--	--	4.0	--	--
	UK White (CC)	Circulator	57	--	--	526	--	--	143	--	--	4.0	--	--
15	Red Mile	Circulator	66	8	8	487	81	81	126	21	21	5.0	1.0	1.0
18	Centre Parkway Crosstown	Crosstown	28	20	19	424	278	266	35	23	22	2.0	1.5	1.5
22	Mercer Road	Core	15	--	--	153	--	--	25	--	--	1.0	--	--
23	North Newtown Pike	Core	18	16	16	202	176	176	31	27	27	1.0	1.0	1.0
24	Old Frankfort Pike	Limited	8	--	--	64	--	--	14	--	--	1.0	--	--
27	UK Yellow Route	Circulator	--	25	25	--	217	212	--	100	98	--	2.0	2.0
51	Night - Woodhill Drive	Night	3	3	--	37	37	--	6	6	--	0.0	0.0	--
52	Night - Georgetown Road	Night	3	3	--	42	42	--	6	6	--	0.0	0.0	--
58	Night - Versailles Road	Night	3	3	--	46	46	--	6	6	--	0.0	0.0	--
59	Night - Eastland	Night	3	3	--	33	33	--	6	6	--	0.0	0.0	--
	Daily System Total		**702**	**343**	**311**	**7,503**	**3,645**	**3,261**	**1,233**	**574**	**520**	**49.0**	**21.0**	**21.0**

3.5 Mid-Term Plan

The mid-term plan builds on the proposed near-term service restructuring. This section describes the proposed mid-term service plans and estimated resource requirements. The proposed weekday and weekend mid-term system maps are provided in **Figure 3-12** and **Figure 3-13** on the following pages. Highlights of the mid-term plan include:

Prepare for Future Development

- Route 2: Georgetown Road frequencies are improved to every 35-minutes outside of New Circle Road serving the Kearney Ridge and future Dairy Farm developments. The implementation of 35-minute service on Route 2 will increase the transit access for low income and minority populations in the Georgetown Road corridor.
- Route 10: Hamburg Pavilion is modified to serve the new Baptist Health Hospital with direct service from downtown via Winchester Road. A new route, Route 25: Liberty Road, is introduced to serve Hamburg Pavilion and developments at Polo Club Boulevard and Man O' War Boulevard.
- Route 18: Centre Parkway Crosstown is extended to connect to the Baptist Health Hospital, providing a new direct connection across the southeast sector of Lexington to this key employment center.
- Route 25: Liberty Road is a new route implemented in the Mid-Term Plan to create quick service from Hamburg Pavilion to Winchester Road and downtown Lexington. As Liberty Road continues to develop and densify the demand for travel through this corridor will intensify.

More Consistent Evening & Weekend Service

- Route 22: Mercer Road begins service seven days a week to create more consistent service throughout the entire week. All core and crosstown routes will operate seven days a week.
- Route 25: Liberty Road operates seven days a week, providing more service to the Hamburg area that operates throughout the week.

3.5.1 Proposed Mid-Term Service Plans

The proposed mid-term service plans are detailed in **Table 3-14** through **Table 3-16**. These tables provide the assumed span of service and frequency by time of day. The proposed near-term service plans are provided for comparison purposes. Routes with new or improved services in the mid-term plan are highlighted in green. Following these tables, are descriptions and maps for each route that is proposed for modification in the mid-term.

Figure 3-12. Mid-Term Weekday Route Network

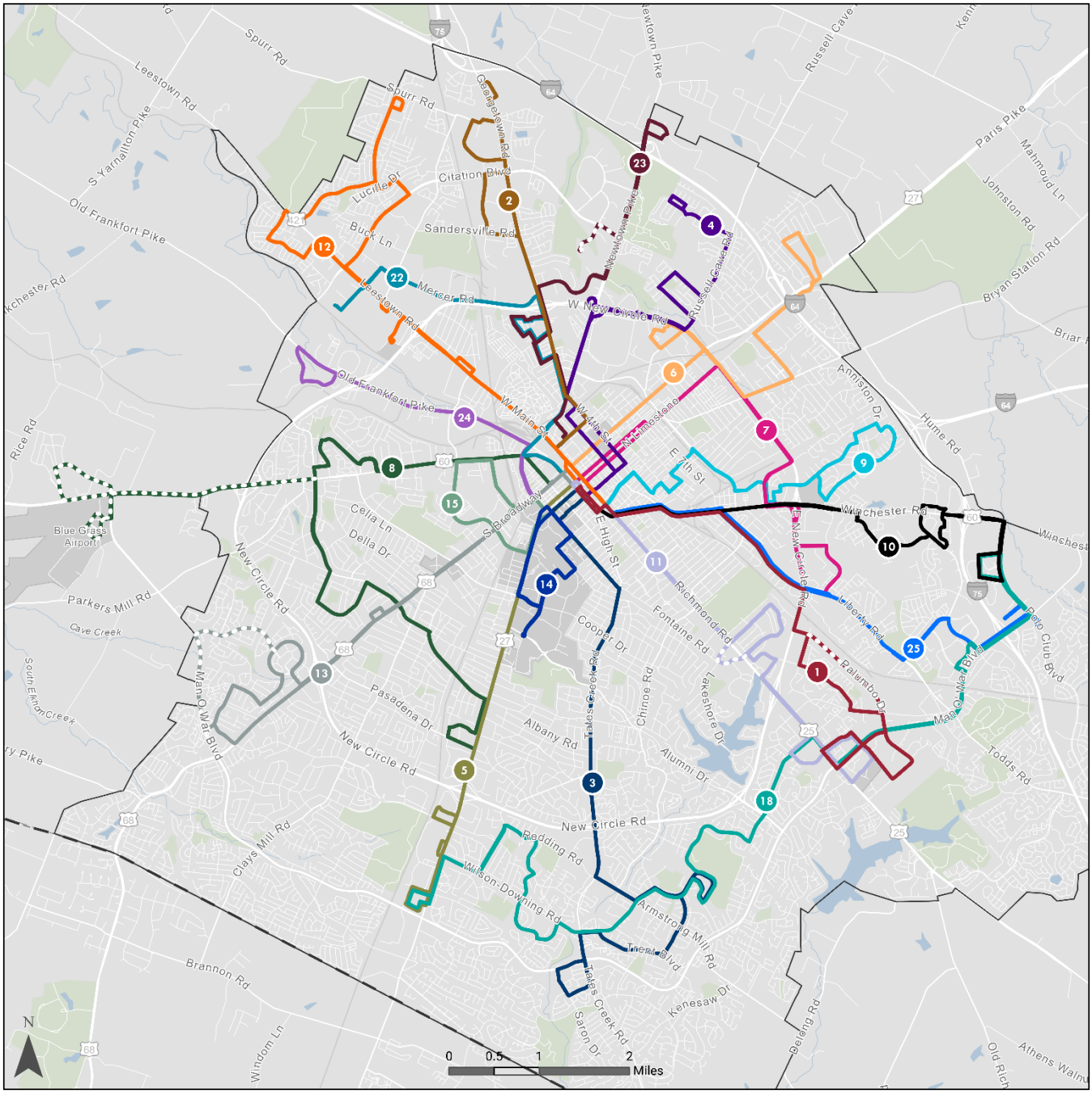
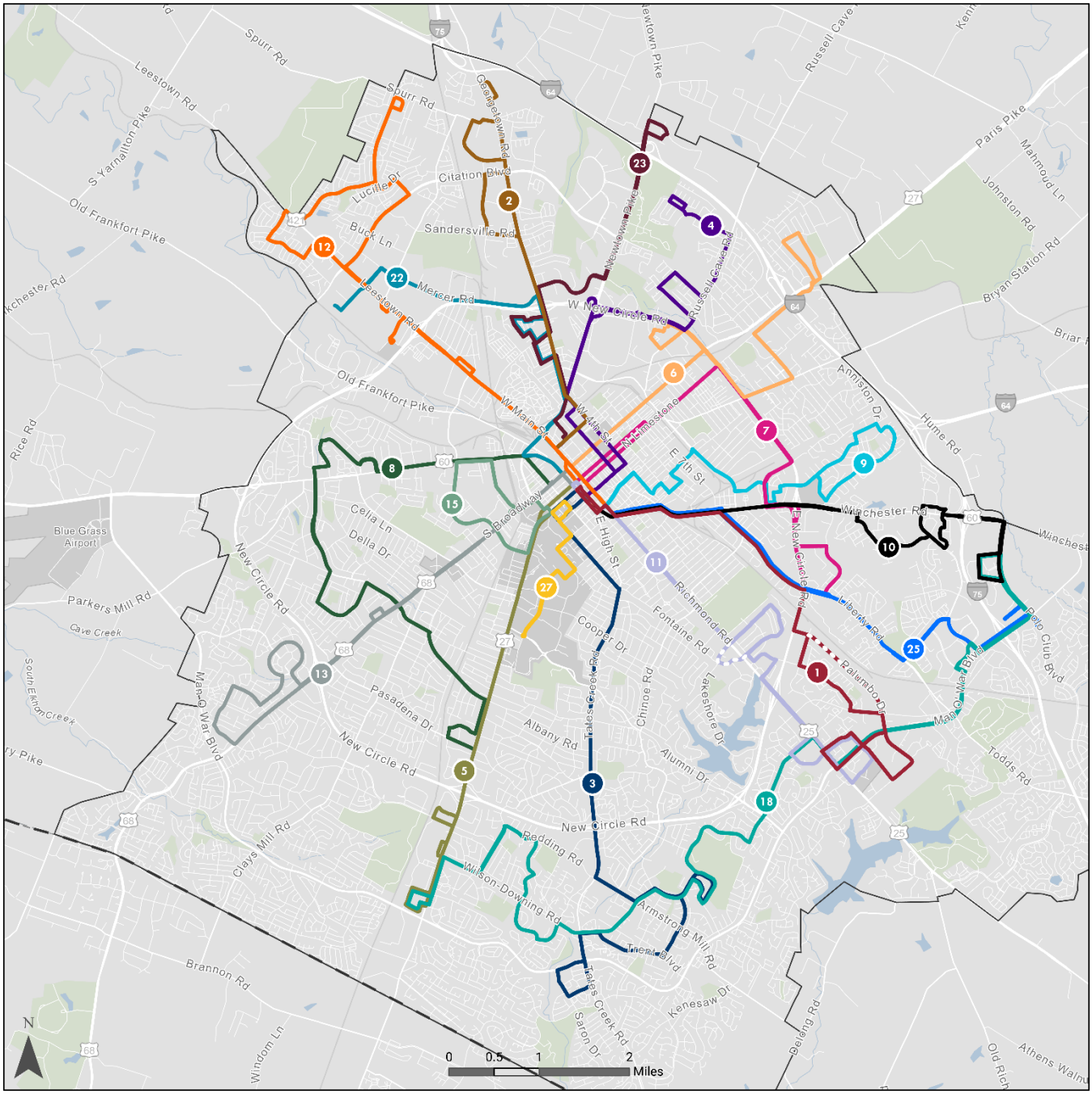


Figure 3-13. Mid-Term Weekend Route Network



Note: Route 1 Woodhill Drive does not operate Palumbo Drive pattern on Sundays

Table 3-14: Mid-Term Proposed Weekday Service Plans

Route	Route Name	Near Term Proposed								Mid Term Proposed							
		Span of Service		Frequency						Span of Service		Frequency					
		Start	End	Early	AM	Mid	PM	Eve	Nite	Start	End	Early	AM	Mid	PM	Eve	Nite
1	Woodhill Drive	5:20 AM	9:20 PM	35	35	35	35	60	70	5:20 AM	9:20 PM	35	35	35	35	60	70
2	Georgetown Road	5:43 AM	8:59 PM	70	70	70	70	70	--	5:43 AM	8:59 PM	35	35	35	35	60	--
3	Tates Creek Road	5:26 AM	12:15 AM	35	35	35	35	60	70	5:26 AM	12:15 AM	35	35	35	35	60	70
4	South Newtown Pike	5:38 AM	12:15 AM	35	35	35	35	60	60	5:38 AM	12:15 AM	35	35	35	35	60	60
5	Nicholasville Road	5:33 AM	12:15 AM	15	15	17	17	45	60	5:33 AM	12:15 AM	15	15	17	17	45	60
6	North Broadway	5:44 AM	12:20 AM	35	35	35	35	60	70	5:44 AM	12:20 AM	35	35	35	35	60	70
7	North Limestone	5:30 AM	9:20 PM	35	35	35	35	60	70	5:30 AM	9:20 PM	35	35	35	35	60	70
8	Versailles Road	5:44 AM	8:44 PM	35	35	35	35	60	--	5:44 AM	8:44 PM	35	35	35	35	60	--
	via Bluegrass Airport	6:20 AM	6:04 PM	--	70	--	70	--	--	6:20 AM	6:04 PM	--	70	--	70	--	--
9	Eastland	5:50 AM	9:10 PM	35	35	35	35	60	70	5:50 AM	9:10 PM	35	35	35	35	60	70
10	Hamburg Pavilion	5:21 AM	12:20 AM	35	35	35	35	70	70	5:21 AM	12:20 AM	35	35	35	35	70	70
11	Richmond Road	5:52 AM	9:05 PM	35	35	35	35	60	70	5:52 AM	9:05 PM	35	35	35	35	60	70
12	Leestown Road	5:28 AM	9:15 PM	70	35	70	35	70	70	5:28 AM	9:15 PM	70	35	70	35	70	70
13	South Broadway	5:58 AM	9:05 PM	35	35	35	35	60	70	5:58 AM	9:05 PM	35	35	35	35	60	70
14	UK Blue (CW)	6:40 AM	11:54 PM	--	6	6	6	12	12	6:40 AM	11:54 PM	--	6	6	6	12	12
	UK White (CC)	6:40 AM	11:54 PM	--	6	6	6	12	12	6:40 AM	11:54 PM	--	6	6	6	12	12
15	Red Mile	1:24 PM	4:50 PM	--	24	24	24	36	24	1:24 PM	4:50 PM	--	24	24	24	36	24
18	Centre Parkway Crosstown	6:48 AM	9:05 PM	--	45	45	45	70	70	6:48 AM	9:05 PM	--	45	45	45	70	70
22	Mercer Road	5:36 AM	8:10 PM	70	70	70	70	70	--	5:36 AM	8:10 PM	70	70	70	70	70	--
23	North Newtown Pike	5:38 AM	12:15 AM	70	70	70	70	70	70	5:38 AM	12:15 AM	70	70	70	70	70	70
24	Old Frankfort Pike	5:59 AM	7:05 PM	70	70	--	70	70	--	5:59 AM	7:05 PM	70	70	--	70	70	--
25	Liberty Road	New Route								5:21 AM	12:20 AM	35	35	35	35	60	70
51	Night - Woodhill Drive	9:30 PM	12:30 AM	--	--	--	--	--	60	9:30 PM	12:30 AM	--	--	--	--	--	60
52	Night - Georgetown Road	9:30 PM	12:30 AM	--	--	--	--	--	60	9:30 PM	12:30 AM	--	--	--	--	--	60
58	Night - Versailles Road	9:30 PM	12:30 AM	--	--	--	--	--	60	9:30 PM	12:30 AM	--	--	--	--	--	60
59	Night - Eastland	9:30 PM	12:30 AM	--	--	--	--	--	60	9:30 PM	12:30 AM	--	--	--	--	--	60

Table 3-15: Mid-Term Proposed Saturday Service Plans

Route	Route Name	Near Term Proposed								Mid Term Proposed							
		Span of Service		Frequency						Span of Service		Frequency					
		Start	End	Early	AM	Mid	PM	Eve	Nite	Start	End	Early	AM	Mid	PM	Eve	Nite
1	Woodhill Drive	5:38 AM	9:20 PM	70	70	70	70	70	70	5:38 AM	9:20 PM	70	70	70	70	70	70
2	Georgetown Road	5:48 AM	8:59 PM	70	70	70	70	70	--	5:48 AM	8:59 PM	70	70	70	70	70	--
3	Tates Creek Road	5:23 AM	12:00 AM	70	70	70	70	70	70	5:23 AM	12:00 AM	70	70	70	70	70	70
4	South Newtown Pike	5:50 AM	12:20 AM	70	70	70	70	70	70	5:50 AM	12:20 AM	70	70	70	70	70	70
5	Nicholasville Road	5:47 AM	12:20 AM	60	70	70	70	70	60	5:47 AM	12:20 AM	60	70	70	70	70	60
6	North Broadway	5:48 AM	12:15 AM	70	70	70	70	70	70	5:48 AM	12:15 AM	70	70	70	70	70	70
7	North Limestone	5:45 AM	9:15 PM	70	70	70	70	70	70	5:45 AM	9:15 PM	70	70	70	70	70	70
8	Versailles Road	5:44 AM	8:59 PM	70	70	70	70	70	--	5:44 AM	8:59 PM	70	70	70	70	70	--
9	Eastland	5:53 AM	8:59 PM	70	70	70	70	70	--	5:53 AM	8:59 PM	70	70	70	70	70	--
10	Hamburg Pavilion	5:40 AM	12:20 AM	70	70	70	70	70	70	5:40 AM	12:20 AM	70	70	70	70	70	70
11	Richmond Road	5:50 AM	8:59 PM	70	70	70	70	70	--	5:50 AM	8:59 PM	70	70	70	70	70	0
12	Leestown Road	5:48 AM	9:10 PM	70	70	70	70	70	70	5:48 AM	9:10 PM	70	70	70	70	70	70
13	South Broadway	5:58 AM	9:05 PM	70	70	70	70	70	70	5:58 AM	9:05 PM	70	70	70	70	70	70
15	Red Mile	10:07 AM	6:14 PM	--	--	24	24	--	--	10:07 AM	6:14 PM	--	--	24	24	--	--
18	Centre Parkway Crosstown	7:24 AM	8:25 PM	--	70	70	70	70	--	7:24 AM	8:25 PM	--	70	70	70	70	--
22	Mercer Road	New Saturday Service								5:36 AM	8:10 PM	70	70	70	70	70	--
23	North Newtown Pike	5:48 AM	8:59 PM	70	70	70	70	70	--	5:48 AM	8:59 PM	70	70	70	70	70	--
25	Liberty Road	New Route								5:40 AM	12:20 AM	70	70	70	70	70	70
27	UK Yellow Route	12:00 PM	12:15 AM	--	--	15	15	15	15	12:00 PM	12:15 AM	--	--	15	15	15	15
51	Night - Woodhill Drive	9:30 PM	12:30 AM	--	--	--	--	--	60	9:30 PM	12:30 AM	--	--	--	--	--	60
52	Night - Georgetown Road	9:30 PM	12:30 AM	--	--	--	--	--	60	9:30 PM	12:30 AM	--	--	--	--	--	60
58	Night - Versailles Road	9:30 PM	12:30 AM	--	--	--	--	--	60	9:30 PM	12:30 AM	--	--	--	--	--	60
59	Night - Eastland	9:30 PM	12:30 AM	--	--	--	--	--	60	9:30 PM	12:30 AM	--	--	--	--	--	60

Table 3-16: Mid-Term Proposed Sunday Service Plans

Route	Route Name	Near Term Proposed								Mid Term Proposed							
		Span of Service		Frequency						Span of Service		Frequency					
		Start	End	Early	AM	Mid	PM	Eve	Nite	Start	End	Early	AM	Mid	PM	Eve	Nite
1	Woodhill Drive	5:42 AM	9:20 PM	70	70	70	70	70	70	5:42 AM	9:20 PM	70	70	70	70	70	70
2	Georgetown Road	5:48 AM	9:15 PM	70	70	70	70	70	70	5:48 AM	9:15 PM	70	70	70	70	70	70
3	Tates Creek Road	5:53 AM	9:20 PM	70	70	70	70	70	70	5:53 AM	9:20 PM	70	70	70	70	70	70
4	South Newtown Pike	5:48 AM	9:15 PM	70	70	70	70	70	70	5:48 AM	9:15 PM	70	70	70	70	70	70
5	Nicholasville Road	5:50 AM	9:20 PM	70	70	70	70	70	60	5:50 AM	9:20 PM	70	70	70	70	70	60
6	North Broadway	5:44 AM	9:15 PM	70	70	70	70	70	70	5:44 AM	9:15 PM	70	70	70	70	70	70
7	North Limestone	5:45 AM	9:15 PM	70	70	70	70	70	70	5:45 AM	9:15 PM	70	70	70	70	70	70
8	Versailles Road	5:46 AM	9:15 PM	70	70	70	70	70	70	5:46 AM	9:15 PM	70	70	70	70	70	70
9	Eastland	5:53 AM	9:15 PM	70	70	70	70	70	70	5:53 AM	9:15 PM	70	70	70	70	70	70
10	Hamburg Pavilion	5:42 AM	9:25 PM	70	70	70	70	70	70	5:42 AM	9:25 PM	70	70	70	70	70	70
11	Richmond Road	5:47 AM	9:20 PM	70	70	70	70	70	70	5:47 AM	9:20 PM	70	70	70	70	70	70
12	Leestown Road	5:48 AM	9:20 PM	70	70	70	70	70	70	5:48 AM	9:20 PM	70	70	70	70	70	70
13	South Broadway	5:59 AM	9:10 PM	70	70	70	70	70	70	5:59 AM	9:10 PM	70	70	70	70	70	70
15	Red Mile	10:55 AM	7:02 PM	--	--	24	24	24	--	10:55 AM	7:02 PM	--	--	24	24	24	--
18	Centre Parkway Crosstown	7:24 AM	8:25 PM	0	70	70	70	70	--	7:24 AM	8:25 PM	--	70	70	70	70	--
22	Mercer Road	New Sunday Service								5:36 AM	8:10 PM	70	70	70	70	70	--
23	North Newtown Pike	5:48 AM	9:15 PM	70	70	70	70	70	70	5:48 AM	9:15 PM	70	70	70	70	70	70
25	Liberty Road	New Route								5:42 AM	9:25 PM	70	70	70	70	70	70
27	UK Yellow Route	12:00 PM	12:15 AM	--	--	15	15	15	15	12:00 PM	12:15 AM	--	--	15	15	15	15

Route 2: Georgetown Road — *Mid Term Plan*

Alignment Changes

Route 2 builds on the Near-Term Plan by extending the alignment further north on Georgetown Road. The remainder of the Near-Term alignment is maintained. The extension to the new Dairy Farm development is possible because of the service modifications made to St Martins Village, where Route 2 operates streamlined service on Georgetown Road.

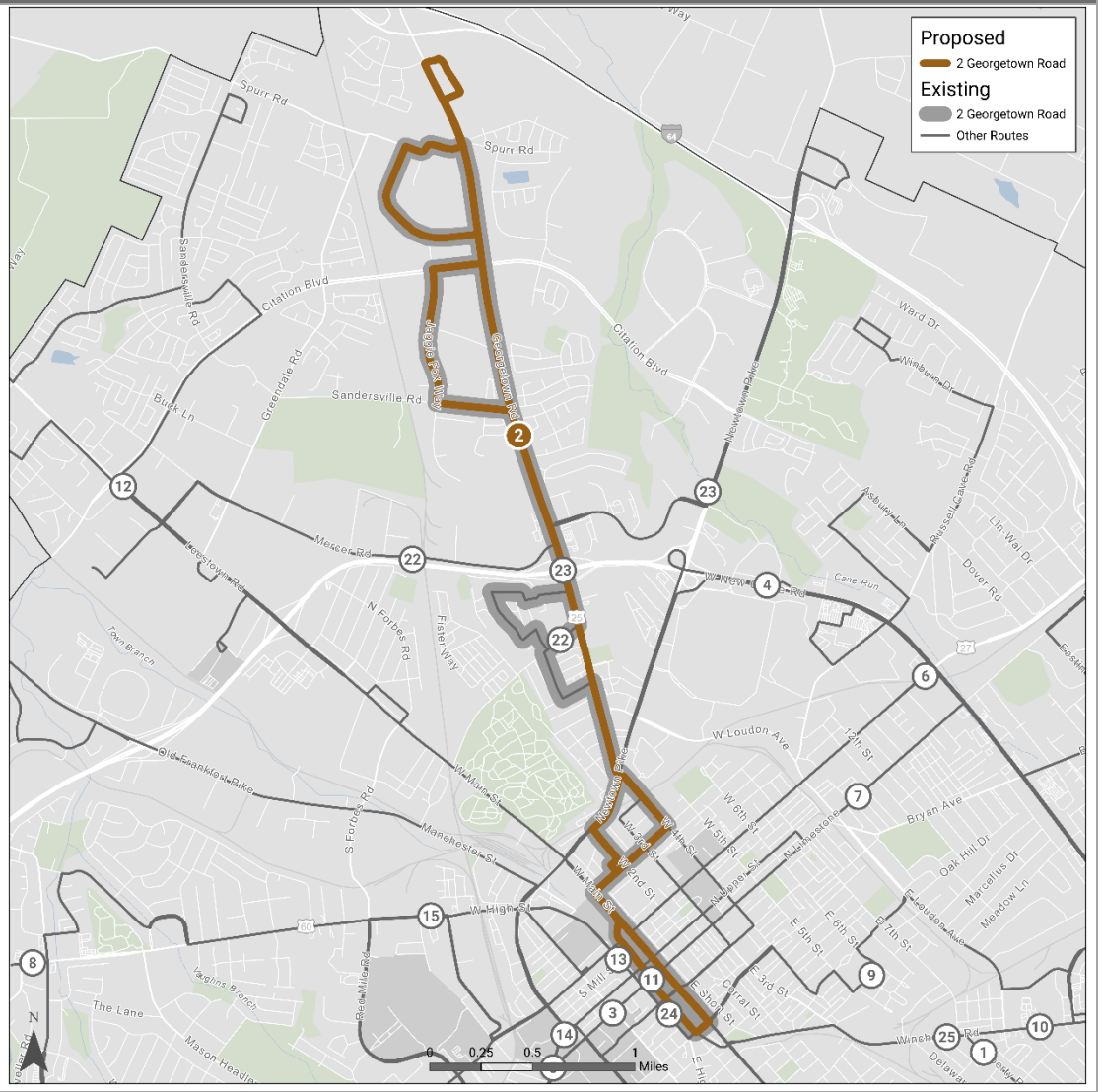
Service Changes

Route 2 Georgetown Road improves frequency from 70-minute headways in the Near-Term Plan to 35-minute service in the Mid-Term Plan. The frequency improvement would increase the number of vehicles required from one to two.

Service Plan

Span	Weekday	Saturday	Sunday
Svc Start	5:43 AM	5:48 AM	5:48 AM
Svc End	8:59 AM	8:59 AM	9:15 AM
Headway	**Weekday**	**Saturday**	**Sunday**
Early	35	70	70
AM	35	70	70
Mid	35	70	70
PM	35	70	70
Eve	60	70	70
Night	--	--	70

Proposed Alignment



Route 10: Hamburg Pavilion — *Mid-Term Plan*

Alignment Changes

Route 10 Hamburg Pavilion is recommended for alignment changes in the Mid Term Plan. The Mid-Term Plan builds on the Near-Term Plan by serving Sir Barton Way and Yankee Street in the outbound direction before serving the new Baptist Health Hospital. In the inbound direction, Route 10 would serve Buena Vista Road before running on Sir Barton Way and Meeting Street.

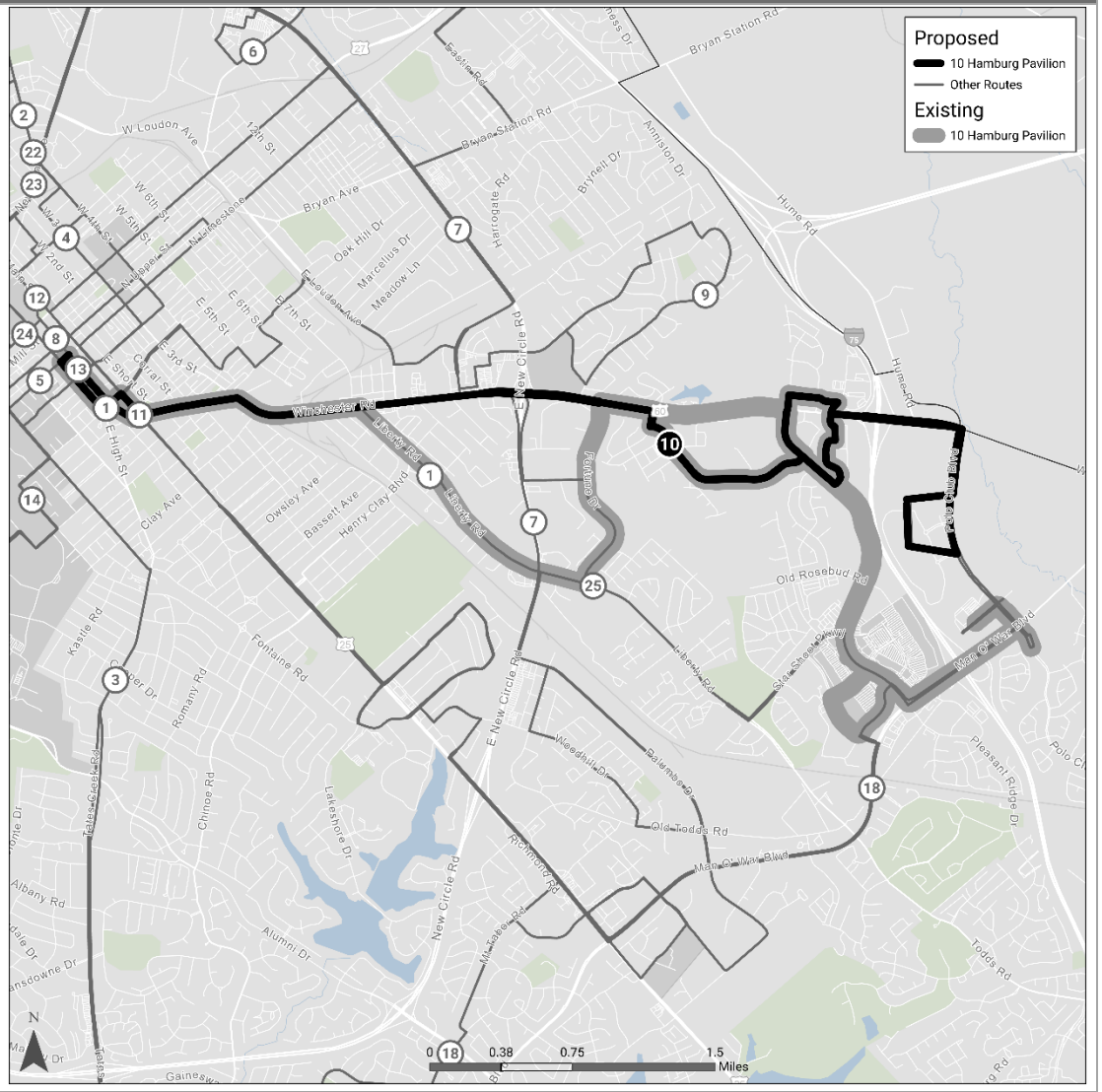
Service Changes

The Mid Term Plan for Route 10 maintains 35-minute headways on weekdays. The modified alignment, however, enables the route to operate with two vehicles instead of three.

Service Plan

Span	Weekday	Saturday	Sunday
Svc Start	5:21 AM	5:40 AM	5:42 AM
Svc End	12:20 AM	12:20 AM	9:25 PM
Headway	**Weekday**	**Saturday**	**Sunday**
Early	35	70	70
AM	35	70	70
Mid	35	70	70
PM	35	70	70
Eve	70	70	70
Night	70	70	70

Proposed Alignment



Route 18: Centre Parkway Crosstown — *Mid-Term Plan*

Alignment Changes

Route 18 builds on the Near-Term Plan alignment by extending the alignment from Hamburg Pavilion eastward on Man O' War Boulevard. Route 18 would operate to Polo club Boulevard to serve the apartments, retail, and Baptist Health Hospital.

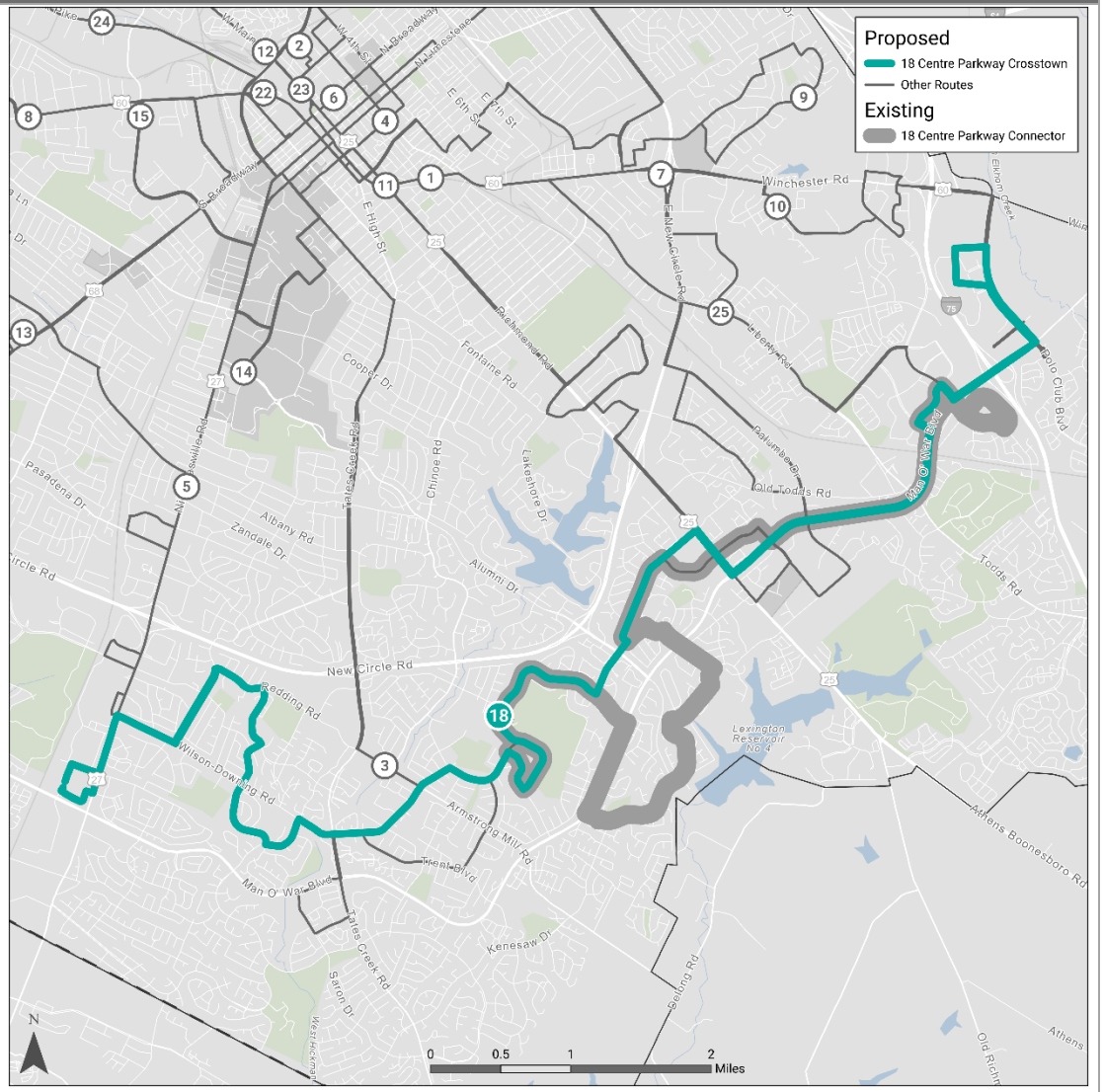
Service Changes

The Mid Term Plan maintains 45-minute service on Route 18, despite the increase in route length. This is achieved with the addition of a vehicle (from two to three revenue vehicles) to operate the service.

Service Plan

Span	Weekday	Saturday	Sunday
Svc Start	6:48 AM	7:24 AM	7:24 AM
Svc End	9:05 PM	8:25 PM	8:25 PM
Headway	**Weekday**	**Saturday**	**Sunday**
Early	--	--	--
AM	45	70	70
Mid	45	70	70
PM	45	70	70
Eve	70	70	70
Night	70	--	--

Proposed Alignment



Route 25: Liberty Road — *Mid-Term Plan*

Alignment Changes

Route 25 is a new route that would operate from the downtown transit center to Midland Avenue and Winchester Road before turning onto Liberty Road. The route would then turn from Liberty Road to Star Shoot Parkway and Sir Barton Way. The Route would terminate at the Costco and Cabela's turnaround via Man O' War Boulevard and Polo Club Boulevard.

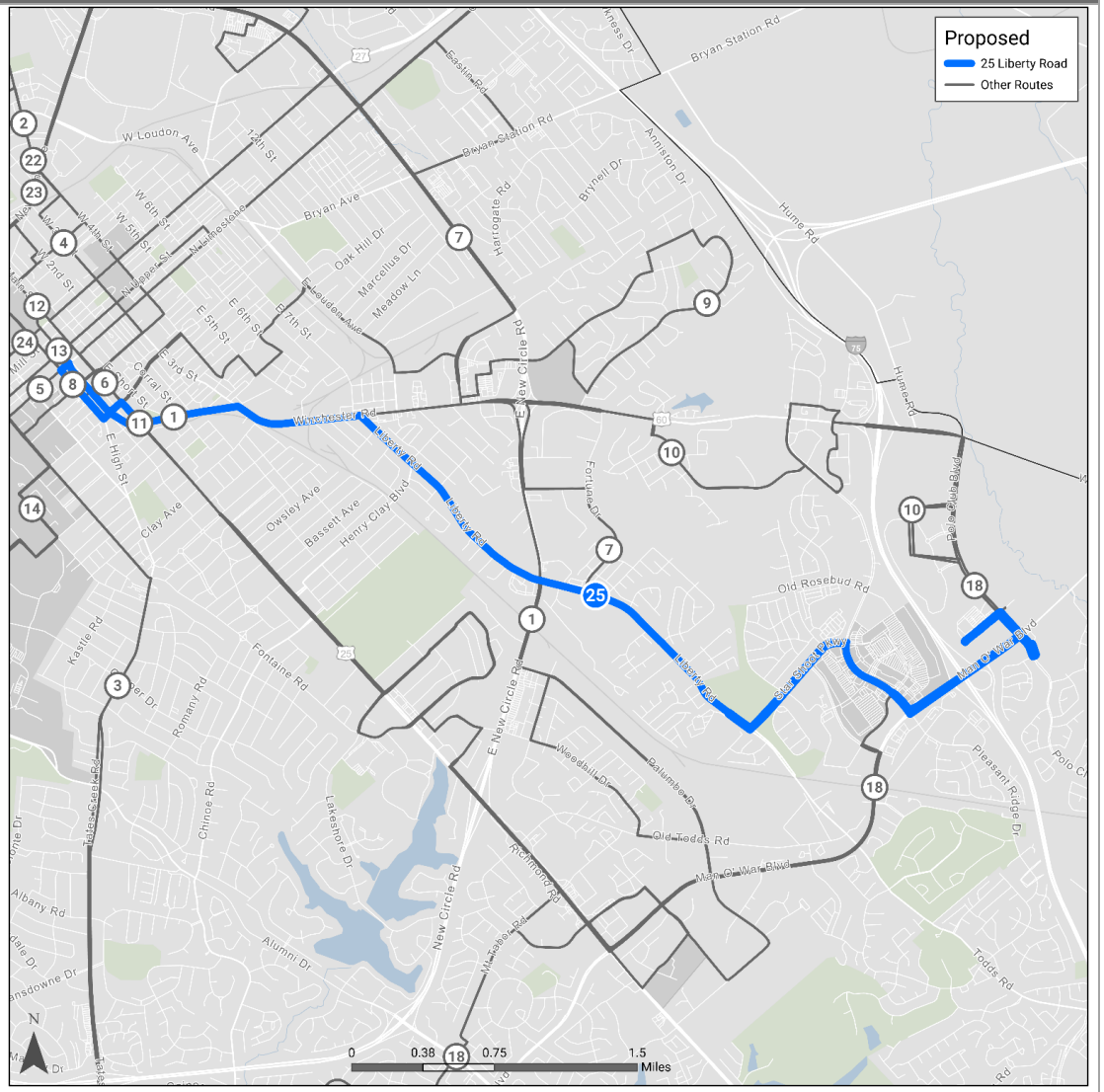
Service Changes

Route 25 would operate 35-minute headways during weekdays and 70-minute headways on weekends.

Service Plan

Span	Weekday	Saturday	Sunday
Svc Start	5:21 AM	5:40 AM	5:42 AM
Svc End	12:20 AM	12:20 AM	9:25 PM
Headway	**Weekday**	**Saturday**	**Sunday**
Early	35	70	70
AM	35	70	70
Mid	35	70	70
PM	35	70	70
Eve	60	70	70
Night	70	70	70

Proposed Alignment



3.5.2 Mid-Term Plan Operating Requirements & Costs

Operating requirements and costs for the mid-term plan were developed based on the service plans described in the previous section and assume implementation of the proposed interlining pairs. Estimated system operating statistics and costs are provided in **Table 3-17** and route-level details are provided in **Table 3-18.** Daily figures were multiplied by 254 weekdays, 52 Saturdays, and 59 Sundays/holidays to arrive at annual totals. Operations and maintenance (O&M) costs were estimated by applying the projected systemwide annual vehicle revenue hours and miles by Lextran's unit cost per vehicle revenue hour ($72.48) and revenue mile ($3.40). Cost figures are reported in FY2022 dollars.

- **Peak Buses:** The proposed service plan requires a peak fleet of 53 buses on weekdays, a net increase of one peak bus.
- **Revenue Hours:** The proposed service plan results in a net increase of approximately 21,700 annual revenue hours, a 10% increase over the existing network.
- **Revenue Miles:** The proposed service plan results in a net increase of approximately 250,200 annual revenue miles, an 11% increase over the existing network.
- **O&M Cost:** It is estimated that the near-term network will cost $25.2 million per year, a 10.7% increase over Lextran's fixed-route operating budget in FY2022.

Table 3-17: Mid-Term Plan System Operating Requirements and O&M Costs

Svc Type	Vehicle Revenue Hours	Vehicle Revenue Miles	Pk Vehicles	Annual O&M Cost
Weekday				
Core	112,000	1,268,700	30	$12,431,800
Frequent	17,300	157,700	5	$1,790,300
Crosstown	10,100	124,600	3	$1,152,500
Circulator	45,800	391,100	13	$4,650,900
Limited	4,100	44,600	2	$452,200
Night	3,000	40,400	0	$358,200
Subtotal	**192,300**	**2,027,100**	**53**	**$20,835,900**
Saturday				
Core	14,900	158,000	17	$1,614,400
Frequent	1,300	10,000	2	$131,700
Crosstown	1,000	16,800	2	$132,900
Circulator	1,700	15,500	3	$178,500
Night	600	8,300	0	$73,300
Subtotal	**19,500**	**208,600**	**23**	**$2,130,800**
Sunday				
Core	15,700	167,600	17	$1,711,200
Frequent	1,400	9,300	2	$129,900
Crosstown	1,100	18,200	2	$144,200
Circulator	1,900	17,300	3	$199,500
Subtotal	20,100	212,400	23	$2,184,800
Annual Total	**231,900**	**2,448,100**	**53**	**$25,151,500**
Change from Existing	**+21,700**	**+250,200**	**+1**	**+$2,440,100**
Percent Change from Existing	**+10%**	**+11%**	**+2%**	**+10.7%**

Table 3-18: Mid Term Plan Operating Requirements by Route

Route	Route Name	Svc Type	Daily Vehicle Revenue Hours			Daily Vehicle Revenue Miles			Daily One-Way Trips			Peak Vehicles		
			Wkd	Sat	Sun	Wkd	Sat	Sun	Wkd	Sat	Sun	Wkd	Sat	Sun
1	Woodhill Drive	Core	29	16	16	329	184	189	50	28	28	2.0	1.0	1.0
2	Georgetown Road	Core	28	16	16	287	161	161	48	27	27	2.0	1.0	1.0
3	Tates Creek Road	Core	41	27	22	543	312	261	54	31	26	2.5	1.5	1.5
4	South Newtown Pike	Core	32	19	16	392	231	189	56	33	27	2.0	1.0	1.0
5	Nicholasville Road	Frequent	68	26	23	621	193	158	106	33	27	5.0	1.5	1.5
6	North Broadway	Core	40	29	23	415	258	211	53	33	27	2.5	1.5	1.5
7	North Limestone	Core	28	16	16	293	161	161	49	27	27	2.0	1.0	1.0
8	Versailles Road	Core	42	32	32	432	248	248	47	27	27	3.0	2.0	2.0
	via Bluegrass Airport	Limited	8	--	--	112	--	--	14	--	--	1.0	--	--
9	Eastland	Core	28	16	16	273	153	153	48	27	27	2.0	1.0	1.0
10	Hamburg Pavilion	Core	32	19	16	367	214	180	55	32	27	2.0	1.0	1.0
11	Richmond Road	Core	28	16	16	309	174	180	48	27	28	2.0	1.0	1.0
12	Leestown Road	Core	23	16	16	316	214	214	40	27	27	2.0	1.0	1.0
13	South Broadway	Core	27	16	16	295	170	170	47	27	27	2.0	1.0	1.0
14	UK Blue (CW)	Circulator	57	--	--	526	--	--	143	--	--	4.0	--	--
	UK White (CC)	Circulator	57	--	--	526	--	--	143	--	--	4.0	--	--
15	Red Mile	Circulator	66	8	8	487	81	81	126	21	21	5.0	1.0	1.0
18	Centre Parkway Crosstown	Crosstown	40	20	19	491	322	308	35	23	22	3.0	1.5	1.5
22	Mercer Road	Core	15	15	15	153	153	153	25	25	25	1.0	1.0	1.0
23	North Newtown Pike	Core	18	16	16	202	176	176	31	27	27	1.0	1.0	1.0
24	Old Frankfort Pike	Limited	8	--	--	64	--	--	14	--	--	1.0	--	--
25	Liberty Road	Core	32	19	16	390	230	195	56	33	28	2.0	1.0	1.0
27	UK Yellow Road	Circulator	--	25	25	--	217	212	--	100	98	--	2.0	2.0
51	Night - Woodhill Drive	Night	3	3	--	37	37	--	6	6	--	0.0	0.0	--
52	Night - Georgetown Road	Night	3	3	--	42	42	--	6	6	--	0.0	0.0	--
58	Night - Versailles Road	Night	3	3	--	46	46	--	6	6	--	0.0	0.0	--
59	Night - Eastland	Night	3	3	--	33	33	--	6	6	--	0.0	0.0	--
Daily System Total			**757**	**377**	**342**	**7,980**	**4,010**	**3,601**	**1,312**	**632**	**573**	**53.0**	**23.0**	**23.0**

3.6 Long-Term Plan

While this COA focuses on short-range service priorities for implementation over the next five years, the project team identified additional long-term priorities to further enhance mobility throughout Lexington. These proposed improvements were identified based on a review of prior planning studies conducted by Lextran and LFCUG, an assessment of existing and forecasted conditions, and public and stakeholder input. As these proposed improvements exceed Lextran's current funding capacity, implementation will require additional new operating and capital funding sources.

3.6.1 Summary of Long-Term Service Priorities

The proposed weekday and weekend long-term system maps are provided in **Figure 3-14** and **Figure 3-15**. A summary of each service improvement is provided below.

New Crosstown Service

Expanded crosstown connections were identified by riders and stakeholders as a key improvement priority. The long-term vision plan proposes a new crosstown route, Route 26: NE Crosstown, which plans to connect several key locations across the northeast portions of Lexington. The dairy farm development would host the northwestern terminus of the route. The route would operate south on Georgetown Road before turning onto Citation Boulevard. Route 26 would operate on Citation Boulevard, utilizing the extension from Newtown Pike to Russell Cave Road. The route would connect at North Park Marketplace before serving the northeast portion of New Circle Road. Route 26 would terminate at the new Baptist Health facility off of Polo Club Boulevard via Winchester Road.

Route 26: NE Crosstown would connect to eight routes across the northeastern arc of Lexington, including:

- Route 2: Georgetown Road at the dairy farm development
- Route 23: North Newtown Pike at Citation Boulevard and Newtown Pike
- Route 4: North Newtown Pike at Citation Boulevard and Russell Cave Road (note: this section of Citation Boulevard has yet to be constructed)
- Route 6: North Broadway at North Park Marketplace
- Route 7: North Limestone on New Circle Road
- Route 9: Eastland on Eastland Parkway
- Route 10: Hamburg Pavilion on Winchester Road and Baptist Health
- Route 18: Centre Parkway Crosstown at Baptist Health

Nicholasville Road Bus Rapid Transit (BRT) Project

Building on the US 27/Nicholasville Road Alternatives Analysis study completed in 2014, the recent Imagine Nicholasville Road corridor study recommended implementation of a new BRT line as part of a multimodal transformation of this important corridor. The initial phase of the six-mile BRT line will run from Lextran's downtown transit center to Brannon Crossing, with longer-term plans to extend the line to Nicholasville. Between downtown and the UK campus, the BRT line will operate on Vine/High streets and South Upper/South Limestone streets, and the remainder of the alignment will run in both directions along Nicholasville Road.

The project includes twelve branded station stops and a new park-and-ride facility at the south end-of-line station at Brannon Crossing station. Other BRT stations would be located at the downtown transit center, the new Target store and mixed-use development on South Upper Street and Good Samaritan Hospital, the University of Kentucky, UK Medical Center, Baptist Health, Southland Drive, Pasadena Drive, Lexington Green, and the Summit at Fritz Farm.

A series of priority treatments will help buses travel faster and more reliably along the corridor, cutting transit travel time by up to 25%. Potential treatments that are being considered include a mix of Business Access-Transit (BAT) lanes, reversible bus-only lanes, and transit signal priority. A pre-paid fare system will reduce the time buses spend stopped at stations. The conceptual service plan assumes the BRT will operate at 15-minute headways throughout the day. Lextran will retain its current Route 5: Nicholasville Road to provide local service to all current stops along Nicholasville Road.

New Mobility On-Demand Service

Lextran should explore the feasibility of implementing a new mobility on-demand service in harder-to-serve areas of Lexington. Potential on-demand zones identified as part of this this COA study include the Northeast Zone (neighborhoods of Joyland, Winburn/Radcliff, and Bryan Station), Northwest Zone (Masterson Station neighborhood), Southeast Zone (neighborhoods of Southeastern Hills, Richmond Road, East Lake, Kirklevington Park, Lansdowne, and Lakewood), and Southwest Zone (neighborhoods of Wyndam Downs and Beaumont). Full details regarding mobility on-demand are provided in Chapter 4: Mobility On-Demand Action Plan.

Figure 3-14. Long-Term Weekday Route Network

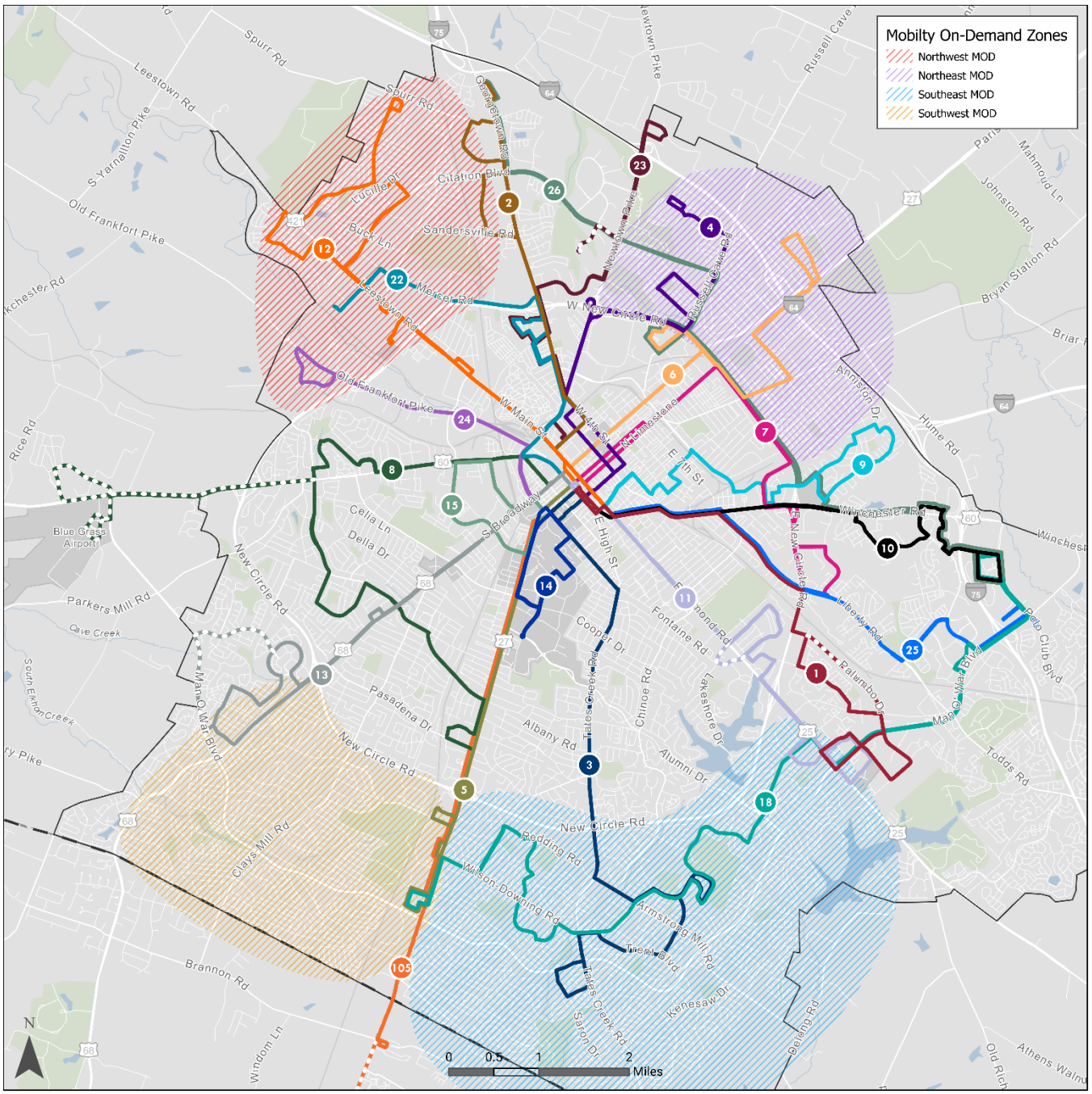
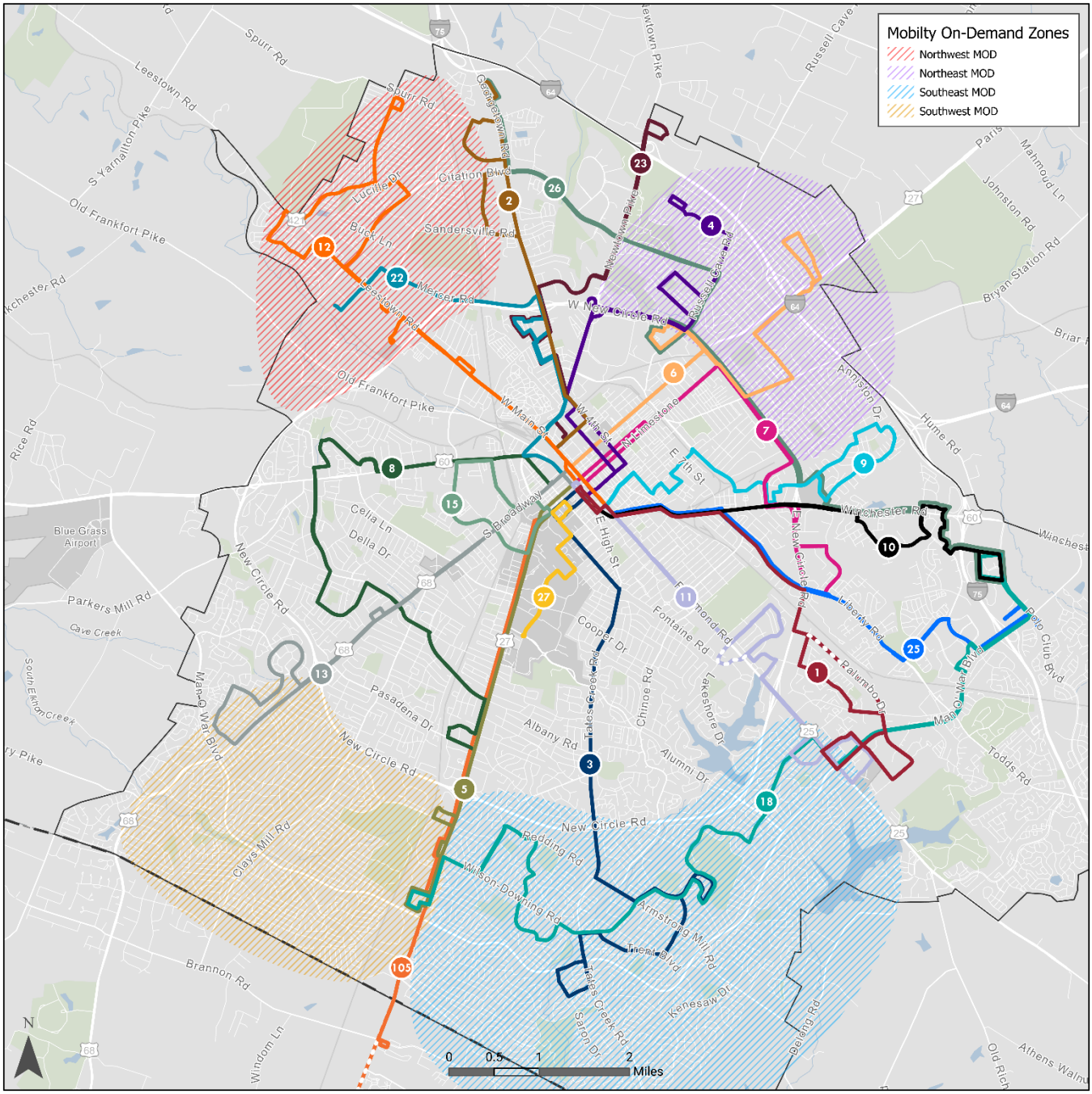


Figure 3-15. Long-Term Weekend Route Network



Note: Route 1 Woodhill Drive does not operate Palumbo Drive pattern on Sundays

3.6.2 Long-Term Plan Operating Requirements & Costs

Operating requirements and costs for the mid-term plan were developed based on the service plans described in the previous section and assume implementation of the proposed interlining pairs. Estimated system operating statistics and costs are provided in **Table 3-19** and route-level details are provided in **Table 3-20.** Daily figures were multiplied by 254 weekdays, 52 Saturdays, and 59 Sundays to arrive at annual totals. Operations and maintenance (O&M) costs were estimated by applying the projected systemwide annual vehicle revenue hours and miles by Lextran's unit cost per vehicle revenue hour ($72.48) and revenue mile ($3.40). Cost figures are reported in FY2022 dollars.

- **Peak Buses:** The proposed service plan requires a peak fleet of 59 buses on weekdays, a net increase of seven peak buses over the existing network.
- **Revenue Hours:** The proposed service plan results in a net increase of approximately 54,900 annual revenue hours, a 26% increase over the existing network.
- **Revenue Miles:** The proposed service plan results in a net increase of approximately 602,000 annual revenue miles, a 27% increase over the existing network.
- **O&M Cost:** It is estimated that the long-term network will cost $28.7 million per year, a 27% increase over Lextran's fixed-route operating budget in FY2022.

Table 3-19: Long Term Plan System Operating Requirements and O&M Costs

Svc Type	Vehicle Revenue Hours	Vehicle Revenue Miles	Peak Vehicles	Annual O&M Cost
Weekday				
Core	122,700	1,366,500	33	$13,542,200
BRT	21,700	220,700	6	$2,324,500
Crosstown	16,900	195,800	5	$1,888,400
Circulator	45,800	391,100	13	$4,650,900
Limited	4,100	44,600	2	$452,200
Night	3,000	40,400	0	$358,200
Subtotal	**214,200**	**2,259,100**	**59**	**$23,216,400**
Saturday				
Core	16,200	167,200	19	$1,741,300
BRT	4,300	44,800	6	$461,400
Crosstown	2,400	30,700	4	$277,000
Circulator	1,700	15,500	3	$178,500
Night	600	8,300	0	$73,300
Subtotal	**25,200**	**266,500**	**31**	**$2,731,500**
Sunday				
Core	17,100	176,700	19	$1,840,300
BRT	4,000	46,300	5	$446,000
Crosstown	2,700	34,000	4	$307,800
Circulator	1,900	17,300	3	$199,500
Subtotal	**25,700**	**274,300**	**30**	**$2,793,600**
Annual Total	**265,100**	**2,799,900**	**59**	**$28,741,500**
Change from Existing	**+54,900**	**+602,000**	**+7**	**+6,030,100**
Percent Change from Existing	**+26%**	**+27%**	**+13%**	**+27%**

Table 3-20: Long Term Plan Operating Requirements by Route

Route	Route Name	Svc Type	Daily Vehicle Revenue Hours			Daily Vehicle Revenue Miles			Daily One-Way Trips			Peak Vehicles		
			Wkd	Sat	Sun	Wkd	Sat	Sun	Wkd	Sat	Sun	Wkd	Sat	Sun
1	Woodhill Drive	Core	29	16	16	329	184	189	50	28	28	2.0	1.0	1.0
2	Georgetown Road	Core	28	16	16	287	161	161	48	27	27	2.0	1.0	1.0
3	Tates Creek Road	Core	41	27	22	543	312	261	54	31	26	2.5	1.5	1.5
4	South Newtown Pike	Core	32	19	16	392	231	189	56	33	27	2.0	1.0	1.0
5	Nicholasville Road	Core	38	25	23	322	182	158	55	31	27	3.0	1.5	1.5
6	North Broadway	Core	40	29	23	415	258	211	53	33	27	2.5	1.5	1.5
7	North Limestone	Core	28	16	16	293	161	161	49	27	27	2.0	1.0	1.0
8	Versailles Road	Core	42	32	32	432	248	248	47	27	27	3.0	2.0	2.0
	via Bluegrass Airport	Limited	8	--	--	112	--	--	14	--	--	1.0	--	--
9	Eastland	Core	28	16	16	273	153	153	48	27	27	2.0	1.0	1.0
10	Hamburg Pavilion	Core	32	19	16	359	209	176	55	32	27	2.0	1.0	1.0
11	Richmond Road	Core	28	16	16	309	174	180	48	27	28	2.0	1.0	1.0
12	Leestown Road	Core	28	16	16	388	214	214	49	27	27	2.0	1.0	1.0
13	South Broadway	Core	27	16	16	295	170	170	47	27	27	2.0	1.0	1.0
14	UK Blue (CW)	Circulator	57	--	--	526	--	--	143	--	--	4.0	--	--
	UK White (CC)	Circulator	57	--	--	526	--	--	143	--	--	4.0	--	--
15	Red Mile	Circulator	66	8	8	487	81	81	126	21	21	5.0	1.0	1.0
18	Centre Parkway Crosstown	Crosstown	40	20	19	491	322	308	35	23	22	3.0	1.5	1.5
22	Mercer Road	Core	15	15	15	153	153	153	25	25	25	1.0	1.0	1.0
23	North Newtown Pike	Core	18	16	16	202	176	176	31	27	27	1.0	1.0	1.0
24	Old Frankfort Pike	Limited	8	--	--	64	--	--	14	--	--	1.0	--	--
25	Liberty Road	Core	32	19	16	390	230	195	56	33	28	2.0	1.0	1.0
26	NE Crosstown	Crosstown	27	26	26	280	268	268	23	22	22	2.0	2.0	2.0
27	UK Yellow Route	Circulator	--	25	25	--	217	212	--	100	98	--	2.0	2.0
51	Night - Woodhill Drive	Night	3	3	--	37	37	--	6	6	--	0.0	0.0	--
52	Night - Georgetown Road	Night	3	3	--	42	42	--	6	6	--	0.0	0.0	--
58	Night - Versailles Road	Night	3	3	--	46	46	--	6	6	--	0.0	0.0	--
59	Night - Eastland	Night	3	3	--	33	33	--	6	6	--	0.0	0.0	--
105	Nicholasville BRT	BRT	86	82	68	869	862	784	123	122	111	6.0	6.0	5.0
Grand Total			**844**	**484**	**435**	**8,894**	**5,124**	**4,650**	**1,416**	**774**	**706**	**59.0**	**31.0**	**30.0**

3.6.3 Service Level Enhancement Scenarios

As an additional long-term visioning exercise, the project team evaluated three service enhancement scenarios. The purpose of this analysis was to determine the operating cost required to bring the near-term, mid-term, and long-term networks into conformance with a set of "aspirational" service standards. **Table 3-21** identifies the service standards that served as the basis of this analysis, with green shading indicating service improvements. The three service level enhancement scenarios are summarized below.

1 **Increase Frequency:** Improve all core routes to operate 35 minutes all-day on weekdays, Saturdays, and Sundays.
2 **Extend Span of Service:** Extend hours of operation by one hour on weekdays and weekends. This scenario assumes discontinuation of the 50-series night routes and replaces them with late-night service on all daytime routes.
3 **Increase Span and Frequency:** This scenario assumes both increased frequency and extended service spans.

Table 3-21: Aspirational Service Standards

Service Type	Days of Service	Day	Proposed Service Standards				Aspirational Service Standards			
			Minimum Span	Minimum Headway			Minimum Span	Minimum Headway		
				Peak	Base	Eve		Peak	Base	Eve
Core	Mon-Sun	Wkd	5:30 AM - 12:30 AM	35	35	70	5:00 AM - 1:00 AM	35	35	70
		Sat	5:30 AM - 12:30 AM	70	70	70	5:00 AM - 1:00 AM	35	35	70
		Sun	6:00 AM - 9:30 PM	70	70	70	5:30 AM - 10:00 PM	35	35	70
Core Frequent	Mon-Sun	Wkd	5:30 AM - 12:30 AM	15	15	70	5:00 AM - 1:00 AM	15	15	70
		Sat	5:30 AM - 12:30 AM	70	70	70	5:00 AM - 1:00 AM	35	35	70
		Sun	6:00 AM - 9:30 PM	70	70	70	5:30 AM - 10:00 PM	35	35	70
Crosstown	Mon-Sun	Wkd	7:00 AM - 9:00 PM	70	70	70	5:00 AM - 1:00 AM	35	35	70
		Sat	7:30 AM - 8:30 PM	70	70	70	5:00 AM - 1:00 AM	35	35	70
		Sun	7:30 AM - 8:30 PM	70	70	70	5:30 AM - 10:00 PM	35	35	70
Limited	Mon-Fri	Wkd	6:00 AM - 7:00 PM	70	--	--	6:00 AM - 7:00 PM	70	70	70
Circulator	Varies	Wkd	Varies based on demand	Varies based on demand			Varies based on demand	Varies based on demand		
		Sat								
		Sun								

The findings of the service level enhancement analysis are summarized in **Table 3-22**. Operating requirements and cost figures are provided for each scenario and plan phase. The incremental operating costs represent the total additional annual cost required to implement each scenario for each plan phase compared to the existing network. The key findings are summarized below:

- **Frequency Enhancements:** Improving the frequency of the near-term network would require an additional $4.9 million in annual operating costs compared to the existing network, a 17% increase. The mid-term and long-term networks would require an additional 21% and 33% in annual operating costs, respectively.
- **Span Enhancements:** Improving the span of the near-term network would require an additional $2.9 million in annual operating costs compared to the existing network, an 11% increase. The mid-term and long-term networks would require an additional 16% and 26% in annual operating costs, respectively.
- **Frequency and Span Enhancements:** Improving both the frequency and span of the near-term network would require an additional $7.2 million in annual operating costs compared to the existing network, a 28% increase. The mid-term and long-term networks would require an additional 32% and 43% in annual operating costs, respectively.

Table 3-22: Service Level Enhancement Cost Impacts

Scenario	Annual Vehicle Revenue Hours	Annual Vehicle Revenue Miles	Peak Vehicles	Annual O&M Cost	Incremental O&M Cost over Existing	Incremental O&M Cost Percent Increase
Existing	210,200	2,197,900	52	$22,711,400	n/a	n/a
Near Term Plan	214,600	2,287,600	49	$23,329,000	$617,600	2.7%
Mid Term Plan	232,200	2,448,000	53	$25,151,500	$2,440,100	10.5%
Long Term Plan	265,200	2,799,800	59	$28,741,500	$6,030,100	24.0%
Frequency Enhancements						
Near Term Plan	254,500	2,694,800	55	$27,605,800	$4,894,400	17.0%
Mid Term Plan	264,200	2,857,100	56	$28,866,300	$6,154,900	20.6%
Long Term Plan	303,100	3,273,100	63	$33,100,900	$10,389,500	33.2%
Span Enhancements						
Near Term Plan	238,100	2,464,300	50	$25,633,400	$2,922,000	10.6%
Mid Term Plan	251,800	2,635,100	53	$27,212,500	$4,501,100	15.6%
Long Term Plan	289,600	3,045,800	59	$31,347,800	$8,636,400	26.1%
Span & Headway Enhancements						
Near Term Plan	276,000	2,917,700	55	$29,926,500	$7,215,100	28.1%
Mid Term Plan	286,300	3,095,000	56	$31,277,100	$8,565,700	31.5%
Long Term Plan	331,000	3,581,200	63	$36,167,400	$13,456,000	42.9%

3.7 Customer Impacts

This section describes the potential customer impacts of the proposed service changes presented in this fixed-route action plan. Section 3.8.1 provides a summary of the service area coverage impacts in terms of existing riders, people, and jobs within walking distance of the proposed routes for the near-term, mid-term, and long-term plans. Section 3.8.2 provides a Title VI service equity assessment of the proposed near-term service plan.

3.7.1 Coverage Impacts

Demographic and ridership data were utilized to measure the service area coverage impacts for the existing and proposed transit networks. Demographic variables from the 2020 American Community Survey (ACS) and job data from the 2019 LEHD datasets were utilized to show the relative gains and losses between the existing and recommended transit networks. The figures shown in **Table 3-23** summarize the total population, minority population, low-income population (based on a definition of 150% of the poverty line), households, and carless households that have access to the proposed networks within a quarter mile of each route. Stop-level ridership data from Fall 2019 were utilized to quantify the existing ridership that is served by the proposed networks, as shown in **Figure 3-16** through **Figure 3-18**. General findings at the system level are discussed first, followed by a deeper investigation into the specific areas that would gain and lose transit service in the Near-Term Network.

System-Level Coverage Impacts

The Near-Term Network will maintain or improve service for nearly all existing riders. A total of 99.8% of existing weekday riders will continue to have service within a quarter-mile distance of the proposed route alignments. On weekends, 99.7% of riders on Saturdays and 99.9% on Sundays will retain service within walking distance. Ridership is maintained at such high percentages because very few service areas were eliminated. Furthermore, ridership is very low on the segments that were eliminated (an average of 33 on weekdays, 20 on Saturdays, and 3 on Sundays).

The Near-Term Network demographic coverage analysis shows a slight redistribution of resources from weekdays to weekends. Population coverage decreases by 3.2% on weekdays, most of which can be attributed to Route 18: Centre Parkway Connector being realigned to stay inside Man O' War Boulevard in the East Lake area. The total population coverage is essentially unchanged on Saturdays but increases by 8.5% on Sundays due to weekend service expansion in the Joyland, Bryan Station, Southland Drive, and Centre Parkway neighborhoods. Other demographic variables are included in **Table 3-23**, but a deeper investigation into equity populations is provided in the Title VI Assessment presented later in this section.

Neighborhood-Level Coverage Impacts

Neighborhood-level coverage impacts were assessed in terms of areas that will receive new coverage and those that will see reduced coverage based on the proposed service changes. Areas with new coverage in the Near-Term Plan include:

- **Retail development at Tates Creek Road and Man O' War Boulevard.** Extending the Route 18: Centre Parkway Connector would enable the shortening of Route 3: Tates Creek Road and

provide additional time in the schedule to reach additional local retail. This additional coverage provides residents along Route 3: Tates Creek Road access to nearby grocery stores.

- **Dunbar High School.** Route 13: South Broadway currently extends to Beaumont but does not reach Dunbar High School. Extending Route 13 to Dunbar High School on select trips would give students an opportunity to use transit to get to school and after school activities.
- **Shopping center at Lowry Lane and Nicholasville Road.** Although Route 5: Nicholasville Road operates nearby, there is currently no transit service on Lowry Lane to access the retail development on that street. Discontinuing Route 16: Southland Drive and reallocating the resources to Route 8: Versailles Road would provide new retail access and transfer opportunities for residents living along Versailles Road, Alexandria Drive, and Southland Drive.
- **Weekend service to Joyland, Bryan Station, and Southland Drive.** The existing transit network does not include weekend service to the neighborhoods in Joyland, Bryan Station, and along Southland Drive. Expansion of weekend service significantly increases access to jobs, retail, and other opportunities for residents living in these neighborhoods.
- **Sunday service on Route 18: Centre Parkway Connector.** Route 18: Centre Parkway Connector does not operate currently on Sundays. The improved Route 18: Centre Parkway Connector would operate seven days a week in the Near-Term Plan.

Areas with reduced coverage in the Near-Term Plan include:

- **Haggard Lane and Radcliffe Road on Route 17: Northside Connector.** Route 17: Northside Connector underperforms in terms of ridership (approximately 4 daily weekday riders) and has been recommended for discontinuation. Instead, the Joyland and Bryan Station neighborhoods are proposed to be served by the revised Route 6: North Broadway. Although Haggard Lane and Radcliffe Road lose service, the overall service to these neighborhoods represents a significant improvement by connecting to the downtown transfer center and improving from 70-minute headways to 35-minute headways on weekdays.
- **Fontaine Road on Route 1 Woodhill Drive.** Fontaine Road is flanked by higher income neighborhoods and produces very little ridership (approximately 13 daily riders on weekdays). Service is recommended to be realigned to Liberty Road to enable the restructuring of Route 10: Hamburg Pavilion. This tradeoff better aligns service supply with demand, as well as streamlines Route 10: Hamburg Pavilion to maintain more consistent service along Winchester Road.
- **Buckhorn Drive and Squires Road on Route 18 Centre Parkway Connector.** Route 18's poor performance is likely the result of long travel times. Route 18 is recommended for realignment to reduce out of direction travel time for passengers onboard, including the discontinuation of service outside of Man O' War Boulevard that produces only 13 daily weekday boardings. Eliminating the service on this portion of the route helps provide the time needed to reach key retail destinations and transfer opportunities along Nicholasville Road. The route is recommended for a headway improvement from 70-minutes to 45-minutes on weekdays, as well as adding new Sunday service.
- **Pleasant Ridge Drive and Bryant Road on Route 18: Centre Parkway Connector.** Route 18 would also lose service to this area in the Near-Term Plan. This small segment has approximately 3 riders a day. Eliminating the deviation on Pleasant Ridge Drive and Bryant Road would help create the additional time needed to operate to Nicholasville Road on the western end of the revised alignment.

Table 3-23: Fall 2019 Ridership and 2020 Demographic Coverage Impacts by Plan Phase

Metric		Existing Network	Near-Term Network			Mid-Term Network			Long-Term Network		
			Total	Absolute Change	Percent Change	Total	Absolute Change	Percent Change	Total	Absolute Change	Percent Change
Weekday											
Ridership	**Within ¼ Mile**	17,898	17,865	-33	-0.2%	17,860	-38	-0.2%	17,860	-38	-0.2%
	Within ½ Mile	17,898	17,885	-13	-0.1%	17,885	-13	-0.1%	17,885	-13	-0.1%
Demographics (within ¼ mile of proposed route)	**Population**	177,800	173,100	-4,700	-3%	174,900	-2,900	-2%	177,800	0	0.0%
	Minority Population	64,200	62,100	-2,100	-3%	62,800	-1,400	-2%	63,700	-500	-1%
	Low-Income	53,900	52,800	-1,100	-2%	53,100	-800	-1%	53,700	-200	-0.4%
	Households	82,000	80,100	-1,900	-2%	80,900	-1,100	-1%	82,100	100	0.1%
	Carless Households	7,600	7,600	0	0.0%	7,600	0	0.0%	7,600	0	0.0%
	Jobs	136,000	137,300	1,300	1%	139,500	3,500	3%	140,700	4,700	3%
Saturday											
Ridership	**Within ¼ Mile**	6,132	6,112	-20	-0.3%	6,113	-19	-0.3%	6,113	-19	-0.3%
	Within ½ Mile	6,132	6,125	-8	-0.1%	6,125	-8	-0.1%	6,125	-8	-0.1%
Demographics (within ¼ mile of proposed route)	**Population**	166,300	166,900	600	0.4%	170,100	3,800	2%	173,200	6,876	4%
	Minority Population	60,600	59,800	-800	-1%	60,900	300	0.5%	62,000	1,426	2%
	Low-Income	51,600	51,700	100	0.2%	52,300	700	1%	52,800	1,266	2%
	Households	77,300	77,600	300	0.4%	79,000	1,700	2%	80,300	3,032	4%
	Carless Households	7,300	7,400	100	1%	7,500	200	3%	7,500	214	3%
	Jobs	126,700	129,300	2,600	2%	133,800	7,100	6%	135,200	8,523	7%
Sunday											
Ridership	**Within ¼ Mile**	5,122	5,120	-3	0.0%	5,121	-2	0.0%	5,121	-2	0.0%
	Within ½ Mile	5,122	5,122	0	0.0%	5,122	0	0.0%	5,122	0	0.0%
Demographics (within ¼ mile of proposed route)	**Population**	153,800	166,900	13,100	9%	170,100	16,300	11%	173,200	19,427	13%
	Minority Population	55,800	59,800	4,000	7%	60,900	5,100	9%	62,000	6,131	11%
	Low-Income	48,500	51,700	3,200	7%	52,300	3,800	8%	52,800	4,322	9%
	Households	71,500	77,600	6,100	9%	79,000	7,500	10%	80,300	8,811	12%
	Carless Households	7,100	7,400	300	4%	7,500	400	6%	7,500	425	6%
	Jobs	122,600	129,300	6,700	5%	133,800	11,200	9%	135,200	12,656	10%

Figure 3-16: Near Term Plan Weekday Ridership Coverage

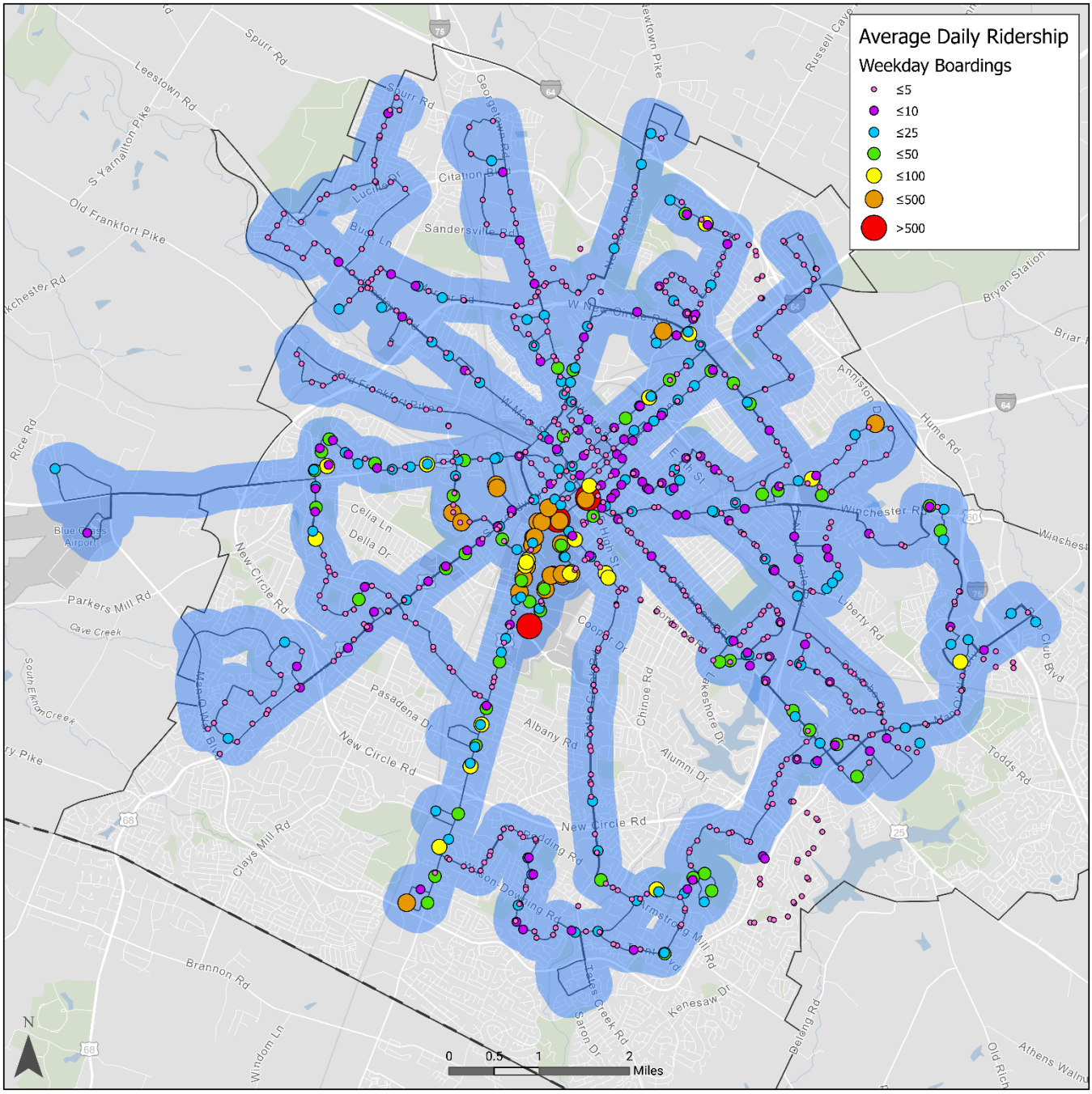


Figure 3-17: Near Term Plan Saturday Ridership Coverage

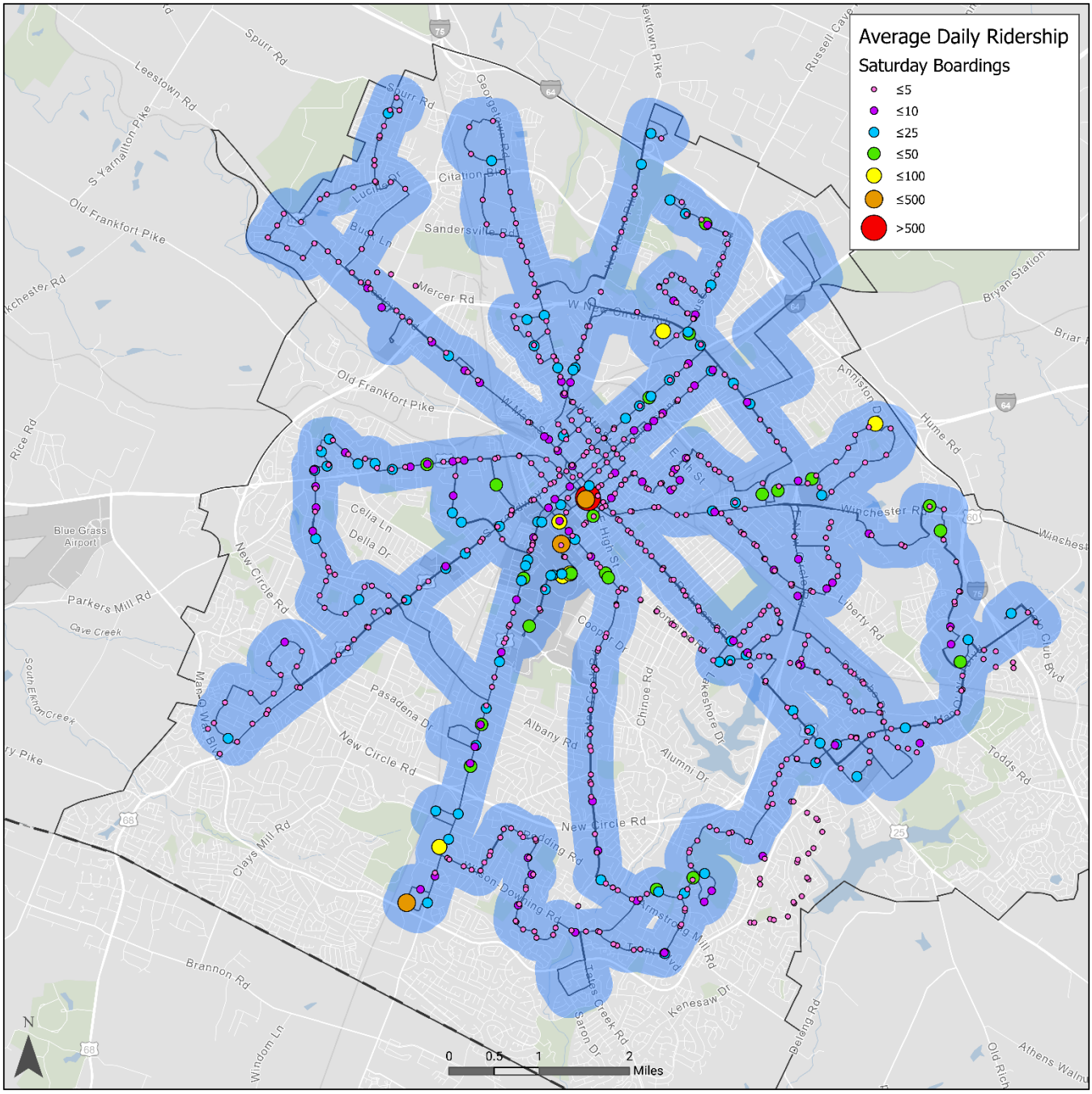
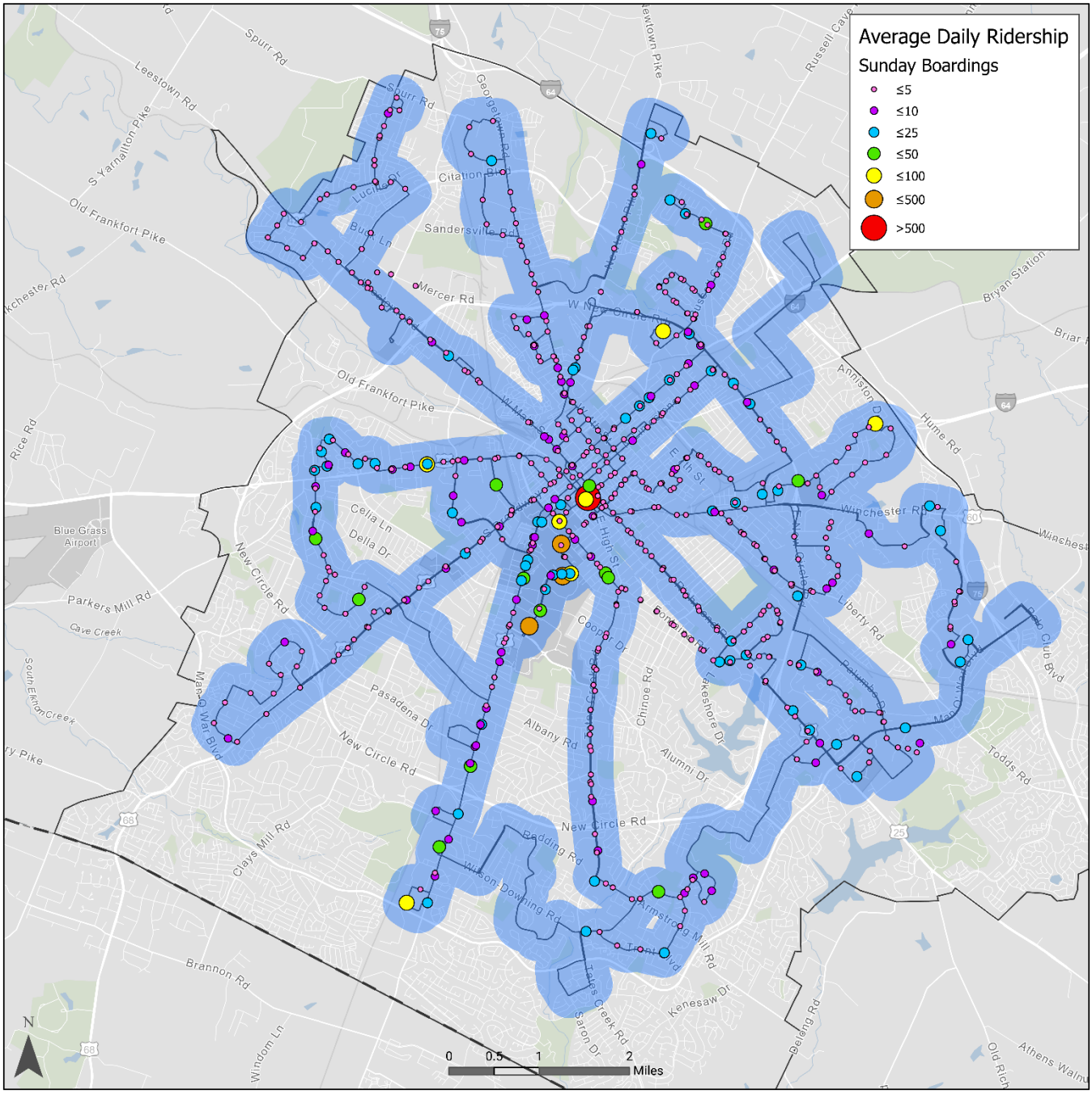


Figure 3-18: Near Term Plan Sunday Ridership Coverage



3.7.2 Title VI Assessment

Per Title VI of the Civil Rights Act of 1964, the Federal Transit Administration (FTA) requires larger transit providers (operating 50 or more fixed-route vehicles in peak service) to conduct a service equity analysis for any proposed major service change. This section summarizes the findings of a Title VI service equity analysis that was conducted for the proposed Near-Term service plan using a multi-level approach at both a route and system level.

Lextran's Title VI Definitions

Lextran defines a major service change as any service modification that impacts 25 percent or more of the service miles or service hours on a transit route. A total of 17 of Lextran's 25 routes are recommended for significant change in the Near-Term Plan, including major route realignments, frequency changes, and route eliminations. As such, a Service Equity Analysis was conducted to detect any potential disparate impacts or disproportionate burdens to minority and low-income populations.

Per the Lextran Title VI policy, a disparate impact (DI) occurs when "a major service impacts a minority population more than plus or minus 20 percent of the non-minority population". A disproportionate burden (DB) occurs when "a major service change impacts a low-income group more than plus or minus 20 percent of the non- low-income population". Minority is defined here as any person that does not identify as white non-Hispanic. Low income is defined as any person living in a household below 150% of the poverty level.

Route-Level Equity Analysis

The route-level equity analysis involves a three-step process. First, equity routes are identified by comparing route-level minority (disparate impact) and low-income (disproportionate burden) percentages to system-level averages. Routes that exceed 20% of the system average minority and/or low-income percentages are defined as equity routes. Second, for equity routes that exceed either the DI or DB threshold, a determination is made as to whether the proposed service modification rises to the level of a major service change. Finally, equity routes with proposed major service changes were flagged for further investigation. According to its Title VI policy, Lextran may proceed with a major service change if there is substantial legitimate justification for the proposed service change and there are no alternatives that would decrease the disparate impact or disproportionate burden while accomplishing the goals of the service change.

For this analysis, equity routes were identified using two separate data sources. The first source utilized on-board survey (OBS) data collected in 2021. The OBS dataset collected many datapoints on Lextran riders, including race, household income, and household size. The information collected on race was utilized to calculate the number of riders who identify as a race/ethnicity other than white non-Hispanic, used here to determine minority status. Because poverty level varies based on household size, low-income riders were identified using both the annual household income as well as the number of people living in the household.

The second source utilized 2020 5-year ACS data at the census block group (CBG) level. Census block groups located within a quarter mile of each route were included in the calculation of route and system-level minority and low-income population percentages.

As shown in **Table 3-24**, the route-level equity analysis flagged seven routes that exceed Lextran's DI/DB thresholds. Four routes meet the definition of equity routes based on the minority population threshold using the OBS dataset: Route 9: Eastland, Route 12: Leestown Road, Route 18: Centre Parkway Connector, and Route 22: Mercer Road. The ACS dataset did not flag any minority routes. Three routes meet the definition of equity routes based on the low-income population threshold using the ACS dataset: Route 14: UK Blue and UK White, Route 15: Red Mile, and Route 24: Old Frankfort Pike. The OBS dataset did not flag any low-income routes.

Of the seven equity routes identified through this analysis, four are proposed for major service changes as part of the near-term plan. These routes are further described below:

- **Route 9: Eastland** is recommended for route realignment. The service miles and hours will remain consistent with the existing service, however. The existing alignment of Route 9: Eastland will be maintained by the recommended Route 9: Eastland or Route 7: Limestone routes. Therefore, all areas currently being served by Route 9: Eastland will continue to be served. The justification for realigning the routes is to create more direct travel paths for passengers and to create better connections. In addition, there is no direct connection between Route 9: Eastland and Route 7: Limestone. By realigning the two routes, the recommendations create a common transfer location at Eastland Shopping Center, thereby improving access to other routes without forcing passengers to travel all the way to the transfer center.
- **Route 18: Centre Parkway Connector** is recommended for route extension and frequency improvement. These changes will provide residents living along the route better access to additional destinations, improved transfer opportunities, more frequent weekday and weekend service, and new service on Sundays.
- **Route 22: Mercer Road** is recommended for route realignment. The route segments that are recommended for realignment are still served by the recommended routes. Per the recommendations, Newtown Pike is served by Route 4: South Newtown Pike, and Nandino Boulevard is served by a new Route 23: North Newtown Pike.
- **Route 24: Old Frankfort Pike** is recommended for route realignment. The sections of the existing route that are being realigned, will continue to be served by Route 15: Red Mile and Route 13: South Broadway. The realigned Route 24 provides additional access to the transit network along Manchester Street that is currently not served, thereby improving the overall service to nearby neighborhoods.

Table 3-24: Title VI Equity Routes

Route	Service Change	2021 On-Board Survey Results		2020 ACS Data	
		Percent Low Income	Percent Minority	Percent Low Income	Percent Minority
1 Woodhill Drive	Route realignment	49.3%	55.0%	33.8%	27.5%
2 Georgetown Road	Route realignment, frequency reduction	62.6%	58.5%	36.6%	39.9%
3 Tates Creek Road	Route realignment	70.5%	45.5%	29.2%	26.7%
4 Newtown Pike	Route realignment	57.0%	53.7%	40.4%	49.3%
5 Nicholasville Road	No change	60.7%	49.0%	40.9%	23.8%
6 North Broadway	Route realignment	65.5%	67.1%	39.0%	43.4%
7 North Limestone	Route realignment	60.1%	41.0%	39.4%	33.4%
8 Versailles Road	Route extension	54.1%	43.5%	44.1%	35.6%
9 Eastland	Route realignment	80.5%	81.7%	37.1%	30.6%
10 Hamburg Pavilion	Route realignment	54.5%	57.2%	29.0%	30.6%
11 Richmond Road	Adding pattern	53.9%	43.6%	31.4%	30.9%
12 Leestown Road	No change	42.3%	77.4%	28.4%	34.6%
13 South Broadway	Adding pattern	48.9%	49.0%	32.8%	22.8%
14 UK Blue and UK White	No change	71.9%	32.9%	62.4%	23.6%
15 Red Mile	No change	77.0%	42.1%	60.7%	29.5%
16 Southland Drive	Route elimination	18.4%	31.5%	34.3%	20.2%
17 Northside Connector	Route elimination	29.7%	40.0%	33.1%	44.5%
18 Centre Parkway Connector	Route extension, frequency improvement	44.1%	82.1%	23.6%	34.3%
22 Mercer Road	Route realignment	39.5%	83.3%	40.2%	40.0%
24 Old Frankfort Pike	Route realignment	-	-	53.0%	31.1%
51 Night Woodhill Drive	Route realignment	48.1%	33.4%	31.0%	28.6%
52 Night Georgetown Road	No change	43.1%	42.5%	32.8%	37.9%
58 Night Versailles Road	No change	80.1%	14.9%	36.7%	31.2%
59 Night Eastland	No change	82.3%	64.7%	38.3%	33.9%
System Average		63.3%	47.6%	27.6%	32.4%
Equity Threshold	*+20% of system average*	**83.3%**	**67.6%**	**47.6%**	**52.4%**

1. Highlighted cells indicate a route exceeding the equity threshold for disparate impact or disproportionate burden.

System-Level Equity Analysis

An equity analysis was conducted to understand neighborhood level impacts from system-wide transit network changes. Areas with high and low percentages of equity populations are mapped based on Lextran's Title VI threshold of 20% plus or minus the average, shown in **Figure 3-19** (minority) and **Figure 3-20** (low-income). The areas with high and low equity populations are compared to areas with major changes in service, shown in **Figure 3-21** (weekday), **Figure 3-22** (Saturday), and **Figure 3-23** (Sunday).

High and low percentages of minority populations are based on the Title VI threshold of 20% plus and minus the average of Fayette County of 29.7%, yielding a threshold of 49.7% for high percentage minority and 9.7% for low percentage minority. The low-income population in Lexington was also analyzed using Title VI threshold of 20% plus and minus the Fayette County average 23.9%, yielding a threshold of 43.9% for high percentage low-income and 3.9% for low percentage low-income. Results of the equity analysis are shown below:

- Neighborhoods in Lexington that generally have a higher percentage of minority populations are in the north along Georgetown Road, Douglass Park, Winburn/Radcliff, and Melrose Park. West of downtown, including Melrose Park, Cardinal Valley, and Gardenside also have areas with high percentages of minority populations. Richmond Road and Man O' War Boulevard also show higher percentages of minority populations.
- Areas with very low minority populations include southeast of downtown, including Eastside, Lakewood, and Lansdowne.
- Low-income populations are primarily located in and near downtown Lexington. South of downtown, including University of Kentucky, Pine Meadows, and Red Mile all have areas with high percentages of low-income populations. Northeast Lexington along North Broadway also show higher low-income populations, including Russell Cave Road areas, Winburn/Radcliff and Joyland.

Figure 3-19. High and Low Percentage Minority Population

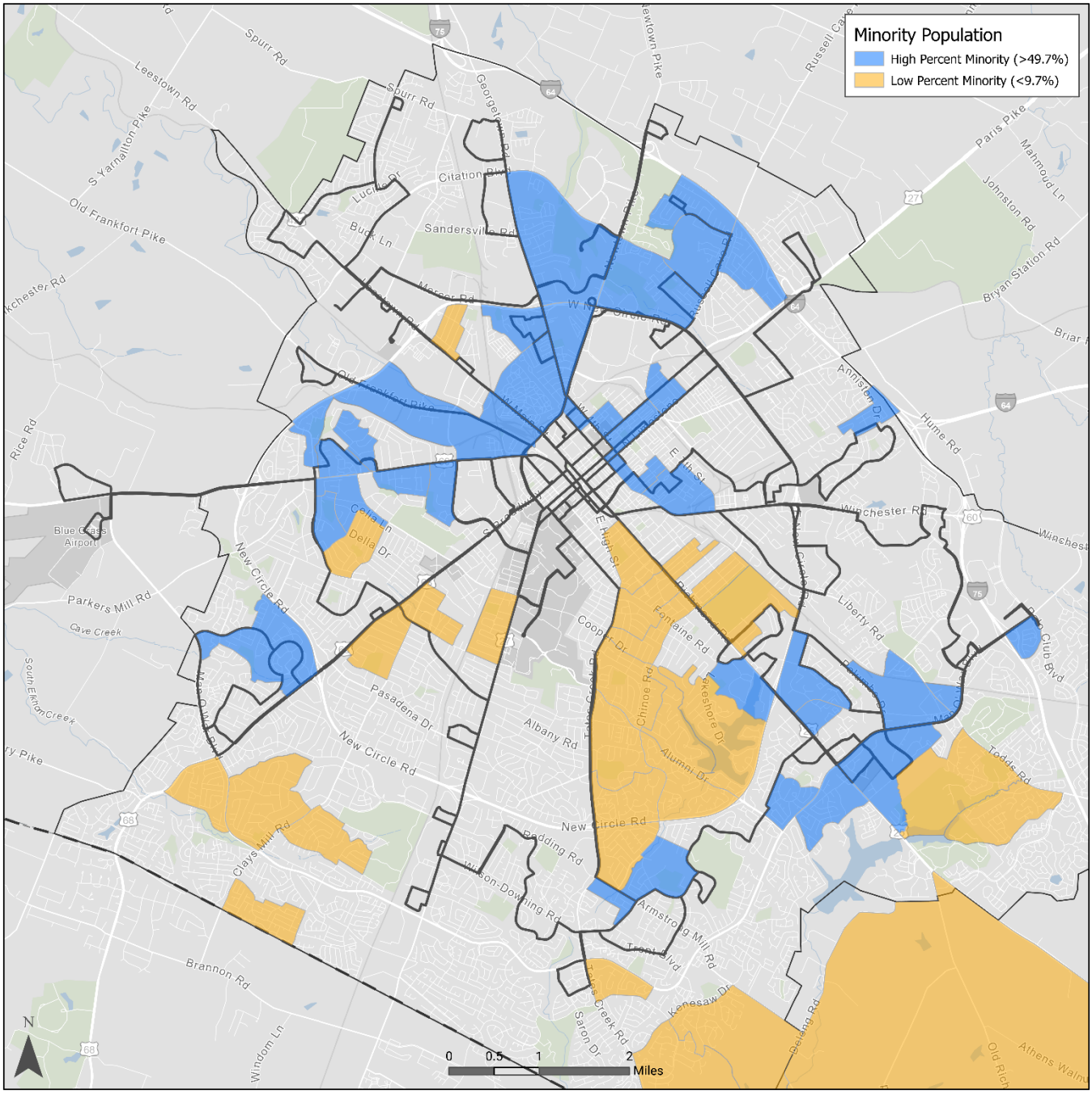


Figure 3-20. High and Low Percentage Low-Income Population

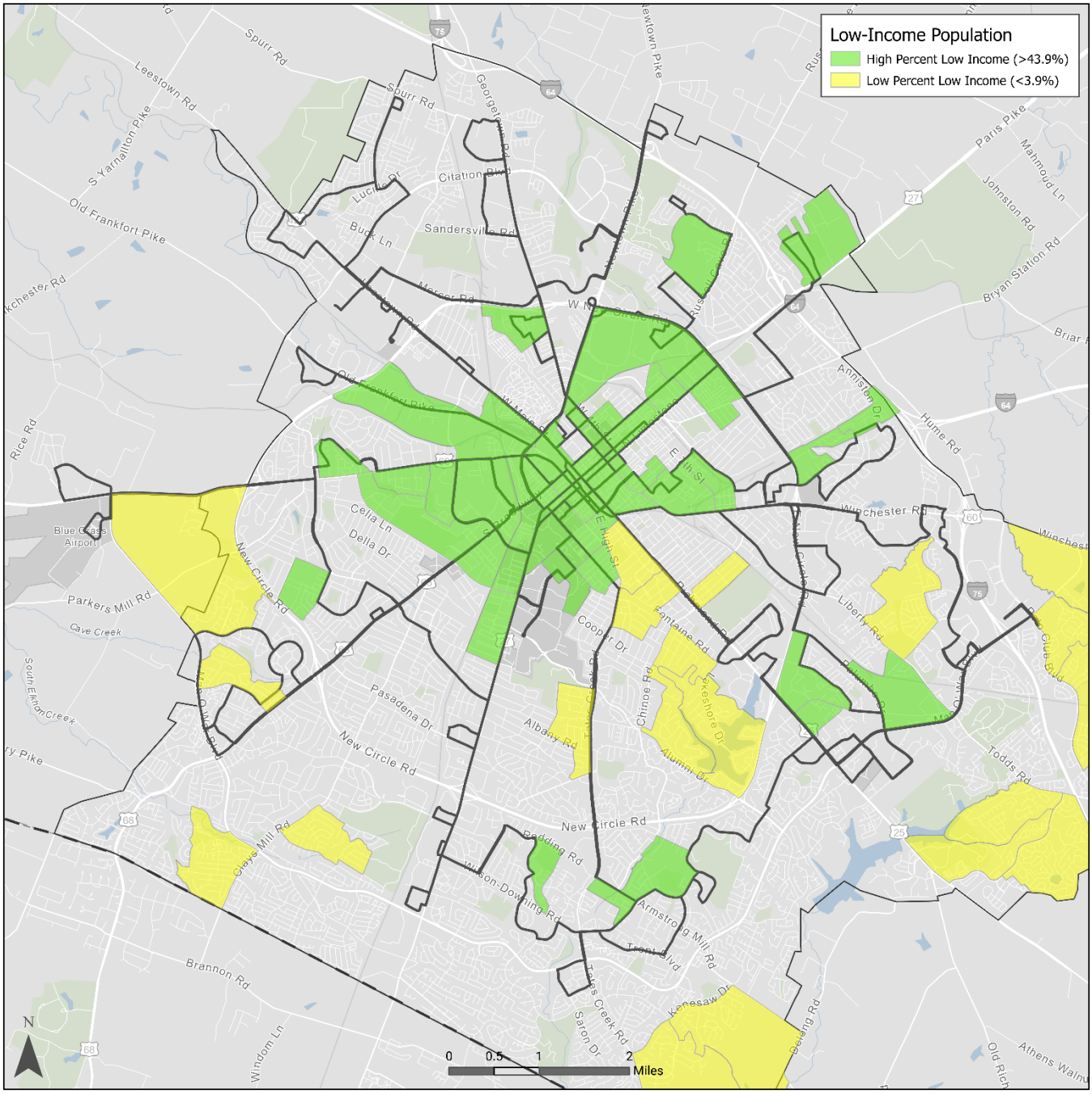


Figure 3-21 (weekday), **Figure 3-22** (Saturday), and **Figure 3-23** (Sunday) show the change in service from daily transit trips in the existing transit network compared to the Near-Term Plan network. Results are shown in percent change from the existing to reveal areas that have comparatively more or less service in the Near-Term Plan network. In addition, CBGs that qualified as both equity areas (as defined above) and areas with major service reductions are shown to highlight potential Title VI concerns. For a system-level perspective, **Table 3-25** (weekday), **Table 3-26** (Saturday), and **Table 3-27** (Sunday) summarize the percentage of equity and non-equity population by service change for the entire service area. Locations that qualify as a combination of equity (high minority or high low-income) and major service decrease are discussed below in sections on weekday, Saturday, and Sunday service.

Weekday Systemwide Service Equity Findings:

- Results in **Table 3-25** show that weekday major service changes meet the Title VI equity requirement thresholds at the system level.
- **Figure 3-21** shows two CBGs that resulted in a combination of high minority population and a major service decrease: Winburn and Henry Clay HS neighborhood. Winburn resulted in a major service decrease because of a reduction in headways on Newtown Pike from 35 minutes to 70 minutes. However, the Winburn CBG will not be impacted by service changes on Newtown Pike because the Winburn neighborhood currently lacks a roadway connection to Newtown Pike. The existing transit service with 35-minute headways will be retained to Winburn via Route 4: South Network Pike. Henry Clay HS shows a major decrease in service because of the realignment of Route 1 Woodhill from Fontaine Road to Liberty Road. This change is justifiable because of the low ridership along Fontaine. The Henry Clay High School area retains service on Route 11 Richmond Road.
- Only one area in the county resulted in high low-income and major reduction, which occurred in Kirklevington Park along Laredo Drive. This area results in decreased service because the Near-Term Plan recommends shortening Route 3 Tates Creek Road (which operates 35-minute headways) and replacing the lost service with Route 18 Centre Parkway Crosstown (which would operate on 45-minute service). The downside of reduction in service is offset with increased opportunities to connect to more of the transit network though, with Route 18 providing connections with Route 5 Nicholasville Road, Route 3 Tates Creek Road, Route 11 Richmond Road, Route 1 Woodhill Drive, and Route 10 Hamburg Pavilion.

Saturday Systemwide Service Equity Findings:

- Results in **Table 3-26** show that Saturday major service changes meet the Title VI equity requirement thresholds at the system level.
- Saturday service changes are shown in **Figure 3-22**, revealing that much of the city experiences service additions. Of the two areas where major service reductions are anticipated, only one of the CBG is an equity population (high minority). The CBG containing Henry Clay High School has a reduction in service because of realignment of Route 1 Woodhill Drive. The nearest major corridor, Richmond Road, will retain service however, providing service to downtown as well as connecting to Route 1 Woodhill Drive and Route 18 Centre Parkway Crosstown.

Sunday Systemwide Service Equity Findings:

- Results in **Table 3-27** show that Sunday major service changes meet the Title VI equity requirement thresholds at the system level.
- **Figure 3-23** shows the distribution of service changes in the Near-Term Recommendations on Sundays. Similar to Saturday service, much of Lexington will increase service on Sunday. One large area along Fontaine Road, however, would experience a major service reduction because of the realignment of Route 1 Woodhill Drive. This is justifiable, however, because Fontaine Road has an average of just 3.1 boardings per Sunday. As with Saturday service, the only location in this area that is of equity concern is the CBG containing Henry Clay High School. The same reasoning for making this recommendation applies for both Saturdays and Sundays; although the number of transit trips decreases through this neighborhood, the connections to other routes create mobility improvements.

Table 3-25: Weekday Service Changes by Percent Equity Population

Service Change	Equity Group	Non-Equity Population	Equity Target	Equity Population
Major Increase	Minority	76.1%	> 9.7%	23.9%
	Low Income	41.8%	> 3.9%	26.2%
Major Decrease	Minority	70.1%	< 49.7%	29.9%
	Low Income	10.6%	< 43.9%	8.3%
No Major Change	Minority	66.4%	-	33.6%
	Low Income	47.7%	-	65.5%

Figure 3-21: Weekday Service Changes by Equity Population Location

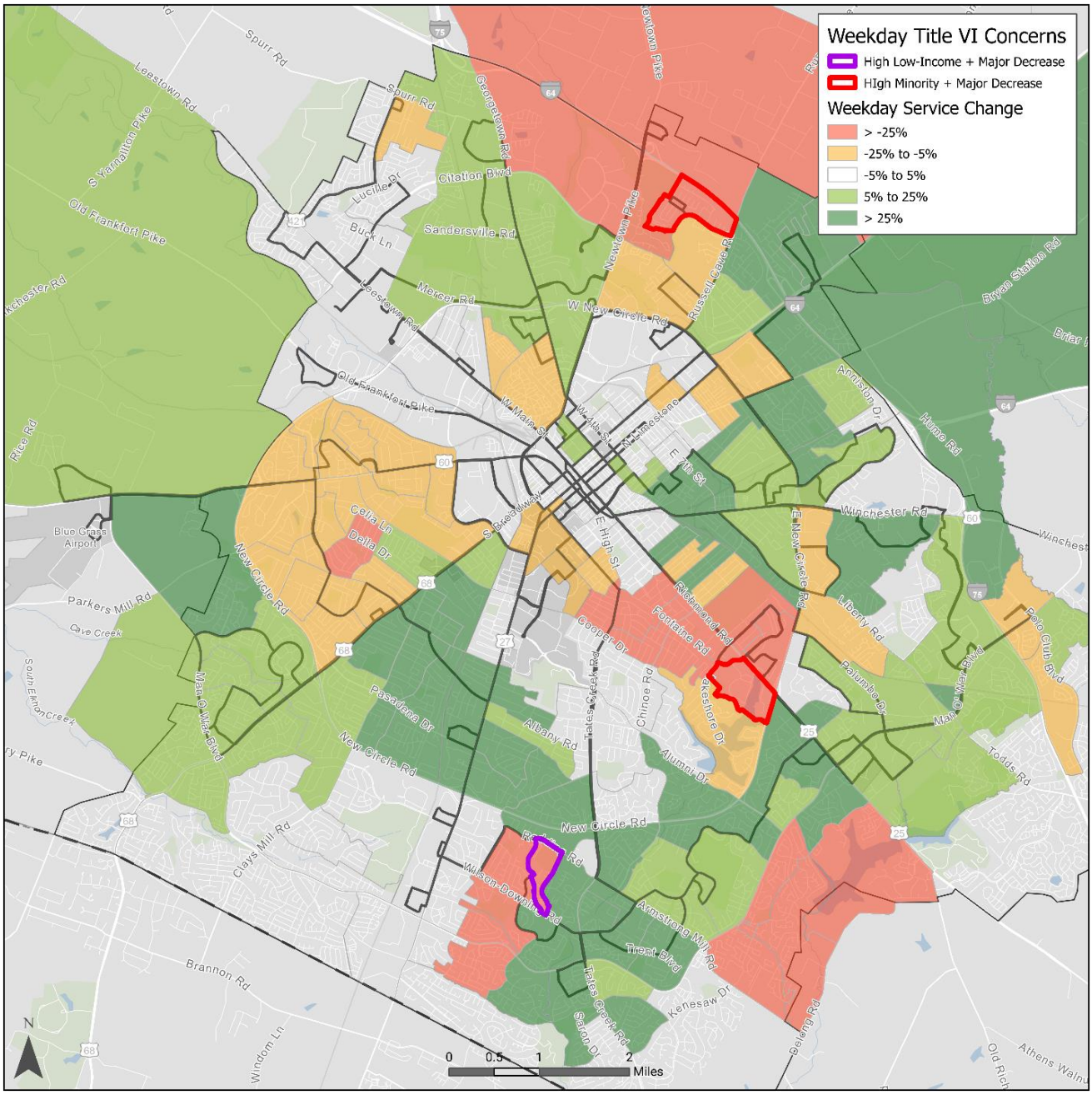


Table 3-26: Saturday Service Changes by Percent Equity Population

Day of Week	Impact	Non-Equity Population	Equity Target	Equity Population
Major Increase	Minority	73.1%	> 9.7%	26.9%
	Low Income	55.3%	> 3.9%	41.3%
Major Decrease	Minority	71.9%	< 49.7%	28.1%
	Low Income	4.1%	< 43.9%	3.7%
No Major Change	Minority	67.1%	-	32.9%
	Low Income	40.6%	-	55.0%

Figure 3-22: Saturday Service Changes by Equity Population Location

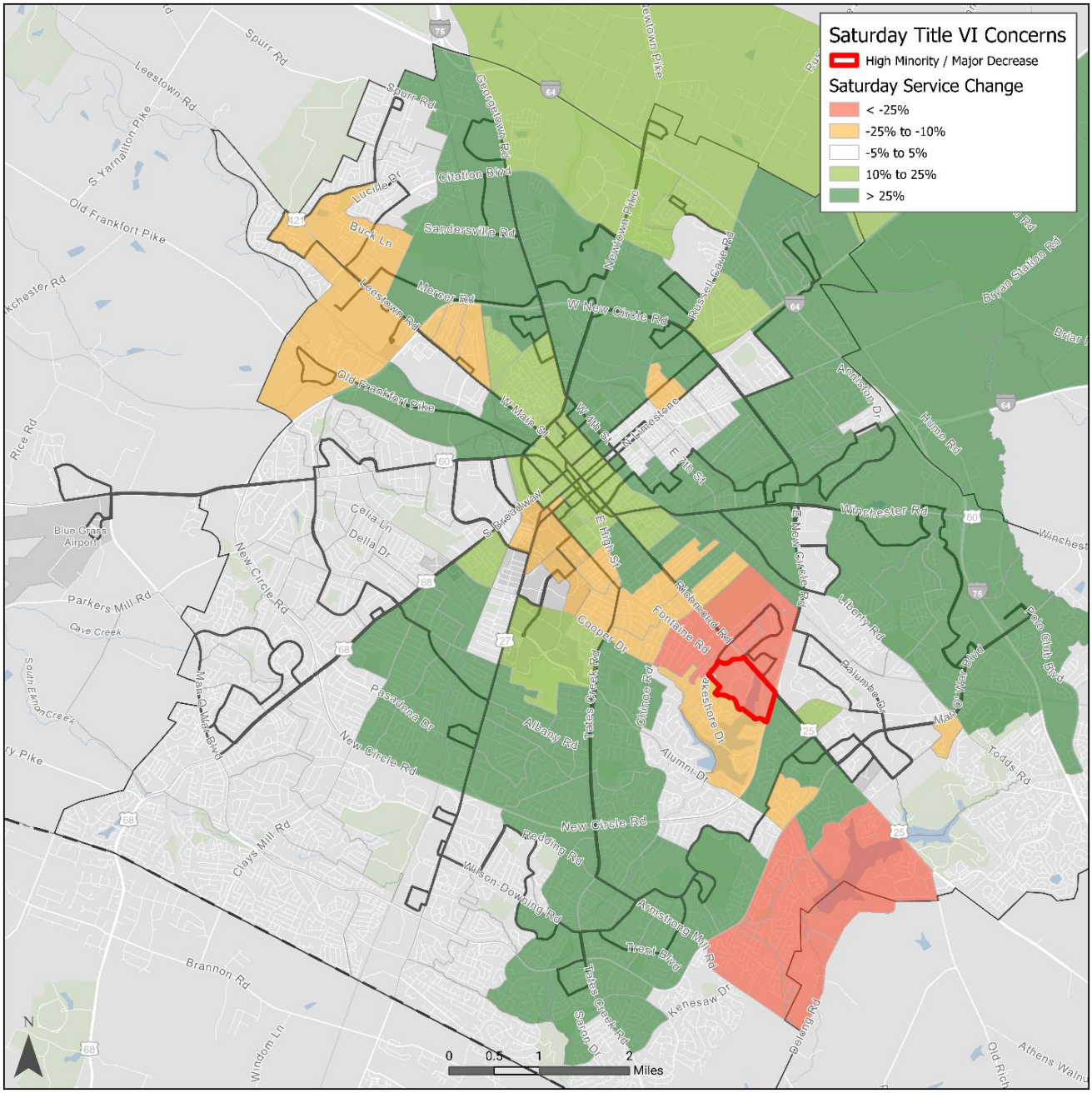
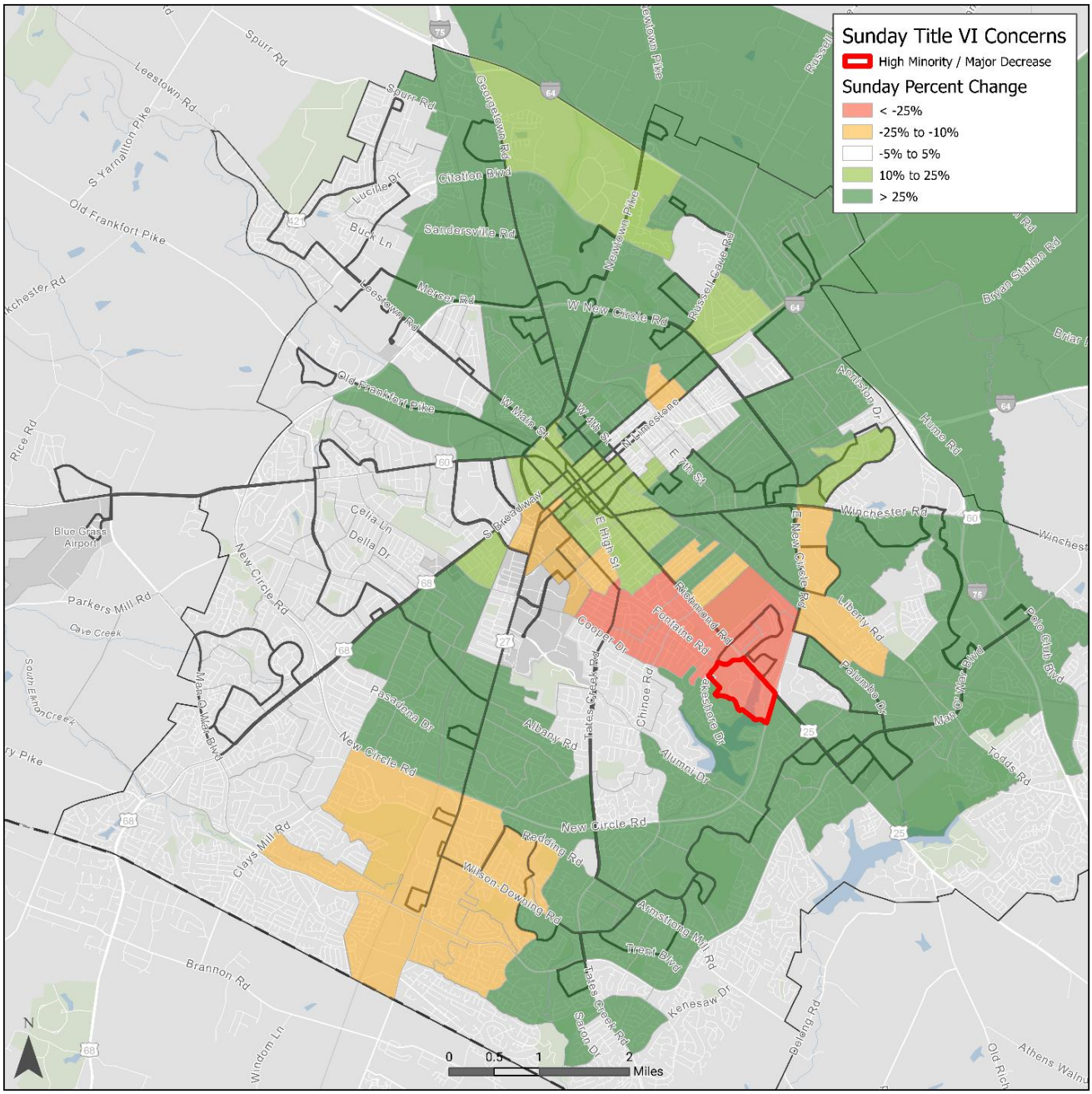


Table 3-27: Sunday Service Changes by Percent Equity Population

Day of Week	Impact	Non-Equity Population	Equity Target	Equity Population
Major Increase	Minority	70.5%	> 9.7%	29.5%
	Low Income	60.3%	> 3.9%	46.7%
Major Decrease	Minority	84.5%	< 49.7%	15.5%
	Low Income	3.1%	< 43.9%	2.2%
No Major Change	Minority	69.2%	-	30.8%
	Low Income	36.6%	-	51.1%

Figure 3-23: Sunday Service Changes by Equity Population Location



3.8 Implementation Strategies

Fixed-route implementation strategies are organized into two components: 1) supporting plans, policies, and partnerships and 2) a service phasing plan for the proposed near-term and mid-term networks. Funding strategies to support the implementation of future investment priorities are detailed in Chapter 7: Financial Plan.

3.8.1 Supporting Plans, Policies, & Partnerships

As described below, Lextran should consider a range of supporting plans, policies, and partnerships to support the implementation of the fixed-route recommendations and to improve the rider experience and service efficiency.

Operational Policies & Procedures

- **Update service standards and monitoring procedure policy.** Service standards provide a consistent rationale for providing and designing transit service while monitoring procedures formalize how key performance indicators are updated, reviewed, and acted upon. It is recommended that Lextran update its existing service standards and monitoring procedures to reflect the system changes proposed in this plan.

Coordination with Local & Regional Partners

- **Conduct Long-Range Transit System Plan Study.** Lextran should coordinate with the Lexington-Fayette Urban County Government (LFUCG) and Lexington Area Metropolitan Planning Organization (LAMPO) to conduct a long-range transit system plan study to further identify and refine the future service priorities identified in this COA.
- **Continue coordination activities with Fayette County Public Schools (FCPS)** to meet the needs of students and faculty that travel across the school district. Lextran drafted a working paper in 2017 to begin the process of establishing a more formal partnership with FCPS. This process should be advanced to leverage Lextran's mobility services to address student and faculty transportation gaps and improve access to high schools and technical academies across Fayette County.
- **Continue coordination with LFUCG to align land use, multimodal transportation, and transit planning initiatives.** Lextran should work with its local partners to develop land use regulations that incentivize Transit-Oriented Development (TOD) and affordable housing along priority corridors and ensure that pedestrian and transit access and circulation are appropriately considered in site plans for major developments. This effort should be coordinated with LFUCG's ongoing initiative to develop in-depth land use plans and transportation studies for major corridors across Lexington.
- **Coordinate with public and subsidized housing and social service providers** to locate future facilities near transit, especially near more frequent transit lines wherever possible.

3.8.2 Service Phasing Plan

The proposed near-term service plan involves a significant restructuring of the Lextran fixed-route network. Many of the proposed service changes are interconnected and must be implemented simultaneously to maintain service continuity for customers. **Table 3-28** presents a proposed service phasing plan for the near-term and mid-tern networks. Each proposed service change is grouped into an implementation package that considers alignment and headway coordination and proposed interlining pairs. While each package is designed to be implemented individually, Lextran may choose to implement the entire near-term and/or mid-term package during the same markup period.

Table 3-28: Fixed Route Phasing Strategy

Package	Sector	Route	Proposed Change	Interline
Near-Term				
A	North	2	Revised alignment and reduced headway	--
A	North	4	Revised alignment	--
A	North	6	Revised alignment	3
A	North	17	Discontinued	--
A	North	22	Revised alignment	--
A	North	23	New route	--
A	East	3	Revised alignment	6
A	East	18	Revised alignment and improved headway	5
B	East	1	Revised alignment	--
B	East	7	Revised alignment	--
B	East	9	Revised alignment	--
B	East	10	Revised alignment	8
B	East	11	Revised alignment	--
B	East	51	Revised alignment	--
B	West	8	Revised alignment	10
B	West	16	Discontinued	--
C	West	13	Improved headway	--
D	West	24	Revised alignment	--
Mid-Term				
A	North	2	Improved headway	--
A	North	22	New weekend service	--
B	East	10	Revised alignment	8
B	East	18	Revised alignment	5
B	East	25	New route	--

4. Mobility On-Demand Action Plan

4.1 Introduction

This chapter documents the findings and recommendations of a Mobility On-Demand (MOD) feasibility analysis performed for the Lextran service area. The following sections provide an overview of on-demand service and use cases, define potential on-demand zones in Lexington, and identify potential costs and implementation strategies should Lextran choose to offer this service in the future.

4.2 What is Mobility On-Demand?

As part of its long-term vision, Lextran is considering a new service type, Mobility on-Demand (MOD or on-demand transit service), to complement the fixed-route network and paratransit service. While on-demand service is not a new concept, recent advances in mobile technology and dynamic scheduling have fundamentally changed the way demand-responsive trips are booked and dispatched. Instead of booking a trip by phone, customers can hail a vehicle using an application on a mobile device with minimal advance reservation time required. The following sections summarize the typical MOD user experience, use cases, and benefits and challenges.

4.2.1 MOD User Experience

On-demand transit is similar to a conventional, fixed-route bus in that passengers are asked to walk to meet a vehicle at a 'virtual bus stop' that may be up to ¼ of a mile from their requested location. However, it is different from a bus in that there are no schedules or route maps. Instead, trips must start and end within zones that fill gaps in the bus network. Along the way, the vehicle will pick up and drop off other passengers heading in the same direction, but care is taken to avoid lengthy detours for passengers already on board.

To use the service, passengers can book a trip using a smartphone application ("app"), a website, or by phone. Once the passenger submits a trip request, they are notified when the vehicle will arrive and where to meet it. Typically, passengers must wait between 5 and 30 minutes for a trip. Fare payments are facilitated through the app using debit or credit cards or pre-loaded transit passes. Cash-paying customers can be accommodated through various means, including mobile payment through the booking app, on-board payment, or through vouchers purchased at retail outlets. **Figure 4-1** illustrates the typical end-to-end MOD user experience. **Table 4-1** on the following pages summarizes the key differences between fixed-route bus, ADA paratransit, and on-demand transit service from a user perspective.

Figure 4-1: Typical MOD User Experience

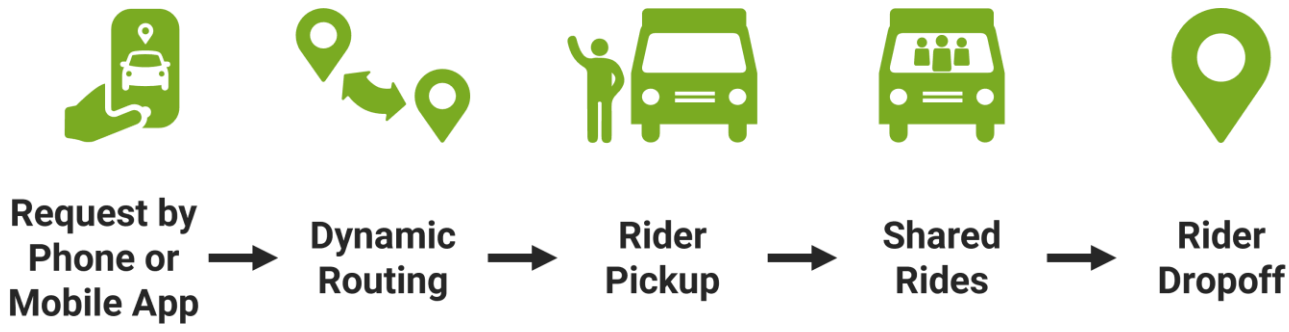


Table 4-1: Mobility On-Demand Rider Experience Frequently Asked Questions

On-Demand FAQs	Fixed Route Service	Paratransit Service	On-Demand Service
Where will I be picked up or dropped off?	Bus Stop	Front Door	Nearby Intersection
Where can I ride?	Trips must begin or end at fixed-route bus stop	Trips must begin and end within Fayette County	Trips must begin and end within defined on-demand zone
Do I need to book a ride in advance?	No advance booking is required	24-hour advance booking is required	Same-day booking. Typical wait time of 30 minutes or less.
Who can ride?	Anyone can ride	Pre-approved customers only	Anyone can ride
Is the service ADA-accessible?	Wheelchair accessible	Wheelchair accessible + Assistance provided	Wheelchair accessible
Will I share a ride with another passenger?	Yes	Sometimes	Sometimes

4.2.2 MOD Use Cases

Many transit agencies have implemented MOD service in recent years to provide service coverage where traditional fixed-route service is unproductive or to supplement existing ADA paratransit service. A survey of U.S. transit properties reveals several common applications, including providing first and last mile connectivity to fixed-route transit hubs, providing coverage in low-density and/or high-needs areas, and offering service during unproductive time periods (e.g. early morning or late evenings). Below is a summary of the most common MOD use cases throughout the industry.

- **Local Transportation in Lower Density Neighborhoods.** In Lexington, one of the more relevant use cases is local transportation in areas where fixed-route service is either unavailable or unproductive, such as in lower-density or suburban neighborhoods. To serve this use case, on-demand transit provides access to any location within a specific zone, and customers are not required to transfer to fixed-route service (though many passengers will still do so to complete longer trips).
- **First and Last Mile Connections:** Another common use case for on-demand transit is to effectively expand the fixed-route network by connecting riders to nearby bus services. In this use case, customers complete the first or last segment of their trip using on-demand transit. The first mile / last mile connection use case is most suitable if the fixed-route service at the transfer point offers frequent service throughout the day, ideally every 15 minutes or better. In Lexington, this use case is most applicable for zones adjacent to the Nicholasville Road corridor, which is served by the highest frequency route in the network, Route 5.
- **Off-Peak Travel Markets:** Serving off-peak travel demand is another key use case for on-demand transit. Because passenger travel demand is typically lower during off-peak times such as late evenings and weekends, it is also possible that on-demand transit can operate at a lower cost-per-trip (using smaller, right-sized vehicles) compared to the cost of extending fixed-route service running during the same hours.
- **Supplemental and Same-Day ADA Paratransit Service:** Supplementing an agency's existing ADA paratransit service is another common on-demand transit use case. Like most ADA paratransit services, Lextran's paratransit service requires passengers to book rides in advance (by 5:00 pm the day prior to the trip) and provides passengers with a variable, 30-minute pickup window. These factors limit the efficacy of paratransit for many types of trips and do not allow for the spontaneity that many passengers need. An alternative approach involves comingling ADA-compliant paratransit and mainstream on-demand transit services. This use case allows paratransit and on-demand services to share vehicle fleets, driver shifts, and even individual passenger trips. Commingling offers transit agencies significant potential cost savings by allowing mainstream on-demand and ADA paratransit customer trips to be routed and shared more efficiently among fewer vehicles and vehicle-hours. Paratransit riders benefit by receiving same-day, on-demand service if traveling within the on-demand zone.

4.2.3 MOD Benefits and Challenges

MOD offers transit agencies a range of potential benefits as well as risks and challenges that must be addressed. Some of the typical benefits of on-demand transit, compared to fixed-route service, include:

- Shorter average wait times, particularly compared to fixed-route bus corridors with existing frequencies of 30 minutes or more
- Shorter typical walking distances for riders to access pickup and drop off locations
- Greater geographic coverage without sacrificing quality of service
- No bus stop infrastructure required, with “Virtual Bus Stops”
- Lower insurance and driver training requirements due to smaller vehicles—in some cases, these may result in a lower cost-per-trip relative to underperforming fixed routes.

On-demand transit also carries several potential challenges and risks that should be addressed in service design and planning. Because on-demand service typically operates with smaller vehicles, it offers lower passenger capacity compared to fixed-route service. Likewise, on-demand offers a lower maximum productivity of service compared to the most productive fixed-route corridors because of the smaller vehicles used. Some on-demand passenger trips may require detours to pick up other passengers, though overall journey times are often shorter than comparable fixed-route trips. As a newer, less familiar form of demand-response transportation, on-demand transit requires an upfront investment in marketing and community outreach to attract significant ridership. Successful marketing campaigns for new on-demand transit services often include distributing promotional materials at key activity centers (e.g. major bus transfer points, colleges, grocery stores, or community centers), posting announcements on bus stop signage, and local news or social media advertising campaigns.

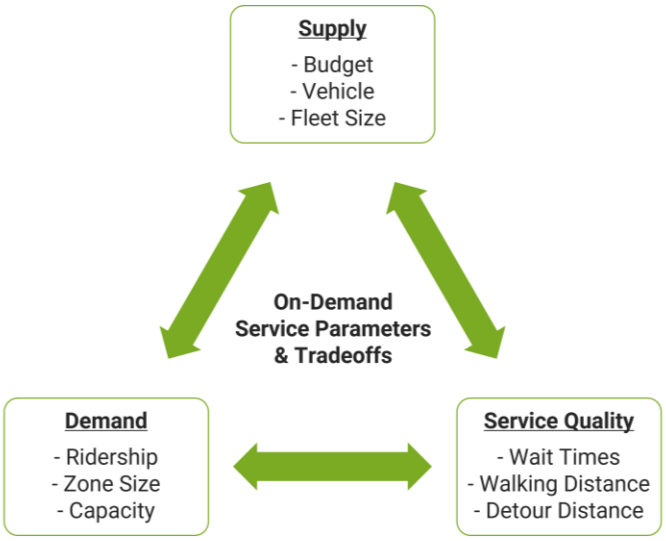
4.3 Proposed Mobility On-Demand Zones

This section outlines the various service design parameters that should be considered when establishing a new MOD service, identifies potential MOD opportunity zones in Lexington, and summarizes the methodology and results of a ridership and vehicle demand analysis for the potential MOD zones.

4.3.1 Service Design Parameters

Service design for MOD is highly configurable and involves numerous trade-offs that influence the selection of specific on-demand transit zones. These decisions are essential to determining a suitable solution that optimizes both quality of service and cost-effectiveness. Below is a summary of the key service design parameters to consider when designing a MOD service.

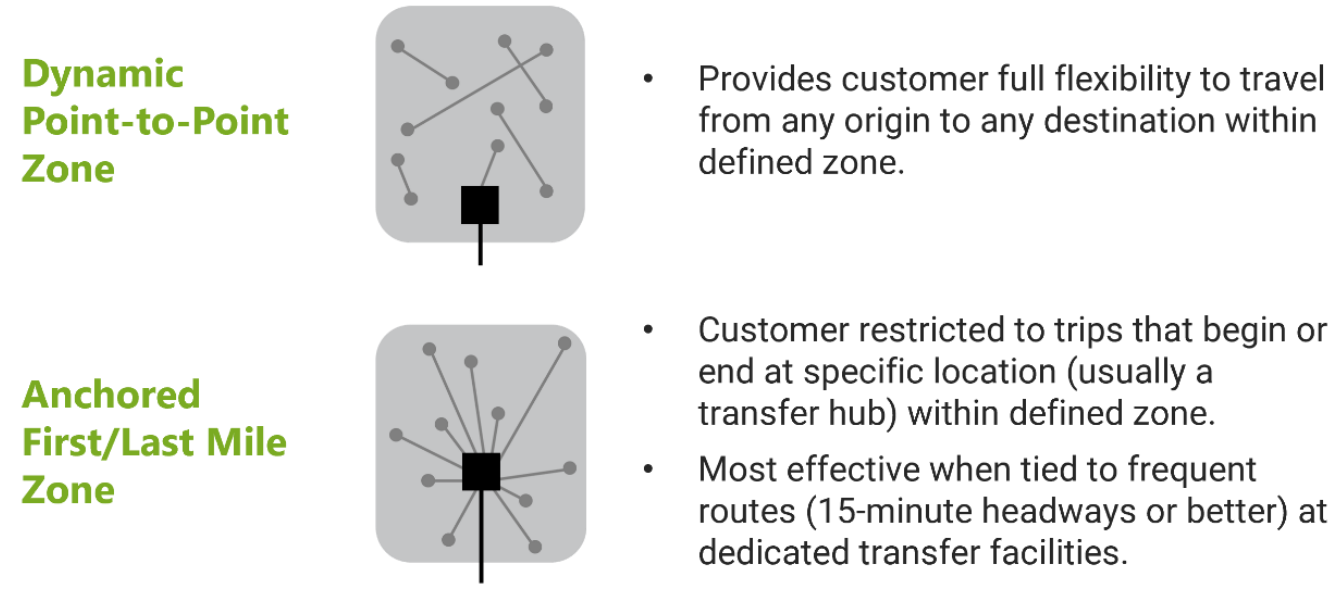
Figure 4-2: MOD Service Design Parameters and Tradeoffs



Trip Restrictions

In some on-demand zones, transit agencies restrict certain trips from being served by on-demand transit despite having an origin and destination falling within the overall service zone boundaries. Most commonly, these restrictions are implemented where there is a frequent and reliable fixed-route service operating within the zone (e.g. bus or train service) that could complete certain trips more cost-effectively. To avoid the displacement of fixed-route ridership to the on-demand service and ensure that trips connect to the broader fixed-route system, some on-demand zones require riders to select a designated transfer point as either their origin or destination. This effectively limits the on-demand service to fulfilling the first mile / last mile connection use case, described in the previous section, while precluding it from serving other types of trips. These trip restrictions are likely to marginally improve an on-demand service's productivity (passenger boardings per vehicle-hour) by ensuring that each trip is anchored by a key node of the fixed-route network, while discouraging travel on less commonly traveled routes. However, in lower-density cities like Lexington where high-frequency fixed-route service is not widely available, these trip restrictions are more likely to discourage ridership by making the on-demand service less useful to riders.

Figure 4-3: Dynamic Point-to-Point vs. Anchored First/Last Mile Service Designs



Passenger Eligibility

Most on-demand services are open to the general public, while a significant minority are limited to specific populations with mobility needs, such as seniors, people with disabilities, qualified ADA paratransit customers, or students. For the purposes of the potential on-demand services discussed in this chapter, we assume that on-demand transit service is available to the general public.

Fare Structure

Fares are an important determinant of ridership in many on-demand transit services. Unlike a taxi or ride-hailing service, on-demand transit is intended to be a fully integrated component of the public transit system. While some agencies offer fare-free on-demand services, a large majority charge flat fares equivalent to their existing one-way fixed-route bus fares, and a smaller number charge distance-based fares which reflect the higher cost of serving longer-distance trips. In most cases, free transfers are offered between on-demand and fixed-route services.

Advance Booking Restrictions

On-demand transit operators provide two primary service models, dynamic or pre-booked. In either case, riders may request rides with a mobile app, web portal, or by calling a customer service center. Both service models also feature real-time vehicle tracking in the passenger mobile app as well as arrival times updated in real time throughout the trip.

- **Dynamic on-demand** services involve rides booked on a same-day basis at the time of need, with vehicles dispatched immediately following a trip request and passenger wait times of typically between 5 and 30 minutes. This service model is generally preferable in urban or suburban areas with relatively short journey times (typically less than 30 minutes) and sufficient travel demand to justify a low-frequency, coverage-oriented fixed-route service.
- **Pre-booked on-demand services** are similar to conventional demand-response services and enable customers to book rides between 2 hours to several weeks in advance as well as book

recurring rides (also known as "subscription trips"). This service model is generally preferable in rural areas with very low, diffuse travel demand or for services geared primarily towards passenger groups who may prefer booking their trips in advance (e.g. some ADA paratransit customers) or on a recurring basis (e.g. dialysis patients, people with disabilities attending day support programs).

A summary of the advantages and disadvantages of dynamic and pre-booked on-demand service models is shown in **Table 4-2**.

Table 4-2: Comparison of Dynamic On-Demand vs. Pre-Booked On-Demand Service Models

	Advantages	Disadvantages
Dynamic On-Demand	• Higher capacity for same-day bookings • Flexibility to book at time of need, adjusts easily to daily schedule • Simpler user experience • Automatic adjustments of supply without the need for dispatch intervention	• Rides cannot be booked in advance nor can recurring rides be booked • Selection of correct booking time is up to rider, and there is no automatic link to bus schedule
Pre-booked On-Demand	• Customers can book rides in advance and recurring rides • Higher level of guarantee that a ride is indeed booked (barring unforeseen circumstances) • Greater potential for trip aggregation, especially in very low-density areas	• Higher average wait times • In a hybrid system, lower capacity for same day bookings because seats are filled "in advance" • Worse experience for rider if a pre-booked ride is missed compared to on-demand • Significantly more complex to operate, especially when needing to adjust supply

Vehicle Selection

On-demand transit is highly customizable with respect to the fleet vehicles used to operate service. Most software platforms are suitable for deployment on a range of vehicle types, from large transit buses to cutaways, minivans, and even passenger vehicles. However, ensuring a cost-effective on-demand service requires that transit agencies strike a balance between vehicle capacity (and therefore the service's capacity) and its cost to operate. Typically, in lower-density areas expected to serve a lower ridership, on-demand services can be operated most cost-effectively with smaller minivans with a capacity of between 6 and 10 passengers. These vehicles are less expensive to operate than cutaways or shuttles and typically carry lower insurance and driver training requirements.

Hours of Operation

Many on-demand services share the same hours of operation as the fixed-route transit system to maximize both the service's legibility and riders' ability to make transfers between on-demand and fixed-route buses. Alternatively, an on-demand service can be designed to fill the temporal gaps in fixed-route service, such as evening and weekend hours.

4.3.2 Zone Identification

Findings from the Existing Conditions analysis were essential to identifying potential on-demand transit zones for further screening. Potential on-demand transit service zones were screened for further analysis based on their ability to facilitate any of a range of improvements to the transit system in Lexington, such as:

- Replacing fixed-route bus service in corridors where transit is currently unproductive, or serves very low ridership;
- Providing first/last-mile connections to more productive fixed-route bus services;
- Facilitating short, locally-oriented trips for residents and employees living or working in the zone;
- Improving mobility for low-income residents;
- Enhancing access to medical facilities, shopping centers, and major employers; and
- Providing a same-day mobility option for ADA paratransit customers.

Characteristics of an ideal on-demand transit zone include the following:

- Multiple clearly defined, overlapping use cases to ensure an even distribution of demand throughout the day
- Major activity centers to generate ridership (e.g. shopping centers, hospitals, schools, social services, or universities)
- Demonstrated need for improved quality of service in the zone, which may be supported by:
    - Poor ridership or productivity on existing fixed-route bus services
    - Significant service gaps - either spatial or temporal
    - High-need or disadvantaged communities with higher propensity to ride transit
- Clear, legible boundaries (i.e. boundaries along major roadways or other natural barriers)
- Transfer opportunities to other fixed-route services

Based on these criteria, four potential on-demand zones were identified in Lexington, as identified in **Figure 4-4** and described below.

Northwest Zone

The Northwest zone covers the Masterson Station, Leestown Road, and western portion of the Georgetown Road neighborhoods. The zone is roughly bounded by New Circle Road on the south, Alexandria Drive, the RJ Corman railroad on the west, Masterson Station Park on the north, and the Norfolk Southern railroad on the east. Much of this zone is relatively low-density single-family residential with commercial uses located along the Leestown Road corridor. The zone is also home to important light industrial and warehouse job centers located along the Mercer Road and Citation Boulevard corridors. Other notable activity generators include the VA Hospital and Bluegrass Community and Technical College. Approximately 12,700 residents and 11,700 jobs are located in the zone. Fixed-route connections include routes 12 and 22.

Northeast Zone

The Northeast zone covers the Joyland, Winburn/Radcliff, and Bryan Station neighborhoods. The zone is bounded by New Circle Road to the south, Newtown Pike to the west, Swigert Avenue on the north, and Kilkenny Drive and Marietta Drive on the east. The zone is primarily comprised of low-density single-family residential land uses. New Circle Road serves as the zone's main commercial corridor and includes major retail destinations such as Walmart and Kroger. The planned connection of Citation Boulevard between Newtown Pike and Russell Cave Road will provide improved connectivity in this area. Approximately 18,000 residents and 3,700 jobs are located in the zone. The Northeast zone has the highest percentage of minority and low-income residents of the four proposed MOD zones. Fixed-route connections include routes 4, 6, and 7.

Southwest Zone

The Southwest zone covers the Wyndam Downs and portions of the Beaumont neighborhoods along with the southern end of the Nicholasville Road corridor. The zone is bounded by the Fayette County line to the south, Harrodsburg Road to the west, Pasadena Drive on the north, and Nicholasville Road on the east. The zone includes a mix of single and multi-family residential, retail, and office land uses. Major destinations include the Fayette Mall and adjacent shopping centers along Nicholasville Road and shopping centers and medical offices at Beaumont Center just west of the zone boundary. Approximately 30,700 residents and 18,300 jobs are located within this zone. Fixed-route connections include routes 5, 8, and 13.

Southeast Zone

The Southeast zone covers the Kirklevington Park, Southeastern Hills, East Lake, and Park Place neighborhoods along with the southern end of the Nicholasville Road corridor. The zone is bounded by the Fayette County line to the south, Nicholasville Road in the west, the Urban Service Area boundary to the east, and New Circle Road in the north. Land uses in the zone include single and multi-family residential and retail centers located along Nicholasville Road, Tates Creek Road, and Richmond Road corridors. Approximately 70,000 residents and 12,700 jobs are located within the zone. Fixed-route connections include routes 3, 5, 11, and 18.

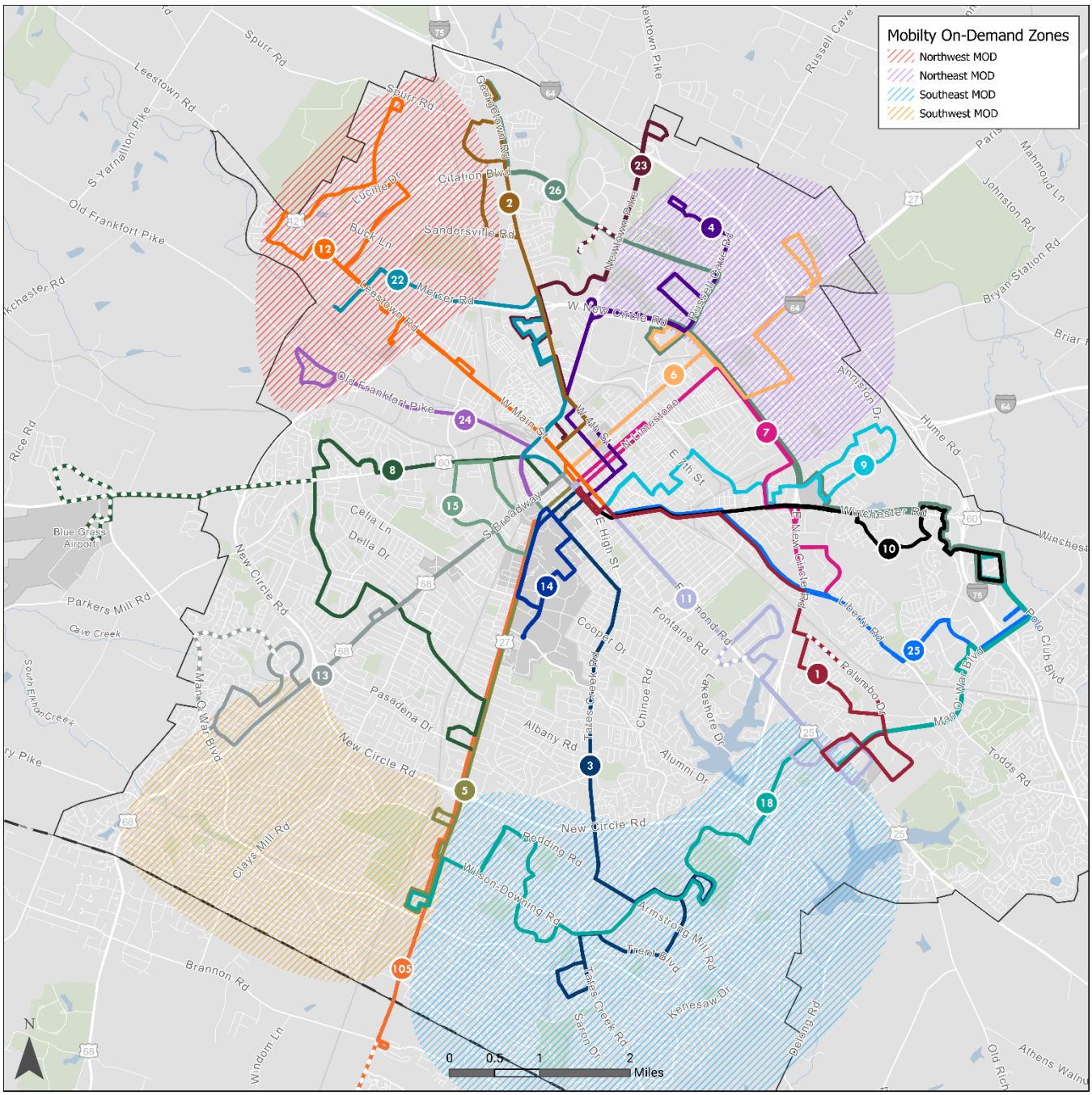
Combined Zones

The project team also evaluated the feasibility of combining the northeast and northwest zones into a single north zone and the southeast and southwest zones into a single south zone. From a customer service perspective, it may be advantageous to combine adjacent zones to provide more trip making opportunities. From an operational perspective, combining zones provides the ability to share vehicles across zones, potentially resulting in fewer vehicles required and higher vehicle utilization.

Table 4-3: Mobility On-Demand Zone Characteristics

	Individual Zones				Combined Zones	
	Northwest Zone	Northeast Zone	Southwest Zone	Southeast Zone	North Zone	South Zone
Area (sq. mi.)	5.1	5.0	8.1	13.5	10	22
Population	12,700	18,000	30,700	70,000	30,700	100,700
Households	5,000	7,500	12,500	31,900	12,500	44,400
Jobs	11,700	3,700	18,300	12,700	15,400	31,000
Minority Population	4,100	9,100	4,800	21,300	13,200	26,100
Percent Minority Population	32%	51%	16%	30%	43%	26%
Low-Income Population	1,200	5,400	2,800	15,800	6,600	18,600
Percent Low-Income Population	9%	30%	9%	23%	21%	18%
Carless Households	50	700	100	1,800	750	1,900
Percent Carless Households	1%	9%	1%	6%	6%	4%
Existing Average Weekday Bus Boardings	146	424	372	722	570	1,094
Existing Annual Paratransit Trips within Zone	760	1,590	1,380	7,440	4,350	13,900
Fixed-Route Connections	Route 12 Route 22	Route 4 Route 6 Route 7	Route 5 Route 8 Route 13	Route 3 Route 5 Route 11 Route 18	Route 4 Route 6 Route 7 Route 12 Route 22	Route 3 Route 5 Route 8 Route 11 Route 13 Route 18

Figure 4-4: Potential Mobility On-Demand Zones



4.3.3 Ridership & Vehicle Demand Estimation

Estimating ridership demand for new MOD services is challenging due to the wide variation of use cases and underlying land use and socio-economic characteristics across the industry. However, basic ridership assumptions are essential in order to estimate the number of vehicles, drivers, and financial resources needed to operate a MOD service. This section outlines the methodology and results of a ridership and vehicle demand analysis for the proposed MOD zones.

Methodology

A range of ridership estimates for the conceptual MOD zones were developed based on the following methodology using industry-standard demand and productivity factors provided in **Table 4-4**.

1. To estimate weekly ridership demand, a range of industry-standard market "capture" rates were applied to the aggregate residents and jobs within each zone. On the low end, this approach assumes that every 1,000 residents and jobs within a proposed MOD zone will produce five weekly MOD trips. On the high end, it is assumed that every 1,000 residents will produce 16 weekly trips, on average.
2. Average daily demand was calculated by dividing the total weekly demand estimates by the total weekly operating days. It is assumed that the proposed MOD zones will operate seven days per week, consistent with Lextran's fixed-route bus service.
3. Hourly demand was calculated by dividing the total daily demand by the total daily operating hours. It is assumed that the proposed MOD zones will operate 14 hours a day, seven days per week. For the purpose of this conceptual demand estimate, it is further assumed that the demand profile will be relatively flat throughout the day without significant peaking.
4. Finally, vehicle requirements are estimated by applying a productivity factor to the hourly demand estimates for each zone. Productivity factors will vary based on zone size and service parameters such as wait time, in-vehicle deviations, and walk distances. As such, a range of productivity factors was applied to each demand estimate, with a factor of three passenger trips per vehicle hour representing the low end of the range and seven trips per vehicle hour representing the high end.

Table 4-4: MOD Ridership & Vehicle Demand Estimation Factors

Range	Ridership Capture Rate (weekly trips per 1,000 people + jobs)	Productivity Factor (passenger trips per vehicle hour)
Low	5	3
Medium	11	5
High	16	7

Ridership and Vehicle Estimation Results

The results of the ridership and vehicle demand analysis are presented in **Table 4-5**. For this exercise, demand and vehicle estimates are provided for each individual zone and combined north and south zones. Given the various factors that influence demand, a range of potential ridership and vehicle requirements are provided for each zone. The results are summarized below:

- **Northwest Zone:** The Northwest zone is estimated to produce 20 to 60 trips per day and require between one and two vehicles.
- **Northeast Zone:** The Northeast zone is estimated to produce 20 to 50 trips per day and require between one and two vehicles.
- **Southwest Zone:** The Southwest zone is estimated to produce 40 to 110 trips per day and require between one and three vehicles.
- **Southeast Zone:** The Southeast zone is estimated to produce 60 to 190 trips per day and require between one and five vehicles.
- **North Zone:** The combined North zone is estimated to produce between 40 and 110 trips per day and require between one and three vehicles.
- **South Zone:** The combined South zone is estimated to produce between 90 and 300 trips per day and require between one and eight vehicles.

Table 4-5: Ridership and Vehicle Estimates by Proposed MOD Zone

	Individual Zones				Combined Zones	
	Northwest Zone	Northeast Zone	Southwest Zone	Southeast Zone	North Zone	South Zone
Population + Jobs	24,400	21,700	49,000	82,700	46,100	131,700
Average Weekly Passenger Trips	120 - 390	110 - 350	250 - 780	410 – 1,320	230 - 740	660 – 2,110
Average Daily Passenger Trips	20 - 60	20 - 50	40 - 110	60 - 190	40 - 110	90 - 300
Average Hourly Passenger Trips	1 - 4	1 - 4	3 - 8	4 - 14	3 - 8	6 - 21
Peak Vehicle Requirement	**1 - 2**	**1 - 2**	**1 - 3**	**1 - 5**	**1 - 3**	**1 - 8**
Low Productivity Factor	1 - 2	1 - 2	1 - 3	2 - 5	1 - 3	2 - 7
Medium Productivity Factor	1	1	1 - 2	1 - 3	1 - 2	2 - 5
High Productivity Factor	1	1	1 - 2	1 - 2	1 - 2	1 - 3

4.4 Mobility On-Demand Implementation Plan

This section summarizes the key steps that Lextran will need to complete in order to implement a new on-demand service. These steps include identifying a service delivery model, refining the service design parameters and zones, defining a capital and operating budget, identifying funding sources, and developing an implementation workplan.

4.4.1 Service Delivery Models

On-demand transit is typically delivered through one of two service models: 1) directly operated in-house using Lextran drivers and vehicles and 2) contract operated through a private vendor. These two service models are described below and summarized in **Table 4-6**.

In-House Operation: In this model, Lextran would provide on-demand transit services using the existing fleet, drivers, and operations team (or new vehicles and resources procured by Lextran) and procure a new software-as-a-service (SaaS) solution to facilitate on-demand trip booking and dispatching. Other services such as ongoing service design and optimization, operational support, and customer service may also be included as part of the technology procurement. This approach provides continuity with Lextran's existing fixed-route operating model using agency staff and assets. The primary disadvantage of this approach is the need to adapt existing resources—including fleet, staff, operators—and procedures to implement a new and unfamiliar service, which may create short-term inefficiencies and a higher cost-per-trip than the Transportation as a Service model described below. Lextran would need to hire or retrain drivers to operate an on-demand service and might need to create new labor classifications. The SaaS technology platform solution includes, at a minimum, the following components:

- Dynamic vehicle routing
- Passenger aggregation (shared-rides)
- Rider and driver mobile apps, with real-time vehicle tracking and live updated ETAs
- Support for booking by phone, as well as some form of cash payment for unbanked individuals
- Backend administrative tools, such as data dashboards to monitor performance
- Ongoing technical, operational, and marketing support

Turnkey Contract: In this model, a turnkey on-demand transit vendor provides a bundled solution that includes the on-demand transit technology described above plus drivers, vehicles, and operations management. The potential advantages of a turnkey contract solution include lower up-front costs and scalability. After the initial pilot project is launched, Lextran could evaluate whether to incrementally increase fleet size and/or extend operating hours. A bundled approach also ensures the operator and technology platform are interoperable and configured to work efficiently together. The primary disadvantage of this approach is the need to rely upon a vendor to operate and maintain the service, which may present administrative or labor-related challenges. Another potential drawback to the turnkey contract model is that Lextran would have less direct control over specific operational decisions, such as the vehicle make/model, driver recruitment and wages/benefits, and vehicle maintenance processes, provided the vendor meets the terms of its service level agreement with Lextran.

Table 4-6: MOD Service Delivery Models

Service Model	Description	Benefits	Drawbacks
In-House Operations	Lextran provides service using own fleet, drivers, maintenance staff/facility, and management team. Lextran procures software/ technology package for reservations/dispatch, customer-facing user interface, operational support, and customer service (optional).	• Provides continuity with existing services • Agency owns fleet, providing flexibility in service delivery method	• Requires need to adapt existing resources – including fleet, staff, operators – and procedures to implement a new and unfamiliar service
Turnkey Contract	Lextran procures turnkey contractor for software/technology, drivers, vehicles, maintenance, customer service, and operations management	• Faster deployment • Easily scalable based on ridership demand and desire to add new zones or expand existing zones •	• Requires reliance on contractor, which may present administrative or labor-related challenges

4.4.2 Cost Estimates & Potential Funding Sources

This section presents cost estimates for the proposed MOD zones based on the in-house and turnkey contract service models described in the previous section. Several potential funding sources for MOD service are presented at the end of this section.

Cost Estimates

Capital and operations and maintenance (O&M) costs were estimated for the proposed MOD zones based on financial data gathered from Lextran's National Transit Database (NTD) reports and industry pricing data. Capital cost assumptions are summarized in **Table 4-7** and ongoing O&M cost assumptions are summarized in **Table 4-8**. Basic costing assumptions are summarized below.

- **Capital Costs:** Upfront capital costs include one-time expenses required to start the service, including vehicles, hardware and data plans, software installation fees, and marketing. If Lextran chooses the turnkey contract delivery model, some or all upfront costs may be amortized over the life of the contract and reflected in the contract operator's annual fixed fee.
- **O&M Costs:** The in-house cost estimate assumes that Lextran will directly operate MOD service using agency vehicles, drivers, and maintenance facilities. Ongoing operational costs include all recurring fixed and variable expenses such as drivers, support and maintenance staff, fuel, and consumables. The turnkey cost estimate assumes that Lextran will procure a third-party contractor to operate and maintain the MOD service. This service model bundles all recurring costs such as vehicle leases, and driver pay, dispatch, and maintenance into a fully loaded cost per vehicle revenue hour. As shown in **Table 4-8**, two tiers of hourly costs are provided based on fleet size to reflect the economies gained by spreading fixed costs across a larger quantity of vehicles and revenue hours. Fixed costs include administration and dispatch, technology (software), marketing, and overhead.

Table 4-7: Upfront Capital Cost Assumptions

Type of cost	Cost Range	Assumptions
Vehicle acquisition	$35,000 - $50,000 per small van $75,000 - $100,000 per accessible van	Cost of acquiring vehicles for the service. Assumes entire fleet is wheelchair accessible.
Hardware and data plans	$200 - $500 per tablet plus ongoing data plan subscription	Cost to purchase tablets, mounts, chargers, and dispatcher hardware (computer, phone, etc.) Each device will require an active data plan.
Software installation fees	$20,000 - $50,000	Software installation fees vary depending on the provider and the size of the deployment.
Marketing	$10,000 - $40,000	Cost to market the service prior to launch, ensuring riders are aware of any changes. This includes the cost of providing referral incentives (e.g., refer a friend and get $5).

Table 4-8: Ongoing Operations and Maintenance Cost Assumptions

Type of cost	Cost Range	Assumptions
In-House Operations		
O&M Cost	$70 - $105 per vehicle revenue hour According to the National Transit Database for the FY2020 reporting year, Lextran spent $105 per vehicle revenue-hour on its fixed-route service and $45 per vehicle revenue hour on its paratransit service. Actual O&M cost will likely fall towards the upper end of this range.	• These figures are inclusive of operations, maintenance, insurance, management, and dispatch/customer service functions. • Lextran would either contract with a 3rd-party vehicle operator to manage ongoing vehicle maintenance or would provide maintenance with its own staff. • A third-party contractor or Lextran would manage the service. Usually this requires at least one person at all times. This individual would act as a dispatcher, receiving phone bookings, managing driver issues, and more.
Software licensing fees	$20,000 - $60,000 / year	Software installation fees vary depending on the provider and the number of vehicles needed to operate the on-demand service.
Turnkey Contract Operations		
O&M Cost (less than 5 fleet vehicles)	$80 - $100 per vehicle revenue hour	Fully loaded cost per vehicle revenue hour, which includes recurring technology fees, vehicle leases, driver pay, and customer service.
O&M Cost (5-10 fleet vehicles)	$60 - $80 per vehicle revenue hour	

Cost Summary

Table 4-9 summarizes the estimated capital and O&M costs associated with the in-house and turnkey contract service delivery models. For both service models, the O&M cost estimates represent the midpoint of the demand and productivity ranges summarized in the previous section. Actual operating costs may be higher or lower depending on the chosen service design parameters and ridership demand. Capital costs for the turnkey contract model are assumed to be included in the annual O&M cost.

Table 4-9: MOD Cost Estimate Summary based on Medium Demand and Productivity Assumpions

Zone	In-House		Turnkey Contract
	Capital	O&M	O&M
Individual Zones			
Northwest Zone	$235,700	$487,500	$459,900
Northeast Zone	$235,700	$487,500	$459,900
Southwest Zone	$235,700	$487,500	$459,900
Southeast Zone	$323,550	$934,900	$919,800
System Total	**$850,650**	**$2,277,300**	**$1,788,500**
Combined Zones			
North Zone	$235,700	$487,500	$459,900
South Zone	$411,400	$1,382,400	$1,379,700
System Total	**$587,100**	**$1,829,800**	**$1,430,800**

Table 4-10 on the following page provides additional detail including vehicle requirements, annual vehicle-hours, and costs to operate on-demand services under both service delivery models. The table also shows the cost per passenger trip as a measure of the service's relative cost-effectiveness.

Table 4-10: MOD Cost Estimate Detail based on Medium Demand and Productivity Assumpions

Cost Category	Individual Zones					Combined Zones		
	Northwest Zone	Northeast Zone	Southwest Zone	Southeast Zone	System	North Zone	South Zone	System
Cost Drivers								
Fleet Vehicles	2	2	2	3	9	2	4	6
Annual Vehicle Hours	5,110	5,110	5,110	10,220	25,550	5,110	15,330	20,440
Capital								
Vehicles	$175,000	$175,000	$175,000	$262,500	$787,500	$175,000	$350,000	$525,000
Hardware / Data	$700	$700	$700	$1,050	$3,150	$700	$1,400	$2,100
Software	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000
Marketing	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000
Capital Total	**$235,700**	**$235,700**	**$235,700**	**$323,550**	**$850,650**	**$235,700**	**$411,400**	**$587,100**
Operating								
In-House Model								
O&M	$447,500	$447,500	$447,500	$894,900	$2,237,300	$447,500	$1,342,400	$1,789,800
Software Licensing	$40,000	$40,000	$40,000	$40,000	$40,000	$40,000	$40,000	$40,000
In-House Operating Total	**$487,500**	**$487,500**	**$487,500**	**$934,900**	**$2,277,300**	**$487,500**	**$1,382,400**	**$1,829,800**
Cost per Passenger Trip	$40.63	$54.17	$23.21	$25.97	$29.20	$23.21	$23.04	$22.59
Turnkey Contract Model								
O&M	$459,900	$459,900	$459,900	$919,800	$1,788,500	$459,900	$1,379,700	$1,430,800
Turnkey Operating Total	**$459,900**	**$459,900**	**$459,900**	**$919,800**	**$1,788,500**	**$459,900**	**$1,379,700**	**$1,430,800**
Cost per Passenger Trip	$38.33	$51.10	$21.90	$25.55	$22.93	$21.90	$23.00	$17.66

Potential Funding Sources

In addition to Lextran's existing operations funding resources, the following sources could provide financial support for on-demand transit services:

- **State and Federal grants:** Most on-demand transit operators will support public agencies in their applications for State and Federal grants. The FTA's RAISE and Accelerating Innovative Mobility (AIM) grant programs are two funds that are particularly suitable for on-demand transit.
- **Private financing:** Private capital can defray the upfront costs of operating microtransit services, aligning the private provider and public partner's interest over the term of the contract. In some cases, private sources of funding have contributed sponsorships or matching funds to operate on-demand transit service. These private sources include major employers, retail and entertainment associations, universities, and other local institutions with a vested interest in ensuring the mobility needs of their communities are met, spurring economic development in the region, offering visitors convenient transportation.
- **Advertising:** Some on-demand transit services have recouped operational expenses by offering "takeover" advertising campaigns. These campaigns may include elements of advertising on vehicles, in-app affiliate marketing, and branded event promotions. Combined into a takeover campaign, these individual strategies have greater value to a potential advertiser. The unique qualities of an on-demand transit service – an app-based system with dedicated vehicles serving geographically-defined markets – make it particularly well suited for a takeover campaign strategy.

4.4.3 ADA Paratransit Considerations

Serving current ADA paratransit customers, particularly with same-day service options, is a primary objective of on-demand transit. On-demand transit may potentially offer Lextran additional cost savings if existing ADA paratransit customers shift a portion of their trips from ADA service to on-demand transit. This shift is due to the fact that MOD is likely to be operated at a slightly lower cost compared to Lextran's 2020 ADA paratransit cost-per-trip of $26. Based on findings from other American MOD services, we find that areas with on-demand transit service generate levels of ADA paratransit ridership (normalized for underlying population) 31% lower than areas without on-demand transit service.[4] By applying this modal shift assumption to the ADA trips that currently have an origin *and* destination within the proposed MOD zones Lextran would realize $20,000 to $50,000 in annual savings, depending on the service delivery model.

[4] Khan et al. 2021. "Travel Behaviors of the Transportation-Disabled Population and Impacts of Alternate Transit Choices: A Trip Data Analysis of The Handitran Paratransit Service in Arlington, TX." p. 9. https://doi.org/10.1061/9780784483534.043.

4.4.4 Marketing New Services

For any new transit service to be successful, it is critical to create a comprehensive marketing plan prior to the launch of the service. Marketing efforts for new MOD services could include:

- Street marketing at fixed-route bus stops
- Parking branded service vehicles in high-traffic areas
- Canvassing or handouts at key points of interest
- Bus driver handouts
- Ads/notices on bus stop signage
- Producing a public service announcement (PSA) to be aired on local public television or the agency's YouTube account
- Placing social media ads
- Participation in community events (e.g. farmers markets, sports tournaments, street fairs)
- Activation of key local influencers and community leaders
- Free ride promotions
- A launch event with local politicians, business leaders, and media present to promote the service

In addition to marketing to customers directly, local institutions are often excellent marketing partners who can help promote local transit services to their customers, employees, and, in the case of universities, students. Lextran should explore such partnership opportunities with local institutions such as the University of Kentucky, Bluegrass Technical College, local healthcare/hospital systems, and other major employers in Lexington.

4.4.5 Implementation Steps & Phasing

The following steps were identified to advance the implementation of on-demand service in Lexington.

1. **Planning & Fundraising**
    - Identify pilot project scope (zonal boundaries, service levels, service policies, fares)
    - Select service delivery model (in-house vs. turnkey contract) and define budget
    - Identify and pursue grant opportunities and identify supplemental operating and capital funding sources
    - Initiate procurements, including a service contractor (if outsourcing operations), vehicles, technology.
2. **Phase 1 Pilot Testing (6-12 months)**
    - Start-up activities
    - Marketing
    - Service launch
    - Service monitoring and evaluation
    - Refine service policies in advance of expansion
3. **Phase 2 Service Expansion**
    - Expand existing zones or launch new zones
    - Initiate procurements, as needed, including new vehicle acquisition and/or modifying service contracts.

5. Capital Plan

5.1. Introduction

This chapter focuses on the capital elements needed to implement the service recommendations defined in Chapters 3 and 4 of this report. The capital plan is organized into the following sections:

- 5.2 Transit Infrastructure, including facilities and passenger amenities at bus stops
- 5.3 Transit Vehicles, with a focus on fixed-route fleet needs
- 5.4 Transit Technology, providing a summary of planned technology deployments
- 5.5 Capital Costs, which details cost assumptions and compares funding needs to the current 5-year capital budget

5.2. Transit Infrastructure

Adequate infrastructure such as transit centers, transfer facilities, bus stops, and maintenance facilities is essential to delivering a high-quality and convenient transportation experience for Lextran riders and helps ensure operational efficiency for the agency. This section recommends infrastructure improvements needed to effectively implement and support the proposed service recommendations.

5.2.1. Facilities

Downtown Transfer Center

Lextran is in the process of upgrading its downtown transit center to improve bus operations, pedestrian experience, and safety. Planned and ongoing improvements include priority signal for buses departing the transit center, placemaking at bus bays, pedestrian signage, wayfinding improvements, lighting improvements, and a technology and security refresh to add real-time arrival screens on platform and upgraded security cameras. Construction on the exterior of the transfer center will begin in 2022. Interior construction is planned for the second quarter of 2023 and will cost. Renderings of the planned upgrades are shown in **Figure 5-1** (exterior) and **Figure 5-2** (interior).

Figure 5-1. Renderings of Downtown Transfer Center Exterior Upgrades

Source: Kersey and Kersey Architects, 2022

Figure 5-2. Rendering of Downtown Transfer Center Interior Upgrades

Source: Kersey and Kersey Architects, 2022

CNG Facilities

Lextran submitted a grant application to renovate a portion of the bus maintenance building to accommodate maintenance for CNG vehicles.

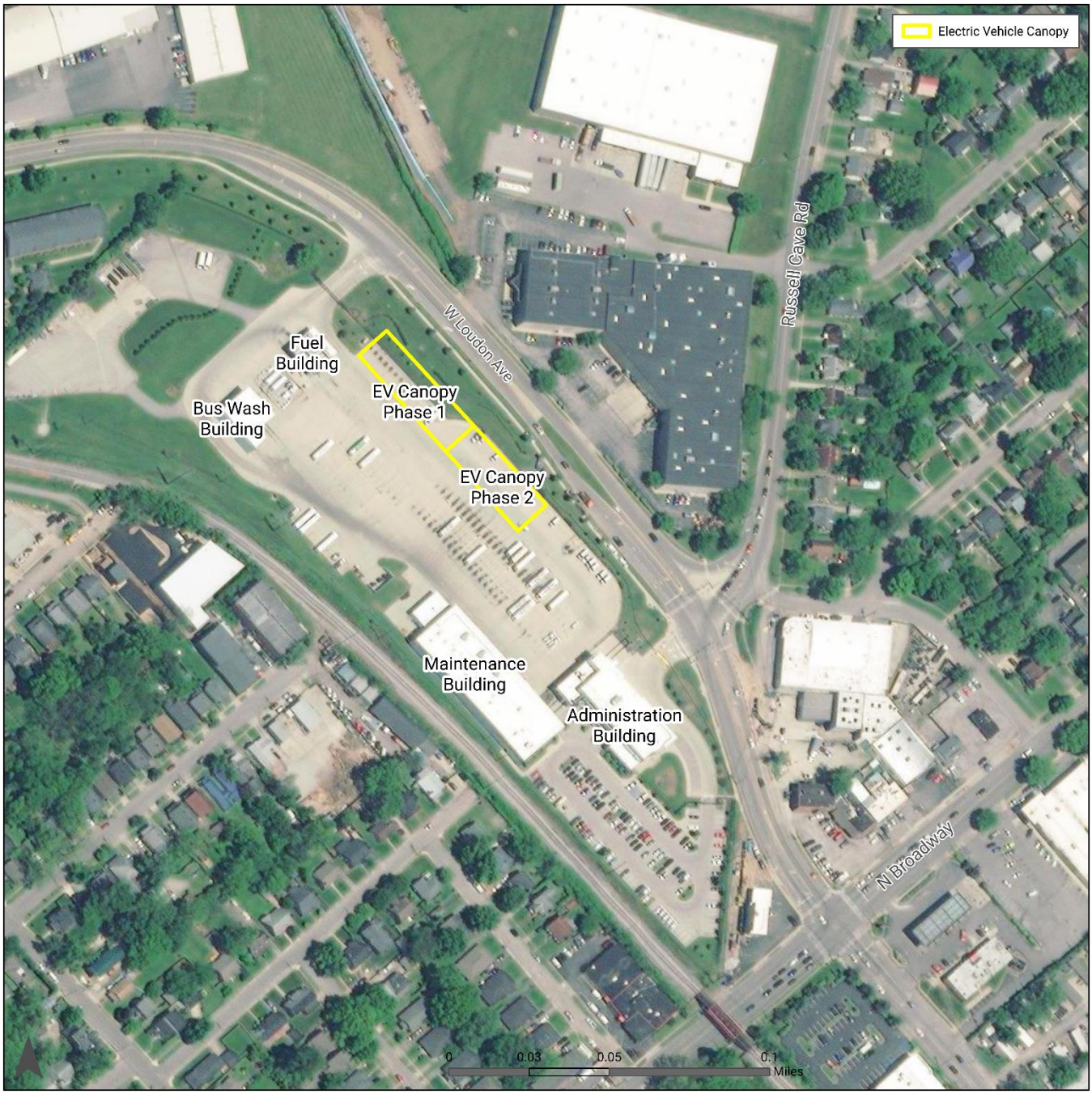
Lextran is limited in the number of CNG vehicles that can be incorporated into its fleet because of operational circumstances and infrastructure needs. Currently, Lextran has two CNG compressors on site and a total of 22 CNG vehicles in the fleet. The average time to fuel a single bus is 10 minutes, meaning more than 3.5 hours is required in fueling time alone to get each vehicle through the fueling station, not including the amount of time required to disengage the fueling apparatus and move the buses into place. Lextran service spans ends at about 12:30 AM and begins at roughly 5 AM, leaving about 4.5 hours for maintenance and fueling. While Lextran does have some block schedules that allow buses to return to the garage sooner than the end of the service span, those blocks tend to be more suitable for battery-electric buses that have a limitation on the time and distance they can operate without recharging, and Lextran currently has 8 battery electric buses in its fleet with additional buses on order. Between operational procedures and facility infrastructure, Lextran is essentially at the limit of CNG buses in its fleet. The CNG Fleet and Facilities project calls to increase fueling capacity with additional compressors and related infrastructure to be able to fuel two buses simultaneously and retain a 10-minute fueling window on average.

Lextran conducted a facilities evaluation in 2017 to identify needs in order to increase the number of CNG vehicles in the fleet. The recommendations generated from that study were aimed at enhancing the safety of our staff and bus bays, thus allowing Lextran to conduct more in-depth maintenance work (such as hot work or grinding) on CNG vehicles on-site. Lextran has submitted applications for grant funding to complete the facility enhancements and to construct additional CNG infrastructure, such as compressors, to increase the number of CNG vehicles that can be deployed.

Bus Canopy Project

Lextran is planning to install a bus canopy at 200 W Loudon Ave adjacent to the maintenance building, shown in **Figure 5-3**. The canopy is proposed to include 15 bus charging stations in Phase 1 and 14 stations in Phase 2 for a total of 29 spaces to accommodate electric vehicles. The project is anticipated to cost a total of. Phase 1 construction is planned to begin in fourth quarter of 2022.

Figure 5-3. Planned Location of Electric Vehicle Canopy



5.2.2. Bus Stops

Lextran has 887 bus stops in its service area. Currently 100 bus stops (11%) have shelters and 162 have benches (18%). The locations of bus stops, shelters, and benches are shown in **Figure 5-5**. The policy for providing bus stop amenities is defined in Lextran's Title VI Program Plan (October 2019).

Title VI Service Policies

Lextran's Title VI Program Plan includes service policies for installing passenger stops and amenities. Bus stop locations are determined with input from the Planning, Technology and Community Relations and Risk Management departments. Lextran maintenance staff services bus stops and assists with installation. The service policy calls for bus stops to be spaced approximately 0.2 miles apart with consideration of contextual land-use and pedestrian infrastructure.

The service policy provides ridership thresholds for various passenger amenities as well. The service policy states that bus stops with greater than 25 daily boardings will be identified as a potential location for a shelter, bench, and waste receptacle. Bus stops that do not qualify for shelters but have greater than 15 daily boardings will be identified as potential locations for a bench and waste receptable only. Major transfer locations will also be considered for passenger amenities. The policy also states that passenger amenity installations are subject to funding availability and right-of-way considerations.

Rider Amenities at Many Places (RAMP) Project

Lextran is currently working to improve the accessibility to bus stops through the Rider Amenities at Many Places (RAMP) project. The RAMP program seeks to improve the passenger experience through enhancements to bus stop access and amenities. RAMP is based on a route facility inventory completed in 2018 which informed the prioritization of stop improvements. Projects implemented through the RAMP include pedestrian access and Americans with Disabilities Act (ADA) improvements and installation of stop amenities such as shelters and benches.

A total of 21 stop locations are planned for improvements as part of the RAMP program, including installations of 19 boarding pads, 10 shelters, and 4 sidewalk improvements. An example of the stop improvement is shown in **Figure 5-4**, with the location and size of boarding and sidewalk construction at Stop 282, Shropshire at Shelby outbound. See **Table 5-1** for a listing of all 21 stops planned for improvements with the RAMP program. Locations of improvements are identified in **Figure 5-6**. The RAMP project is anticipated to be completed by July or August of 2022.

Newtown Pike Extension (Oliver Lewis Way) Bus Station

Lextran and the LFUCG, in cooperation with Kentucky Transportation Cabinet (KYTC), are in the design phase to install four bus shelters on Oliver Lewis Way between West High Street and South Broadway. Two of the four shelters are planned to be prefabricated structures, while the other two will incorporate custom elements that reflect the unique character of the adjacent neighborhoods. Locations for the four bus stops can be found in **Figure 5-6**.

Table 5-1. Rider Amenities at Many Places (RAMP) Improvements

Stop Number	Stop Name	Improvement Type
3	Alexandria @ Devonport Inbound	Install boarding pad and shelter
10	North Broadway @ Loudon Outbound	Install boarding pad
282	Shropshire @ Shelby Outbound	Install boarding pad, curbing, and sidewalk
360	Beaumont Centre @ 3251 (YMCA)	Install shelter
362	Appian Way @ Armstrong Mill Inbound	Install boarding pad
897	Rio Dosa @ The Ridge	Install boarding pad, shelter, sidewalk
933	Buena Vista @ 2240 Outbound	Install boarding pad
952	Liberty @ 1825 Inbound	Install boarding pad, shelter
1074	Palumbo @ 2875 Inbound	Install boarding pad, shelter
1161	Armstrong Mill @ Tates Creek Inbound	Install boarding pad, shelter, and trash
1177	Wilson Downing @ Tates Creek Ctr Inbound	Install shelter, increase concrete slab and sidewalk
1250	4th @ Jefferson	Install boarding pad, bench, and trash
1286	New Circle @ Russell Cave Outbound	Replace boarding pad, bench, and trash
1339	Winburn @ Mccullough Outbound	Install boarding pad
1341	Winburn @ Pennebaker	Install boarding pad
1383	Nicholasville @ 2374 Inbound	Install concrete pad, shelter, and trash
1401	North Limestone @ New Circle Outbound	Install boarding pad
1467	Oxford @ Versailles Inbound	Replace concrete pad, curbing, sidewalk, shelter, and trash
1520	South Broadway @ 1221 (Lexington Clinic)	Install shelter
1673	Woodhill @ Thorntons Outbound	Install boarding pad
5052	Alexandria @ Devonport Outbound	Install boarding pad

Figure 5-4. Shropshire at Shelby Outbound Stop Boarding Pad Construction

Bus Stop and Amenity Recommendations

Based on the Title IV Service Policies, there are currently 43 stops that meet policy requirements for a transit shelter (greater than 25 daily boardings) and 23 stops that meet the policy requirements for a bench (greater than 15 daily boardings). However, Lextran plans to accelerate the installation of bus stop amenities, with the goal of installing shelters at all stops with greater than 15 daily boardings.

To accommodate the service changes in the Near-Term Plan, 22 new bus stops will need to be installed (e.g., Duval Street and Saron Drive on Route 3 Tates Creek Road, Pasadena Drive and Lowry Lane on Route 8 Versailles Road, and Dunbar High School on Route 13 South Broadway). The Near-Term Plan also recommends removal of service in some areas (e.g., Fontaine Road on existing Route 1 Woodhill Drive, Buckhorn Drive on existing Route 18 Centre Parkway Connector, and Radcliffe Road on existing Route 17 Northside Connector). A total of 79 bus stops are anticipated to be removed in the process of service changeover from existing service to the Near-Term Plan recommendations.

Unit costs for bus stops and amenity improvements are shown in **Table 5-2**. Bus stop removal is anticipated to be completed by Lextran's maintenance department as part its annual maintenance budget. Out of the 79 stops recommended for removal, only one stop (1503 Loudon/849 Inbound) has a bench requiring removal.

Table 5-2. Stop Amenity Recommendations and Cost

Recommendation Type	Quantity	Unit Cost	Total Cost
Sign and Pole	22	$100	$2,200
Stop Amenities	66	$13,000	$858,000
Boarding Pad + Sitework	66	$6,890	$454,740
Subtotal			**$1,314,940**
Additional Costs (65% of Subtotal)			$854,711
Grand Total			**$2,169,651**

Notes:
1. Sign and Pole to match existing Lextran bus stop sign and U-post sign pole.
2. Stop Amenities assume shelter, bench, and trash.
3. Boarding Pad + Sitework include excavation, framing, gravel base, 4" concrete, and finishing work.
4. Additional Costs include coordination of activities, surveying, design, and inspection of work. Cost will vary based on work scope.
5. Costs may need to be adjusted based on timing of work, inflation, material availability, etc.
6. All costs in FY 2022 dollars.

Superstop Recommendations

The Near-Term Plan recommends route alignment changes that promote connections between routes, yielding increased mobility for passengers. It is also recommended that Lextran install additional stop infrastructure at these locations to facilitate easy and comfortable transfers between routes. These enhanced connecting locations are called "superstops", and should be considered for the following additional investments:

- **Passenger amenities and information:** Install shelters, benches, and trash cans at these locations. Provide passenger information and digital display boards with real time arrival/departure information.
- **Security cameras and lighting:** Work to maintain adequate lighting at these locations and install security cameras. This will be helpful for both riders and drivers, the latter of which may use these locations for breaks.
- **Bus stop infrastructure:** Coordinate on-street and/or off-street changes to roadways and/or parking lots to safely and efficiently accommodate transit vehicles and riders. This will likely require agreements between Lextran and private property owners.
- **Mobility hubs:** Coordinate with planning partners to co-locate other mobility services at these hubs, such as bike share, scooter share, or car share services or parking for bicyclists or other vehicles.

A total of 14 locations for superstops have been identified and mapped in **Figure 5-6**. Costs and specifications of amenities at each superstop will depend on funding availability and local right-of-way considerations. Superstop costs generally range from $250,000 for on-street infrastructure and $750,000 for off-street infrastructure, not including right-of-way acquisition costs.

Figure 5-5. Existing Stop Amenities

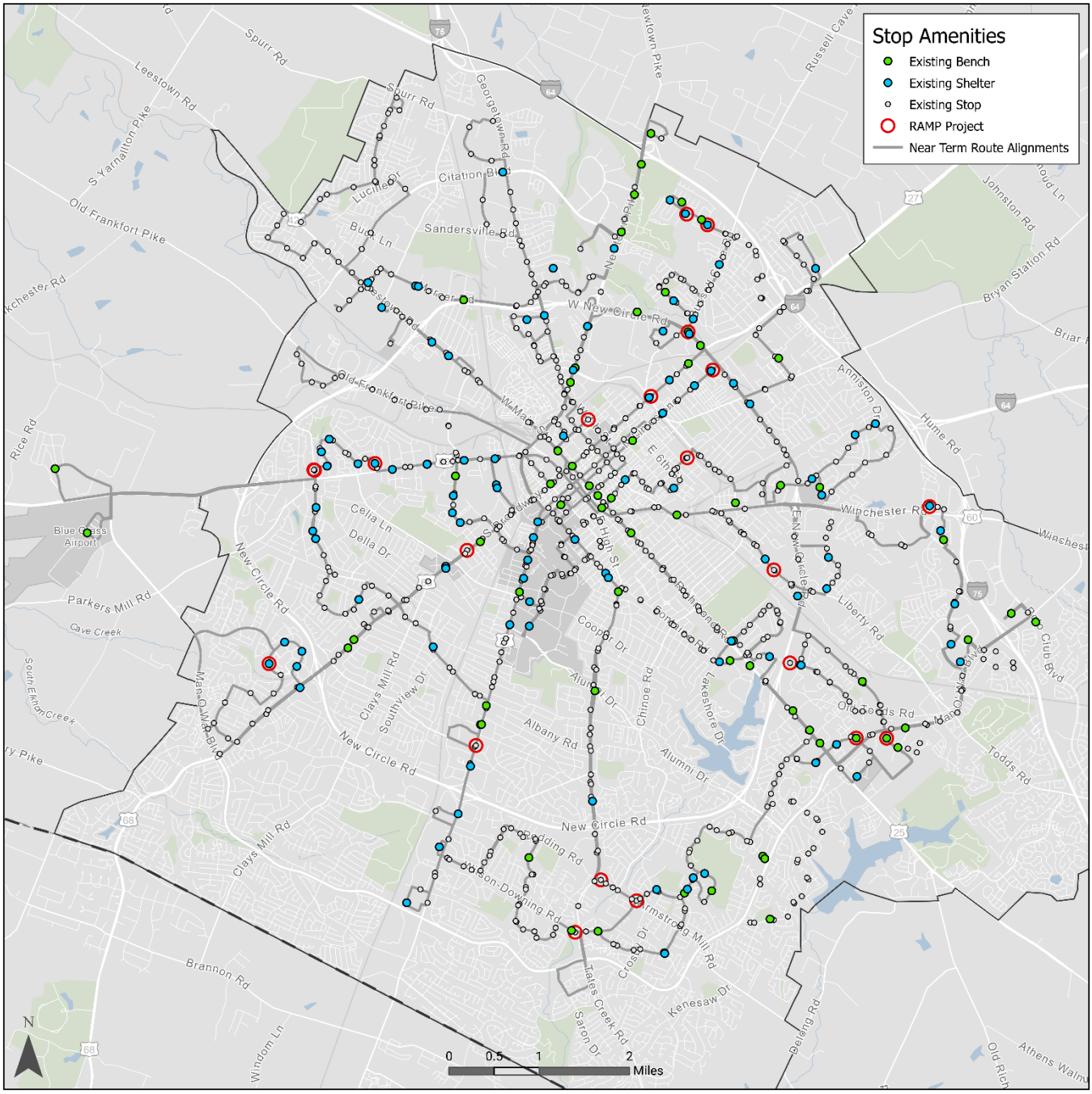
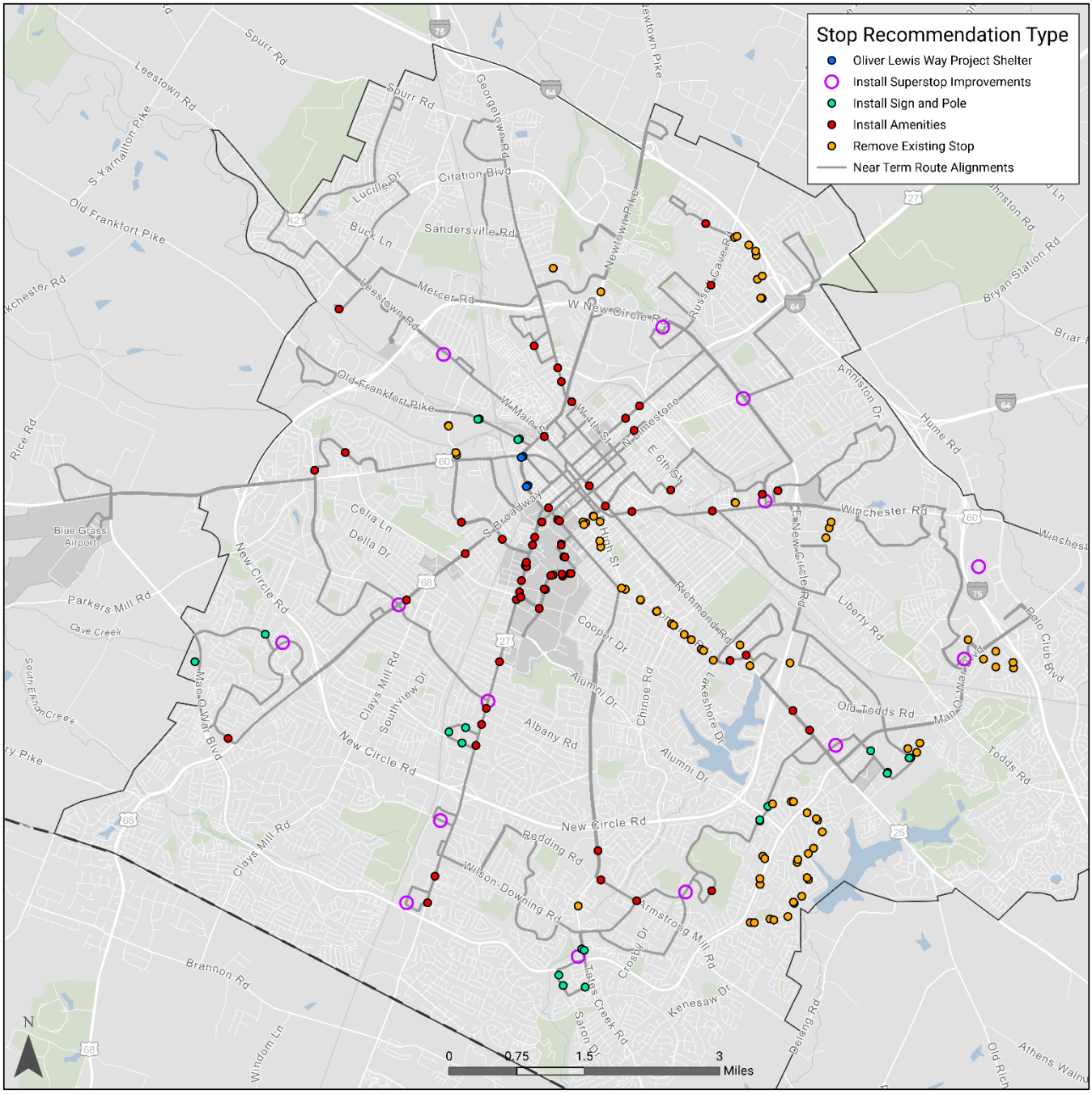


Figure 5-6. Recommended Stop Amenities



5.3. Transit Vehicles

Lextran's vehicle needs vary by service type. Vehicles used in fixed-route service are owned and maintained by Lextran. For paratransit service, Lextran contracts with a third party that owns and operates the demand-response vehicles. Lextran also owns 17 non-revenue support vehicles such as trucks and other transport vehicles. Although Lextran does not currently operate mobility on-demand service, the long-term plan recommendations call for four mobility on-demand zones that will require additional vehicles. Cost assumptions for each fleet category are shown below, followed by sections detailing the vehicle needs for each service type.

Table 5-3. Transit Vehicle Cost Estimates

Fleet Category	Type	Estimated Cost
Fixed Route	CNG	$675,000
	Battery Electric	$1,000,000
Support Vehicle	SUV/Pick-up Truck	$50,000
Mobility On-Demand	Small Van	$42,500
	Accessible Van	$87,500

1. Costs may need to be adjusted based on timing of acquisition, inflation, vehicle availability, etc.
2. All costs in FY 2022 dollars.

5.3.1. Fixed-Route Vehicle Needs

Two ten-year vehicle needs scenarios were developed: a No Service Change Scenario and a Service Changes Scenario. The No Service Change Scenario assumes no service changes are implemented over the ten-year timeframe, i.e., the existing service is maintained. The Service Changes Scenario assumes the service changes in the Near-Term, Mid-Term, and Long-Term Plans are implemented in 2023, 2027, and 2032, respectively.

No Service Changes Scenario

The No Service Change Scenario assumes no changes to the existing service. However, vehicle purchases are planned throughout the ten-year cycle to maintain a state of good repair. **Table 5-4** shows the vehicle needs from FY 2022 (existing) to FY 2032 for the No Service Changes Scenario. Assumptions and outcomes are noted below.

- **Active Fleet:** Lextran currently has 55 vehicles in the active fleet and plans to maintain this fleet size to accommodate current service levels. Lextran has ordered six vehicles that will be ready to enter service in 2023. Future years assume a vehicle purchase rate of five vehicles annually. This translates to a decrease in average age, from 8.9 years (currently) to 5.5 years (FY 2032).
- **Vehicles Retired:** Without expansion of service, the rate of vehicle disposal will be the same as the purchase rate. In FY 2023, Lextran will replace six vehicles. Five vehicles are assumed to be replaced each year for the remainder of the ten-year planning horizon. The average age of vehicles being retired will therefore decrease from 18.3 years (FY 2023) to 14.2 years (FY 2032).
- **Contingency Fleet:** Lextran maintains a contingency fleet that is not considered part of the active fleet. The contingency fleet is made up of vehicles that have exceeded their normal service life but are maintained and properly stored so they can be called into service when needed. Lextran currently has eight vehicles designated as contingency fleet. Future years

assume continuation of eight contingency vehicles. Under these circumstances, the average age of the contingency vehicles decreases from 17.5 years to 12.0 years.

- **Total Fleet:** The total fleet consists of the active fleet and contingency fleet combined, which amounts to 63 vehicles for all years.
- **Peak Vehicles:** The number of peak vehicles is anticipated to remain at 53.
- **Spare Ratio:** Lextran's spare ratio is 3.8%. Lextran is able to achieve a relatively low spare ratio primarily because of the contingency fleet.

Service Changes Scenario

The Service Changes Scenario assumes that the Near-Term, Mid-Term, and Long-Term Plan recommendations are implemented in FY 2023, FY 2027, and FY 2032, respectively. **Table 5-5** shows the vehicle needs from FY 2022 (existing) to F Y2032. Results are discussed below.

- **Active Fleet:** The number of peak vehicles is reduced from 53 to 49 in the Near-Term Plan. Lextran should maintain the active fleet of 55 vehicles, however, because the peak number of vehicles increases to 53 in the Mid-Term Plan. In FY 2027, Lextran should begin increasing the number of active vehicles to prepare for the service expansion in FY 2032. The average age of active fleet is slightly more than in the No Service Changes Scenario, but still decreases (from 8.9 years in the existing to 5.8 years in FY 2032).
- **Vehicles Retired:** The proposed Mid-Term plan service expansion would require additional vehicles. To accommodate this expansion, Lextran should retire fewer vehicles beginning in 2027, from five vehicles to four vehicles.
- **Contingency Fleet:** Lextran should maintain the current contingency fleet size to accommodate service growth as recommended in the Mid-Term Plan. It is appropriate to grow the contingency fleet size from eight vehicles to nine when the Long-Term Plan is implemented. Increasing the size of the contingency fleet to nine would maintain current proportion of contingency vehicles (12.7% of total vehicles).
- **Total Fleet:** The total fleet size should remain the same over the Near-Term Plan, but should grow for the Mid-Term and Long-Term Plans, increasing to 64 and 71 vehicles, respectively.
- **Peak Vehicles:** After an initial decrease from 53 to 49 peak vehicles in the Near-Term Plan, the Mid-Term Plan increases the peak vehicle count back to 53, and the Long-Term Plan increases to 59.
- **Spare Ratio:** The spare ratio increases to 12.2% when the Near-Term Plan is implemented. The higher number of spare vehicles in the Near-Term should be maintained, however, because the Mid-Term Plan calls for an increase in service and results in the spare ratio decreasing to 5.7%. The spare ratio increases again as Lextran prepares for the Long-Term Plan service increase in 2032. When the Long-Term Plan is implemented, the spare ratio decreases from 15.1% to 5.1%.

Table 5-4. No Service Changes Scenario Vehicle Needs

Fleet Category	Statistic	Fiscal Year										
		Existing	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Active Fleet	Existing	55	49	50	50	50	50	50	50	50	50	50
	Purchased	0	6	5	5	5	5	5	5	5	5	5
	Total	55	55	55	55	55	55	55	55	55	55	55
	Average Age (Years)	8.9	8.2	7.6	7.0	6.5	6.1	5.9	5.8	5.6	5.5	5.5
Contingency Fleet	Total	8	8	8	8	8	8	8	8	8	8	8
	Average Age (Years)	17.5	16.8	17.0	18.0	17.0	15.6	14.3	13.3	13.4	12.8	12.0
Vehicles Retired	Total	0	6	5	5	5	5	5	5	5	5	5
	Average Age (Years)	-	18.3	18.2	18.0	19.0	19.2	17.0	16.2	14.4	14.6	14.2
Total Fleet (Active + Contingency)	Total	63	63	63	63	63	63	63	63	63	63	63
	Average Age (Years)	10.0	9.3	8.8	8.4	7.9	7.3	7.0	6.7	6.6	6.4	6.3
Peak Vehicles		53	53	53	53	53	53	53	53	53	53	53
Spare Ratio ((Existing Active Fleet - Peak Vehicles) / Peak Vehicles)		3.8%	3.8%	3.8%	3.8%	3.8%	3.8%	3.8%	3.8%	3.8%	3.8%	3.8%
Contingency Ratio (Contingency Vehicles / Total Vehicles)		12.7%	12.7%	12.7%	12.7%	12.7%	12.7%	12.7%	12.7%	12.7%	12.7%	12.7%

Table 5-5. Service Changes Scenario Vehicle Needs

Fleet Category	Statistic	Fiscal Year										
		Existing	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Active Fleet	Existing	55	49	50	50	50	51	52	53	54	55	56
	Purchased	0	6	5	5	5	5	5	5	5	6	6
	Total	55	55	55	55	55	56	57	58	59	61	62
	Average Age (Years)	8.9	8.2	7.6	7.0	6.5	6.3	6.2	6.1	6.1	5.9	5.8
Contingency Fleet	Total	8	8	8	8	8	8	8	8	8	8	9
	Average Age (Years)	17.5	16.8	17.0	18.0	17.0	15.8	15.5	14.3	13.9	14.4	13.9
Vehicles Retired	Total	0	6	5	5	5	4	4	4	4	4	4
	Average Age (Years)	-	18.3	18.2	18.0	19.0	20.0	17.0	17.5	16.5	15.0	15.8
Total Fleet (Active + Contingency)	Total	63	63	63	63	63	64	65	66	67	69	71
	Average Age (Years)	10.0	9.3	8.8	8.4	7.9	7.5	7.3	7.1	7.0	6.9	6.8
Peak Vehicles		52	49	49	49	49	53	53	53	53	53	59
Spare Ratio ((Existing Active Fleet - Peak Vehicles) / Peak Vehicles)		5.8%	12.2%	12.2%	12.2%	12.2%	5.7%	7.5%	9.4%	11.3%	15.1%	5.1%
Contingency Ratio (Contingency Vehicles / Total Vehicles)		12.7%	12.7%	12.7%	12.7%	12.7%	12.5%	12.3%	12.1%	11.9%	11.6%	12.7%

5.3.2. Paratransit Vehicle Needs

Lextran's current paratransit fleet totals 56 vehicles, including 43 cutaways, seven vans, and six automobiles, per Lextran's 2018 Transit Asset Management Plan. Lextran currently contracts its paratransit service to a third-party contractor, which owns, operates, and maintains the paratransit fleet.

5.3.3. Mobility On-Demand Vehicle Needs

Proposed recommendations for new mobility on-demand service are detailed in Chapter 4 of this report. The results of the mobility on-demand action plan showed that under medium demand and productivity assumptions, the Northwest, Northeast, and Southwest on-demand zones would likely require two vehicles to operate the service. The Southeast on-demand zone would likely require three vehicles, bringing the total number of vehicles needed to nine. Because Lextran currently does not operate mobility on-demand service, all vehicles would either need to be procured (if service is operated in house) or provided by a third party (if service is contracted through a turnkey delivery model).

5.3.4. Support Vehicles

In addition to the revenue fleet, Lextran owns a total of 17 support vehicles used for maintenance and/or administrative purposes. Non-revenue/support vehicles are less related to the level of transit service provided than revenue vehicles, and therefore, support vehicle needs are not anticipated to change based on the service changes scenarios. In most years, Lextran budgets $75,000 for the replacement of support vehicles, although this figure varies from year to year (e.g., Lextran ordered five support vehicles in 2022). Additional information can be found in Lextran's Transit Asset Management Plan.

5.4. Transit Technology

Lextran conducted a review of its technology systems as part of the Technology Consulting Service Project in 2020, led by IBI Group. The project created a technology strategic plan that included a comprehensive review of existing IT systems, an identification of IT needs/gaps, and recommendations to improve Lextran's technology systems moving forward. A summary of IT needs identified in the report are provided below:

Data and Performance Management – refers to findings that are related to data and reporting. Key findings included:

- Data management is a challenge from source.
- Reporting Tools need improvement to minimize need for time-intensive manual work.
- Inadequate real-time information and performance measures.

Vendor Management – refers to issues stemming from a vendor or the management of a vendor. Key findings included:

- Challenging to manage some vendors, including Avail and IVR vendor.
- ERP tool has limited support since procurement.
- Sprint has issues with cell comms. quality, customer service, coverage.
- Need to build in better contractual incentives to manage vendors.

Business Process/ Organizational – refers to findings that are related to business processes followed by different departments for completing daily business functions or any staffing and organizational challenges. This category refers to any issues that are related to system workflows. Key findings included:

- Various technology tools are outdated, resulting in staff having to develop workarounds.
- Need to incorporate regular training as part of any technology implementation.

Technical – refers to findings that are related to limitations in the currently deployed tools and technologies. Key findings included:

- Only one dispatcher can speak at a time through current radio system.
- Scheduling
- Creating detours is time consuming and complicated.
- Customers and Lextran staff use different maps.
- Performing maintenance activities is a challenge in Fleetnet.

Recommendations

Recommendations to address the needs identified above are summarized in **Table 5-7**. Lextran has completed two of the eight recommendations: replacing the radio/voice communication system and interactive voice response system. Lextran is currently drafting scope for future procurement of technology to address five of the remaining six recommendations. Estimated project costs for high priority items are shown in **Table 5-6**.

Table 5-6. High Priority Technology Project Costs

Project	Capital Costs	Annual Operating Costs	5-Year Costs
Radio/Voice Communication System	$50,000 - $150,000	$25,000 -$60,000	$150,000 -$400,000
Data Management and Scheduling Tools	$40,000 -$100,000	$20,000 -$50,000	$120,000 -$300,000
Maintenance Management Software	$120,000 -$300,000	$20,000 -$50,000	$200,000 -$500,000
TOTAL	**$210,000 -$560,000**	**$65,000 -$160,000**	**$470,000 -$1,200,000**

Source: IBI Technology Feasibility Study Presentation

Table 5-7. Technology Consulting Services Project Recommendations

Recommendation Type	Priority	Issue Identified	Resolution	Rationale	Status
Radio/Voice Communication System	High	Lextran EDACS radio system support ended June 2021 and Lextran needed to move away from independent radio system	Partner with a local agency (e.g. LFUCG)	– Reduces upfront investment and effort – Spreads maintenance duties and costs – Improves redundancy and interoperability	Completed.
Data Management and Scheduling Tools	High	TMS scheduling software not easy to use, and has limited reporting	Replace with alternative solutions that provide better schedule related reporting and analytics	– Improved scenario analysis – Improved quality of source data – Has downstream benefits for real-time information, reporting, analytics	Scope currently in development to prepare for procurement process.
Maintenance Management Software	High	Fleetnet Software provides limited capabilities, is dated, requires workarounds	Replace FleetNet maintenance management capabilities with new software	– Provides the most updated features for maintenance, inventory management – Reduces the time and costs of upgrading and improving FleetNet – Reduces manual efforts and workarounds to using FleetNet	Scope currently in development to prepare for procurement process.
Computer-Aided Dispatch and Automatic Vehicle Location Systems	Medium	Avail system generally meets agency needs but may need full upgrade or replacement in 2-3 years.	Rewrite maintenance and support contract and evaluate in future	– Meets Lextran's needs – Reduces additional procurement costs – Reduces additional training needs	Scope currently in development to prepare for procurement process.
Real-time Information	Medium	Vehicle position information is generally reliable, but challenges with getting systemwide information, particularly for routes being detoured or on headway service (UK).	– Near term: Reformat TransLoc AVL data for Avail system – Long term: Consolidate all AVL data using third-party software		Scope currently in development to prepare for procurement process.
Enterprise Resource Planning	Medium	Fleetnet software has dated UI, is not easy to use, and requires supplementation with manual Excel sheets.	Procure new ERP software post the replacement of the maintenance management software	– Improved integration with other systems – Improves financial reporting	Scope currently in development to prepare for procurement process.
Fare Collection System	Low	Fareboxes are getting old but largely work as needed.	Evaluate transfer policy, options to incentivize move away from cash.		Defer replacement.
Interactive Voice Response System	Low	IVR system works as needed, but usage is dropping.	Planning to decommission in near to mid-term.		Completed.

Source: IBI Technology Feasibility Study Presentation

5.5. Capital Costs

Capital plan recommendations identified as part of this COA were compared to the 5-year capital budget to reveal unfunded costs that would need to be secured to complete each recommendation within the next five years. **Table 5-8** summarizes the estimated project costs, showing the unfunded needs in the context of the most recent approved 5-year capital budget. Categories of capital expenses are shown below, providing additional details for assumptions as well as the resulting potential funding gaps.

5.5.1. Facilities

The 5-year capital budget currently includes line items for the bus canopy and transit center renovations. However, the cost estimates for these items suggest that additional funding is needed to complete these projects. The capital plan showed that facility capital costs include bus canopy ($8,700,000), transit center ($2,745,777), and CNG facilities renovation ($416,000). Based on the existing 5-year capital budget, the bus canopy is largely unfunded, with $6,500,000 needed to complete the project. The transit center, however, is 96.5% funded. The CNG facilities renovation is currently unfunded.

5.5.2. Bus Stops

The 5-year capital budget includes transit enhancements of $150,000 annually, summing to $750,000 over five years. The capital plan included improvements that amount to $2,169,651. Over the 5-year period, this creates a need for an additional $1,419,651. The superstops described in the capital plan are unfunded, which creates the need for $10,500,000 in additional funding to install all 14 recommended superstops.

5.5.3. Vehicles

The 5-year capital budget shows $13,104,924 in bus purchases including both electric and CNG vehicles. The capital plan assumes the purchase of five new buses annually to maintain a state of good repair in the fixed route fleet. The cost estimate for the five new fixed-route vehicles is based on two electric vehicles at $1,000,000 each, and three CNG vehicles at $675,000 each. Over five years, this creates $4,865,447 in unfunded needs for electric vehicles and $2,154,629 for CNG vehicles. A budget of $405,000 over five years is likely sufficient to meet the needs for service vehicles. Mobility on-demand costs are more likely to occur outside of the five-year timeframe.

5.5.4. Technology

The 5-year capital budget includes $9,973,938 for technology projects (CAD/AVL system, ITS technology services, hardware and software, and security equipment). For the capital plan, technology cost estimates utilized the higher end estimate for Data Management and Scheduling Tools and Maintenance Management Software costs in **Table 5-6** amounting to approximately $410,000. The Radio/Voice Communication System has already been replaced and no longer needs to be included in the capital budget. The existing budgeted items in the capital project list should be sufficient to cover the cost of $410,000 for the highest priority technology recommendations.

Table 5-8. Capital Plan Recommendations Funding Needs Based on Existing 5-Year Capital Budget

Category	Capital Project	Existing 5-Year Capital Budget						COA Capital Plan Projects	
		FY2022	FY2023	FY2024	FY2025	FY2026	TOTAL	Cost Estimate	Unfunded
Facilities	Bus Canopy (carry over)	$2,200	-	-	-	-	$2,200	$8,700	($6,500)
	Capital Maintenance	$2,750	$2,600	$2,600	$2,600	$2,600	$13,150	-	-
	Transit Center Project (TAP) (carry over)	$1,650	$1,000	-	-	-	$2,650	$2,746	($96)
	Shop Tools/Equipment/Facilities	$25	$94	$1,072	$1,079	$1,049	$3,319	-	-
	CNG Facilities Renovation	-	-	-	-	-	$0	$416	($416)
Bus Stops	Transit Enhancements (Shelters, Benches, Trash Cans)	$150	$150	$150	$150	$150	$750	$2,170	($1,420)
	Superstops	-	-	-	-	-	$0	$10,500	($10,500)
Vehicles	Electric Buses & Chargers	-	$5,135	-	-	-	$5,135	$10,000	($4,865)
	Bus Purchase (CNG)	$3,697	$1,403	$1,445	$702	$723	$7,970	$10,125	($2,155)
	Service Vehicles	$75	$255	-	-	$75	$405	-	-
	Capital Cost of Contracting (Paratransit)	$2,625	$2,600	$3,500	$3,500	$3,500	$15,725	-	-
Technology	CAD AVL System	-	-	$3,500	-	-	$3,500	$410	$0
	ITS Technology Services	$657	$1,018	$1,050	$1,100	$1,125	$4,950		
	Hardware & Software (IT Projects)	$194	$94	$180	$190	$190	$848		
	Security Equipment	$61	$378	$75	$80	$82	$676		
TOTAL		**$14,083**	**$14,728**	**$13,572**	**$9,401**	**$9,494**	**$61,278**	**$45,066**	**($25,952)**

1. Existing 5-Year Capital Budget amounts based on Capital Budget presented to Lextran Board of Directors in April 2022.
2. Bolded Capital Projects (CNG Facilities Renovation and Superstops) are additions to the 5-Year Capital Plan based on COA Recommendations
3. Transit technology cost estimates are ongoing and not included in the COA Capital Plan Project cost estimates.
4. All costs are in FY2022 dollars. Costs may increase with inflation.
5. All costs in $1,000s

6. Financial Plan

6.1. Existing Financial Overview

This section provides an overview of Lextran's FY2023 annual budget as approved by the Board of Directors in April 2022.

6.1.1. Funding Sources

Lextran utilizes a number of funding sources for operating and capital expenses. Lextran currently utilizes each of the funding sources identified in **Table 6-1.**

Table 6-1: Existing and Potential Capital and Operating Funding Sources

Funding Source	Description	Eligible Activities	Local Match
Federal			
FTA Section 5307 – Urbanized Area Grant	Supports operating and capital costs for transit service in urbanized areas. Federal formula includes set-aside for Lexington-Fayette, KY urbanized area.	Operating & Capital	50% Op. 20% Cap.
FTA Section 5310 – Enhanced Mobility of Seniors and Individuals with Disabilities Grant	Supports operating and capital costs for transit service that meets the needs of older adults and people with disabilities in underserved markets. While most operators are private, non-profit entities, public transit operators are eligible recipients.	Operating & Capital	50% Op. 20% Cap.
FTA Section 5339(a) – Buses and Bus Facilities Grant	Provides funding to replace, rehabilitate and purchase buses and related equipment and to construct bus-related facilities.	Capital	20%
FHWA Surface Transportation Block Grant	Provides funding for states and localities for a wide range of projects, including transit. The MPO allocates local funding for this program via a regular call for projects.	Capital	20%
Congestion Mitigation and Air Quality (CMAQ)	CMAQ provides funding for a variety of air quality projects including transit capital expenditures.	Capital	20%
Multiple competitive grants	USDOT has several competitive grant programs that include transit projects as eligible activities. These include the AIM, ARP, RAISE, CIG, MOD, and 5339(c) grant programs.	Varies	Varies
State			
State Discretionary Grants	The Commonwealth of Kentucky contributes up to 10% matching funds for capital maintenance.	Operating & Capital	n/a
Local			
Fayette County Property Tax Assessment	A local property tax assessment of 6 cents for every $100 of property value for Fayette County property owners.	Operating & Capital	n/a
Directly Generated			
Fares	Lextran revenues from fares and passes	Operating & Capital	n/a
Service Contracts / Partnerships	Lextran revenues from agreements with partner organizations related to providing transit service to a particular location or for subsidized or free transit, such as UK.	Operating & Capital	n/a
Advertising	Lextran revenues from advertising at stops and on vehicles	Operating & Capital	n/a
Concessions	Lextran revenues from selling concession items at facilities	Operating & Capital	n/a

6.1.2. Capital Budget

Lextran's FY2022 capital budget is approximately $14.1 million. **Table 6-2** presents the sources, or revenue funds, of Lextran's capital plan for the five-year period beginning in FY2022. Each capital funding source is summarized below:

- **Federal:** Federal grants comprise $8 million (57%) of Lextran's planned FY2022 capital funding. Lextran's two largest capital funding sources are Federal Transit Administration (FTA) Section 5307 funds, which account for $4.8 million (34%) of the capital budget, and Section 5339 funds, which account for $2.8 million (20%) of the total capital budget.
- **State:** The Commonwealth of Kentucky contributes up to 10% matching funds for capital maintenance. This source accounted for about $1.2 million (9%) of the total capital budget in FY2022. Proceeds from the Volkswagen Settlement Fund were also distributed by the state, totaling $1.2 million (8%) in FY2022.
- **Local:** Local funding sources comprise the balance of the capital budget after federal and state sources have been applied. The Local Mass Transit Fund accounted for $3.3 million (23%) of the FY2021 capital budget.

Table 6-3 presents the uses, or projects, of Lextran's FY2023 capital plan. Planned capital improvement projects over the five-year horizon of the capital plan are described in Section 5.5 of this report.

Table 6-2: Lextran Five-Year Capital Revenue, FY2022 – FY2026

Revenue Source	FY22	FY23	FY24	FY25	FY26
Section 5307 Formula Funding	4,854,673	6,238,037	6,300,417	6,363,422	6,427,056
Section 5339 Bus & Bus Facilities Funding	561,323	4,668,965	566,937	572,606	578,332
Section 5339 LoNo Grant (canopy)	2,200,000	-	-	-	-
Surface Transportation Block Grant (SLX)	400,000	400,000	400,000		
State Funding	1,216,024	1,216,025	1,216,025	1,216,025	1,216,025
Volkswagen Settlement Funding	1,145,144	-	-	-	-
Coronavirus Aid, Relief & Economic Security Act (CARES)	-	-	3,500,000	-	-
Transit Center Project (TAP) (carry over)	428,000	-	-	-	-
Local Share from Mass Transit Fund	3,278,083	2,204,496	976,589	1,248,610	1,272,409
TOTAL REVENUE	**14,083,247**	**14,727,523**	**12,959,968**	**9,400,663**	**9,493,822**

Source: Lextran Board Resolution 2022-06 (April 20, 2022)

Table 6-3: Lextran Five-Year Capital Plan, FY2022 – FY2026

Capital Projects	FY22	FY23	FY24	FY25	FY26
Bus Purchase (CNG)	3,696,596	1,403,308	1,445,407	702,000	723,060
Electric Buses & Chargers	-	5,134,553	-	-	-
Bus Canopy (carry over)	2,200,000	-	-	-	-
CAD AVL System	-	-	3,500,000	-	-
ITS Technology Services	656,968	1,018,087	1,050,000	1,100,000	1,125,000
Service Vehicles	75,000	255,000	-	-	75,000
Capital Cost of Contracting (Paratransit)	2,625,000	2,600,000	3,500,000	3,500,000	3,500,000
Capital Maintenance	2,750,000	2,600,000	2,600,000	2,600,000	2,600,000
Transit Center Project (TAP) (carry over)	1,650,000	1,000,000	-	-	-
Transit Enhancements (Shelters, Benches, Trash Cans)	150,000	150,000	150,000	150,000	150,000
Hardware & Software (IT Projects)	194,000	94,200	180,000	190,000	190,000
Shop Tools/Equipment/Facilities	25,000	94,375	1,071,849	1,078,663	1,048,762
Security Equipment	60,683	378,000	75,000	80,000	82,000
TOTAL EXPENSES	**14,083,247**	**14,727,523**	**13,572,256**	**9,400,663**	**9,493,822**

Source: Lextran Board Resolution 2022-06 (April 20, 2022)

6.1.3. Operating Budget

Lextran's approved FY2023 operating budget is approximately $30 million. Lextran's primary operating revenue source is a dedicated ad valorem property tax ($.006 per $100.00) collected by the Lexington-Fayette Urban County Government, which accounts for 49% of its annual operating budget. The remaining local sources include contributions from the University of Kentucky (5%) and state grants (3%). Federal funding accounts for 40% of operating revenues. The increase in federal funding over previous years is due to the influx of COVID-related funding and increased apportionments through the Bipartisan Infrastructure Law. The remaining 3% of revenues are directly generated from passenger fares (2%) and advertising revenue (1%), and fuel tax refunds and vending income (less than 1%).

Lextran's operating expenses are largely consumed by labor, as wages and fringe benefits account for 59% of the total operating budget. Other major expenditures include paratransit contract expenses (17%), fuel, materials, and consumables (11%), and professional services (6%). Lextran's budgeted FY2023 operating revenues and expenses are presented in **Table 6-4** and **Table 6-5.**

Table 6-4: Lextran Operating Revenues (FY2023 Approved)

Revenue Source	FY23 Budget	FY22 Projected	FY 22 Budget	FY 21 Actual
Property Tax Revenue	$20,949,543	$20,241,104	$20,241,104	$19,957,760
Federal Funding	$17,018,641	$9,542,220	$9,542,220	$12,357,792
UK Partnership	$2,339,246	$2,339,246	$2,129,201	$2,129,201
State Funding	$1,216,025	$1,216,024	$0	$0
Passenger Fares	$986,917	$958,675	$784,000	$378,546
Advertising Revenue	$260,000	$260,000	$260,000	$260,000
Miscellaneous Revenue (fuel tax, vending)	$151,500	$144,462	$162,800	$137,937
Revenue from Lextran Foundation	$0	$78,852	$78,852	$0
Local Operating Assistance	$0	$68,882	$0	$125,441
TOTAL REVENUE	**$42,921,872**	**$34,849,465**	**$33,198,177**	**$35,346,677**

Source: Lextran Board Resolution 2022-06 (April 20, 2022)

Table 6-5: Lextran Operating Expenses (FY2023 Approved)

Operating Expenses	FY23 Budget	FY22 Projected	FY 22 Budget	FY 21 Actual
Wages & Fringe	$17,691,171	$16,152,411	$16,142,363	$14,010,185
Paratransit Expense*	$5,200,000	$4,900,000	$5,200,000	$4,878,189
Fuel & Oil	$1,881,484	$1,427,924	$1,406,000	$987,355
Professional Services	$1,826,663	$1,245,893	$1,729,540	$1,636,496
Materials & Supplies	$1,349,500	$1,228,919	$1,281,500	$1,497,848
Property & Liability Insurance Expense	$851,166	$826,375	$882,540	$834,474
Utilities & Phone	$471,932	$389,722	$463,850	$408,305
Miscellaneous Expenses (Bank fees, fuel tax)	$267,900	$240,212	$210,100	$214,406
Media Advertising	$233,000	$108,688	$157,000	$117,387
Dues, Training, Meetings & Awards	$223,625	$131,454	$249,350	$130,018
Vanpool Expense	$20,000	$20,000	$25,200	$15,339
Leases-Facility-Admin	$0	$208,515	$208,515	$826,056
Interest Expense-Admin.	$0	$0	$0	$60,930
TOTAL EXPENSES	**$30,016,441**	**$26,880,113**	**$27,955,958**	**$25,616,988**

Source: Lextran Board Resolution 2022-06 (April 20, 2022)

6.2. Operating and Capital Cost Estimates

Operating cost estimates for the Near-Term, Mid-Term, and Long-Term plans are identified in **Table 6-6** by mode and fiscal year. Fixed-route operating costs were estimated in FY2022 base year dollars and inflated by 9.3% to arrive at estimated FY2023 costs. An annual inflation rate of 3% was applied to all subsequent years. Paratransit and Vanpool costs are based on Lextran's FY2023 approved operating budget and inflated by 3% per year.

The figures presented in **Table 6-6** assume that the Near-Term plan will be implemented as early as FY2023, the Mid-Term plan as early as FY2024, and the Long-Term plan as early as FY2028. The annual cost figures assume full implementation of the recommendations within each plan horizon. Costs may be reduced in any given year if Lextran chooses to implement the recommendations in smaller packages, as described in Section 3.8.2.

Table 6-6: Estimated Operating Costs by Plan Horizon and Fiscal Year

Mode	FY23	FY24	FY25	FY26	FY27	FY28
Baseline						
Fixed Route	$24.81	$25.56	$26.32	$27.11	$27.93	$28.77
Paratransit	$5.20	$5.36	$5.52	$5.68	$5.85	$6.03
Vanpool	$0.03	$0.03	$0.03	$0.03	$0.03	$0.03
Total	**$30.04**	**$30.94**	**$31.87**	**$32.82**	**$33.81**	**$34.82**
Near-Term Plan						
Fixed Route	$25.49	$26.25	$27.04	$27.85	$28.69	$29.55
Paratransit	$5.20	$5.36	$5.52	$5.68	$5.85	$6.03
Vanpool	$0.03	$0.03	$0.03	$0.03	$0.03	$0.03
Total	**$30.71**	**$31.63**	**$32.58**	**$33.56**	**$34.57**	**$35.61**
Increment Over Baseline	**$0.67**	**$0.69**	**$0.72**	**$0.74**	**$0.76**	**$0.78**
Mid-Term Plan						
Fixed Route	--	$28.30	$29.15	$30.03	$30.93	$31.86
Paratransit	--	$5.36	$5.52	$5.68	$5.85	$6.03
Vanpool	--	$0.03	$0.03	$0.03	$0.03	$0.03
Total	**--**	**$33.69**	**$34.70**	**$35.74**	**$36.81**	**$37.91**
Increment Over Baseline	**--**	**$2.75**	**$2.83**	**$2.91**	**$3.00**	**$3.09**
Long-Term Plan						
Fixed Route	--	--	--	--	--	$36.40
Paratransit	--	--	--	--	--	$6.03
Vanpool	--	--	--	--	--	$0.03
On-Demand	--	--	--	--	--	$2.88
Total	**--**	**--**	**--**	**--**	**--**	**$45.35**
Increment Over Baseline	**--**	**--**	**--**	**--**	**--**	**$10.52**

Notes:
1. Costs presented in MM, YOE$
2. FY22-FY23 inflation rate assumed at 9.3%
3. FY24-FY28 inflation rate assumed at 3.0% per year
4. Fixed route costs based on estimated operating requirements as documented in Chapter 3 of this report
5. Paratransit and vanpool costs based on approved FY23 budget
6. Near-term plan assumed to be implemented in FY23
7. Mid-term plan assumed to be implemented as early as FY24
8. Long-term plan assumed to be implemented as early as FY28

Lextran's five-year capital improvement program includes $47.19M of funded investments, as identified in early sections of this document and summarized in **Table 6-7**. Unfunded capital needs identified in this plan total $25.95M. Lextran will need to identify additional new revenue sources to fund these improvements. Potential new funding sources could include competitive grant programs administered through the FTA and USDOT and additional formula funding that is expected through the recent federal transportation bill.

Table 6-7: Estimated Capital Costs by Plan Horizon

Cost Category	Near-Term FY23	Mid-Term FY24-FY26	Total Funded	Unfunded
Facilities	$3.69	$11.00	$14.69	($7.01)
Bus Stops	$0.15	$0.45	$0.60	($11.92)
Vehicles	$9.39	$13.46	$22.84	($7.02)
Technology	$1.49	$7.57	$9.06	$0.00
Total	**$14.73**	**$32.48**	**$47.19**	**($25.95)**

Notes:
1. Costs presented in MM$.
2. All costs are in FY2022 dollars. Costs may increase with inflation.