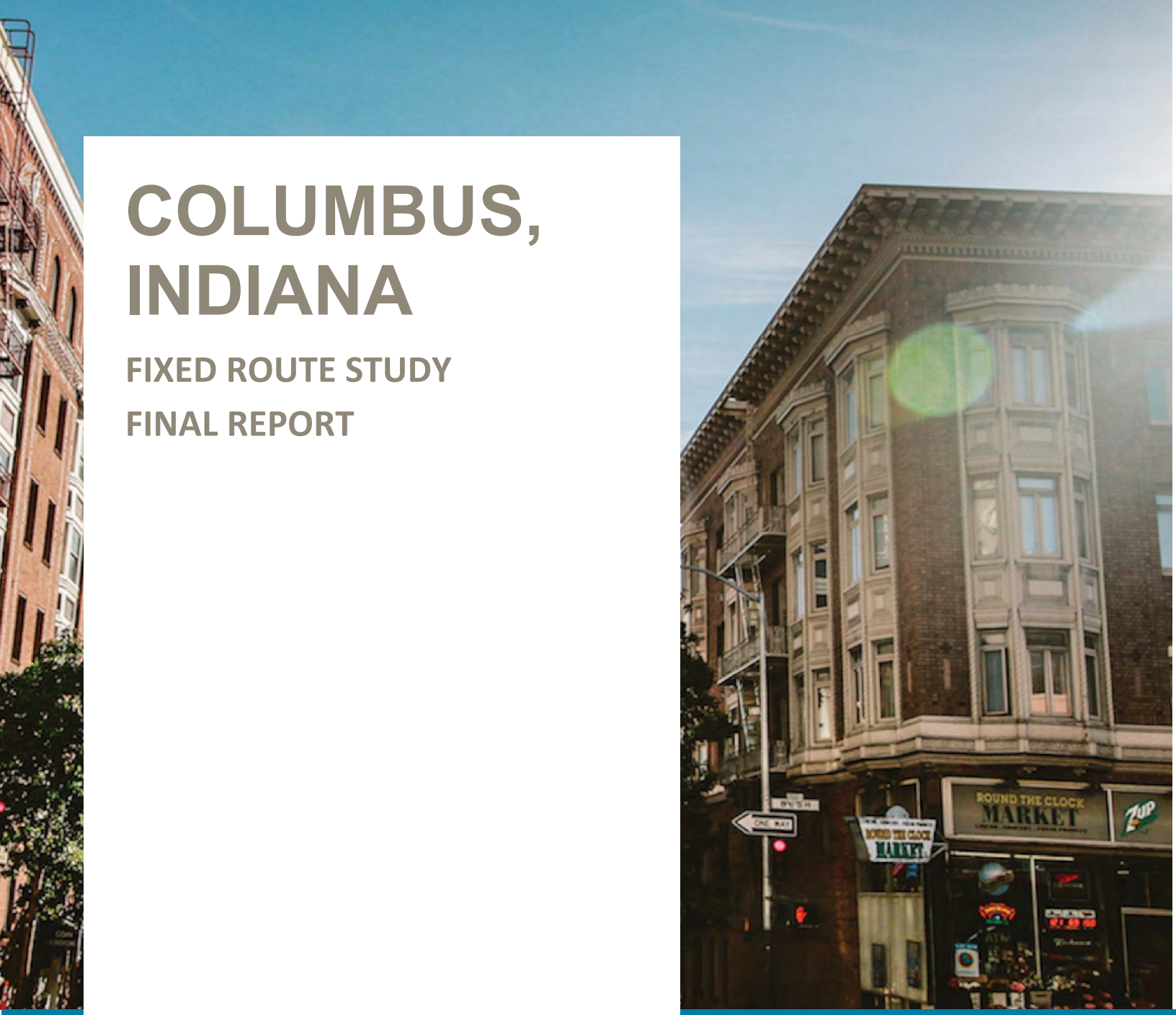
COLUMBUS, INDIANA

FIXED ROUTE STUDY
FINAL REPORT



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1 Executive Summary

The Columbus, Indiana transit route study is an in-depth review of the routes and operations of the anticipated new transit center for the city's transit system, known as ColumBUS. This transit center will be located at 13th St./Hutchins Ave., approximately two miles from the existing Mill Race transit center. A schematic diagram of this new transit center is provided at the end of this Executive Summary. See **Figure 1-1**.

The following points summarize the key components and findings of this project. Its points correspond to the main single-digit sections of this Final Report. This Executive Summary is Section 1 of the report. The listing below provides these key components and findings beginning with Section 2.

Section 2 – Existing System Overview

This section documents the services, fares, demographics and major trip generators served by the ColumBUS system. A key component of this overview is a comparison of ColumBUS with peer transit systems in the United States. This comparison was provided using a standard Federal Transit Administration (FTA) database.

Key findings in this peer comparison include:

- ColumBUS management provides an effective level of management and cost control.
- ColumBUS' complicated route structure (with many indirect and one-way loops) probably contributes to underperformance on ridership measures.
- Call-a-Bus service probably is overused. Two key factors include liberal eligibility policies, as well as service provided beyond geographic limits provided in FTA guidelines.
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Section 3 – Operating Cost Model

ColumBUS operating and financial data submitted to FTA's National Transit Database (NTD) was used to allocate operating costs to bus miles, bus hours and peak buses operated. This allocation is used to estimate the cost of added service. A key point which this allocation highlights is that an expansion of service (by adding the number of buses in operation during peak times) has a direct and significant effect in managerial and dispatching costs. This allocation shows that every additional fixed-route bus in operation at peak times results in annual operating cost increases of $36,600 for managerial and dispatching costs.

Section 4 – Existing Routes Overview

This section compares ColumBUS routes on key efficiency measures. Route 4 is the most productive route by a wide margin. Route 1 and Route 5 are notably less productive compared to other routes. These comparisons are provided based upon operating and ridership data provided by ColumBUS, as well as complete on-off counts on all routes conducted in September 2018.

This section also includes detailed individual profiles of each route. It provides a detailed demographic assessment of the area served by each route. It identifies route segments with higher and lower productivity. It also assesses the adequacy of scheduled running time on each route, as well as variation in ridership levels throughout the day. Trips operating between 11 am and 4 pm (times leaving Mill Race transit center) are consistently the highest ridership trips.

Section 5 – Vehicles and Facilities

This section presently is a placeholder. It will be finalized at the same time as the Final Service Plan.

Section 6 – Operating Practices Review

This is a review of standard operating procedures, business practices and uses of tool and technology for ColumBUS and Call-a-Bus (the demand responsive alternative service provided to satisfy Americans with Disabilities Act (ADA) requirements). Key findings include:

- Bus operators and dispatchers have significant flexibility to address operating issues at the lowest practical level. This reflects a high degree of managerial trust in its operating personnel.
- There is a high level of employee morale, and overall good relations between management and operating personnel.
- It is recommended that ColumBUS implement a small "extra board" to formally schedule bus operators to fill in for anticipated absences.
- There is a lower level of technology in use. Automatic passenger counting (APC) technology is standard in most properties (even smaller ones). This technology is not yet implemented by ColumBUS.
- Public information and marketing materials are limited. Fare media are paper-based and may be purchased only with cash.
- Moderately-significant cost savings ($20,000 to $40,000 annually) could be realized by tightening eligibility requirements for Call-a-Bus service, as well as limiting Call-a-Bus service to geographic guidelines provided by FTA (within ¾ miles of existing fixed route service).

Section 7 – Input Summaries

This project has a robust input process. These included stakeholder interviews, driver interviews, public workshops, an on-line survey and a project steering committee. Key themes from these input processes include:

- Service frequency is a key issue with existing ColumBUS service. Buses operate only at 60-minute intervals.
- The fixed route fare ($0.25) is low, and should be increased. It has been at $0.25 for at least 40 years. ColumBUS 5 peer systems have adult fares ranging from $1.00 to $1.50.

- Customer service as well as operations will be improved by implementing a policy of stopping only at designated bus stops. Presently buses will stop at any requested location along a route where it is safe to do so.
- Service to the northeast side of Columbus along the US 31/Indianapolis Road corridor should be investigated.

Section 8 – Service Guidelines

Detailed guidelines are provided to recommend where, when and how often fixed route service should be provided. These include recommendations for route coverage, bus stop spacing, route directness, span of service and service frequency. It also makes recommendations for transit-related amenities (shelters, benches, bicycle racks, sidewalks and bicycle infrastructure). This section also provides public participation guidelines, including thresholds of service and fare changes which require a public meeting to be held.

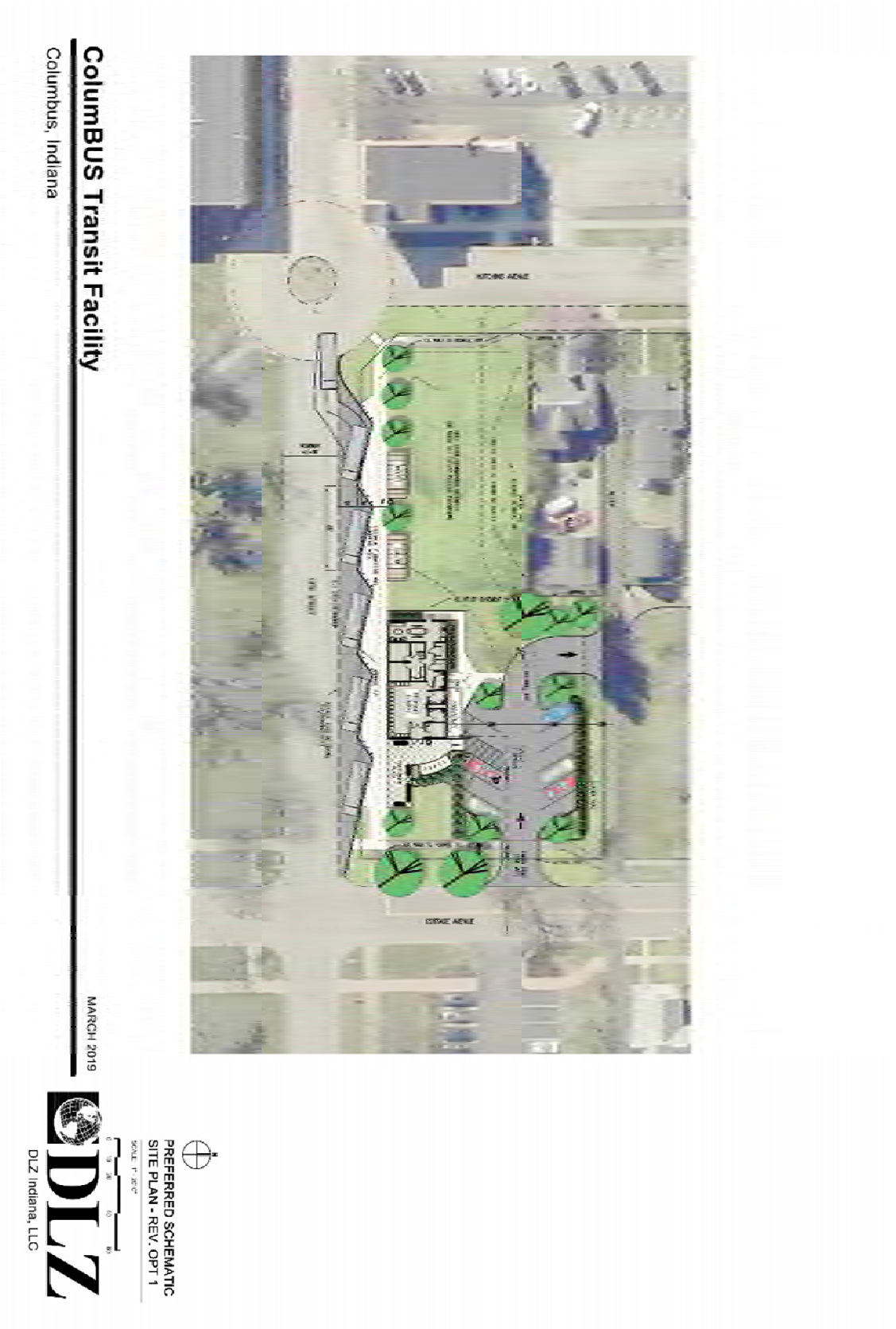
Section 9 – Recommended Service Plan

A draft service improvement and expansion plan is recommended. Key aspects of this plan include:

- Revising all routes to serve the transit center at 13th St./ Hutchins Ave.
- Implementing 30-minute service on two routes for a six-hour period (11 am to 5 pm) weekdays. These improvements will result in annual ridership increases of between 11,000 and 27,000 and will increase operating costs by up to $226,000. The exact cost increase depends upon the required increase in managerial and dispatching staffing.
- Increasing the adult fare from $0.25 to $0.50. This will increase annual fare revenue between $32,000 and $37,000 and will result in a ridership decrease of 10% - 15%.
- Retaining service on two routes to the Mill Race transit center.
- Continuing service to the Target transit center.
- The route restructuring emphasizes service to residential trip generators.
- The need for significant public involvement and marketing efforts to implement the new route structure (which is assumed to occur with the opening of the 13th/Hutchins transit center).

This section has placeholders for plan elements (including the final version of the plan itself) which will be finalized after public and client input. Also, in this draft report, there are placeholders for Appendices which will be provided with the final report. These are designated as **Appendix X**.

Figure 1-1: ColumBUS Transit Facility



2 Existing System Overview

The following sections provide an overview of ColumBUS' services and fare structure. Demographic profile summaries for Columbus and Bartholomew County are also included. Additionally, a peer systems comparison is presented to compare ColumBUS with other similar transit systems.

2.1 Service Description

The City of Columbus' transit system, ColumBUS, provides fixed route services, with complementary demand response service for the disabled. It is operated as a department of city government, within the City of Columbus Public Works Department.

ColumBUS provides fixed route service on five regular bus routes throughout the day. Each of the five regular routes has 14 trips per day with the first trip starting at 6:00 a.m., with subsequent trips every 60 minutes. The fixed route services cover the majority of the City of Columbus and operate within the city limits.

ColumBUS operates Monday through Friday, 6:00 a.m. to 8:00 p.m. year-round and Saturdays, 6:00 a.m. to 6:00 p.m. ColumBUS observes the following 6 holidays:

- New Year's Day
- Memorial Day
- Independence Day
- Labor Day
- Thanksgiving Day
- Christmas Day

In addition, observed holidays, ColumBUS operates reduced hours (9:00 a.m. to 5 p.m.) on the following dates:

- July 5
- The day after Thanksgiving
- December 24
- December 31

ColumBUS provides curb-to-curb paratransit service, known as Call-A-Bus, in addition to its fixed route operations, to serve customers as required by the Americans with Disabilities Act (ADA). Federal Transit Administration (FTA) regulations require such service be offered to riders who are unable to use regular fixed route service. Pick up and drop off times are arranged between the rider and ColumBUS dispatcher. ColumBUS requests that Call-A-Bus passengers schedule rides at least one day in advance by calling the dispatch office. Call-A-Bus operates throughout the City of Columbus, so riders can request to be picked up or dropped off at any location within the city limits.[1] The paratransit service operates during the same hours as regular route service.

Table 1 below shows key summary statistics for ColumBUS from its 2016 National Transit Database (NTD) report. The statistics are shown for both fixed route and Call-A-Bus service. ColumBUS' 2016 NTD reporting year runs from January 1, 2015 to December 31, 2016.

Table 0-1: ColumBUS Summary Statistics for 2016 Reporting Year

	Fixed Route	Call-A-Bus
Annual Ridership	243,291	18,483
Annual Revenue Miles	244,162	87,877
Annual Revenue Hours	21,320	8,944

2.2 Fares

Table 2-2: Fare Table

Single Ride Fares	
Regular Fare (ages 18+)	$0.25
Children (ages 0-18)	Free
Reduced/Half Fare	$0.10
Multiple Ride Passes	
Adult Pass 25 Rides)	$5.00
Call-A-Bus	
One-way trip	$.50

ColumBUS offers single ride fares as well as multiple ride passes, as shown in **Table 2-2** above. The Regular Fare is $0.25 for a one-way trip. This includes transfers if more than one route is needed to reach the passenger's destination. Children under the age of 18 can ride free with an Easy Rider Pass. Easy Rider Pass applications can be obtained from any route driver. Easy Rider passes are issued from the transit office, and

[1] This statement reflects current ColumBUS operating policies. FTA Circular *FTA C 4710.1 (11-04-15) Americans with Disabilities Act (ADA): Guidance* provides that complementary paratransit service is required only for trips with origins **and** destination within three-fourths of a mile of fixed routes (Section 8.4.2). Some complementary paratransit trips served by Call-a-Bus may exceed the requirements of FTA's regulations.

the first pass is free; any replacements cost $5.00. Riders are eligible for the Reduced/Half Fare if they are 60 years old or older, have a disability or are a Medicare cardholder. To receive half-fare, the rider must show Medicare card or submit an application to the transit office (Mill Race Station, 850 Lindsey Street) to receive a Half-Fare ID Card. The ColumBUS bus passes are available as 25-ride punch cards. ColumBUS does not offer unlimited ride passes. The Call-A-Bus fare is $0.50 for a one-way trip. ColumBUS drivers aid Call-A-Bus passengers as needed to board and alight the buses. If the Call-A-Bus passenger requires additional help, an attendant may ride at no additional cost.

2.3 Service Area Demographics

The following pages include demographic profile summaries of the City of Columbus and Bartholomew County (see **Figure 2-1**). Below are the definitions and sources used for all the demographic data. The same definitions and sources were used for the route profile summaries (**Section 4.2**).

Age (source: 2012-2016 ACS 5-year Estimates, Table B01001)

Total Population: Total number of people in all age groups.
Age 0-19: Percentage of people 19 years old or younger.
Age 20-59: Percentage of people between the ages of 20 and 59.
Age 60+: Percentage of people 60 years of age or older.

Household Ownership (source: 2012-2016 ACS 5-year Estimates, Table B25003)

Total Households: Total number of occupied housing units.
Owner Occupied: Percentage of housing units occupied by the owner of the unit.
Renter Occupied: Percentage of housing units occupied by the renter of the unit.

Race/Ethnicity (source: 2012-2016 ACS 5-year Estimates, Table B02001, B03002)

White: Percentage of the population that is White, non-Hispanic.
Black: Percentage of the population that is Black or African American, non-Hispanic.
Nat Am/Alaska Nat: Percentage of the population that is Native American/American Indian or Alaska Native, non-Hispanic.
Asian: Percentage of the population with origins in any of the original peoples of the Far East, Southeast Asia or the Indian subcontinent, non-Hispanic.
Haw Pac Islander: Percentage of the population with origins in any of the original peoples of Hawaii, Guam, Samoa or other Pacific Islanders, non-Hispanic.
Other: Percentage of the population that is not categorized by any of the above categories, non-Hispanic.
2 or more races: Percentage of the population categorized by two or more of the above categories, non-Hispanic.
Hispanic/Latino: Percentage of the population that is Hispanic or Latino of any race.

Educational Attainment (source: 2012-2016 ACS 5-year Estimates, Table S1501)

No HS Diploma/GED: Percentage of the population 25 years and over without a high school diploma, GED or equivalent.
HS Diploma/GED: Percentage of the population 25 years and over with a high school diploma, GED or equivalent, but no college degree.
College Degree: Percentage of the population 25 years and over with an Associate's degree, Bachelor's degree, Graduate or Professional degree.

Employment Status (source: 2012-2016 ACS 5-year Estimates, Table B23025)

Employed: Percentage of the population 16 years and over, in the civilian labor force that are employed.

Unemployed: Percentage of the population 16 years and over, in the civilian labor force that are unemployed.

Household Income (source: 2012-2016 ACS 5-year Estimates, Table B19001)

< $25,000: Percentage of households with an annual income below $25,000.
$25,000-$50,000: Percentage of households with an annual income between $25,000 and $50,000.
$50,000-$75,000: Percentage of households with an annual income between $50,000 and $75,000.
$75,000-$100,000: Percentage of households with an annual income between $75,000 and $100,000.
> $100,000: Percentage of households with an annual income of $100,000 or greater.

Vehicles Ownership (source: 2012-2016 ACS 5-year Estimates, Table B25044)

0 Vehicle Household: Percentage of occupied housing units with no vehicles available, including owned and rented vehicles.
1 Vehicle Household: Percentage of occupied housing units with 1 vehicle available, including owned and rented vehicles.
2 Vehicle Household: Percentage of occupied housing units with 2 vehicles available, including owned and rented vehicles.
3 Vehicle Household: Percentage of occupied housing units with 3 vehicles available, including owned and rented vehicles.
4 Vehicle Household: Percentage of occupied housing units with 4 vehicles available, including owned and rented vehicles.
5+ Vehicle Household: Percentage of occupied housing units with 5 or more vehicles available, including owned and rented vehicles.

County to County Commuting Flows (source: 2009-2013 ACS 5-year Estimates,
Employment (source: 2014 Longitudinal Employer-Household Dynamics (LEHD))

Total Employment: Total number of jobs in all employment categories. This includes all Primary and non-Primary jobs as well as Private and Federal jobs.
Retail Employment: Total number of jobs at retail businesses (NAICS sectors 44-45).
Service Employment: Total number of jobs at service businesses (NAICS sectors 72 & 81).

Government Employment: Total number of jobs at government agencies (NAICS sector 92).'

ACS 5-year Estimates available at: **https://factfinder.census.gov/**
Longitudinal Employer-Household Dynamics (LEHD) data available at: **https://lehd.ces.census.gov/** and **https://onthemap.ces.census.gov/**

The primary source of demographic data used in this report is the American Community Survey (ACS). It is administered by the U.S. Census Bureau to collect a wide range of demographic data. As of the writing of this report, the 2016 ACS data are the most current information available. The ACS replaced the "long form" questionnaires formerly sent to a proportion of households during each decennial census. The ACS generally provides more current data than the decennial census because it is administered on an ongoing basis. The latest 5-year ACS estimates were used in this report. These estimates average data over five consecutive years.

Figure 2-1: Map of ColumBUS and Bartholemew County

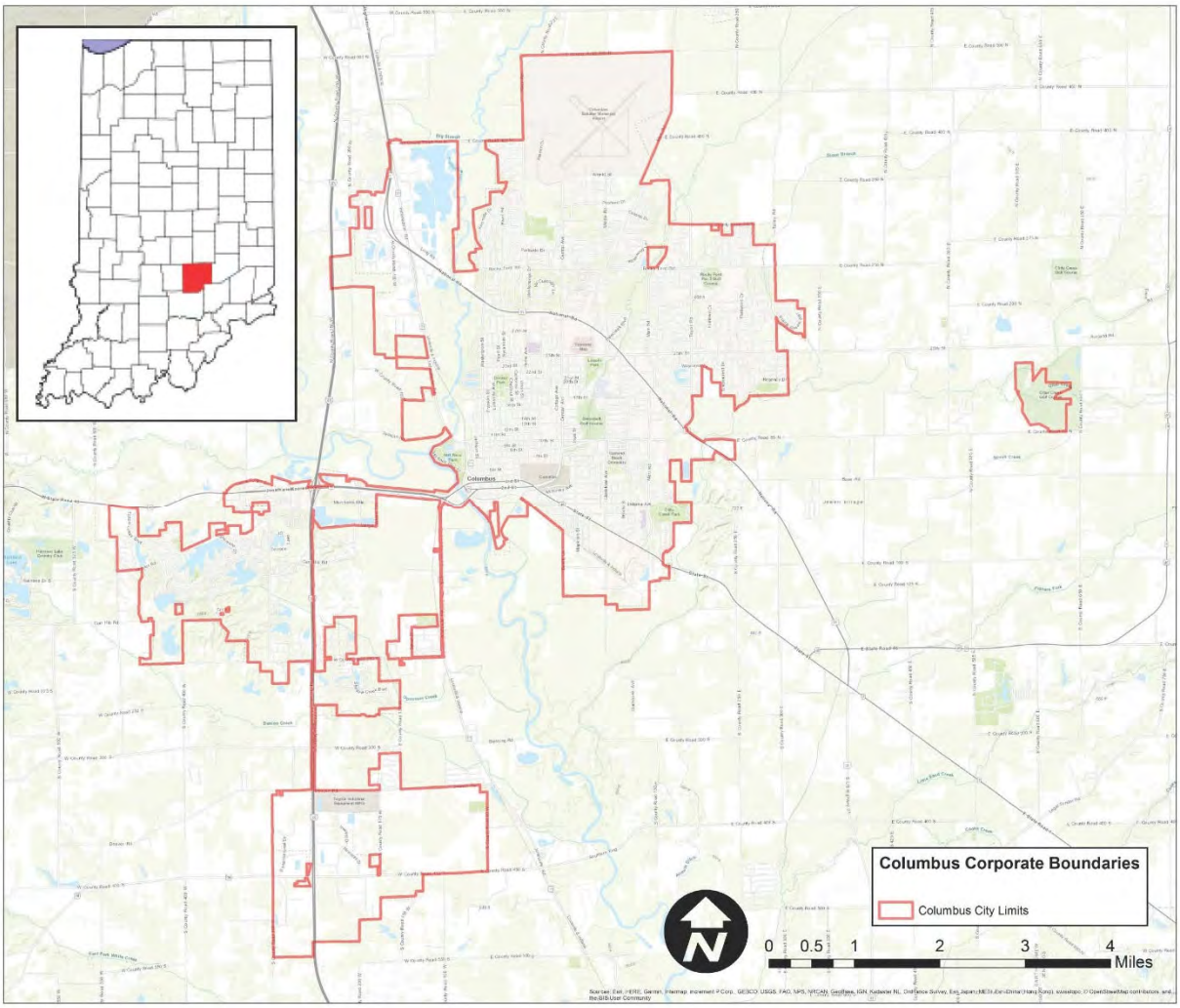


Table 0-3: Columbus, Bartholomew County, and State Age of Population

Age	Total Population	Age 0-19	Age 20-59	Age 60+
City of Columbus	46,474	26%	54%	20%
Bartholomew County	80,203	26%	53%	21%
State of Indiana	6,666,818	27%	52%	22%

Table 0-4: Columbus, Bartholomew County, and State Housing Tenure

Households	Total Households	Owner Occupied	Renter Occupied
City of Columbus	18,774	62%	38%
Bartholomew County	31,073	70%	30%
State of Indiana	2,557,299	70%	31%

Table 0-5: Columbus, Bartholomew County, and State Racial Composition

Race/Ethnicity	White	Black	Nat Am/Alaska Nat	Asian	Haw Pac Islander	Other	2 or more races	Hispanic/ Latino
City of Columbus	82%	3%	>0.5%	10%	>0.5%	3%	2%	6%
Bartholomew County	86 %	2%	>0.5%	6%	>0.5%	4%	2%	6%
State of Indiana	84%	9%	>0.5%	2%	>0.5%	2%	3%	7%

Table 0-6: Columbus, Bartholomew County, and State Educational Attainment

Educational Attainment*	No HS Diploma/ GED	HS Diploma/GED	Some College (no degree)	Associate's Degree	Bachelor's Degree	Graduate/ Professional Degree
City of Columbus	8%	28%	17%	8%	18%	16%
Bartholomew County	10%	35%	17%	9%	18%	12%
State of Indiana	12%	34%	21%	8%	16%	10%

**Highest level completed for those aged 25 and above*

The percentage of the population in Columbus with a graduate/professional degree is high, especially for a city without a major university. This skew toward advanced educational attainment can be attributed to the concentration of highly educated employees at Cummins Inc., a Fortune 500 company which has its world

headquarters in Columbus. According to the Greater Columbus Economic Development Corporation[2], Cummins directly employs over 8,000 people in the Columbus area (nearly 10% of the county's total population). These and other demographic statistics were compared to those for the State of Indiana. The percentage of the population with a college degree or higher in Columbus and Bartholomew County is significantly higher than the State's average. The percentage of people with no high school diploma or equivalent is also lower for Columbus and Bartholomew County than the State. The percentage of non-white population in Columbus differs slightly from Indiana as a whole. A much higher percentage of Columbus' population is Asian (9.5% compared with 2.2% for all of Indiana). This probably the more varied makeup of Cummins Inc.'s workforce, compared with other employers in Indiana.

Table 0-7: Columbus, Bartholomew County, and State Labor Force Participation

	Total Workforce Population	In Labor Force	Not in Labor Force	Labor Force Participation Rate
City of Columbus	36,315	24,058	12,257	66%
Bartholomew County	62,879	41,710	21,169	66%
State of Indiana	5,216,340	3,329,372	1,886,968	64%

Table 0-8: Columbus, Bartholomew County, and State Employment Status

Employment Status*	Employed	Unemployed
City of Columbus	95%	5%
Bartholomew County	95%	5%
State of Indiana	93%	7%

**Includes only those in the labor force*

Table 0-9: Columbus, Bartholomew County, and State Household Income

Household Income	< $25,000	$25,000 - $50,000	$50,000 - $75,000	$75,000 - $100,000	> $100,000
City of Columbus	21%	23%	20%	13%	22%
Bartholomew County	19%	25%	21%	14%	21%
State of Indiana	23%	27%	20%	13%	19%

Table 0-10: Columbus, Bartholomew County, and State Vehicles per Household

Vehicles Owned	0 Vehicle Household	1 Vehicle Household	2 Vehicle Household	3 Vehicle Household	4 Vehicle Household	5+ Vehicle Household
City of Columbus	6%	38%	38%	12%	3%	2%
Bartholomew County	5%	33%	39%	16%	6%	2%
State of Indiana	7%	33%	39%	15%	5%	2%

[2] https://www.columbusin.org/cummins-inc/

Table 0-11: Columbus, Bartholomew County, and State Type of Employment

Employment	Total Employment	Retail Employment	Service Employment	Government Employment
City of Columbus	39,771	2,925	3,363	1,279
Bartholomew County	46,602	4,183	4,150	1,294

Table 2-11 shows that the working age population in Columbus is 24,058. However, there are 39,771 jobs in Columbus which is nearly double the labor force within the city. Many workers employed in Columbus travel from other areas both in Bartholomew County and beyond.

A third of the employment in Bartholomew County is in manufacturing. This reflects the heavy influence of major employers like Cummins, Inc. and its suppliers, in addition to the proximity to I-65 which is a major logistics corridor. Indiana ranks first in the nation for manufacturing as a share of nonfarm employment with an average of 18% of total state employment in the manufacturing sector. Compared to 9% of total employment in the manufacturing in the United States overall, Columbus (36%) and Bartholomew County (33%) exceed state and national averages by significant margins.

Table 0-12: County of Residence for Bartholomew County Workers

County of Residence	County of Work	Workers	Percentage
Bartholomew County	Bartholomew County	31,240	68.3%
Jackson County	Bartholomew County	2,858	6.2%
Jennings County	Bartholomew County	2,829	6.2%
Johnson County	Bartholomew County	2,220	4.9%
Brown County	Bartholomew County	1,308	2.9%
Marion County	Bartholomew County	1,267	2.8%
Other	Bartholomew County	3,992	8.7%
Total Employment in Bartholomew County		45,714	100.0%

**The discrepancy between the total employment in Bartholomew County from Table 2-3 and Table 2-4 (46,602 and 45,714, respectively) is due to data collection in different years. Please refer to the beginning of this section for more details.*

Table 0-13: Place of Work for Bartholomew County Residence

County of Residence	County of Work	Workers	Percentage
Bartholomew County	Bartholomew County	31,240	85%
Bartholomew County	Marion County	1,375	4%
Bartholomew County	Jackson County	1,107	3%
Bartholomew County	Johnson County	848	2%
Bartholomew County	Jennings County	345	>0.5%
Bartholomew County	Out of State	334	>0.5%
Bartholomew County	Other	1500	4%

Total Workers in Bartholomew County	36,749	100.0%

2.4 Major Trip Generators

Shown in the following maps and their respective tables are major trip generators identified by ColumBUS. The ID columns in the following tables correspond to the ID numbers shown on the associated maps.

Figure 0-2: Map of Major Trip Generators—Major Employers

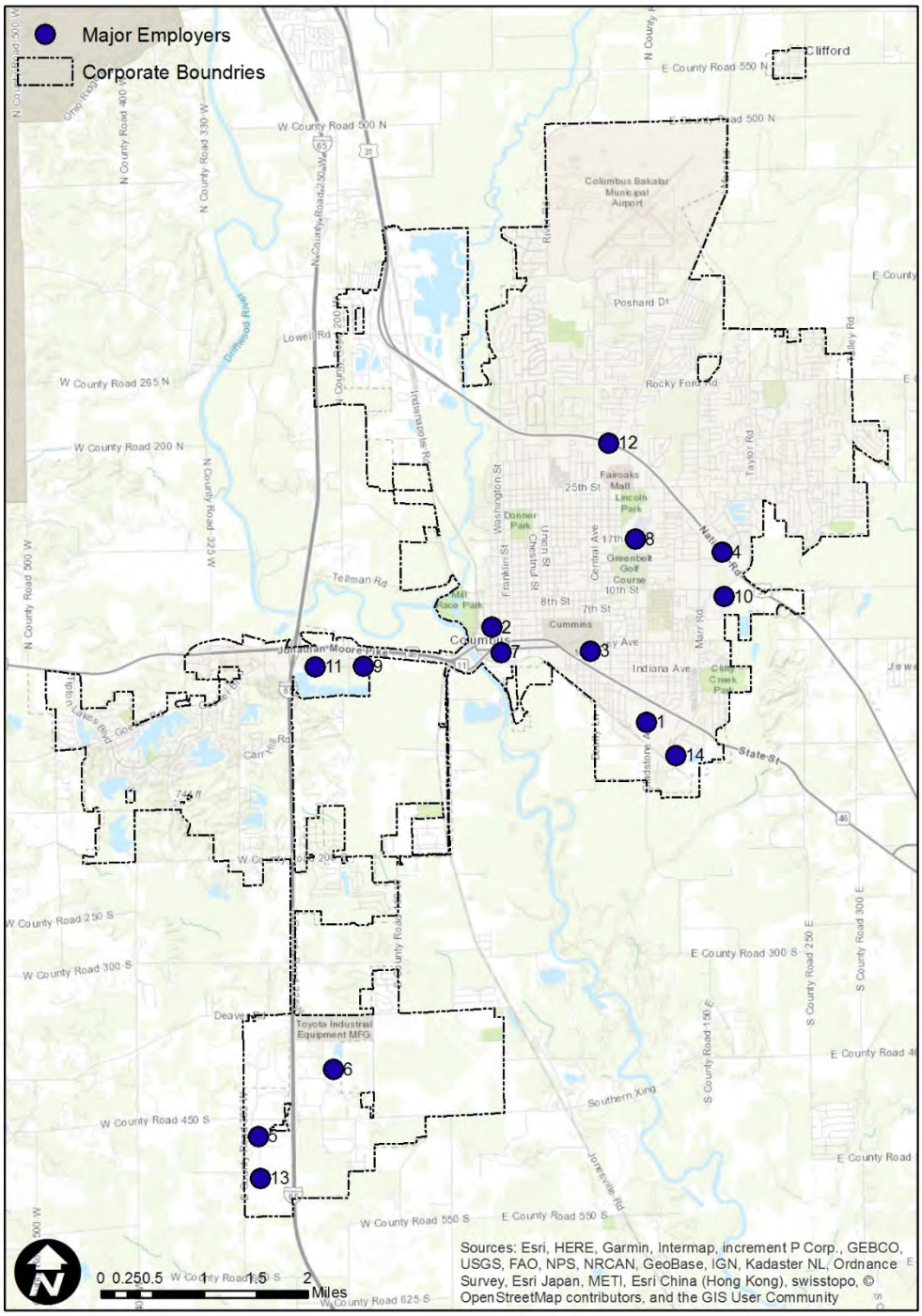


Table 0-14: Major Trip Generators – Major Employers

ID	Name	Address	Beyond City Limits
1	Faurecia Gladstone	601 S Gladstone Ave, Columbus, IN 47201	
2	Cummins Inc.	500 Jackson St, Columbus, IN 47201	

3	Cummins Technical	1900 McKinley Ave, Columbus, IN 47201	
4	Cummins Fuel Systems	1460 N National Rd, Columbus, IN, 47201	
5	Cummins Service and Training Center	7660 S International Dr, Columbus, IN, 47201	
6	Toyota Industrial Equipment Manufacturing Inc.	5555 Inwood Dr, Columbus, IN 47201	
7	City of Columbus	123 Washington St # 12, Columbus, IN, 47201	
8	Columbus Regional Hospital	2400 17th St. Columbus, Columbus, IN, 47201	
9	Wal Mart	2025 Merchant Mile, Columbus, IN, 47201	
10	Wal Mart	735 Whitfield Dr, Columbus, IN, 47201	
11	Sam's Club	2715 Merchant Mile, Columbus, IN, 47201	
12	Kroger	3060 N. National Road, Columbus, IN, 47201	
13	NTN	8251 S International Dr, Columbus, IN, 47201	
14	Cummins, Inc	910 S Marr Rd, Columbus, IN 4720,	

Figure 0-3: Map of Major Trip Generators—Social Services and Senior Living Centers

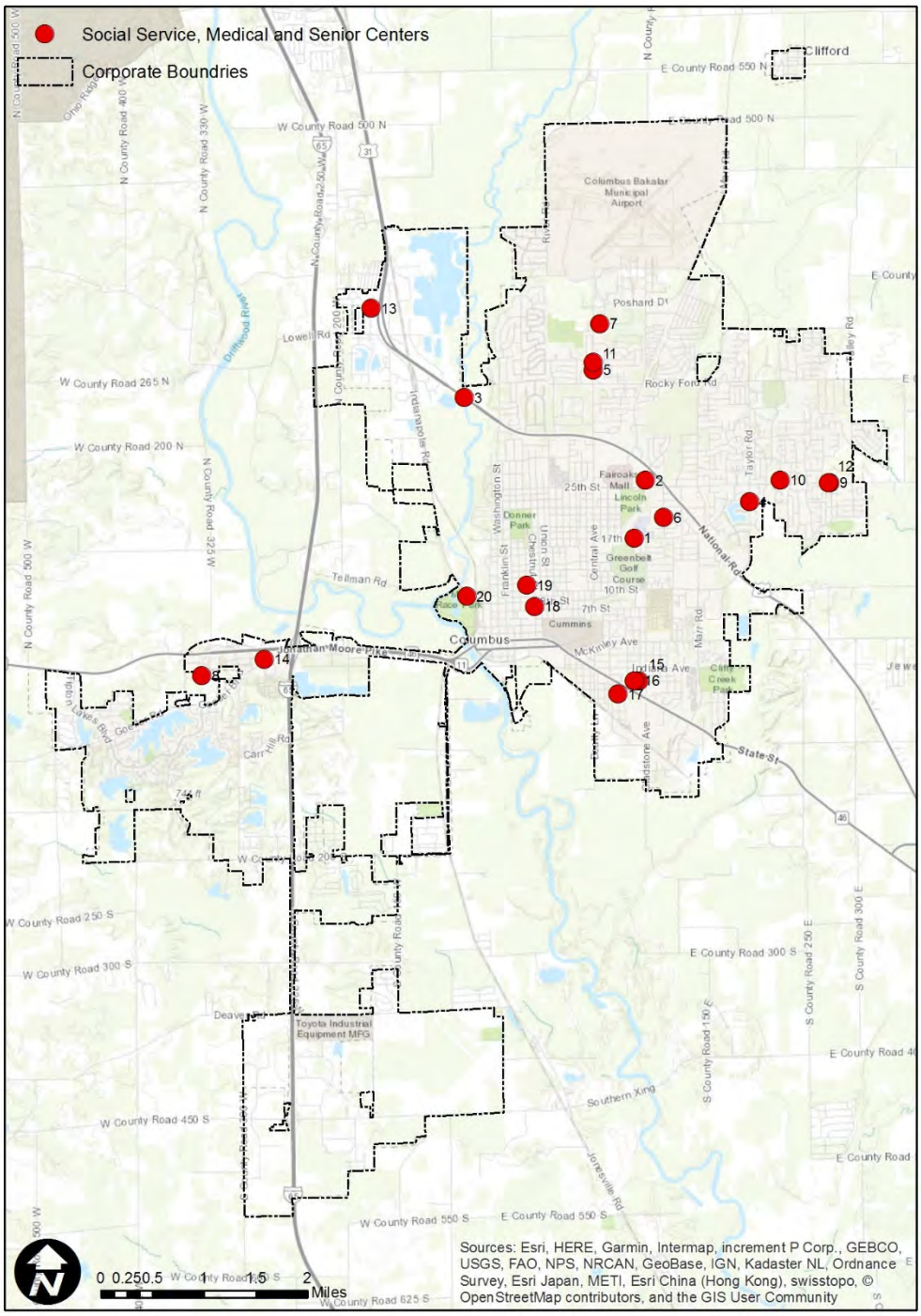


Table 0-15: Major Trip Generators – Social Service, Medical and Senior Centers

ID	Name	Address	Beyond City Limits
1	Columbus Regional Health	2400 17th Street, Columbus, IN, 47201	
2	Williams Brothers Health Care	2560 Eastbrook Plaza, Columbus, IN, 47201	
3	Interim HealthCare of Columbus	3200 N. National Rd, Columbus, IN, 47201	
4	Four Seasons Retirement Center	1901 Taylor Rd, Columbus, IN, 47203	
5	Willow Crossing Health and Rehab	3550 Central Ave, Columbus, IN, 47203	
6	Columbus Transitional Care and Rehabilitation	2100 Midway St, Columbus, IN, 47201	
7	Silver Oaks Health Campus	2011 Chapa Dr, Columbus, IN, 47203	
8	Greentree at Columbus	4895 Pine Ridge Dr, Columbus, IN, 47201	
9	Hickory Creek at Columbus	5480 E 25th St, Columbus, IN, 47203	
10	Keepsake Village of Columbus	2564 Fox Pointe Dr, Columbus, IN, 47203	
11	Parkside Court	3660 Central Ave, Columbus, IN, 47203	
12	Benchmark Human Services.	5440 E 25th St, Columbus, IN, 47203	
13	Benchmark Human Services	4620 Progress Dr, Columbus, IN, 47201	
14	Indiana Family and Social Services Administration	3528 W 2 Mile House Rd, Columbus, IN, 47201	
15	Salvation Army	2525 Illinois Ave, Columbus, IN, 47201	
16	Youth Service Center	2350 Illinois Ave, Columbus, IN, 47201	
17	Love Chapel Center	311 Center St, Columbus, IN, 47201	
18	Horizon House	724 Chestnut St, Columbus, IN, 47201	
19	Lincoln Central Neighborhood Family Center	1039 Sycamore St, Columbus, IN, 47201	
20	Mill Race Center	900 Lindsey Street, Columbus, IN, 47201	

Figure 0-4: Map of Major Trip Generators—Apartments/Multi-Family Housing

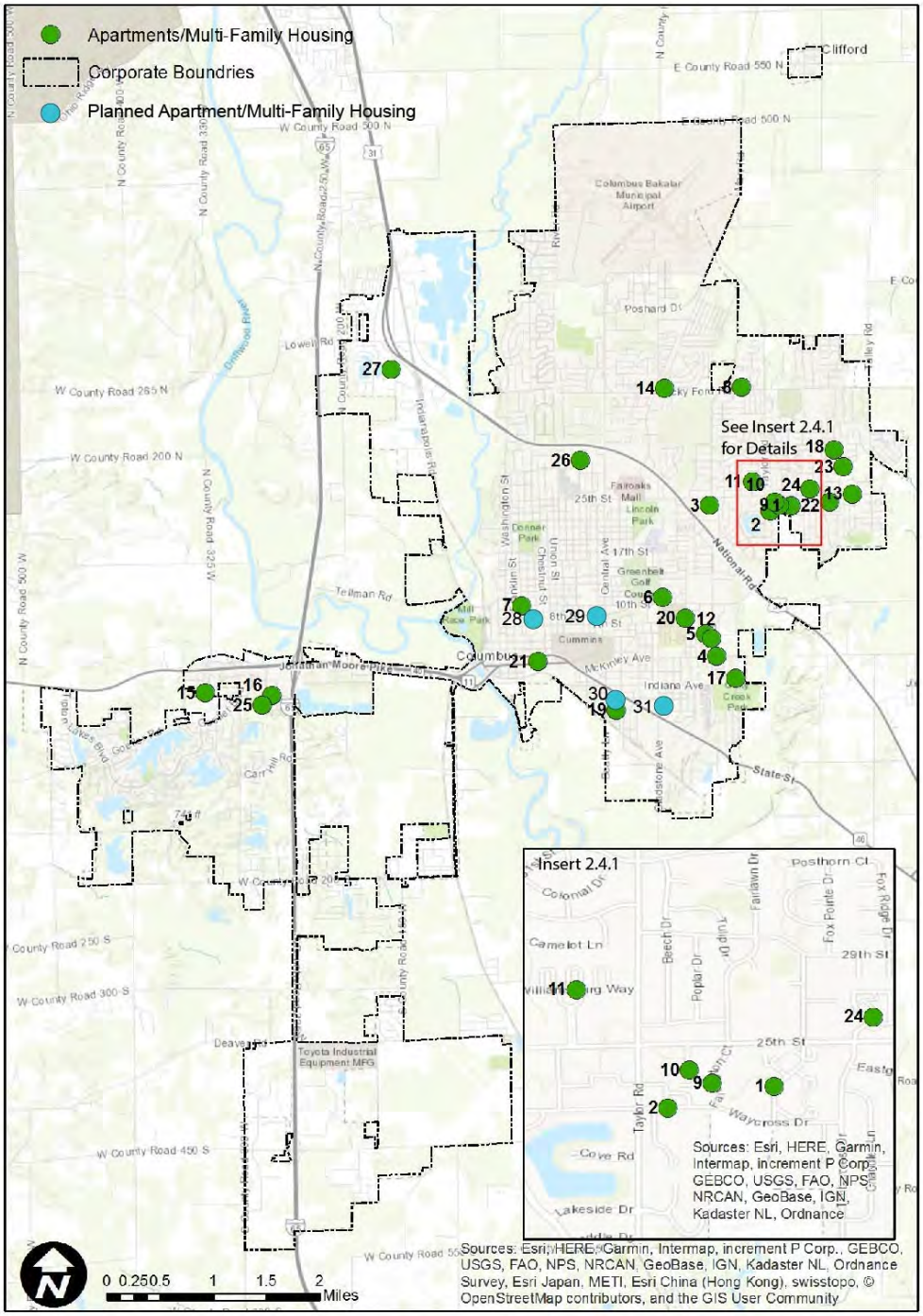


Table 0-16: Major Trip Generators – Apartments/Multi-Family Housing

ID	Name	Address	Beyond City Limits
1	Fox Pointe Apartments	Fox Trail Ln, Columbus, IN 47203	
2	Briarwood Apartments	2350 Thornybrook Dr, Columbus, IN 47203	
3	Villas Apartments	4101 Waycross Dr, Columbus, IN 47203	
4	Bloomfield Apartments	2410 Sims Ct #1, Columbus, IN 47203	
5	Cambridge Square Apartments	3301 McKinley Ave, Columbus, IN 47201	
6	Stonegate Apartments	1001 Stonegate Dr, Columbus, IN 47201	
7	Quail Run Apartments	1182 Quail Run Dr, Columbus, IN 47201	
8	Ashford Park Apartments	616 10th St, Columbus, IN 47201	
9	Willowood Apartments	3541 Cardinal Ct, Columbus, IN 47203	
10	Fairington Apartments	2351 Fairington Ct, Columbus, IN 47203	
11	Charleston Square Apartments	2410 Charleston Pl, Columbus, IN 47203	
12	Williamsburg way Apartments	3838 Williamsburg Way, Columbus, IN 47203	
13	Monarch Crossing Apartments	420 Wint Ln, Columbus, IN 47201	
14	Regency Park Apartments	5520 E 25th St, Columbus, IN 47203	
15	Canterbury House Apartments	3501 Nicholas Ln, Columbus, IN 47203	
16	Westwood Pines Apartments	4745 Pine Ridge Dr, Columbus, IN 47201	
17	Spruce Ridge Apartments	3770 Blue Ct, Columbus, IN 47201	
18	River Stone Apartments	3440 Riverstone Way, Columbus, IN 47201	
19	Steinhurst Manor	133 Salzburg Blvd, Columbus, IN, 47201	
20	Columbus Village	560 28th St, Columbus, IN, 47201	
21	Villas	4101 Waycross Dr, Columbus, IN, 47203	
22	Flintwood North	5206 Miami Dr, Columbus, IN, 47203	
23	Pence Place	595 Pence Ave, Columbus, IN, 47201	
24	Heritage Woods	799 McClure Rd, Columbus, IN, 47201	
25	Sycamore Place	222 Sycamore St, Columbus, IN, 47201	
26	Lincoln Village	5135 N Lincoln Village Dr, Columbus, IN, 47203	
27	All Saints Community	5400 Yellowwood Ct, Columbus, IN, 47203	
28	Planned Multi-Family Housing	8th and Sycamore Street, Columbus, IN, 47201	
29	Planned Multi-Family Housing	1539 10th Street, Columbus, IN, 47201	
30	Planned Multi-Family Housing	1971 State Street, Columbus, IN, 47201	
31	Planned Multi-Family Housing	411 S. Gladstone, Columbus, IN, 47201	

Figure 0-5: Map of Major Trip Generators—Major Retail Hubs

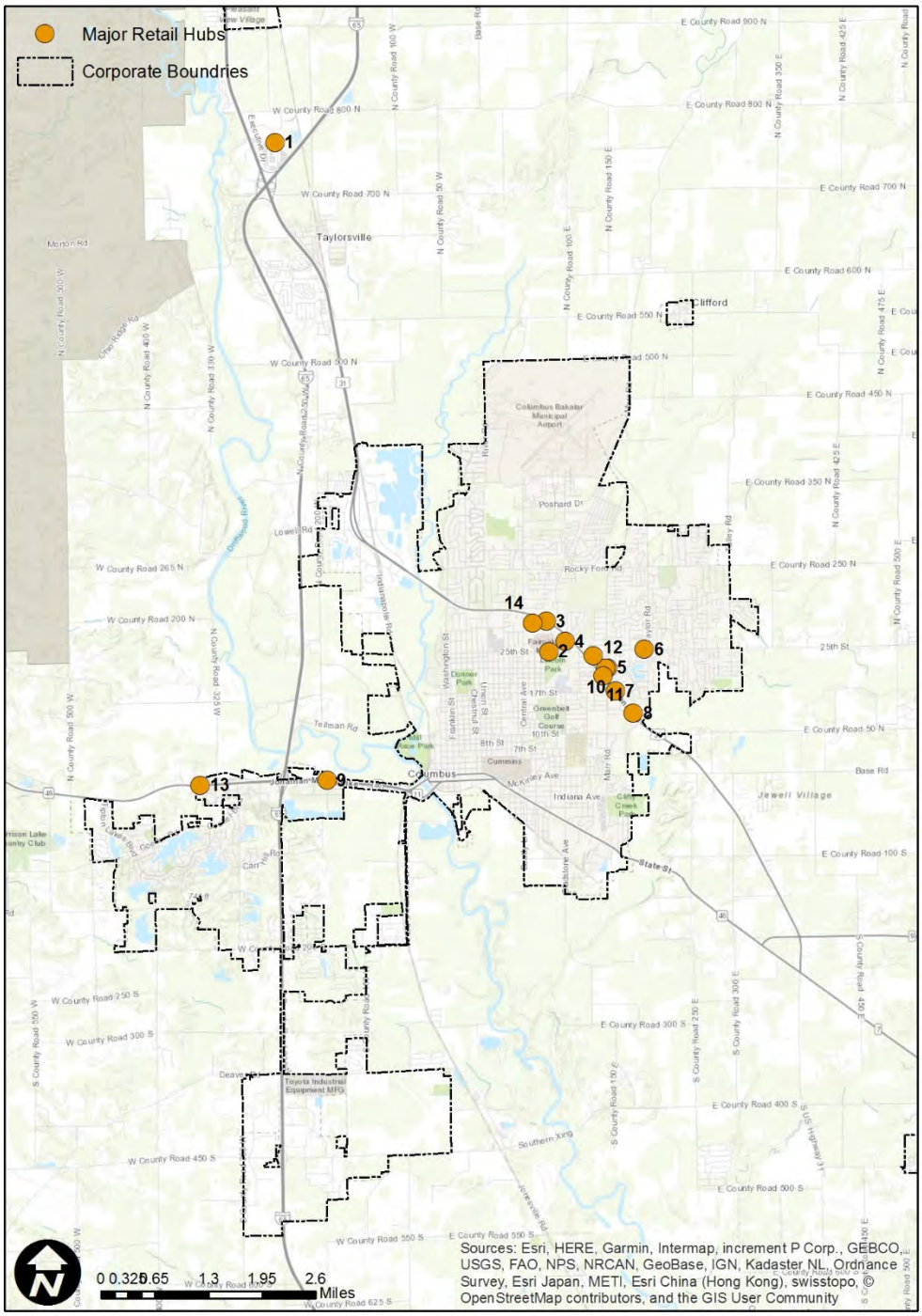


Table 0-17: Major Trip Generators – Major Retail Hubs

ID	Name	Address	Beyond City Limits
1	Edinburg Premium Outlet Mall	11622 NE Executive Dr, Edinburgh, IN 46124	**X**
2	Fair Oaks Mall	2380 25th St, Columbus, IN 47201	
3	Northern Village	2985 N National Rd, Columbus, IN 47201	
4	Eastbrook Plaza	2628 Eastbrook Plaza, Columbus, IN 47201	
5	Columbus Center	3200 Columbus People Trail, Columbus, IN 47203	
6	Holiday Center Shopping Center	3928 25th St, Columbus, IN, 47203	
7	Regal Park Plaza	1629-1645 N National Rd, Columbus, IN, 47201	
8	Clifty Crossing	1149 N National Rd, Columbus, IN, 47201	
9	Columbus Crossing Shops	2145 W Jonathan Moore Pike, Columbus, IN, 47201	
10	Columbus Center	3150 Columbus Center, Columbus, IN, 47203	
11	Target	1865 N National Road, Columbus, IN, 47201	
12	Kohl's	2485 Beam Rd, Columbus, IN, 47203	
13	Jay C	4290 W Jonathan Moore Pike, Columbus, IN, 47201	
14	Kroger	3060 N. National Road, Columbus, IN, 47203	

2.5 Peer System Comparison

Transit systems operate throughout the nation, in large cities and in small ones. Despite the vast differences in operating locations, a few key indicators can be used to evaluate the performance of transit systems. By comparing ColumBUS to peer systems throughout the nation, it can be determined if it is under-performing, over-performing or about average. Since ColumBUS provides two distinct services, i.e. fixed route and demand response services, they are analyzed separately. After analyzing each service type separately, the fixed route/demand response breakdown is also presented. The first step in conducting the peer comparison is selecting peer systems.

2.5.1 Peer Systems Selection

The Federal Transit Administration (FTA) requires any transit agency receiving federal funding to report transit related data and statistics via the National Transit Database (NTD) system. Every transit system has its own unique characteristics such as service type (fixed route, demand response, etc.), service area, service population, etc. which are documented in the NTD reports. The Urban Integrated National Transit Database (Urban iNTD) is a state-of-the-art tool developed by Florida Department of Transportation (FDOT) Transit Office[3]. Although FDOT originally created the tool, it was developed in conjunction with the FTA. The tool is designed to compare transit systems throughout the nation.

Urban NTD system data is included in the Urban iNTD database. The Urban iNTD calculates a Likeness score for potential peer systems. This score considers the unique characteristics of each transit system and is used to

identify likely peer systems. In consultation with the City of Columbus, these rankings were fine-tuned to ensure relevant characteristics of the study system matched the peer systems. The following were designated as peer systems to ColumBUS.

- Albany Transit System – Albany, Oregon
- MC Transit– Michigan City, Indiana
- JEFFTRAN– Jefferson City, Missouri
- Fond Du Lac Area Transit – Fond Du Lac, Wisconsin
- Goldsboro-Wayne Transportation Authority – Goldsboro, North Carolina

Albany Transit System provides transit services in Albany, Oregon which has a population of 50,724. It provides four fixed routes and is operated as a department of City government.

Michigan City Transit (MC Transit) provides transit services in Michigan City, Indiana which has a population of 31,479. It provides five fixed routes and is operated as a department of City government.

Jefferson City Transit Division (JEFFTRAN) provides transit services in Jefferson City, Missouri which has a population of 43,186. It provides six fixed routes (as well as three "tripper" routes which provide one trip each day) and is operated as a department of City government.

Fond Du Lac Area Transit provides transit services in Fond Du Lac, Wisconsin which has a population of 49,167. It provides seven fixed routes and is operated as a department of City government.

Goldsboro-Wayne Transportation Authority (GATEWAY) provides transit services in Goldsboro, North Carolina which has a population of 36,303. It operates five fixed routes and is operated by a not-for-profit board which receives funding from state, federal and local sources.

2.5.2 Fixed Route Comparison

Table 2-18 and 2-19 and **Figures 2-6** through **Figure 2-10** compare the averages of major fixed route operating statistics for ColumBUS with its five peer systems for the years 2012 through 2016. These are the five most recent years available in the Urban iNTD database. However, not all peer systems submitted complete data sets for the entire analysis period. All available NTD data provided by the FTA were used with the incomplete data noted as appropriate.

Table 2-18: Overall Fixed Route System Ridership and Operating Ratios – 2012 to 2016 NTD Average

Transit System	Passenger Trips	Revenue Miles	Revenue Hours	Revenue	Total Operating Expenses
ColumBUS (IN)	208,735	207,353	18,580	$35,415	$1,093,872
Peer System Average	201,822	224,276	14,218	$111,555	$1,020,607
Albany Transit System (OR)	213,284	182,826	9,223	$55,899	$998,182
Michigan City Transit System (IN)	152,660	190,212	13,333	$88,653	$959,217
JEFFTRAN (ILMO)	222,063	275,554	17,248	$142,289	$1,295,534
Fond Du Lac Area Transit (WI)	152,371	141,203	10,569	$127,901	$969,150
Goldsboro-Wayne Transportation Authority (NC)	222,063	331,587	20,719	$14,034	$880,954

Table 2-19: Per Passenger Fixed Route Ridership and Operating Ratios – 2012 to 2016 NTD Average

Transit System	Farebox Recovery	Revenue/ Passenger Trip	Passenger Trips/ Revenue Hour	Cost/ Passenger Trip	Passenger Trips/ Capita
ColumBUS (IN)	3.3%	$0.16	11.2	$4.97	4.62
Peer System Average	10.5%	$0.57	14.9	$5.25	4.86
Albany Transit System (OR)	6.0%	$0.26	22.4	$4.67	4.21
Michigan City Transit System (IN)	10.2%	$0.56	11.4	$5.17	4.82
JEFFTRAN (MO)	11.0%	$0.54	15.6	$5.11	6.22
Fond Du Lac Area Transit (WI)	13.4%	$0.85	14.4	$6.06	3.10
Goldsboro-Wayne Transportation Authority (NC)	11.9%	$0.64	10.6	$5.23	5.94

ColumBUS' fixed route operations underperform its peer systems. It ranks below the average of its peers' systems in four of the five categories and has the lowest or second lowest performance in three of the five categories. This identifies opportunities to improve the effectiveness and efficiency of ColumBUS' fixed route operations. The significantly lower-than-average performance on farebox recovery and revenue/passenger trip would be improved by an increase in passenger fares.

Figure 2-6 shows ColumBUS has the lowest fixed-route farebox recovery compared to its peers, slightly more than one-third of the average of its peer systems. Lower fixed route fares result in correspondingly lower farebox recovery for demand response.

Figure 0-6: Fixed Route Peer Comparison – Farebox Recovery (Pct.)

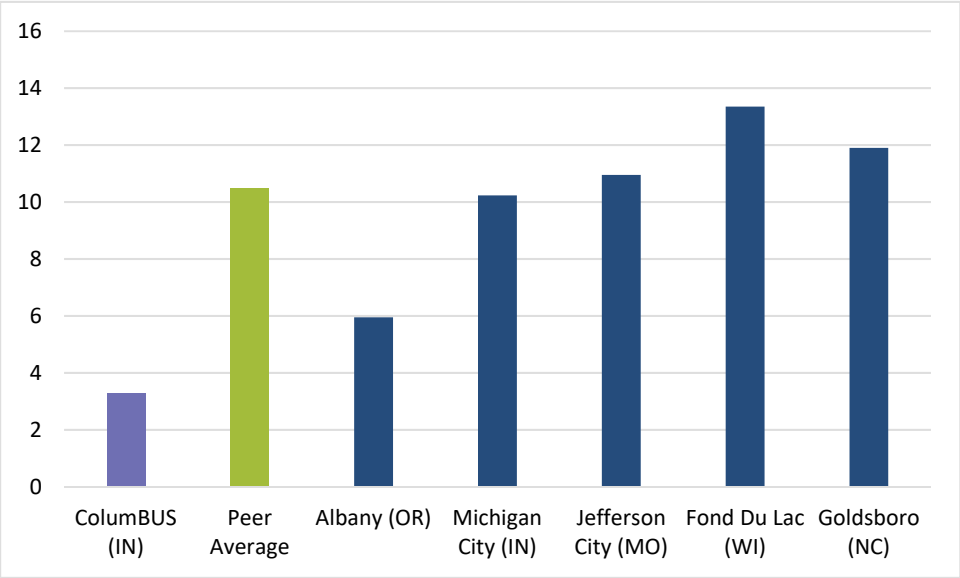


Figure 2-7 shows ColumBUS farebox revenue per passenger trip ($0.16/passenger trip) is the lowest of its peer systems and is less than 30% of the peer average ($0.57/passenger trip).

Figure 0-7: Fixed Route Peer Comparison – Revenue/Passenger Trip

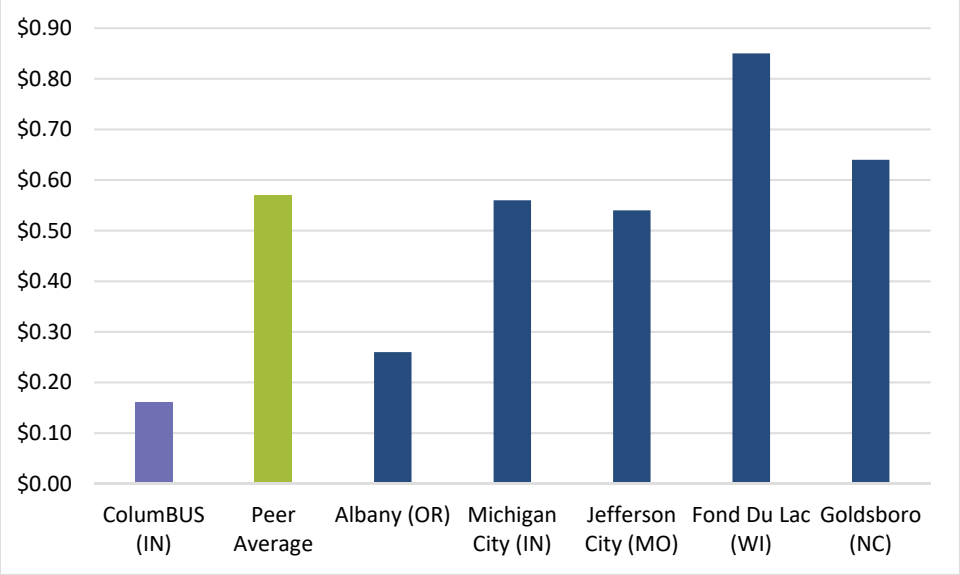


Figure 2-8 shows ColumBUS has second lowest ratio of fixed-route passenger trips per revenue hour ($11.20) of its peer systems. This indicates an opportunity for ColumBUS to improve both the efficiency of its dispatching practices.

Figure 0-8: Fixed Route Peer Comparison – Passenger Trips/Revenue Hour

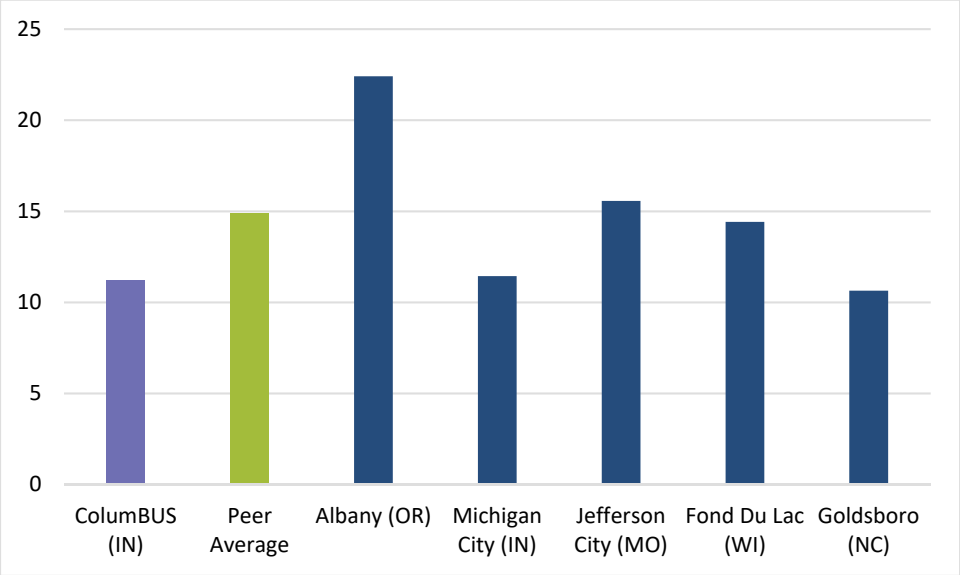


Figure 2-9 displays expenses per passenger trip. ColumBUS expenses per passenger trip are $5.07 which is only slightly below the peer average of $5.27. This indicates that Call-a-Bus operating expenses compare favorably with its peers.

Figure 0-9: Fixed Route Peer Comparison – Expenses/Passenger Trip

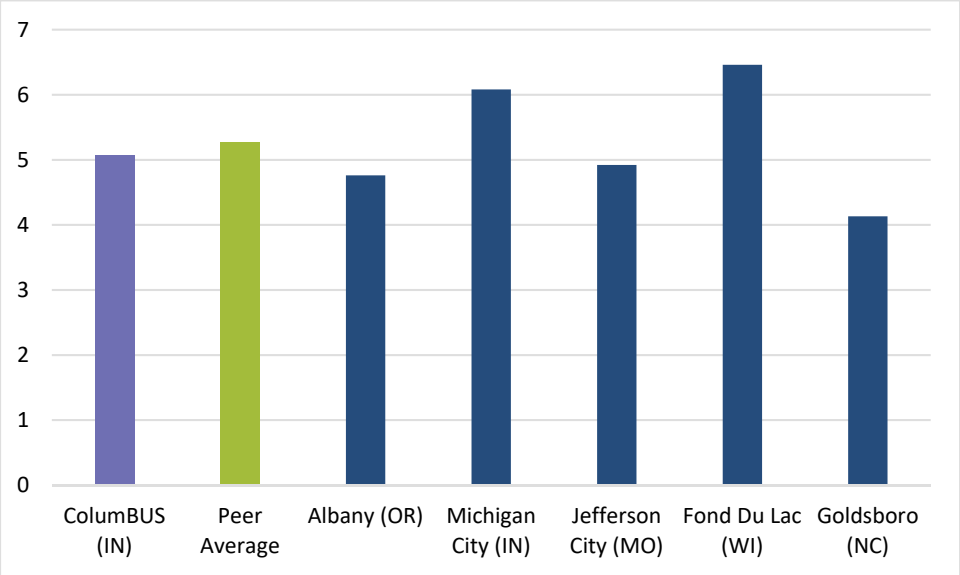
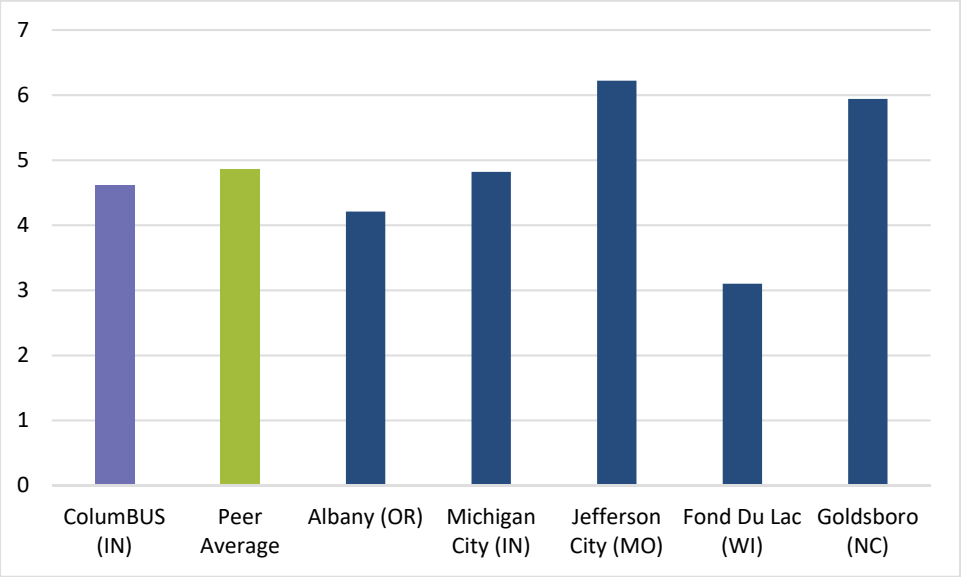


Figure 2-10 displays passenger trips per capita and shows that compared to its peers, ColumBUS serves a reasonable percentage of the service area population.

Figure 0-10: Fixed Route Peer Comparison – Passenger Trip Per Capita



2.5.3 Demand-Response Comparison

In addition to a fixed-route peer comparison, a peer comparison was performed on the Columbus demand-response service, Call-A-Bus. Upon detailed examination, two of the fixed-route peers, Fond du Lac (WI) and Goldsboro (NC) deviated significantly in scope, service, and operations from the Call-A-Bus program. The data for these services proved inconsistent for a peer comparison. As a result, only Albany, Michigan City, and Jefferson City demand-response services were analyzed for the Call-A-Bus peer comparison.

Table 2-20 compares the averages of major demand response operating statistics for Call-A-Bus with its peer systems for the analysis period, 2012 through 2016. Not all peer systems submitted complete data sets for the entire analysis period. All available NTD data provided by FTA was used with the incomplete data being noted as appropriate.

Table 0-20: Demand Response Ridership and Operating Statistics – 2012-16 NTD Average

Transit System	Passenger Trips	Revenue Miles	Revenue Hours	Revenue	Total Operating Expenses
ColumBUS (IN)	17,307	88,045	9,031	$6,905	$456,773
Peer System Average	38,791	238,765	23,655	$88,021	$696,780
Albany Transit System (OR)	18,623	96,616	7,893	37,070	$419,239
Michigan City Transit System (IN)	4,644	40,955	40,955	9,001	$199,815
JEFFTRAN (MO)	55,638	214,026	15,032	56,717	$887,732

Note: Operating expense and revenue data was missing for 2012 for all transit systems.

Table 2-21 compares ColumBUS' demand response operating ratios with its peers while **Figures 2-11** to **2-15** depict the comparisons graphically.

Table 0-21: Demand Response Ridership and Operating Statistics – 2012-16 NTD Average

Transit System	Farebox Recovery	Revenue/ Passenger Trip	Passenger Trips/ Revenue Hour	Cost/ Passenger Trip	Passenger Trips/ Capita
ColumBUS (IN)	1.15%	$0.41	1.92	$27.47	.38
Peer System Average	4.84%	$2.84	2.39	$24.41	.93
Albany Transit System (OR)	6.69%	$2.15	2.37	$24.23	.37
Michigan City Transit System (IN)	4.92%	$1.96	1.43	$44.31	.15
JEFFTRAN (MO)	6.51%	$1.03	3.70	$16.20	1.29

Note: Farebox recovery data was not available for Fond Du Lac Area Transit

Figure 2-11 shows ColumBUS has the lowest demand response farebox recovery compared to its peers, slightly more than one-third of the average of its peer systems. This is similar to the findings of the fixed route farebox recovery ratio, which was also 2/3 below the peer average. A transit system may charge only twice the fixed-route fare for ADA demand response service. Lower fixed route fares result in correspondingly lower farebox recovery for demand response.

Figure 0-11: Demand Response Ridership and Operating Statistics – Farebox Recovery

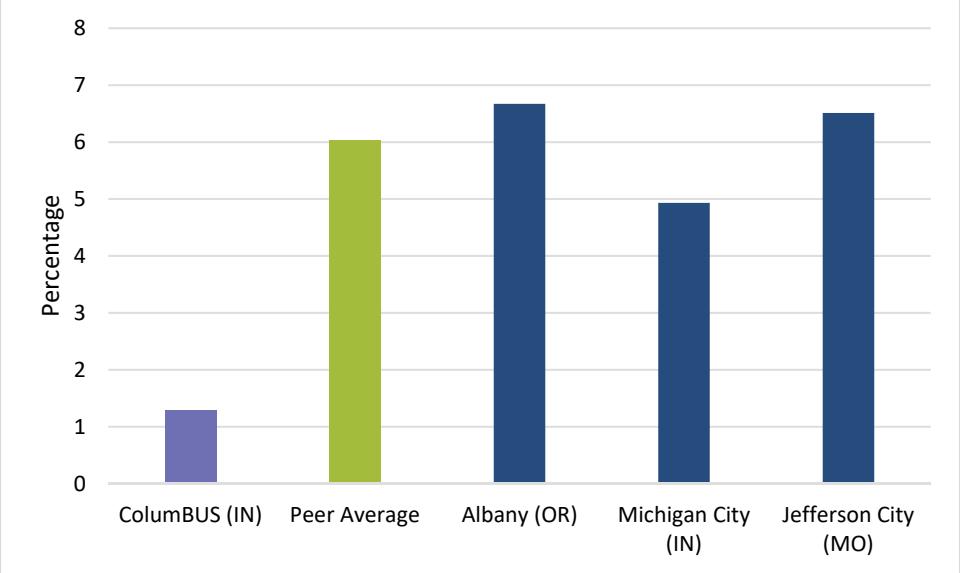


Figure 2-12 shows that Call-A-Bus' farebox revenue per passenger trip ($0.41/passenger trip) is the lowest of its peer systems and is less than 30% of the peer average ($.1.71/passenger trip).

Figure 0-12: Demand Response Ridership and Operating Statistics – Revenue/Passenger Trip

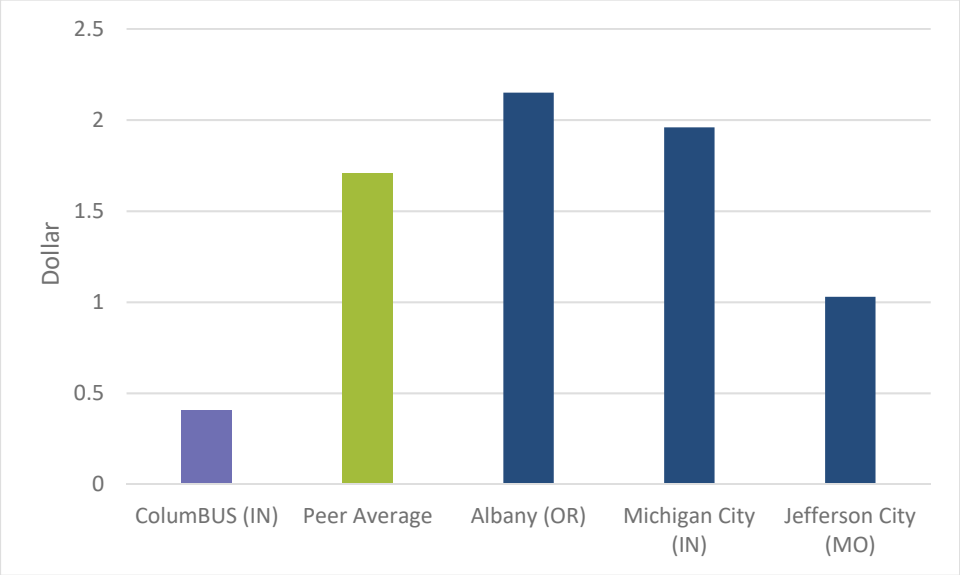


Figure 2-13 shows Call-A-Bus has second lowest ratio of demand response passenger trips per revenue hour (1.92) of its peer systems. This indicates an opportunity for Call-A-Bus to improve the efficiency of its dispatching practices.

Figure 0-13: Demand Response Ridership and Operating Statistics – Passenger Trips/Revenue Hour

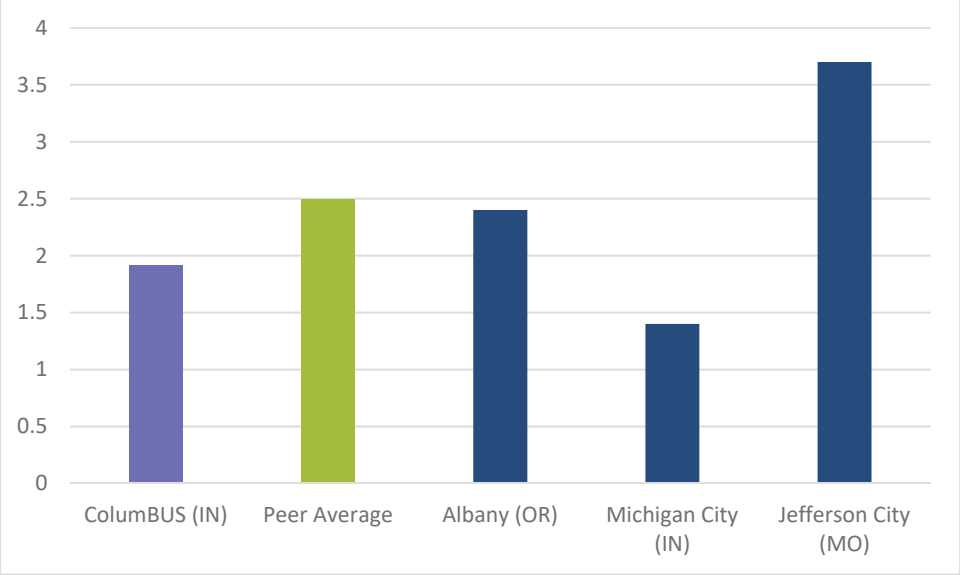


Figure 2-14 displays expenses per passenger trip. Call-A-Bus is slightly below the peer average of 28.25. This indicates that Call-a-Bus operating expenses compare favorably with its peers.

Figure 0-14: Demand Response Ridership and Operating Statistics – Expenses/Passenger Trip

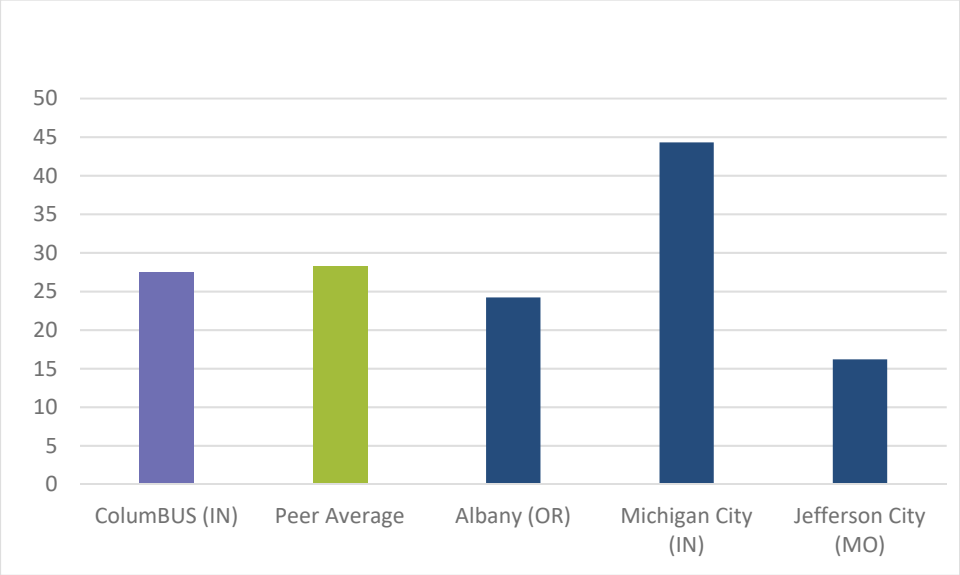
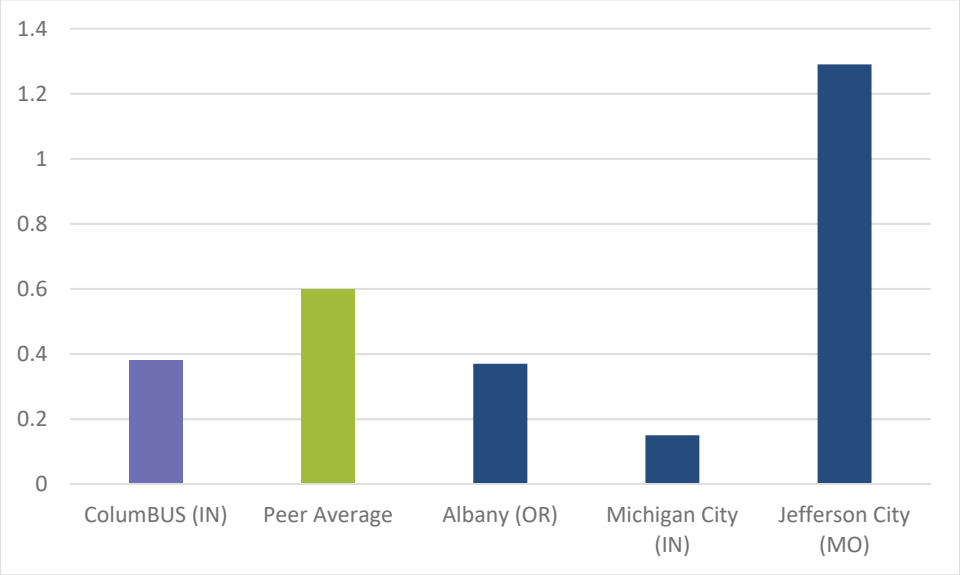


Figure 2-15 displays passenger trips per capita and shows that compared to its peers, Call-A-Bus serves a reasonable percentage of the service area population.[3]

Figure 0-15: Demand Response Ridership and Operating Statistics – Passenger Trips Per Capita



[3] Lochmueller Group completed a route study for the Jefferson City, Missouri (JEFFFTRAN) system in late 2017. A key finding was that JEFFTRAN's eligibility policies were unusually generous and exceeded the requirements of FTA's ADA guidance. That study recommended a review of paratransit ridership eligibility to reduce paratransit operating expenses. This savings in turn would fund extended service hours for fixed-route service.

Demographic statistics that are particularly significant to demand response service are displayed in **Table 2-22**. Age per se is not an eligibility determinant for paratransit service. Though Columbus' percentage of its population over 65 is similar to its peers, it does have the lowest percent of residents who are disabled. This indicates that passenger trips per capita should reflect a smaller percent of Columbus' residents using demand response service. Since Call-A-Bus reports the second highest passenger trips per capita, this suggests that system economies could be identified by reviewing eligibility determinations for Call-A-Bus riders.

Table 0-22: Demand Response Ridership Age Demographics

Transit System Location	Total Population	%65+	% Disabled
Columbus, IN	46,474	14.5%	12.4%
Peer System Average	41,980	14.8%	15.0%
Albany, OR	51,919	14.6%	16.0%
Michigan City, IN	31,374	14.7%	14.9%
Jefferson City, MO	43,172	14.2%	16.2%

Source: 5 Year ACS Data – 2016 (Tables B01001 and S1810)

2.5.4 Funding Sources

Data from NTD reports provided funding sources for ColumBUS and its peer systems**. Tables 2-23 and 2-24** below show the funding breakdown for the average of NTD reporting years 2015 and 2016. System-wide totals are shown. Funding is not allocated by service type (i.e. fixed route and demand response).

Table 0-23: Funding Sources – Average of 2015 and 2016 NTD Reporting Years

Transit System	Fare Revenue	Local Funds	State Funds	Federal Funds	Other Funds	Total
ColumBUS (IN)	$47,728	$573,810	$285,135	$743,108	$0	$1,649,780
Peer System Average	$104,730	$262,690	$342,874	$572,475	$34,831	$1,317,349
Albany Transit System (OR)	$122,854	$257,468	$176,831	$559,573	$88,551	$1,205,276
Michigan City Transit System (IN)	$137,912	$147,323	$987,766	$374,487	$28,583	$1,676,069
JEFFTRAN (MO)	$97,268	$309,362	$81,241	$558,084	$18,790	$1,064,743
Fond Du Lac Area Transit (WI)	$60,885	$335,607	$125,658	$797,757	$3,399	$1,323,306

Note: Comparable data for Goldsboro were not available.

Table 2-24 indicates that the percentage of total operating funds obtained from fare revenue is below the average for ColumBUS, which has the lowest percentage of its peer systems. ColumBUS funding from government sources (local, state and federal) are higher, compensating for the low farebox revenue as a result government sources having to accommodate low fare revenue.

Table 0-24: Operating Funds Breakdown by Funding Sources (Ave. of 2015 & 2016 NTD)

Transit System	Fare Revenue	Local Funds	State Funds	Federal Funds	Other Funds
ColumBUS (IN)	2.9%	34.8%	17.3%	45.1%	0%
Peer System Average	15.8%	29.6%	13.2%	39.8%	1.8%
Albany Transit System (OR)	17.9%	43.1%	0%	41.3%	0%
Michigan City Transit System (IN)	7.7%	24.3%	14.7%	53.4%	0%
JEFFTRAN (MO)	8.3%	42.2%	12.9%	32.6%	2.1%
Fond Du Lac Area Transit (WI)	29.3%	8.8%	25.2%	31.7%	5.1%

Note: Comparable data for Goldsboro was not available.

2.5.5 Peer System Comparison Summary

To surmise, ColumBUS' fixed route operations show some opportunities for improvement when compared with its peer systems. Our conclusion is that due to the particularly low $0.25 fare, ColumBUS reports significantly lower farebox recovery and lower revenue per passenger trip. Performance on passenger trips per revenue hour also suggests there is potential for improved efficiencies in route planning. When compared to its peers for operations expenses however, ColumBUS results compare favorable indicating that despite low revenue, ColumBUS' management is able to provide an effective level or cost control for fixed-route operations.

Similar to the conclusion to fix-route service, low farebox recovery and revenue is directly related to the significantly lower fare of the Call-A-Bus service. Lower trips per revenue hour than the peer average indicate that there is potential for improvement dispatching practices. Call-A-Bus compares favorably with its peers on expense per trip, indicating that management can provide an effective level or cost control for demand-response operations.

It should be noted that Columbus has a measurably smaller population of disabled residents than its peers. As a result, ridership for Call-A-Bus should reflect a fewer passengers per capita than its peers; however, results indicate that Call-A-Bus reports the second highest number of passengers per capita. This leads us to conclusion that the eligibility requirements for demand-response service may be more broadly interpreted. It is our conclusion that these current eligibility determination policies allow some riders who do not satisfy FTA requirements for alternative service to use Call-A-Bus service. As a result, an additional number of customers who could use fixed route service (at a cost of $4.93 per trip) instead are determined eligible to use Call-A-Bus service (at a cost of $16.37 per trip).

3 Operating Cost Model

Allocating operating costs by route requires identifying basic operating statistics which represent key cost drivers for categories of costs. For smaller systems such as ColumBUS, costs can be regarded as being determined ("driven") by three service parameters. These include:

- **Vehicle hours of service.** Most costs of service are dependent upon the number of vehicle hours operated. These include bus operator wages and fringes (including employee benefits, paid time off (vacation, sick pay, jury duty pay, etc.).
- **Vehicle miles of service.** Maintenance and fuel costs are dependent upon the number of vehicle miles operated.
- **Peak vehicles.** Managerial and dispatching costs are most dependent upon the number of peak vehicles operated. This is a measure of the size of the system which must be managed. Note that this is an ***annual*** cost factor. Cost comparisons in Section 4 will consider only marginal costs due to hours and miles of operation. They will not include these "overhead" costs attributable to peak vehicles. This peak vehicle factor is used to estimate the cost of service modifications which change the number of peak vehicles operated.

Table 3-1 provides unit cost factors which were calculated for ColumBUS based upon data reported in its 2015 and 2016 NTD reports. These cost factors were used to compute operating costs for existing service at the route level. They also are used to estimate costs for service modifications. ColumBUS is a reduced NTD reporter and is not required to further categorize operating costs beyond allocating them either to fixed route or demand response services. Lochmueller used recent data from its studies of other systems (Jefferson City MO and RIDES MTD (serving Marion and Carbondale IL) as guidance to breaking down total operating costs in the three categories cited above.

Appendix X documents these calculations, including how data from other systems was used to allocate ColumBUS costs. Data from these other systems was used only to determine the relative allocation of costs to vehicle hours, vehicle miles and peak vehicles. The actual costs which were allocated to these factors come directly from ColumBUS' NTD reports.

Table 3-1: ColumBUS Operating Cost Allocation

	Fixed Route	Call-a-Bus
Cost/Vehicle Hour	$ 36.43	$ 35.73
Cost/Vehicle Mile	$ 1.18	$ 0.49
Cost/Peak Vehicle	$ 36,600	$ 16,100

4 Existing Routes Overview

ColumBUS provides service on five regular bus routes weekdays 6 am through 8pm. On-board counts were conducted on Monday, September 10, 2018 and Tuesday, September 11, 2018. Ridership and boarding/alighting counts were collected by stop for each trip of every route. Lastly, actual bus arrival times were recorded at the major stops of each route (as shown in published route maps). Some of these major stops were also used to break the routes into segments for analysis purposes. The reported data is based on the counts which took place over a two-day span. However, follow-up analyses normalize these counts to reflect typical year-round ridership on each route.

- The City of Columbus provided electronic files for digitized versions of each route. GIS tools along with the on-board counts were used to estimate segment/route lengths, passengers per mile, daily passenger-miles and other statistics. A few pertinent definitions are listed below.
- Route Segment: A subsection of a route between two major stops as specified in the route maps published by ColumBUS.
- Daily Passenger-Miles (Day of Count): The passenger-miles served by a route estimated from the on-board counts and files provided by the City of Columbus in conjunction with GIS tools.

Peak Load: The largest number of passengers on any bus throughout the day for a route or segment.
All routes start and end at the Mill Race Transit Depot (900 Lindsey St.). Each of the five routes has 14 trips per weekday. All routes except Route 5 (Purple) meet mid-route at a transfer point located at Target (1865 N National Rd) where riders can alight from one route and board another to continue their journey.

4.1 Summary Route Comparisons

ColumBUS provides service on five regular bus routes shown in **Figure 4-1**. Please refer to **Appendix X** for the full-size version of the figure.

Figure 4-1: ColumBUS Routes

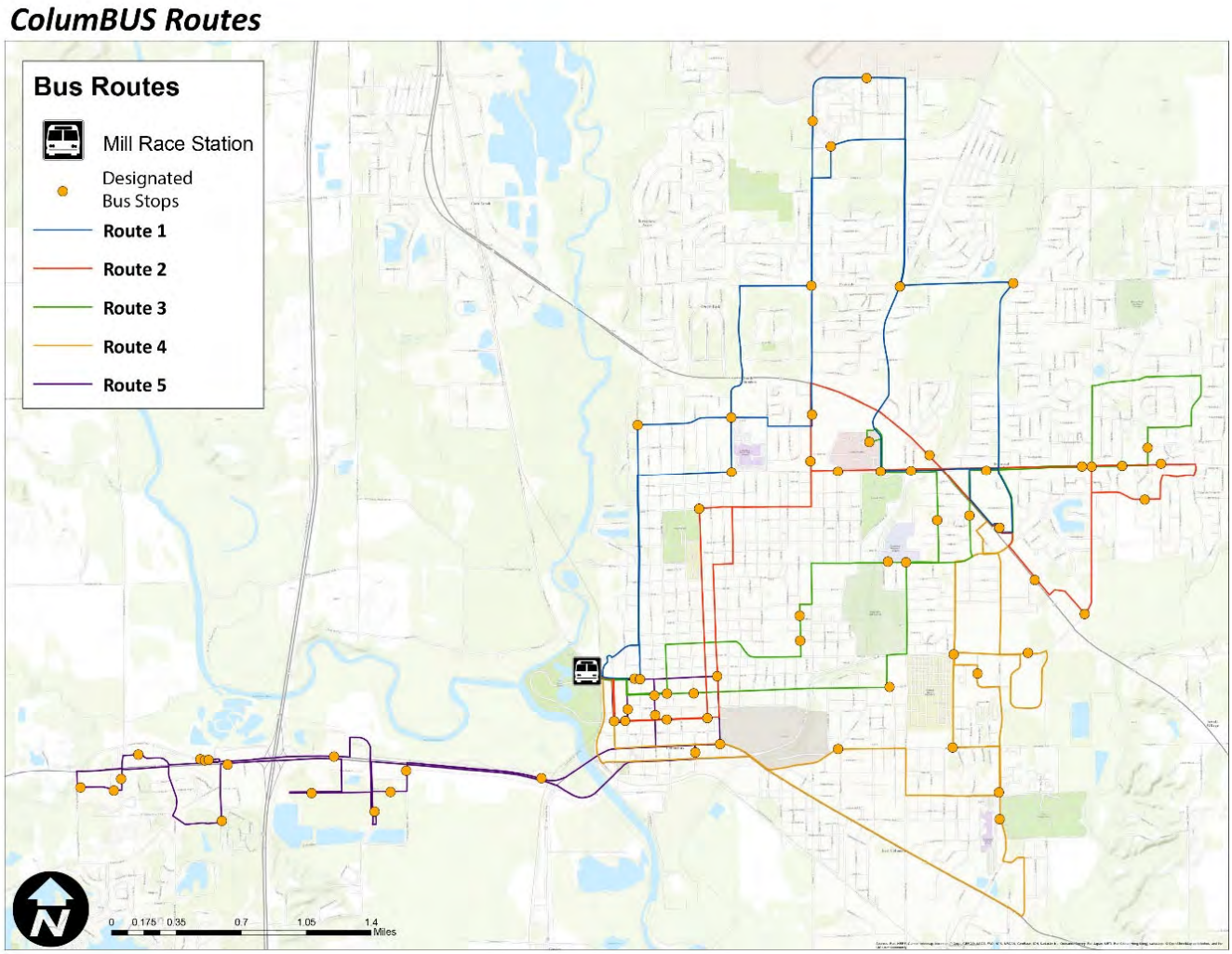


Table 0-1: ColumBUS Route Ridership Comparison

Route	Length (miles)	Daily Ridership		
		September 2018 Count	Avg. Weekday, 2017-2018	Weekday Adjustment Factor
Route 1 (Blue)	13.7	148	118	0.80
Route 2 (Red)	11.98	211	179	0.81
Route 3 (Green)	11.9	204	137	0.67
Route 4 (Orange)	11.9	334	282	0.84
Route 5 (Purple)	12.4	120	62	0.52
Average weekday for period between October 2017 and October 2018. Data provided by ColumBUS.				

Table 4-1 above summarizes key information for each route. The on-board counts were conducted over a two-day span on Monday, September 10, 2018 and September 11, 2018.

The boarding and alighting count data was used to calculate daily passenger-miles and ridership for the specific day of the count. However, to better represent typical operating conditions throughout the year, the data was annualized to show daily averages for a typical weekday between October 2017 and September 2018. The annual normalization calculations assume that the average trip lengths on the day of the count do not differ from those on a typical weekday in 2018.

Table 0-2: ColumBUS Route Level Performance Statistics

Route	Daily Vehicle Miles	Daily Operating Cost	Cost/ Passenger	Passengers/ Hour	Passengers/ Route Mile	Passengers/ Vehicle Mile
Route 1 (Blue)	191.8	$736.34	$6.24	8.4	8.6	0.62
Route 2 (Red)	167.7	$707.91	$3.95	12.8	14.9	0.94
Route 3 (Green)	166.6	$706.61	$5.16	9.8	11.5	0.82
Route 4 (Orange)	166.6	$706.61	$2.51	20.1	23.7	1.69
Route 5 (Purple)	173.6	$714.87	$11.53	4.4	5.0	0.38

Note: Passengers are based on average 2017-18 weekday ridership from Table 4-1.

Table 4-2 above shows additional route level performance statistics. The costs shown are *marginal* costs, reflecting only miles and hours of vehicle operation. These costs are calculated using the unit cost factors presented in Section 3. Due to the large number of riders that Route 4 serves, it has the lowest cost per passenger as well as the highest passengers per hour, route mile and vehicle mile. Route 5 has the highest cost per passenger as well as the lowest passengers per hour, route mile and vehicle mile.

Table 0-3: ColumBUS Route Ridership Comparison Weekday vs. Saturday

Route	Daily Ridership		
	Ave. Weekday, 2017-2018	Avg. Saturday, 2017-2018	Saturday Adjustment Factor
Route 1 (Blue)	118	48	0.41
Route 2 (Red)	179	117	0.65
Route 3 (Green)	137	88	0.64
Route 4 (Orange)	282	175	0.62
Route 5 (Purple)	62	51	0.82
Average weekday for period between October 2017 and September 2018. Data provided by ColumBUS.			

Table 4-3 above summarizes key information for each route and calculates the adjustment factor for average Saturday service.

The on-board counts were conducted over a two-day span on Monday, September 10, 2018 and Tuesday September 11, 2018. To more accurately typical operating conditions throughout the year, the data was annualized to show averages for a typical Saturday between October 2017 and September 2018. The annual normalization calculations assume that the average trip lengths on the day of the count do not differ from those on a typical Saturday in 2018. The Saturday adjustment factor can be used to adjust the average weekday ridership to reflect the average Saturday ridership.

4.2 Individual Route Profiles

The following pages include route profile summaries for each of the ColumBUS routes. Each page includes a map of the route with a ¼ and ½ mile buffer around the route bus stops. Each page also includes demographic data for the area within the two buffer areas. The same definitions and sources were used as the city and county-wide demographic data.

The recommended service plan will provide for a major realignment of ColumBUS service to serve the new transit center. In this realignment, more productive segments of existing routes are grouped together to form new routes which will be recommended for 30-minute service weekdays. Less productive segments of existing routes will be grouped into new routes which will continue to operate every 30 minutes.

Please refer to **Appendix X** for full size version of the maps included in this section of the report.

4.2.1 Route 1

The map below in **Figure 4-2** shows the Route 1 with a ¼ and ½ mile buffer area around the route bus stops. Following the map are tables showing demographic information within these buffer areas. Additional tables show ridership and running time information as well as route transfer information.

Figure 0-2: ColumBUS Route 1

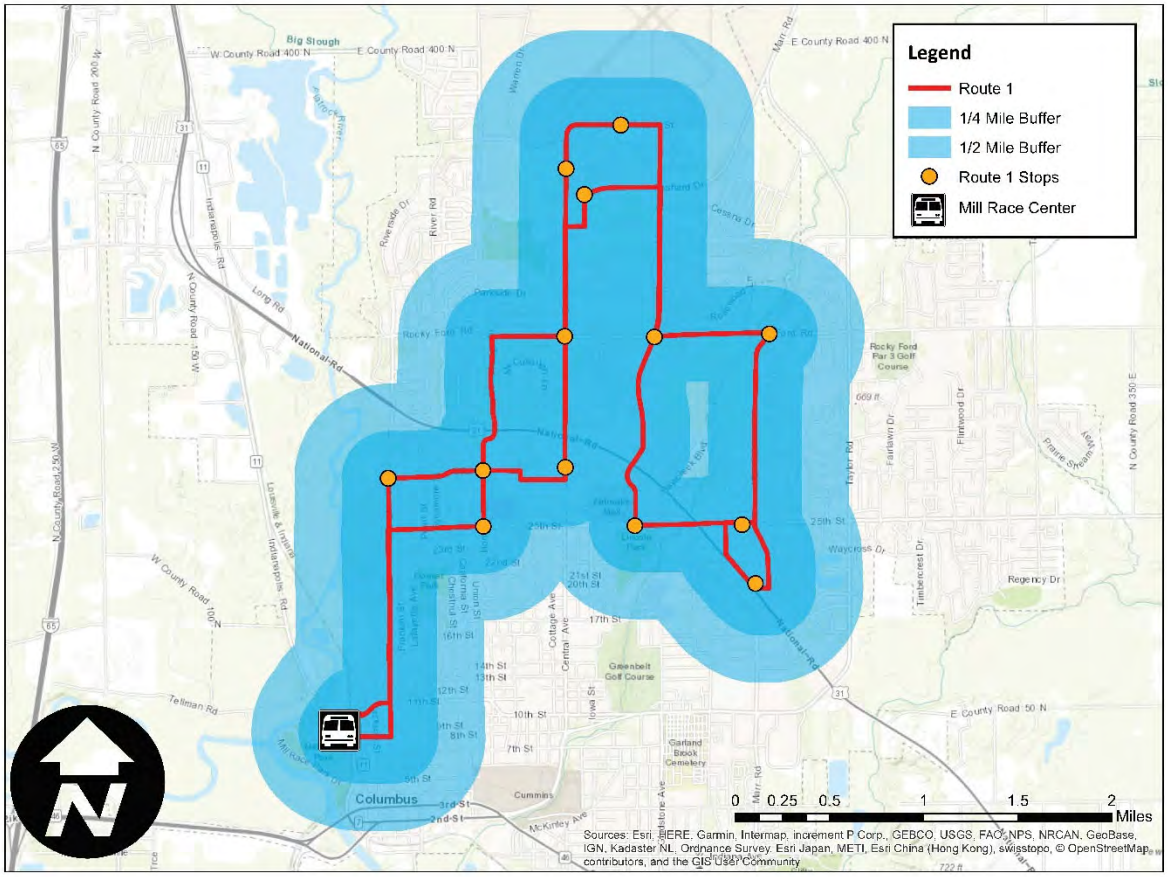


Table 0-4: Route 1 – Age Cohorts

Age	Total Population	Age 0-19	Age 20-59	Age 60+
¼ Mile Buffer	10.862	25%	52%	23%
½ Mile Buffer	16,778	25%	52%	23%

Table 0-5: Route 1 – Housing Tenure

Households	Total Households	Owner Occupied	Renter Occupied
¼ Mile Buffer	4289	75%	25%
½ Mile Buffer	6430	66%	34%

Table 0-6: Route 1 – Racial Composition

Race/Ethnicity	White	Black	Nat Am/Alaska Nat	Asian	Haw Pac Islander	Other	2 or more races	Hispanic/Latino
¼ Mile Buffer	81%	3%	>0.5%	6%	0%	4%	1%	5%
½ Mile Buffer	86%	3%	>0.5%	5%	0%	4%	1%	6%

Table 0-7: Route 1 – Educational Attainment

Educational Attainment*	No HS Diploma/GED	HS Diploma/GED	College Degree
¼ Mile Buffer	8%	55%	37%
½ Mile Buffer	9%	57%	34%

**Highest level completed for those aged 25 and above*

Table 0-8: Route 1 – Employment Status

Employment Status*	Employed	Unemployed
¼ Mile Buffer	96%	4%
½ Mile Buffer	96%	4%

**Includes only those in the labor force*

Table 0-9: Route 1 – Household Income

Household Income	< $25,000	$25,000 - $50,000	$50,000 - $75,000	$75,000 - $100,000	> $100,000
¼ Mile Buffer	17%	28%	17%	11%	27%
½ Mile Buffer	19%	28%	18%	11%	23%

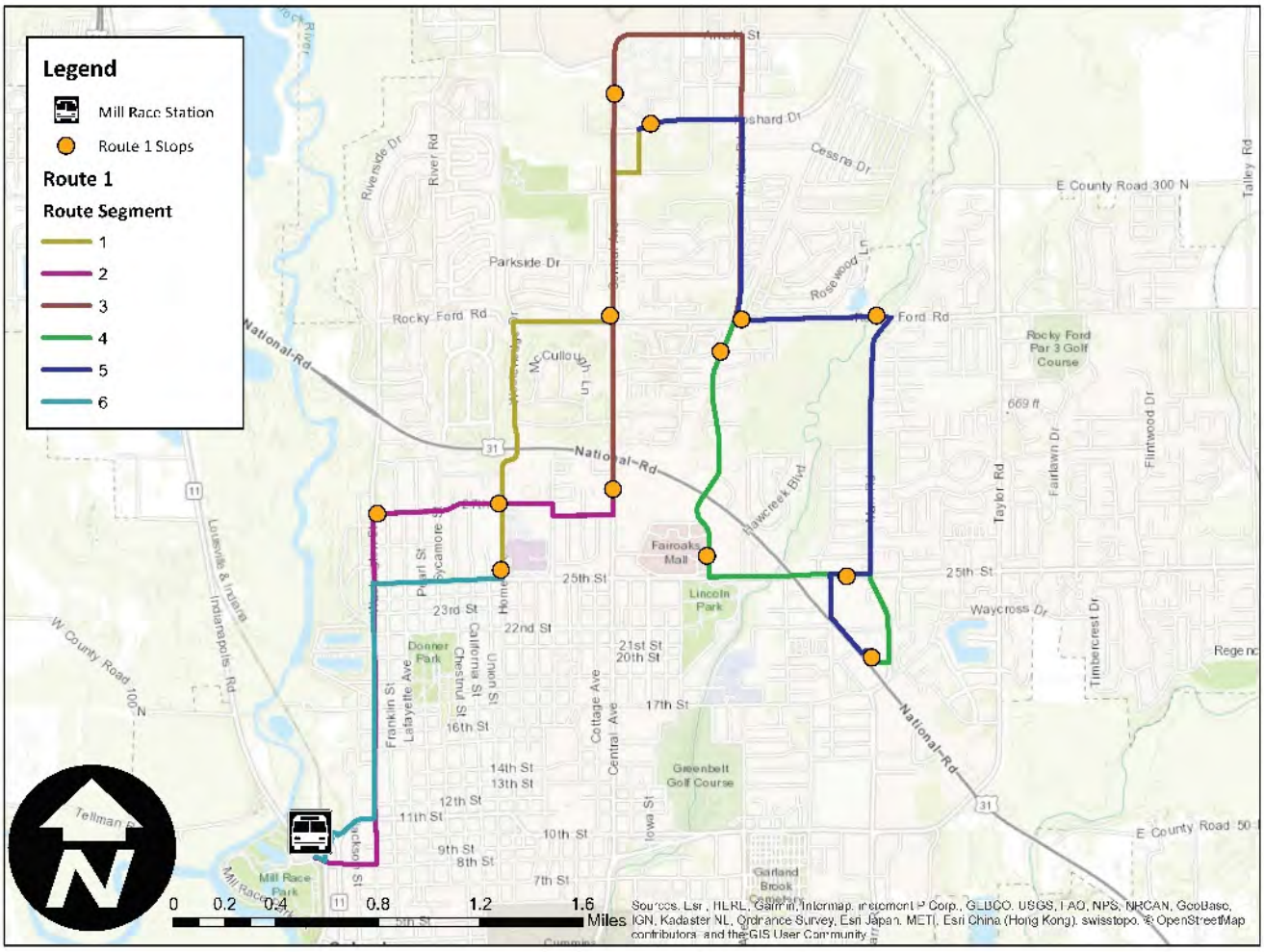
Table 0-10: Route 1 – Vehicles per Household

Vehicles Owned	0 Vehicle Household	1 Vehicle Household	2 Vehicle Household	3 Vehicle Household	4 Vehicle Household	5+ Vehicle Household
¼ Mile Buffer	4%	33%	42%	14%	6%	1%
½ Mile Buffer	5%	36%	41%	13%	5%	1%

Table 0-11: Route 1 – Type of Employment

Employment	Total Employment	Retail Employment	Service Employment	Government Employment
¼ Mile Buffer	5647	10%	11%	3%
½ Mile Buffer	8526	10%	11%	3%

Figure 0-3: Route 1 -Segment Analysis



The subsequent tables report the actual data collected on the day of the count. However, to better represent typical operating conditions throughout the year, an annual normalization factor may be multiplied to reflect typical weekdays and Saturdays in 2017-18. For Route 1, the weekday annual normalization factor is 0.80 (148/118) and the weekday/Saturday annual normalization factor is 0.41 (118/48) based on **Table 0-1 and 4-3.** Passengers/route mile are given both on the day of the counts, as well as applying the annual normalization factor of 0.80.

In this and following ridership segment tables, numbers in (parentheses) indicate boarding and alighting at the Mill Race or Target transfer centers. These are included in the total riders on or off for that segment.

Table 0-12: Route 1 – Ridership by Segment

Segment	Start Location	Riders On	Riders Off	Segment Length	Passengers/Route Mile	
					Counted	Normalized
1	**Mill Race Station**	61 (40)	13	2.3	16.1	12.9
2	**Central Avenue (Kroger)**	15	21	2.7	6.7	5.4
3	**Rockford & Middle (North Park)**	21	19	3.4	5.9	4.7
4	**Leave Target Inbound**	33 (22)	32 (20)	2.1	15.5	12.4
5	**Poshard & Wade**	11	14	3.4	3.7	3.0
6	**25th & Home**	7	49 (36)	1.8	15.5	12.4
Total		148	148	13.7		

*Note: Passengers per Route Mile are calculated as (Riders On + Riders Off) / (2*Segment Length).*

Key observations about ridership patterns on Route 1 include:

- Excluding segments service the two transit centers, none of the route segments are productive.
- Some segments now served by Route 1 will be consolidated into other routes.
- The resources made available will be used to recommend service extension northeast along the US 31 corridor.

As mentioned previously, each route was broken into multiple segments using ColumBUS' designated stops. The riders on/off columns indicate the number of riders that boarded/alighted the bus at any stop within the segment during the entire day that was surveyed.

Table 0-13: Route 1 – Ridership by Time Period

Trip Start Time	Ridership	Trip Start Time	Ridership
6:05 a.m.	5	12:05 p.m.	9
7:05 a.m.	11	1:05 p.m.	27
8:05 a.m.	12	2:05 p.m.	10
9:05 a.m.	7	3:05 p.m.	16
10:05 a.m.	10	4:05 p.m.	19
11:05 a.m.	9	5:05 p.m.	2*
		6:05 p.m.	8
		7:05 p.m.	3*
		Total*	148

**Indicates train delays that caused driver to deviate from scheduled route*

As mentioned earlier, each of the five regular routes has 14 different trips throughout the day. The trip start-times (time leaving the Mill Race Transit Center) are listed in the first column. The Ridership column indicates the total number of riders boarding the bus during the entire round trip. The best patronized trips are in the afternoon (1:05 p.m., 3:05 p.m. and 4:05 p.m.).

Table 0-14: Route 1 – Scheduled and Actual Route Running Times

Segment			Running Time (Minutes)	
Number	**From**	**To**	**Scheduled**	**Actual (Avg.)**
1	Mill Race Station	Central Avenue (Kroger)	10	14
2	Central Avenue (Kroger)	North Park	8	7
3	North Park	Leave Target	12	10
4	Leave Target	Poshard & Wade	7	6
5	Poshard & Wade	25th & Home	7	7
6	25th & Home	Mill Race Station	6	10
	Total		50	54
Data from on-board counts conducted September 10 and 11, 2018				

Scheduled running times are inadequate in Segments 1 and 6; in each of these segments, the scheduled running time is 3 – 4 minutes less than the average running actual time. Scheduled running time in Segment 3 is two minutes greater than the average actual running time. Since this includes the Target transfer point, it is not clear if it would be appropriate to modify scheduled running time in this segment. Route 1 is the only route where the average actual round-trip running time (54 minutes) exceeds scheduled running time (50 minutes).

4.2.2 Route 2

The map below in **Figure 4-4** shows the Route 2 with a ¼ and ½ mile buffer area around the route bus stops. Following the map are tables showing demographic information within these buffer areas. Additional tables show ridership and running time information as well as route transfer information.

Figure 0-4: ColumBUS Route 2

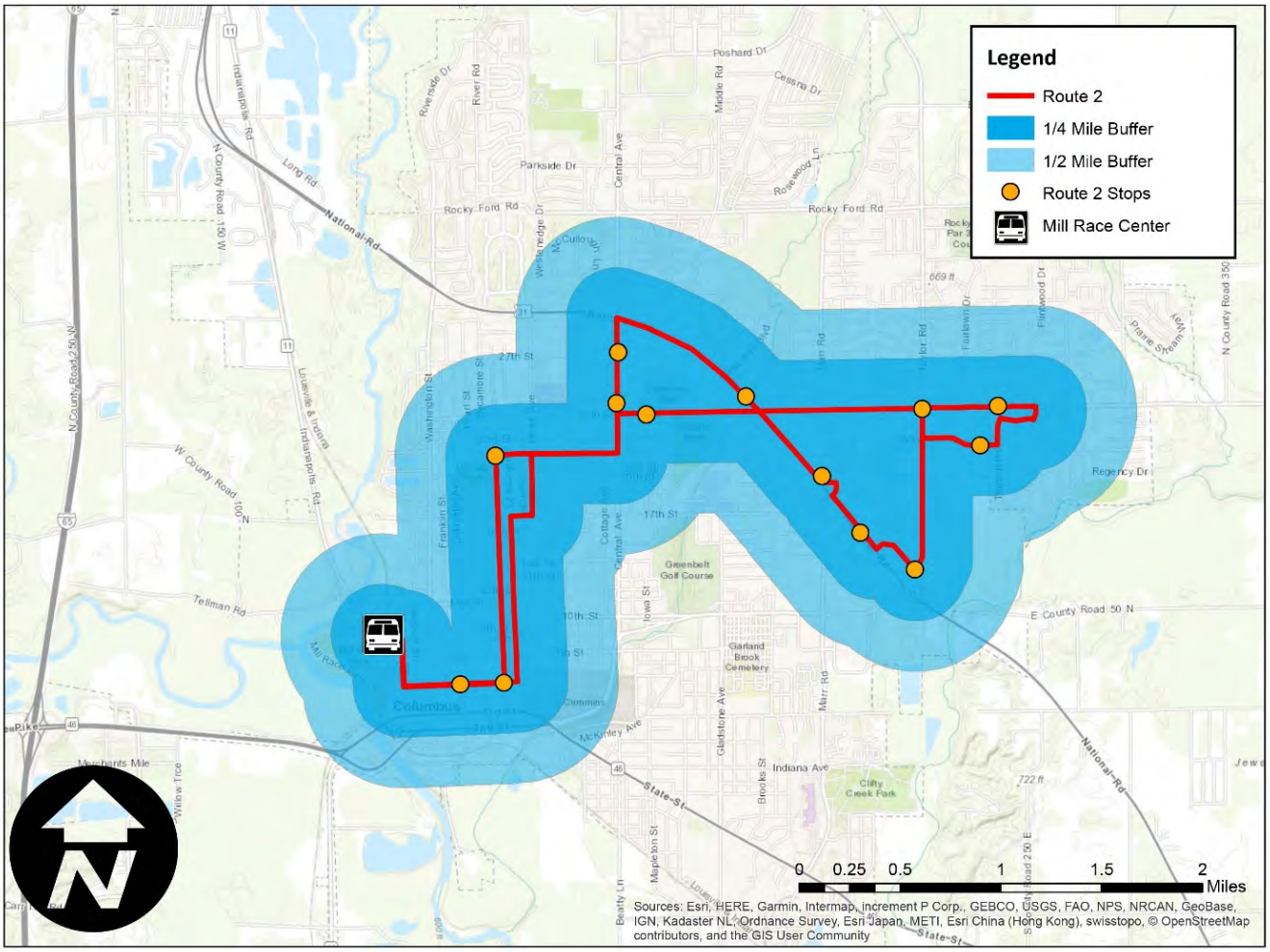


Table 0-15: Route 2 – Age Cohorts

Age	Total Population	Age 0-19	Age 20-59	Age 60+
¼ Mile Buffer	10,107	22%	55%	22%
½ Mile Buffer	15,797	22%	55%	23%

Table 0-16: Route 2 – Housing Tenure

Households	Total Households	Owner Occupied	Renter Occupied
¼ Mile Buffer	4501	53%	47%
½ Mile Buffer	7019	56%	45%

Table 0-17: Route 2 – Racial Composition

Race/Ethnicity	White	Black	Nat Am/Alaska Nat	Asian	Haw Pac Islander	Other	2 or more races	Hispanic/Latino
¼ Mile Buffer	81%	4%	>0.5%	6%	0%	3%	1%	5%
½ Mile Buffer	82%	4%	>0.5%	6%	0%	3%	1%	4%

Table 0-18: Route 2 – Educational Attainment

Educational Attainment*	No HS Diploma/GED	HS Diploma/GED	College Degree
¼ Mile Buffer	11%	63%	26%
½ Mile Buffer	10%	61%	29%

**Highest level completed for those aged 25 and above*

Table 0-19: Route 2 – Employment Status

Employment Status*	Employed	Unemployed
¼ Mile Buffer	94%	6%
½ Mile Buffer	94%	6%

**Includes only those in the labor force*

The percent of residents in the buffer area with income levels below $25,000 is significantly higher (25%) than city averages (21%) for both the ¼ and ½ mile buffer.

Table 0-20: Route 2 – Household Income

Household Income	< $25,000	$25,000 - $50,000	$50,000 - $75,000	$75,000 - $100,000	> $100,000
¼ Mile Buffer	25%	30%	20%	13%	12%
½ Mile Buffer	25%	30%	20%	12%	14%

44% of households citywide own 1 or fewer vehicles; however, a significantly larger percent of residents (55%) in the Route 2 service area are low or no vehicle households. Route 2 is the second most patronized route for weekday ridership which, in part, can be contributed to the limited number of personal vehicles available.

Table 0-21: Route 2 – Age Cohorts

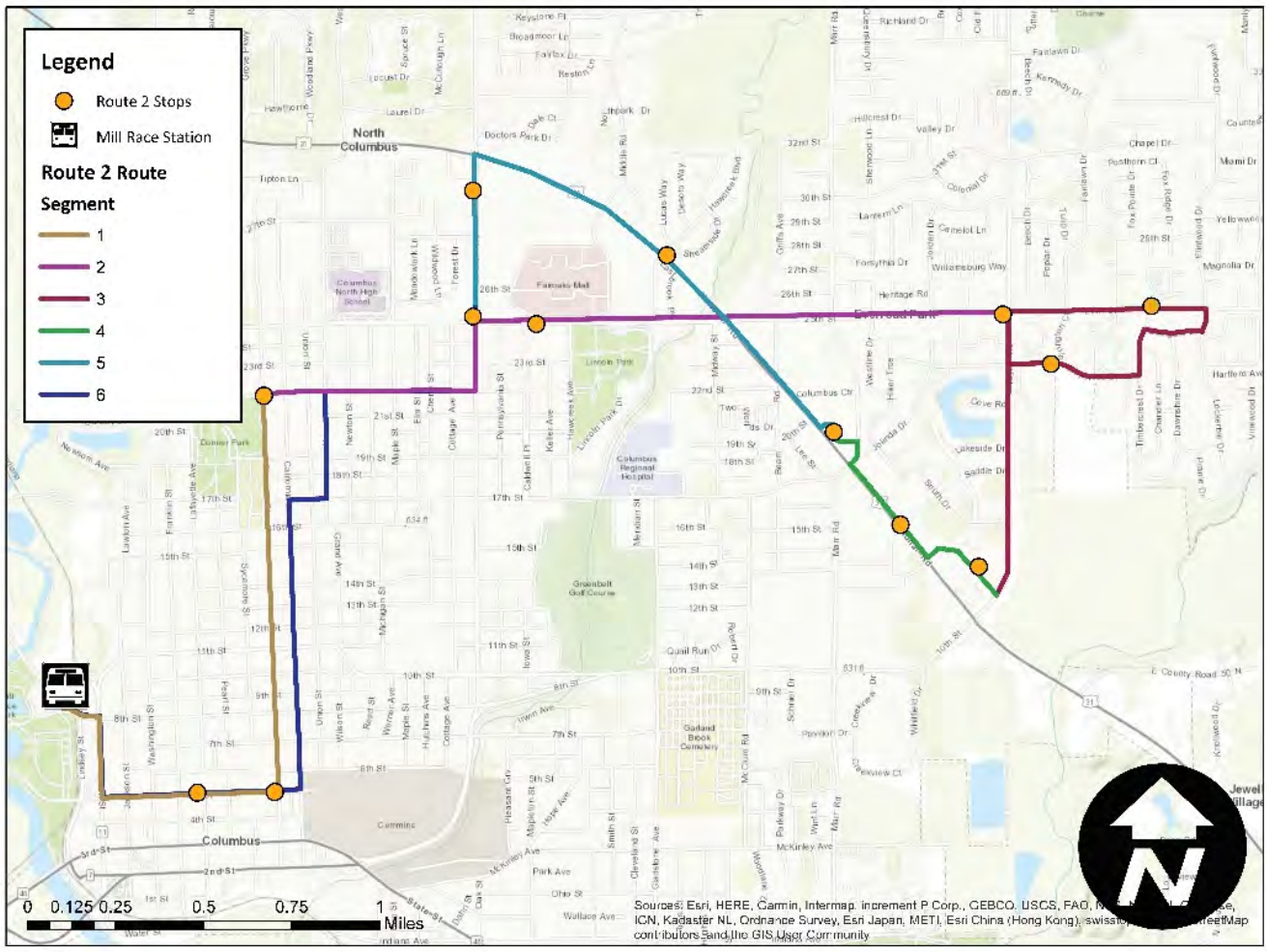
Vehicles Owned	0 Vehicle Household	1 Vehicle Household	2 Vehicle Household	3 Vehicle Household	4 Vehicle Household	5+ Vehicle Household
¼ Mile Buffer	10%	45%	34%	8 %	3%	1%
½ Mile Buffer	10%	42%	36%	9%	3%	1%

The employment in the Retail and Service sectors combined (23%) are notable higher than city averages (18%) rate for both the ¼ and ½ mile buffer.

Table 0-22: Route 2 – Type of Employment

Employment	Total Employment	Retail Employment	Service Employment	Government Employment
¼ Mile Buffer	4997	11%	12%	3%
½ Mile Buffer	7895	11%	13%	3%

Figure 0-5: Route 2 – Segment Analysis



The subsequent tables report the actual data collected on the day of the count. However, to better represent typical operating conditions throughout the year, an annual normalization factor may be multiplied to reflect a typical weekday in 2017/18. For Route 2, the annual weekday normalization factor is .81 (211/179) and the annual weekday/Saturday normalization factor is .65 (179/117) based on **Table 0-1** and **4-3**. Passengers/route mile are given both on the day of the counts, as well as applying the annual normalization factor of 0.81.

Table 0-23: Route 2 – Ridership by Segment

Segment	Start Location	Riders On	Riders Off	Segment Length	Passengers/Route Mile	
					Counted	Normalized
1	Mill Race Station	63 (28)	4	2.0	16.8	13.6
2	22nd and Chestnut	21	25	2.3	10.0	8.1
3	25th and Taylor	35	21	2.3	12.2	9.9
4	Clifty Crossing (Hobby Lobby)	4	11	.8	9.6	7.8
5	Leave Target Inbound	56 (43)	59 (33)	1.8	31.9	25.8
6	25th Street Shopping Center	32	91 (36)	2.8	22.0	17.8
Total		211	211	12.0		

*Note: Passengers per Route Mile are calculated as (Riders On + Riders Off) / (2*Segment Length).*

Key observations about ridership patterns on Route 2 include:

- Most route segments are productive.
- The 25th Street corridor is particularly productive.
- Service along the 25th Street corridor will be a point of emphasis in the route recommendations
- 25th Street is also a productive segment of Route 3.

As mentioned previously, each route was broken into multiple segments based on stops provided in ColumBUS' public schedules. The riders on/off columns indicate the number of riders that boarded/alighted the bus at any stop within the segment during the entire day that was surveyed.

Table 0-24: Route 2 – Ridership by Time Period

Trip Start Time	Ridership	Trip Start Time	Ridership
6:05 a.m.	14	12:05 p.m.	10
7:05 a.m.	12	1:05 p.m.	24
8:05 a.m.	12	2:05 p.m.	13
9:05 a.m.	10	3:05 p.m.	34
10:05 a.m.	9	4:05 p.m.	21
11:05 a.m.	22	5:05 p.m.	10*
		6:05 p.m.	15*
		7:05 p.m.	5*
		Total*	211

**Indicates train delays that caused driver to deviate from scheduled route*

As mentioned earlier, each of the five regular routes has 14 different trips throughout the day. The trip start times are listed in the first column. The Ridership column indicates the total number of riders boarding the bus during the entire round trip. The best patronized trips are mid-day and early afternoon (11:05 a.m., 1:05 p.m., 3:05 p.m., and 4:05 p.m.).

Table 0-25: Route 2 – Scheduled and Actual Route Running Times

Segment			Running Time (Minutes)	
Number	From	To	Scheduled	Actual (Avg.)
1	Mill Race Station	22nd & Chestnut	8	9
2	22nd & Chestnut	25th & Taylor	8	7
3	25th & Taylor	Clifty Crossing	7	7
4	Clifty Crossing	Leave Target	7	6
5	Leave Target	25th St. Shopping Center	5	7
6	25th St. Shopping Center	Mill Race Station	15	7
	Total		50	43
Data from on-board counts conducted September 10 and 11, 2018				

Running time in all but one segment is appropriate. Segment 6 (between 25th Street Shopping Center and Mill Race Station) has a scheduled running time of 15 minutes, versus an actual average running time of 7 minutes. The running time in this segment is excessive.

4.2.3 Route 3

The map below in **Figure 4-6** shows the Route 3 with a ¼ and ½ mile buffer area around the route bus stops. Following the map are tables showing demographic information within these buffer areas. Additional tables show ridership and running time information as well as route transfer information.

Figure 0-6: ColumBUS Route 3

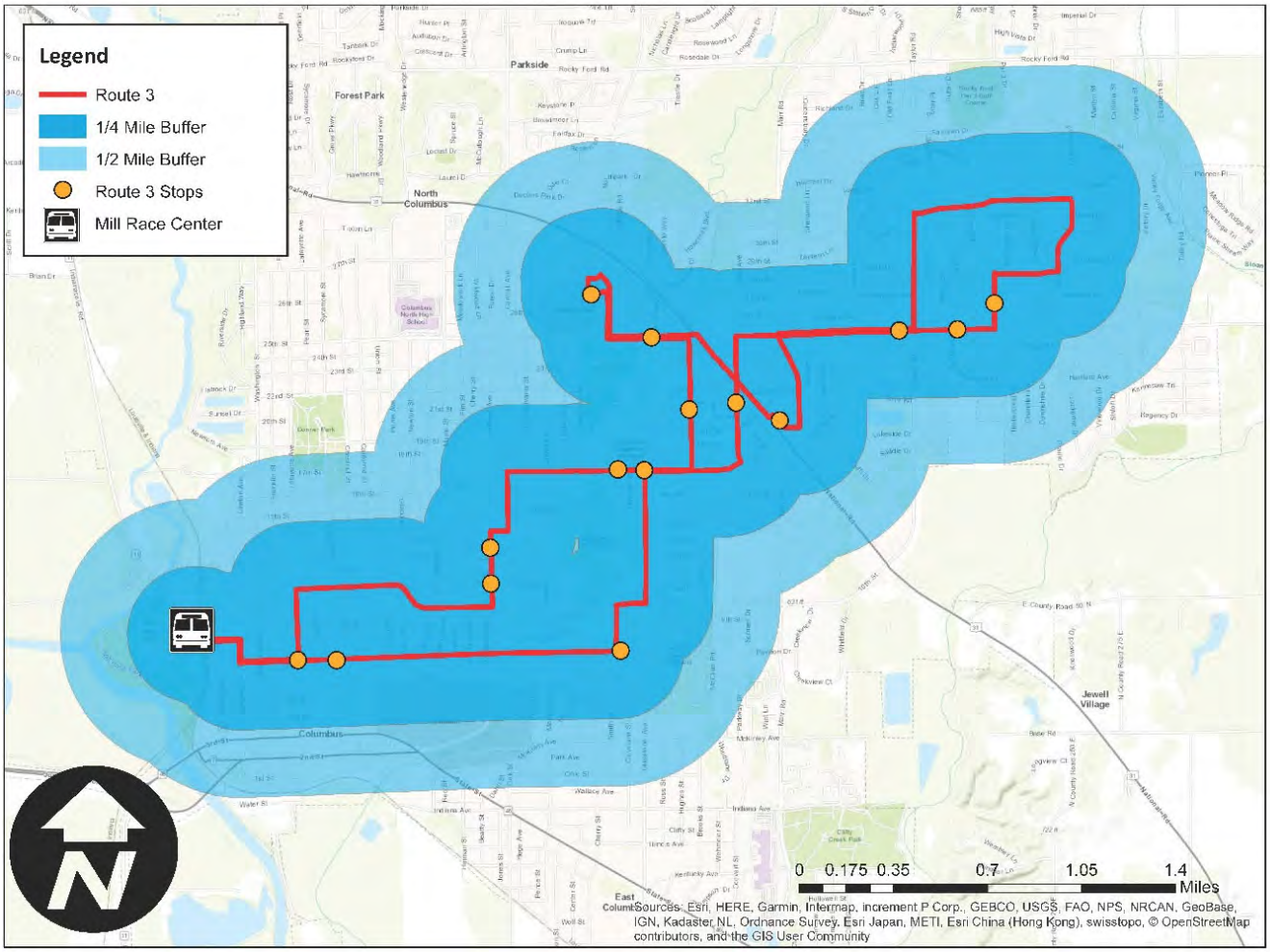


Table 0-26: Route 3 – Age Cohorts

Age	Total Population	Age 0-19	Age 20-59	Age 60+
¼ Mile Buffer	9,939	22%	56%	22%
½ Mile Buffer	16,419	22%	55%	22%

Table 0-27: Route 3 – Housing Tenure

Households	Total Households	Owner Occupied	Renter Occupied
¼ Mile Buffer	4410	51%	48%
½ Mile Buffer	7156	55%	45%

Table 0-28: Route 3 – Racial Composition

Race/Ethnicity	White	Black	Nat Am/Alaska Nat	Asian	Haw Pac Islander	Other	2 or more races	Hispanic/ Latino
¼ Mile Buffer	81%	3%	>0.5%	6%	>0.5%	3%	2%	5%
½ Mile Buffer	81%	4%	>0.5%	6%	>0.5%	3%	2%	5%

Table 0-29: Route 3 – Educational Attainment

Educational Attainment*	No HS Diploma/GED	HS Diploma/GED	College Degree
¼ Mile Buffer	10%	65%	26%
½ Mile Buffer	10%	63%	27%

**Highest level completed for those aged 25 and above*

Table 0-30: Route 3 – Employment Status

Employment Status*	Employed	Unemployed
¼ Mile Buffer	94%	6%
½ Mile Buffer	95%	5%

**Includes only those in the labor force*

Table 0-31: Route 3 – Household Income

Household Income	< $25,000	$25,000 - $50,000	$50,000 - $75,000	$75,000 - $100,000	> $100,000
¼ Mile Buffer	27%	30%	20%	13%	12%
½ Mile Buffer	25%	30%	20%	12%	14%

The household income for both the ¼ and ½ mile buffer trend notably lower than city averages.

Table 0-32: Route 3 – Vehicles per Household

Vehicles Owned	0 Vehicle Household	1 Vehicle Household	2 Vehicle Household	3 Vehicle Household	4 Vehicle Household	5+ Vehicle Household
¼ Mile Buffer	12%	41%	36%	9%	2%	1%
½ Mile Buffer	10%	41%	36%	9%	3%	1%

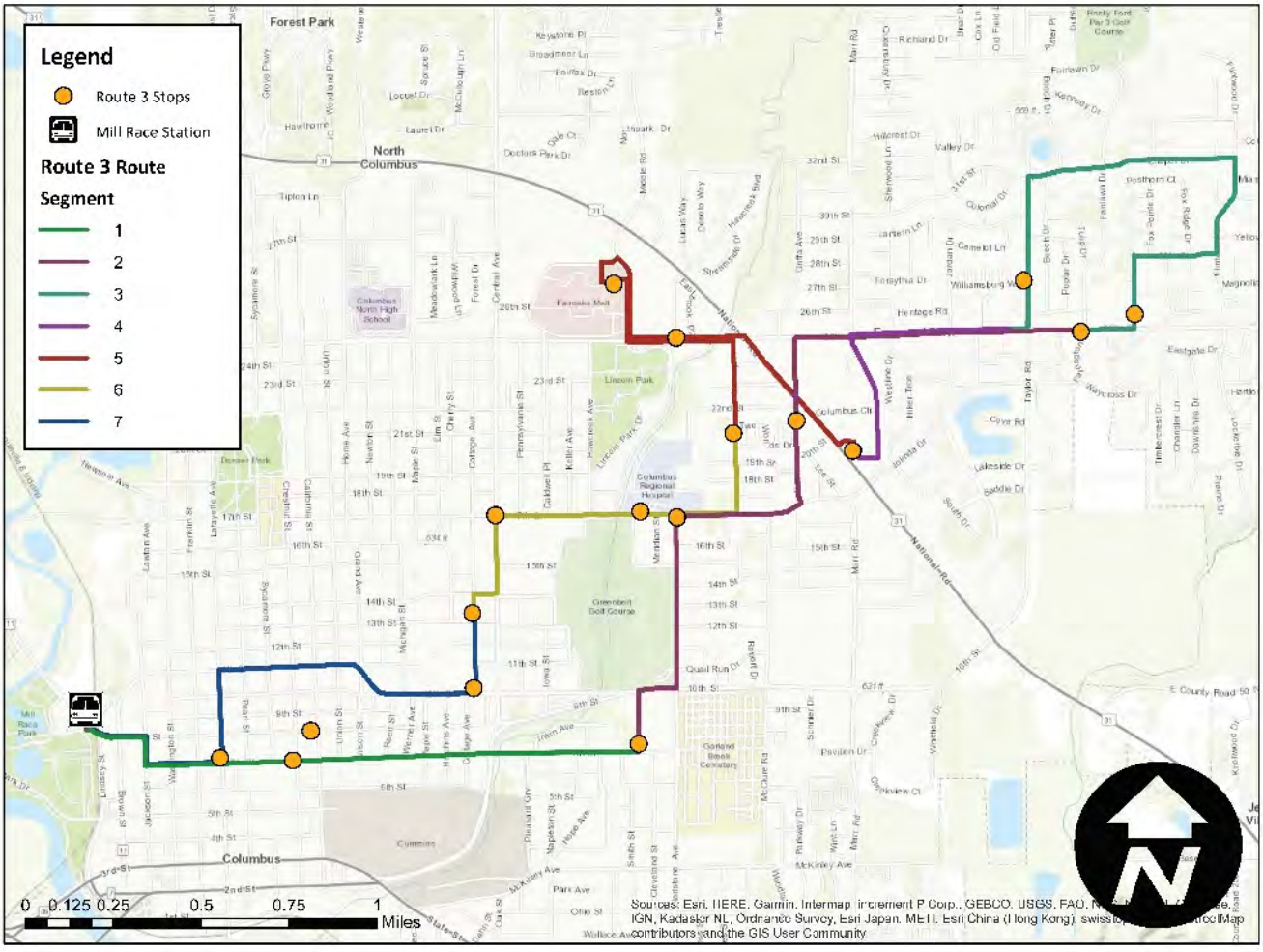
Zero vehicle households are twice as common in the ¼ mile buffer (12%) than the city's average (6%).

Table 0-33: Route 3 – Type of Employment

Employment	Total Employment	Retail Employment	Service Employment	Government Employment
¼ Mile Buffer	4,926	11%	14%	3%
½ Mile Buffer	8,155	11%	14%	3%

The service area buffer zones for Route 3 indicate a higher rate of retail and service employment (25%) than city average (15%).

Figure 0-7: Route 3 – Segment Analysis



The subsequent tables report the actual data collected on the day of the count. However, to better represent typical operating conditions throughout the year, an annual normalization factor may be multiplied to reflect a typical weekday in 2017/18. For Route 3, the weekday annual normalization factor is .67 (204/137) and the weekday/Saturday annual normalization factor is .64 (137/88) based on **Table 0-1 and Table 4-3.** Passengers/route mile are given both on the day of the counts, as well as applying the annual normalization factor of 0.67.

Table 0-34: Route 3 – Ridership by Segment

Segment	Start Location	Riders On	Riders Off	Segment Length	Passengers/Route Mile	
					Counted	Normalized
1	**Mill Race Station**	71 (46)	13	1.7	24.7	16.5
2	**7th and Smith St. (Pregnancy Care Center)**	17	31	2.4	10.0	6.7
3	**25th Street**	20	16	1.9	9.5	6.4
4	**Williamsburg/Holiday Center**	23	11	.9	18.9	12.7
5	**Leave Target Inbound**	28 (18)	26 (20)	2.0	13.5	9.0
6	**Midway (Kindred)**	16	14	1.3	11.5	7.7
7	**United Way**	29	93 (54)	1.7	35.9	24.1
Total		204	204	11.9		

*Note: Passengers per Route Mile are calculated as (Riders On + Riders Off) / (2*Segment Length).*

Key observations about ridership patterns on Route 3 include:

- Most route segments are moderately productive, although not as much as those on Routes 2 or 4.
- The 25th Street corridor is particularly productive (as it is for Route 2).
- The Columbus Regional Hospital is not a strong trip generator.

As mentioned previously, each route was broken into multiple segments based on stops provided in ColumBUS' public schedules. The riders on/off columns indicate the number of riders that boarded/alighted the bus at any stop within the segment during the entire day that was surveyed.

Table 0-35: Route 3 – Ridership by Time Period

Trip Start Time	Ridership	Trip Start Time	Ridership
6:05 a.m.	5	12:05 p.m.	9
7:05 a.m.	11	1:05 p.m.	27
8:05 a.m.	12	2:05 p.m.	10
9:05 a.m.	7	3:05 p.m.	16
10:05 a.m.	10	4:05 p.m.	19
11:05 a.m.	9	5:05 p.m.	2*
		6:05 p.m.	8
		7:05 p.m.	3*
		Total*	148

**Indicates train delays that caused driver to deviate from scheduled route*

As mentioned earlier, each of the five regular routes has 14 different trips throughout the day. The trip start times are listed in the first column. The Ridership column indicates the total number of riders boarding the bus during the entire round trip. The best patronized trips are in the afternoon (1:05 p.m., 3:05 p.m. and 4:05 p.m.).

Table 0-36: Route 3 – Scheduled and Actual Route Running Times

Segment			Running Time (Minutes)	
Number	**From**	**To**	**Scheduled**	**Actual (Avg.)**
1	**Mill Race Station**	**7th & Smith St.**	7	12
2	**7th & Smith St.**	**25th St. (Farrington Stop)**	9	6
3	**25th St. (Farrington Stop)**	**Willamsburg/Holiday Ctr.**	6	8
4	**Willamsburg/Holiday Ctr.**	**Leave Target**	8	5
5	**Leave Target**	**Midway (Kindred)**	9	5
6	**Midway (Kindred)**	**United Way**	3	3
7	**United Way**	**Mill Race Station**	6	8
	Total		48	47
Data from on-board counts conducted September 10 and 11, 2018				

Actual running time in 4 of the 7 segments (Segments 1, 2, 4 and 5) differs significantly from scheduled running time. When these route segments are incorporated into the revised routing patterns, these scheduled running times will be reevaluated.

4.2.4 Route 4

The map in **Figure 4-8** below shows the Route 4 with a ¼ and ½ mile buffer area around the route bus stops. Following the map are tables showing demographic information within these buffer areas. Additional tables show ridership and running time information as well as route transfer information.

Figure 0-8: ColumBUS Route 4

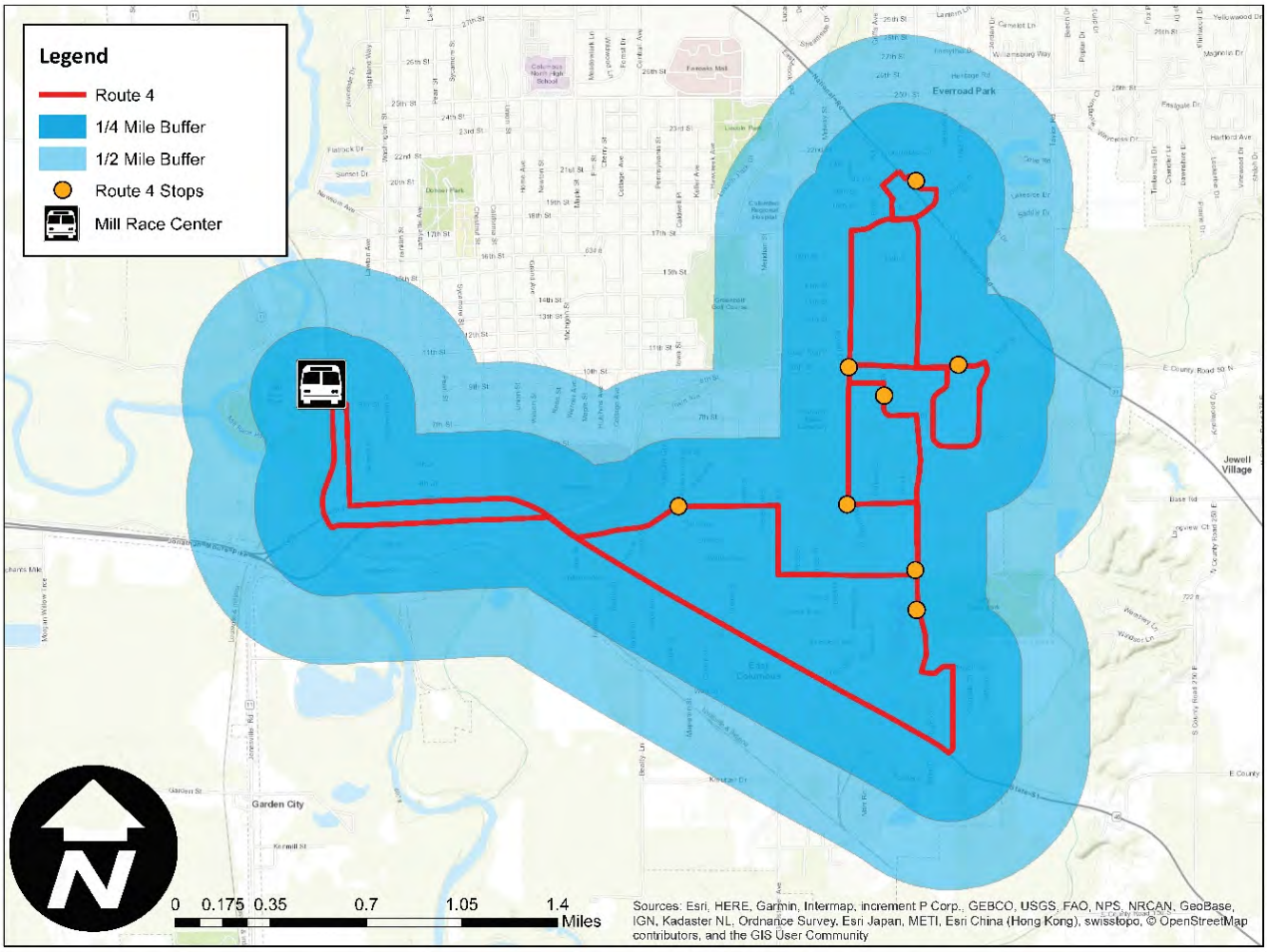


Table 0-37: Route 4 – Age Cohorts

Age	Total Population	Age 0-19	Age 20-59	Age 60+
¼ Mile Buffer	6,293.7	22%	58%	20%
½ Mile Buffer	9,586.3	22%	58%	20%

Table 0-38: Route 4 – Housing Tenure

Households	Total Households	Owner Occupied	Renter Occupied
¼ Mile Buffer	2834	51%	63%
½ Mile Buffer	4303	42%	58%

Table 0-39: Route 4 – Racial Composition

Race/Ethnicity	White	Black	Nat Am/Alaska Nat	Asian	Haw Pac Islander	Other	2 or more races	Hispanic/ Latino
¼ Mile Buffer	76%	2%	>0.5%	11%	>0.5%	3%	3%	6%
½ Mile Buffer	76%	3%	>0.5%	11%	>0.5%	3%	2%	5%

Table 0-40: Route 4 – Educational Attainment

Educational Attainment*	No HS Diploma/GED	HS Diploma/GED	College Degree
¼ Mile Buffer	15%	62%	23%
½ Mile Buffer	13%	63%	24%

**Highest level completed for those aged 25 and above*

Table 0-41: Route 4 – Employment Status

Employment Status*	Employed	Unemployed
¼ Mile Buffer	95%	5%
½ Mile Buffer	94%	6%

**Includes only those in the labor force*

The ¼ and ½ mile buffer for Route 4 indicate that lower household incomes are more prevalent than citywide averages, which are 21% (< $25,000) and 23% ($25,000 - $50,000) (from **Table 2-2**).

Table 0-42: Route 4 – Household Income

Household Income	< $25,000	$25,000 - $50,000	$50,000 - $75,000	$75,000 - $100,000	> $100,000
¼ Mile Buffer	28%	34%	22%	9%	8%
½ Mile Buffer	28%	33%	22%	10%	8%

The Route 4 service area has more 0 and 1 Vehicle Households total (59%) than the citywide average (44%).

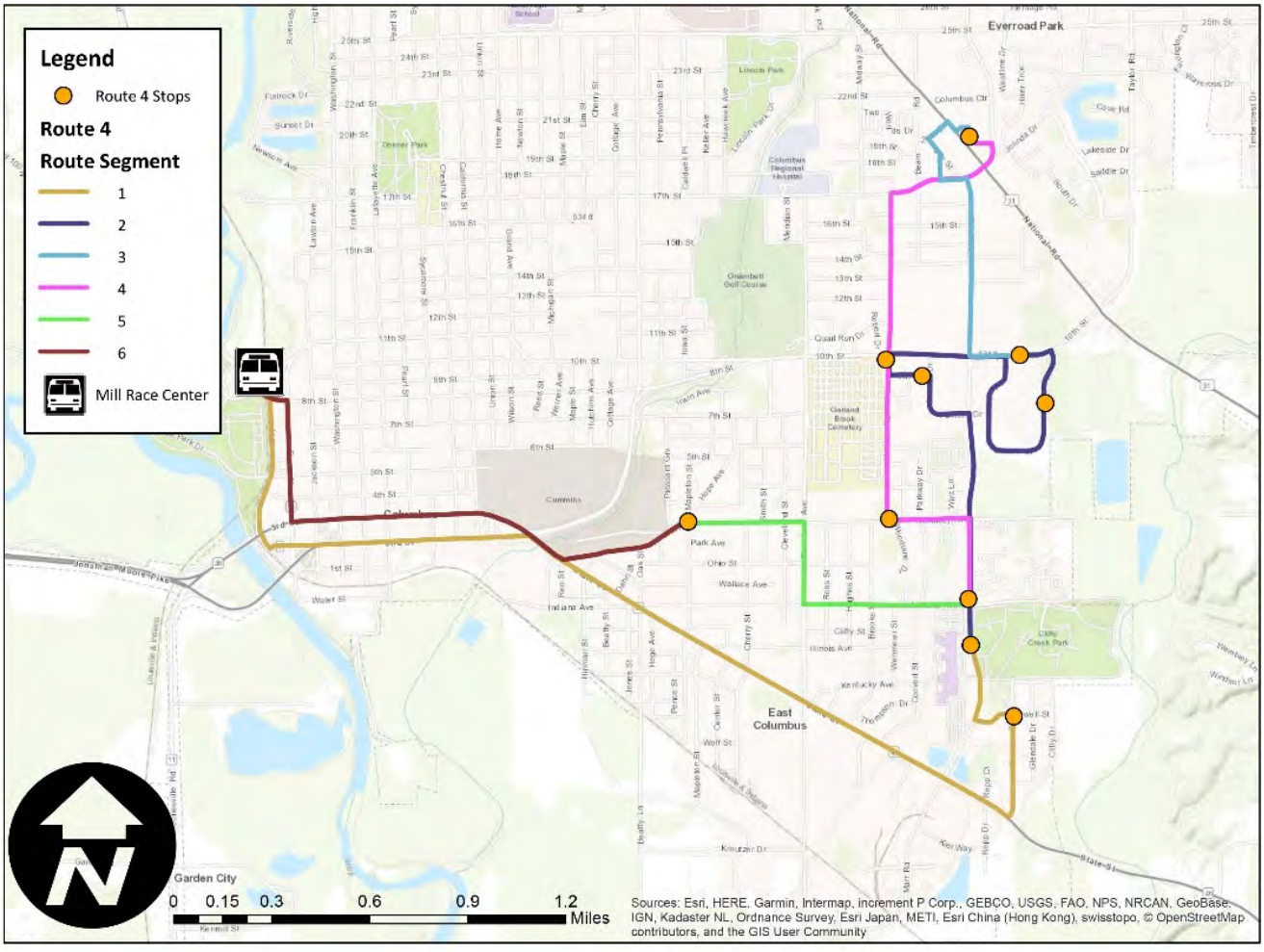
Table 0-43: Route 4 – Vehicles per Household

Vehicles Owned	0 Vehicle Household	1 Vehicle Household	2 Vehicle Household	3 Vehicle Household	4 Vehicle Household	5+ Vehicle Household
¼ Mile Buffer	11%	49%	28%	10%	2%	1%
½ Mile Buffer	11%	48%	29%	9%	2%	1%

Table 0-44: Route 4 – Type of Employment

Employment	Total Employment	Retail Employment	Service Employment	Government Employment
¼ Mile Buffer	2,972	9%	11%	2%
½ Mile Buffer	4303	9%	12%	2%

Figure 0-9: Route 4 – Segment Analysis



The subsequent tables report the actual data collected on the day of the count. However, to better represent typical operating conditions throughout the year, an annual normalization factor may be multiplied to reflect a typical weekday in 2017/18. For Route 4, the weekday annual normalization factor is .84 (334/282) and the

weekday/Saturday annual normalization factor is .62 (282/175) based on **Table 0-1 and Table 4-3.** Passengers/route mile are given both on the day of the counts, as well as applying the annual normalization factor of 0.84.

Table 0-45: Route 4 – Ridership by Segment

Segment	Start Location	Riders On	Riders Off	Segment Length	Passengers/Route Mile	
					Counted	Normalized
1	**Mill Race Station**	121 (84)	29	3.7	20.3	17.1
2	**Wehmeier (East High School)**	40	42	2.3	17.8	15.0
3	**10th & Creekview**	40	28	1.1	30.9	30.0
4	**Leave Target Inbound**	83 (55)	102 (72)	2.0	46.3	38.9
5	**Indiana & Marr (East High, Columbus Christian)**	28	13	1.1	18.6	15.6
6	**McKinley & Hope (Five Points, FFY)**	22	120 (95)	1.7	41.8	35.1
Total		334	334	11.9		

*Note: Passengers per Route Mile are calculated as (Riders On + Riders Off) / (2*Segment Length).*

Key observations about ridership patterns on Route 4 include:

- Segments of Route 4 are consistently productive.
- On the day of the counts, 28 riders were observed both boarding and alighting at East High School (total, both directions)
- There are no designated stops on the first segment between Mill Race and East High School. However, counts showed 37 riders boarding and 29 alighting on this segment.

As mentioned previously, each route was broken into multiple segments based on stops provided in ColumBUS' public schedules. The riders on/off columns indicate the number of riders that boarded/alighted the bus at any stop within the segment during the entire day that was surveyed.

Table 0-46: Route 4 – Ridership by Time Period

Trip Start Time	Ridership	Trip Start Time	Ridership
6:05 a.m.	6	12:05 p.m.	28
7:05 a.m.	20	1:05 p.m.	33
8:05 a.m.	19	2:05 p.m.	23
9:05 a.m.	20	3:05 p.m.	43
10:05 a.m.	27	4:05 p.m.	28
11:05 a.m.	30	5:05 p.m.	18*
		6:05 p.m.	29
		7:05 p.m.	10*
		Total*	334

**Indicates train delays that caused driver to deviate from scheduled route*

As mentioned earlier, each of the five regular routes has 14 different trips throughout the day. The trip start times are listed in the first column. The Ridership column indicates the total number of riders boarding the bus during the entire round trip. Route 4 has the highest number of riders of any route in the system. The best patronized trips are in the midday and early afternoon (11:05 a.m., 1:05 p.m., and 3:05 p.m.).

Table 0-47: Route 4 – Scheduled and Actual Route Running Times

Segment			Running Time (Minutes)	
Number	From	To	Scheduled	Actual (Avg.)
1	Mill Race Station	Wehmeier (East HS)	10	13
2	Wehmeier (East HS)	10th & Creekview	5	8
3	10th & Creekview	Leave Target	15	10
4	Leave Target	Indiana & Marr (East HS)	7	7
5	Indiana & Marr (East HS)	McKinley & Hope	5	4
6	McKinley & Hope	Mill Race Station	8	5
	Total		50	47
Data from on-board counts conducted September 10 and 11, 2018				

Actual running time in 4 of the 6 segments (Segments 1, 2, 3 and 6) differs significantly from scheduled running time. When these route segments are incorporated into the revised routing patterns, these scheduled running times will be reevaluated.

4.2.5 Route 5

The map below in **Figure 4-10** shows the Route 1 with a ¼ and ½ mile buffer area around the route bus stops. Following the map are tables showing demographic information within these buffer areas. Additional tables show ridership and running time information as well as route transfer information.

Figure 0-10: ColumBUS Route 5

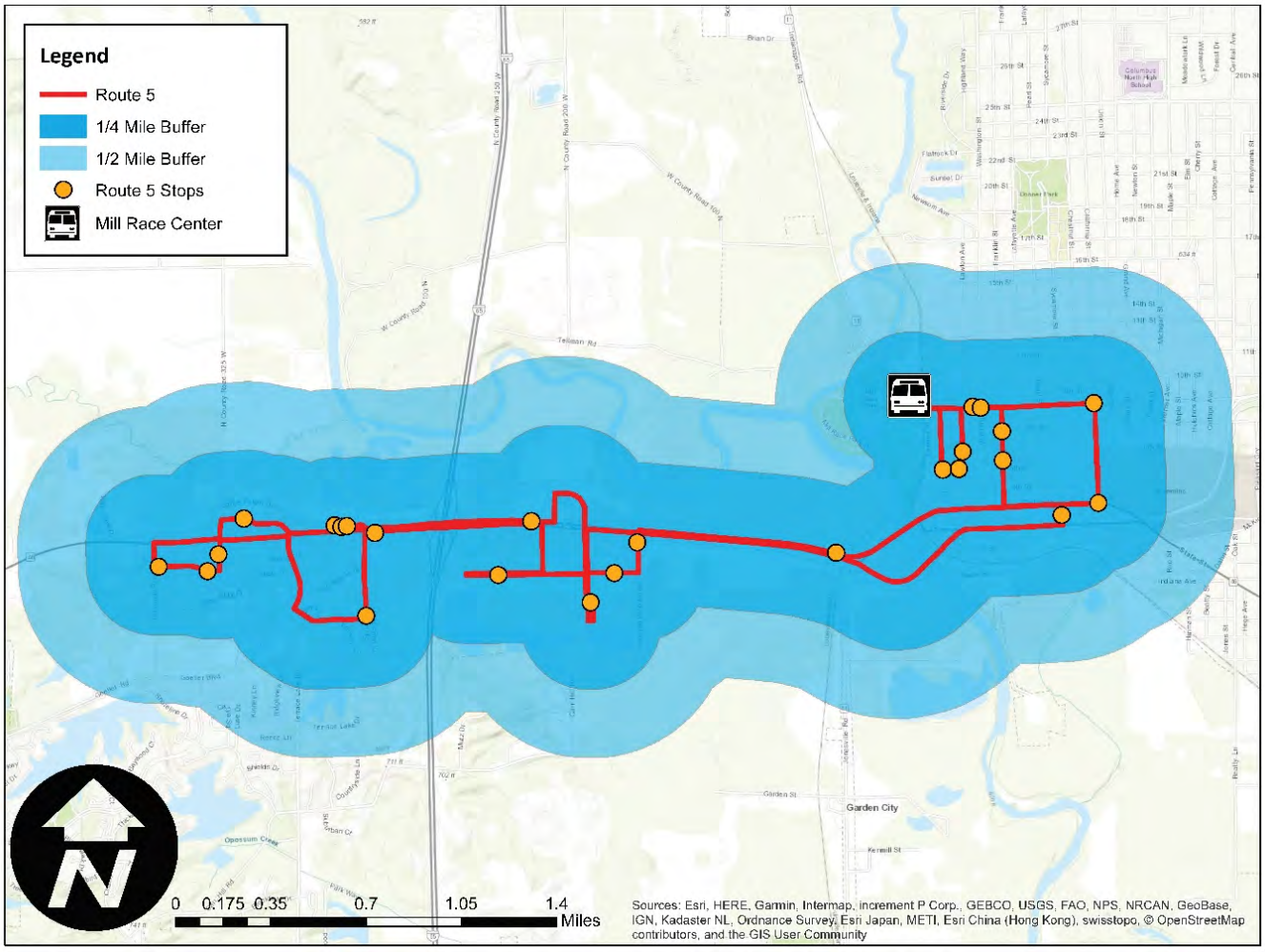


Table 0-48: Route 5 – Age Cohorts				
Age	**Total Population**	**Age 0-19**	**Age 20-59**	**Age 60+**
¼ Mile Buffer	2,853	23%	67%	10%
½ Mile Buffer	4707	24%	66%	11%

Route 5 serves a demographically different community than the other ColumBUS routes. The service area represents several large apartment complexes that cater to young professionals, thus resulting in a younger and more educated population. This demographic difference is reflected in resident housing and transportation choice.

The city average of residents 60 and older is 20%, whereas in the Route 5 ¼ and ½ mile service there are only 10-11% residents over 60.

Table 0-49: Route 5 – Housing Tenure			
Households	**Total Households**	**Owner Occupied**	**Renter Occupied**
¼ Mile Buffer	989	33	67
½ Mile Buffer	1997	37	63

The ¼ and ½ mile buffer for Route 5 indicate a reversal of city trends of owner and renter occupied units. In the service area, nearly twice (63-67%) of the city's average (38%) number of households are renter occupied. As a result, only 33-37% of all households in this area are owner occupied units.

Table 0-50: Route 5 – Racial Composition								
Race/Ethnicity	**White**	**Black**	**Nat Am/Alaska Nat**	**Asian**	**Haw Pac Islander**	**Other**	**2 or more races**	**Hispanic/ Latino**
¼ Mile Buffer	82%	6%	0%	8%	0%	>0.5%	3%	4%
½ Mile Buffer	79%	5%	0%	8%	>0.5%	2%	2%	4%

Table 0-51: Route 5 – Educational Attainment			
Educational Attainment*	**No HS Diploma/GED**	**HS Diploma/GED**	**College Degree**
¼ Mile Buffer	8%	52%	40%
½ Mile Buffer	8%	55%	36%

**Highest level completed for those aged 25 and above*

Over 40% of residents in this service area have a college degree which is 6% above city average.

Table 0-52: Route 5 – Employment Status		
Employment Status*	**Employed**	**Unemployed**
¼ Mile Buffer	92%	8%
½ Mile Buffer	93%	7%

**Includes only those in the labor force*

Table 0-53: Route 5 – Household Income

Household Income	< $25,000	$25,000 - $50,000	$50,000 - $75,000	$75,000 - $100,000	> $100,000
¼ Mile Buffer	23%	25%	16%	17%	20%
½ Mile Buffer	24%	29%	14%	15%	19%

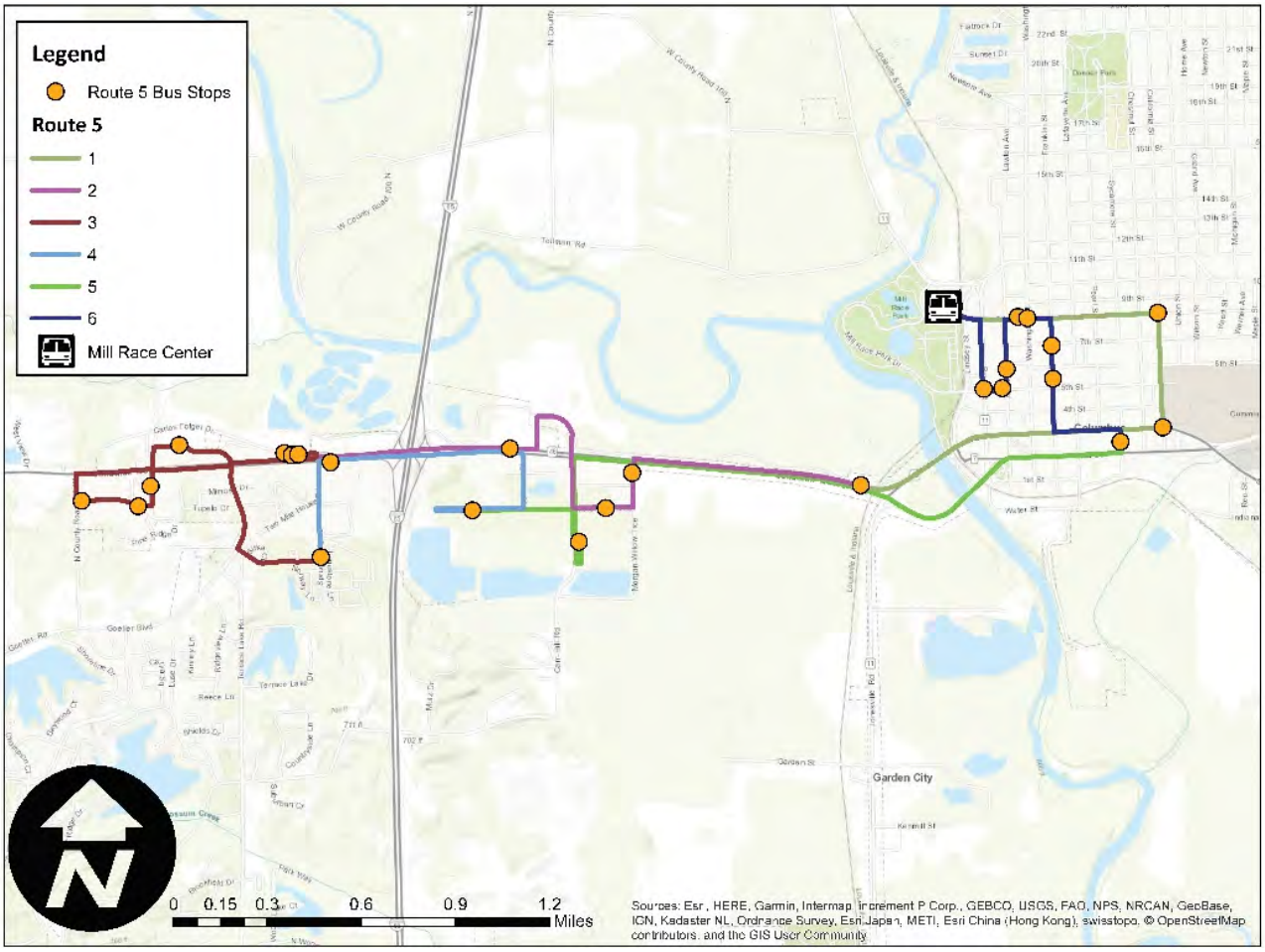
Table 0-54: Route 5 – Vehicles per Household

Vehicles Owned	0 Vehicle Household	1 Vehicle Household	2 Vehicle Household	3 Vehicle Household	4 Vehicle Household	5+ Vehicle Household
¼ Mile Buffer	12%	42%	31%	10%	2%	2%
½ Mile Buffer	11%	40%	34%	10%	3%	2%

Table 0-55: Route 5 – Type of Employment

Employment	Total Employment	Retail Employment	Service Employment	Government Employment
¼ Mile Buffer	1517	8%	14%	>0.5%
½ Mile Buffer	2553	9%	18%	1%

Figure 0-11: Route 5 – Segment Analysis



The subsequent tables report the actual data collected on the day of the count. However, to better represent typical operating conditions throughout the year, an annual normalization factor may be multiplied to reflect a typical weekday in 2017/18. For Route 5, the weekday annual normalization factor is .52 (120/62) and the weekday/Saturday annual normalization factor is .82 (62/51) based on **Table 0-1** and **Table 4-3**. Passengers/route mile are given both on the day of the counts, as well as applying the annual normalization factor of 0.52.

Table 0-56: Route 5 – Ridership by Segment

Segment	Start Location	Riders On	Riders Off	Segment Length	Passengers/Route Mile	
					Counted	Adjusted
1	**Mill Race Station**	55 (38)	2	2.1	13.6	7.1
2	**Railroad Track**	10	29	2.4	8.1	4.2
3	**Papa's Grill**	16	11	2.2	6.3	3.3
4	**Spruce Ridge**	8	14	1.5	7.3	3.8
5	**Sam's Club**	24	9	2.8	5.9	3.1
6	**Sycamore Apt**	7	55 (45)	1.4	22.1	11.5
Total		120	120	12.4		

*Note: Passengers per Route Mile are calculated as (Riders On + Riders Off) / (2*Segment Length).*

Key observations about ridership patterns on Route 5 include:

- Segments of Route 5 are consistently less productive than other routes.
- One moderately productive trip generator is Walmart. Counts showed 26 riders boarding and 15 alighting the entire day.

As mentioned previously, each route was broken into multiple segments based on stops provided in ColumBUS' public schedules. The riders on/off columns indicate the number of riders that boarded/alighted the bus at any stop within the segment during the entire day that was surveyed.

Table 0-57: Route 5 – Ridership by Time Period

Trip Start Time	Ridership	Trip Start Time	Ridership
6:05 a.m.	2	12:05 p.m.	6
7:05 a.m.	11	1:05 p.m.	15
8:05 a.m.	13	2:05 p.m.	5
9:05 a.m.	6	3:05 p.m.	10
10:05 a.m.	8	4:05 p.m.	20
11:05 a.m.	14	5:05 p.m.	5*
		6:05 p.m.	3
		7:05 p.m.	2*
		Total*	120

**Indicates train delays that caused driver to deviate from scheduled route*

As mentioned earlier, each of the five regular routes has 14 different trips throughout the day. The trip start times are listed in the first column. The Ridership column indicates the total number of riders boarding the bus during the entire round trips. The best patronized trips are in the midday and early afternoon (11:05 a.m., 1:05 p.m. and 4:05 p.m.).

Table 0-58: Route 5 – Scheduled and Actual Route Running Times

Segment			Running Time (Minutes)	
Number	**From**	**To**	**Scheduled**	**Actual (Avg.)**
1	**Mill Race Station**	**Railroad Track**	7	12
2	**Railroad Track**	**Papa's Grill**	8	6
3	**Papa's Grill**	**Spruce Ridge**	9	4
4	**Spruce Ridge**	**Sam's Club**	5	4
5	**Sam's Club**	**Sycamore Apts.**	11	9
6	**Sycamore Apts.**	**Mill Race Station**	8	6
	Total		48	41
Data from on-board counts conducted September 10 and 11, 2018				

Actual running time in 3 of the 6 segments (Segments 1, 3, and 5) differs significantly from scheduled running time. When these route segments are incorporated into the revised routing patterns, these scheduled running times will be reevaluated.

4.2.6 Overall Route Evaluation

Peak ridership periods generally are from late morning to late afternoon (generally leaving Mill Race between 11 am and 4 pm). Recommendations for increased service frequencies will emphasize these periods of time. Peak travel times for ColumBUS ridership do not correspond to traditional work commute times (such as 7 to 8 am, and 5 to 6 pm).

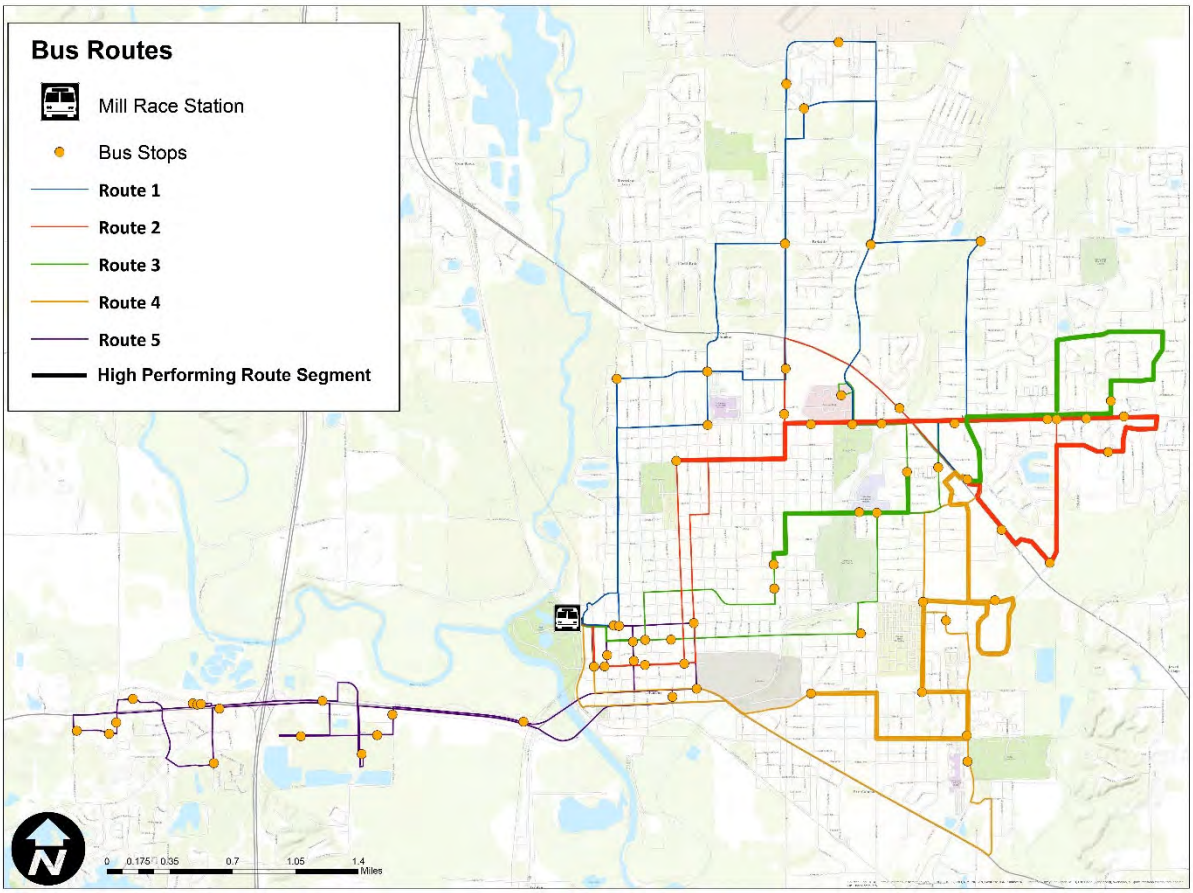
Table 4-59 shows the most productive segments of ColumBUS fixed route service. These segments are ranked by passengers per route mile, as defined in the preceding tables. These are "normalized" to correspond to typical weekday ridership between October 2017 and September 2018. It includes all route segments (other than those serving the Target or Mill Race transfer centers) with normalized passengers/route mile over 7.0. These route segments are located on Routes 2, 3 and 4 only.

Table 0-59: Route 5 – Passenger Per Route Mile

	Segment			Passengers Per Route Mile (Normalized)
Route	**Number**	**From**	**To**	
4	**3**	10th/Creekview	Target	30.0
4	**5**	East HS	Five Points	15.6
4	**2**	Wehmeier (East High School)	10th/Creekview	15.0
3	**4**	Holiday Center	Target	12.7
2	**3**	25th/Taylor	Clifty Crossing	9.9
2	**2**	22nd/Chestnut	25th/ Taylor	8.1
2	**4**	Clifty Crossing	Target	7.8
3	**6**	Midway	United Way	7.7

The recommendations for restructured routes in **Section 9** generally connect existing route segments which are more productive. These new routes connecting existing productive segments are recommended for 30-minute service weekday middays. Other routes are designed to consolidate existing route segments which are lightly-patronized. Some of these lightly-used resources are used to recommended extended service along the US 31 corridor (a key received during the public input process). **Figure 4-12** below highlights these route segments over a base map displaying all ColumBUS routes.

Figure 4-12: Productive Route Segments



4.3 Schedule and Running Time Evaluation

Routes will be significantly realigned to serve the new transit center at 13th/Hutchins. Our analysis focused on the adequacy of running time on specific route segments, since these route segments generally will be incorporated into new routes servicing the new transit center. Our overall conclusions are:

- Most routes have inadequate running time for the first route segment (leaving the Mill Race Station). Average actual running times exceed the scheduled running time by 3 to 5 minutes (except for Route 2, which has adequate running time in its first segment). Buses generally are behind schedule not long after beginning their runs. This results in them having to play "catch up" for much of their run.
- Routes 2 and 5 require significantly less running time than schedules provide. Route 2 schedules provide 50 minutes for a round trip; the average bus surveyed required only 43 minutes actual running time. Route 5 schedules provide 48 minutes for a round trip; the average bus surveyed required only 41 minutes actual running time.
- There was significant variability in actual running time on several of the longer segments of various routes. This supports driver observations that two factors (riders requesting service at non-designated bus stops, and the unpredictability of service to customers using wheelchairs) contribute to unpredictable operating times.
- Route 1 presently has inadequate round-trip running time. The average round trip required 54 minutes. Buses operate every 60 minutes.

5 Vehicles and Facilities

The vehicle and facility assessment will be finalized with the finalized service plan.

5.1 Vehicle Assessment

5.2 Maintenance Facility Assessment

5.3 Passenger Facility Assessment

5.4 Capital Plan Assessment

6 Operating Practices Review

A review was conducted of the standard operating procedures, business practices, and uses of tools and technology for ColumBUS and Call-A-Bus service. A number of commendable practices were identified, including high levels of driver flexibility, autonomy, and communication related to problem solving, assigning all drivers to all routes on a rotating basis, and the overall high level of employee.

6.1 Incident Management

When bus operators experience any kind of difficulty impacting the timely provision of service, radio dispatchers are the primary point of contact. The most common types of incidents are equipment malfunctions, service incidents, passenger incidents and vehicle accidents. ColumBUS offers a commendable level of flexibility for drivers and dispatchers to problem solve as service incidents occur in real time. Drivers are often able to identify issues and enact corrective measures, then subsequently relay their actions to dispatch. Currently, no policy is in place to prioritize the order in which operator requests are accepted. It would be advisable to have an electronic record of calls to enable dispatchers to remember all of the incidents and record those daily for reports.

6.2 Labor Management

Managing labor includes checking operator uniform appearance, operator absences, assigning coaches to the operations, schedule adherence, and managing overall operator availability to perform scheduled service. Overall, there is a high level of employee morale and support for management. Indicators and interviews show high levels of communication between management, supervisors, and dispatchers. Drivers are assigned to all routes on a rotating schedule to encourage cross-training of routes and reduce monotony. One driver is currently designated as a driver “trainer,” but no formal training protocol has been codified. Dispatchers are traditionally trained on the job and could benefit from separate training prior to the beginning of their duties. Staff are expected to work in a fast paced and multifaceted function where each day presents new challenges.

It is recommended that Columbus implement the standard transit practice of maintaining a small “extra board.” These are operators whose scheduled work is to report in anticipation of bus operator absences. Currently, absences are addressed on a case-by-case basis, sometimes with telephone calls to off-duty operators on the day an absence occurs. Under an “extra board” scenario, ColumBUS would assign one or two operators to fill in for absences (which generally do occur). It will take some experience to determine the appropriate level of extra board staffing.

6.3 Equipment Management

Internal equipment management entails the process used by operations and maintenance to ensure the availability of coaches for the service day. External component of managing equipment occurs when incidents

take place in the field, such as malfunctioning of mirrors, destination signs, fare boxes, and the malfunctioning of the coach itself.

Cameras are present on all buses and most are equipped with covert emergency alarms. Technology can provide tools, but humans are still required to synthesize, strategize, prioritize, and make decisions to take action.

6.4 Customer Service, Communication, and Marketing

Dispatch and drivers have the primary responsibility for customer service, interfacing with customers who have questions, report lost items, need route assistance, etc. Drivers provide Easy Rider pass applications and route information. Dispatchers are responsible to for selling fixed route passes, processing Easy Rider Passes, and verifying Half Fare ID Card eligibility. Customer service functions still rely heavily on face-to-face, pen and paper, telephone, and radio communication.

Mill Race Station provides only limited information and services. Restrooms at the station are available, but only during office hours. Riders who need to visit the facility before 6am or after 4pm on weekdays, and before 8am or after noon on Saturday have no access or nearby alternative. Fare cards are only available for purchase in-person at the Mill Race Station and select social service agencies throughout Columbus and can only be made with cash. As such, it can be difficult for some riders to find time during operating hours to purchase fare cards, collect Easy Rider Passes, or submit applications for Half Fare ID cards. Because customer calls are routinely routed to the dispatch office at Mill Race Station, it is not uncommon for no operators to be available to respond or answer question. ***It is recommended that the Transit Center at 13th St./Hutchins Ave. have service hours corresponding to the scheduled hours or service.***

Paper maps are provided for download on the city's website. In addition, an electronic map of the service area with real-time bus location is currently available via www.columbusindianatrnait.com/map . Though, its current primary use is to inform riders of the bus location, a tool of this nature can allow the dispatcher to identify the location of incoming buses transfer locations to determine if any are late, and to advise other operators to hold buses as necessary.

The ColumBUS system currently does not sell advertising on their coaches, bus shelters, or benches. Nor does ColumBUS advertise its services advertise on traditional or social media. Both are potential revenue sources.

6.5 Call-a-Bus Operations

Frank conversations with managers, dispatchers and drives indicate that ColumBUS has been generous in providing Call-a-Bus service. This not only relates to eligibility determinations, but to scheduling trips within the appropriate limits of ColumBUS' service area. One of our recommendations is to tighten both eligibility determinations and dispatching practices. This has the potential for significant cost savings. These are further discussed in **Section 9.1**.

7 Input Summaries

This section summarizes the public involvement process and input received from community meetings that were held in October and December of 2018. An important part of the system assessment is to reach a broad constituency within the community to solicit input on routes, schedules and service types. This is to ensure that the community is involved, given ample opportunity to provide input and made aware that their issues have been heard and understood.

7.1 Stakeholder Interviews

Ten stakeholder meetings were conducted during October 18-19, 2018. All meetings were held at the Columbus City Hall. Each stakeholder meeting was up to an hour in length and formatted as structured interviews based upon the specific areas of expertise of the interview participant. People were invited to participate in meetings with the following emphases: education, public officials, healthcare/social service organizations, transit advisory committee, employment/business organizations and a general meeting. The meeting summary report is included in **Appendix X** of this document. Following is a summary of key findings by topic:

7.1.1 Major Trip Generators

Interviewees reported that several sites were well served by ColumBUS service. The most common sites respondents mentioned were the Fair Oaks Mall, United Way, and retail centers like Target. Other locations that interviewees noted as significant to the service included Jaycee's Central Location, Volunteers in Medicine, Love Chapel, and Brighter Days. Many commented that it was important to continue to serve food pantries, doctors' offices, grocery stores, low income housing, and senior housing.

In addition, interviewees reported several locations were unserved or underserved by ColumBUS. Most notably, nearly every stakeholder mentioned a desire for service to Walesboro Industrial Park and International Drive. Several interviewees also mentioned it was imperative to provide service to the Human Service Center which had recently been relocated beyond Columbus city limits. Stakeholders mentioned desiring service to specific location including all the local Cummins facilities, Edinburgh Outlet Mall, Heritage Woods, Centerstone, Pence Place, Woodside. Commuter service was requested to connect Columbus to Seymour, Taylorsville, and the Edinburgh industrial park. Further, improve routing to the western and southern portions of Columbus were requested.

7.1.2 Service Feedback

Service feedback focused on three distinct topics, frequency, hours of operation, and route locations. Frequency was seen as the most concerning service issue. Nearly all stakeholder commented that bus headways are too infrequent. These and other service issues contributed to a number of additional concerns identified during the interview process are included below:

Frequency

- Concerns included inability to reach childcare drop-off/pick-up in a timely manner
- Long wait times at stops (many at unsheltered locations)
- Limited schedule flexibility for riders.
- Difficult to conduct brief trips in succession.
- More frequent pickups needed during commuter hours

Hours of Operation

- Service hours do not accommodate early morning and 3rd shift workers.
- Shifts among neighboring businesses in Walesboro industrial park do not align.
- Service is not provided on Sunday
- Later evening service is needed to accommodate service workers and evening activities

Route Locations

- ColumBus works well to serve the community equitably and fairly
- Service is limited to city limits
- Does not serve major employer locations that would assist clients becoming self-sufficient
- Many pickups are not in close proximity to low-income and senior housing
- Healthcare and hot-meal site access needed on weekends
- Stops serving areas with a large number of children (YYF) need a stop proximate to door for safety
- Routes are too long
- Route needed to connect the high schools to one-another

Fare

- Difficulty carrying exact change for fare
- Inability to purchase tickets or fare cards with credit/debit or via electronic payment
- No discount available for SNAP card holders
- Tickets are easy to lose and destroy and are not reloadable.

Information

- Routes are difficult to navigate, not intuitive
- No route names or stop names bus stop signs
- Designated bus stop locations not always identified
- Maps are difficult to find and not readily available
- Many users have physical and mental disabilities and need special information accommodations
- Little to no marketing effort for service and amenities

Other Service Barriers

- Train delays cause major service disruption
- Limited sidewalk access throughout the city
- Limited access to bus shelters
- Limited availability of benches at bus stops
- Bus driver shortage
- Bus not considered safe for children to travel alone

Other Service Opportunities

- Unmet demand from international workers and young professionals

- Buses, shelters and benches can be a source of revenue for advertising instead of purely aesthetic
- Require transit accommodations in all new developments
- Provide rapid service routes to population destinations and retail centers
- Create a citywide position focused on marketing to address all city services

7.1.3 Fare

Most stakeholders were aware that the ColumBUS fare was $0.25 but most were unaware the fare had not changed in nearly 40 years. All interview candidates commented that the fare was very economical and generous for the service provide. Though many stakeholders supported raising the fare and considered $0.50 to be reasonable, most were concerned about the affordability of the increase to the most dependent users. One stakeholder mentioned that a $0.50 fare would be burdensome for her clients who are very sensitive to price changes. She proffered that is fares were raised to $0.50 that transfers would be free. Most respondents were averse to raising the fare closer peer transit system standards ($1.25). More than one interviewee suggested that a provision be written to evaluate the fare every 5 years. In addition, one stakeholder commended that if rates were raised, it should be made clear what the revenue would be used to address.

Some of the interviewees were aware the ColumBUS transit system was highly subsidized and that raising the fares could reduce the burden on the City. One stakeholder recommended that reducing service may be a more favorable solution to save on expenses and that reducing services should be considered before increasing fares. One stakeholder recommended presenting fare/service combination alternatives to showing results of different service changes and fare increases and allow for all citizens to weigh in on preference.

Call-A-Bus service was considered more than fare an economical at $0.50. Most stakeholders supported a $1 fare for Call-A-Bus. One stakeholder recommended presenting fare/service combination alternatives to showing results of different service changes and fare increases and allow for all citizens to weigh in on preference.

7.1.4 Additional Findings

Stakeholders commented that Columbus has a high level of civic engagement compared to others cities. As a result, there are a number of civic minded organization that support social service needs. One interviewee was concerned the City may be spending money inefficiently as a result of being a civic-minded community, and potentially trying to offer too much support.

The City of Columbus is growing to the southwest and northeast where 200-250 new homes are being constructed on Greenfield sites. In particular, growth was identified in Tipton Lakes and Shadow Creek neighborhoods. Development to the east of the city has been discouraged. There is desire to provide more infill housing in the central neighborhoods to increase density and provide more transit oriented affordable housing. The available housing within the corporate boundaries is limited, and less regulated ordinances in the county are encouraging sprawl.

Transit alternatives are popular in Columbus. Stakeholders reported that anecdotally more residents bike to work than ride the bus. Each Cummins office in town has a bike station. A recently launched bikeshare program and some stakeholders would like the city to explore scooter sharing and other micro motorized vehicles. In addition to biking, interviewees mentioned vanpools and commuter car shares are entering the Columbus market. Commuter vanpools from Indianapolis are becoming popular. Ridesharing services like Uber and Lyft have not entered the Columbus market. Neither parking nor congestion were identified as a motivating factor. Instead, interviewees mentioned there was more focus on reducing CO2 emissions and environmental sustainability.

Additional support for transit service was identified through the Columbus Community Dialog (facilitated by Mary Charmichael), and the United Way Bi-Monthly service agency meeting.

7.2 Driver Interviews

Input was solicited through two group meetings with ColumBUS transit bus operators. Twelve total bus operators participated in the two one-hour long meetings conducted on October 17. The following is a summary of the comments received.

Major Trip Generators and Destinations

- Served
    - Briarwood
    - Villas at Farmington
    - Four Seasons
    - Schools
- Unserved/Underserved
    - Candlelight
    - Clifty Crossing
    - Edinburgh Outlet mall
    - Walesboro Industrial Park
- Overserved
    - IUPUC
    - Silver Oaks
    - Vacant Holiday Inn

Service feedback

- Route 1
    - Too long. There is low ridership and the route covers over 100 miles in a shift.
    - Route 1 gets kids to college and is much needed but doesn't need to perform a loop
    - Inbound route is difficult to keep on schedule
- Route 2
    - Runs hot, pushes drivers hard to meet schedule.
    - Route 2 is a problem for scheduling. It does not reach outbound transfer point on schedule and often relies on Route 3 to go off-route to finish its pick-ups.

  - Route 2 does not have enough time currently to load a wheelchair without running behind.
  - Route changes most often happen between Route 2 and 3 and are arranged via radio calls. Route 2 and 3 intersect at Taylor Road around 25-27 minutes after the hour and this is a common switch point.
  - Drivers can make up time on 2 on the return trip
  - Route 2 could be 9 minutes rate and include Clifty Crossing as well as another shopping center
- Route 3
  - Currently inbound 17th Street and takes a left on central and right on 14th. Drivers recommend staying on 17th all the way to Cottage.
  - FFY/boys and girls club is on Route 3
  - On Saturdays after 10 AM, 5-7 times Route 3 will do Route 2 pick-ups at Clifty Crossing
  -
- Route 4
  - Riders need designated stops. Want to get off on every block.
  - Stop and go traffic on State Street.
  - Drivers cut through Waymeyer when there is heavy traffic.
  - If Route 4 were able to reach East High School earlier by 4 minutes it could avoid traffic.
  - Route affected by train
- Route 5
  - Route affected by train
  - No need to stop at SAMS because people buy in bulk and won't carry bulk items on the bus
  - Safety: Driving inbound over the bridge is a safety hazard because the bus must stop in the middle lane at railroad tracks. There have been 2 accidents at that location. ColumBUS has added flashing lots and signage is there but drivers insist that they must go slow over the bridge to avoid rear end collisions when they stop.
  - 2nd bridge at railroad on incoming Route 5 is dangerous because the bridge is not flat—it is downhill.

Operational feedback

- 12/14mph is good platform speed
- Having second transfer point at Target is very important. Lots of Cummins people ride and need 2 transfer stations.
- Drivers have the ability to make route changes and problem solve on the fly. This happens several times a day, most frequently at the beginning of the month. Dispatch does not coordinate these changes.
- Drivers needs to account for at least one wheelchair pickup per route and each pick up requiring an additional 5 minutes built into the trip schedule.
- Due to no designated stops, riders and drivers have a discrepancy on where stops are located and sometimes have to respond to where people want to be picked up which is not ideal for the bus
- Work shifts are decided by the Transit Coordinator and switched every day so that no driver feels trapped on an undesirable route.
- The plan to move the depot is a direct response to increased train activity. Moving the depot would change the entire system and might make all this feedback moot.

- Visibility for the train is good going in on 3rd, poor visibility to right coming out of 3rd

Suggestions for Improvement

- Drivers recommend regular bus stop would be better than stopping at every block downtown. Downtown is congested and riders must walk out into the road to get on the bus. Route 2 in particular needs designated stops to stay on schedule. Numerous drivers reiterated that not having designated stops slows down the route.
- Develop an express route to Walmart, Clifty Crossing, Target, Kroger

Fare

- Drivers believe the quarter fare is "ridiculous."
- At this time, there is no way to purchase tickets with debit/credit cards. Electronic cards or swipe card fair boxes would be beneficial to drivers
- Drivers don't like punching paper tickets because it slows down the route and riders take poor care of the paper cards.
- Paper tickets are "gross." Drivers don't want to tare tickets or touch because folks put them in mouth and other places.
- Free fare cards (given to homeless shelter) and Easy Rider Pass (18 and U) are lost easily.

Call-A-Bus:

- Call backs are chaos, pick-ups are scheduled, drop offs are not usually planned. Becomes stressful for drivers
- Some folks like to ride together, you can fit 4 people in the pus, or 2 people plus a chair, drivers are not a fan of MV chairs
- Too many folks qualify for Call-A-Bus, and drivers question if conditional passes meeting criteria.
- Some who ride fixed route should use Call-A-Bus and vice versa.

Additional Findings:

- Drivers would like to designate a bus for wheelchair pickups.
- Best wheelchairs have hooks for riding transit.
- After 5 pm and on weekends, restrooms in the station are closed
- NTN hiring
- Drivers recommend to travel to Californian instead of Sycamore where there is light and control to avoid picking people up at Sycamore without hazards – Route unknown.
- Drivers say there is no need to go every block between Chestnut and California—route unknown.
- One person is a designated trainer.

7.3 Public Workshops

7.3.1 Existing Conditions Workshop

Input from a transit system's stakeholders is the foundation for determining what is working and what is perceived to be broken in the system. ColumBUS is no exception. The community meeting was advertised in multiple venues. To comply with CAMPO's public participation plan, a press release was distributed to local outlets, promotions in English and Spanish were posted to the ColumBUS Transit Facebook page, the event was placed on the City Calendar, and an email was sent to the transportation distribution list. Additionally, notification flyers were placed on buses and in City Hall to reach residents and existing riders.

The public information meeting and open house was held on December 10, 2018 between 5 p.m. and 7 p.m. at Columbus City Hall building. This allowed people to use ColumBUS service to travel to and from the meeting. It started with a presentation that reviewed the project purpose and peer system analysis which was followed by open house format. This gave the public ample opportunity to review study materials and ask informal questions. From there, members of the community were able to provide their input and feedback by marking on display boards. Comment forms also were made available as well as one-on-one interaction between participants and the project team. Approximately 20 people registered on the meeting attendance sheet.

The following is a summary of the comments obtained during the public meeting. Detailed comment forms and other public input are found in **Appendix X.**

Large displays (24" by 36") were prepared, showing an individual map of each ColumBUS route as well as a map showing the combined routes in the service area. Attendees were asked to write on these maps and/or affix post-it notes to the maps to provide input on specific routes. Their comments are listed below:

Route 1 (Blue): The route is too long. Cut the route in half and create a 6th route that serves Corn Brook. This route primarily serves the schools.

Route 2 (Red): This route is primarily for general use and daily needs.

Route 3 (Green): There are too many stops at or near Fair Oaks. There is very little activity at that location. This route is considered the healthcare route by riders.

Route 4 (Orange): Need to add multiple stops on SR46.

Route 5 (Purple): Cut the Walgreens from the route. CVS is also served by the route and already has access. Is the stop at Sam's club needed? Extend the route further eastbound on 2nd street to SR46 to bring employees closer to the major employer (Cummins). This route has a large number of employee housing clusters and employee destination location.

All Routes Map: Need service on the north and west side of town. Reach the Lowell road where there are apartments and Columbus Township. Provide service on US 31 N. Too many bus stop on Route 2 between 12th and 22nd street. Stop needed to serve State Street Apartments (120 units).

7.3.2 Draft Recommendations Workshop

Placeholder for final workshop summary.

7.4 On Line Survey

Residents and riders were invited to take the online survey via Facebook posts, public notices/signs, promotional events and other avenues. CAMPO announced the opening of the survey with a Facebook post and also posted pictures of promotional events encouraging the public to complete the survey. Public signs were put on buses and other public places to inform the community about the survey. ColumBUS held promotional events to help receive input from diverse demographic groups and to ensure that the public remains involved throughout the process.

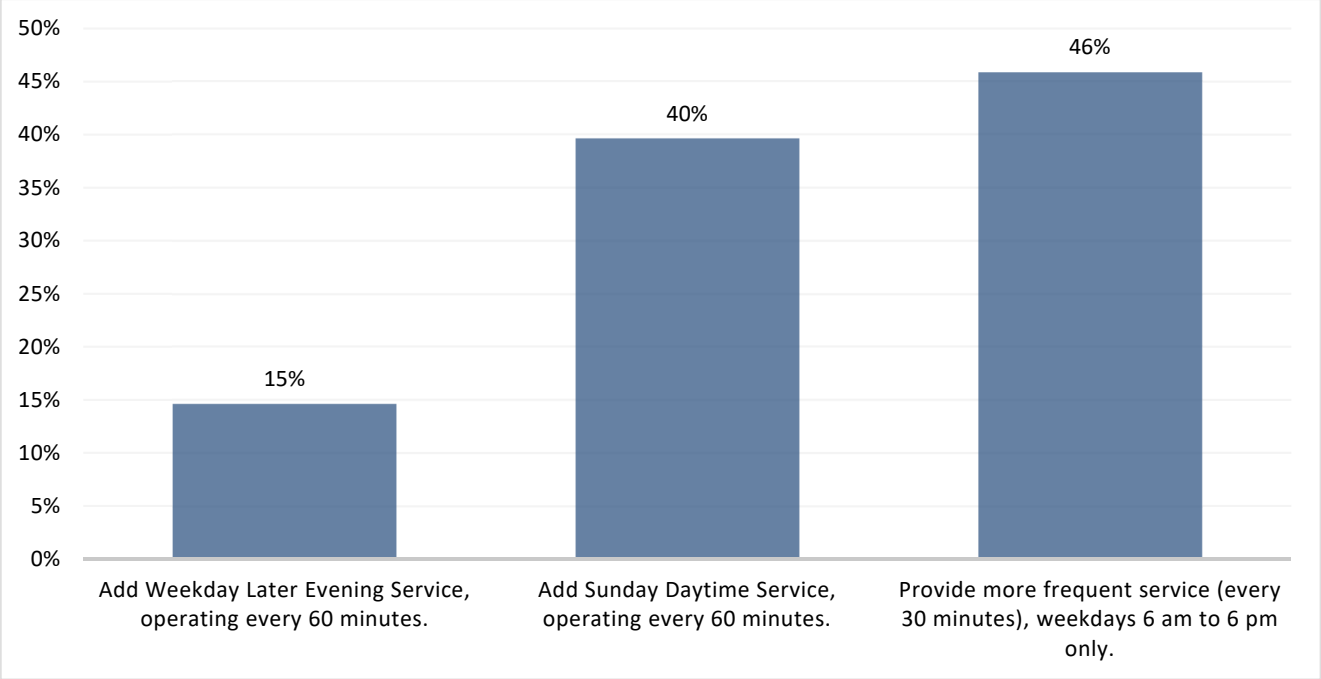
The survey was available between Tuesday November 13, 2018 and Tuesday November 27, 2018. A total of 224 responses were received. The online survey directed respondents to answer some but not all the questions in the survey depending upon their answer to the first question, "Do you live within the city limits of Columbus?" The respondents who reported living in Columbus were asked questions focusing on unmet needs and alternatives to expand days/hours of service. The respondents who reported living outside of Columbus were asked to reply to questions focusing on potential express service. All respondents were given the opportunity to provide general feedback via text comments.

7.4.1 Resident Survey Results

Nearly two-thirds of the respondents reported living within the Columbus City limits. Of the respondents living in Columbus, about 35% have used ColumBUS service within the last year (including Call-A-Ride service). Approximately 90% of these respondents reported that they primarily use the fixed route services while 10% reported that they primarily use Call-A-Bus.

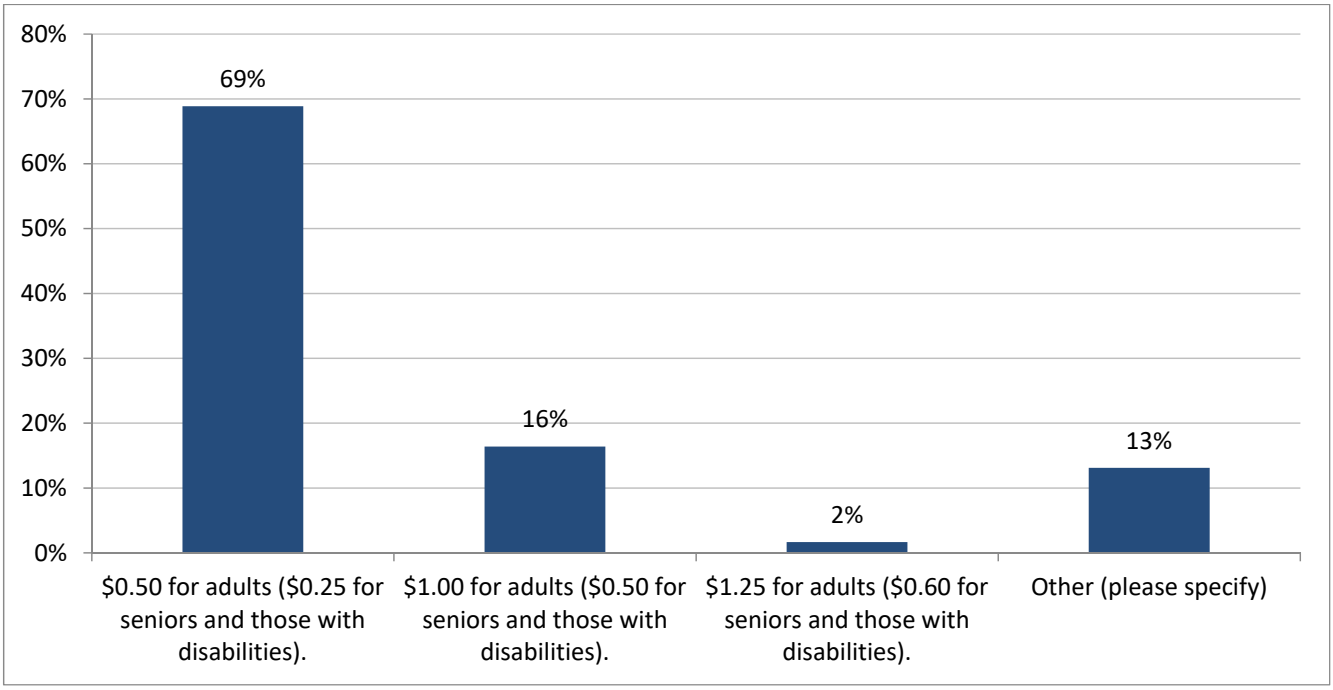
When asked which alternative for expanded service they preferred, about 46% of respondents preferred to add more frequent service (every 30 minutes) weekdays 6 am to 6 pm, while 40% preferred to add Sunday daytime service operating every 60 minutes shown in **Figure 7-1**.

Figure 7-1: Online Survey – If ColumBUS expanded service, which option would you like to see?



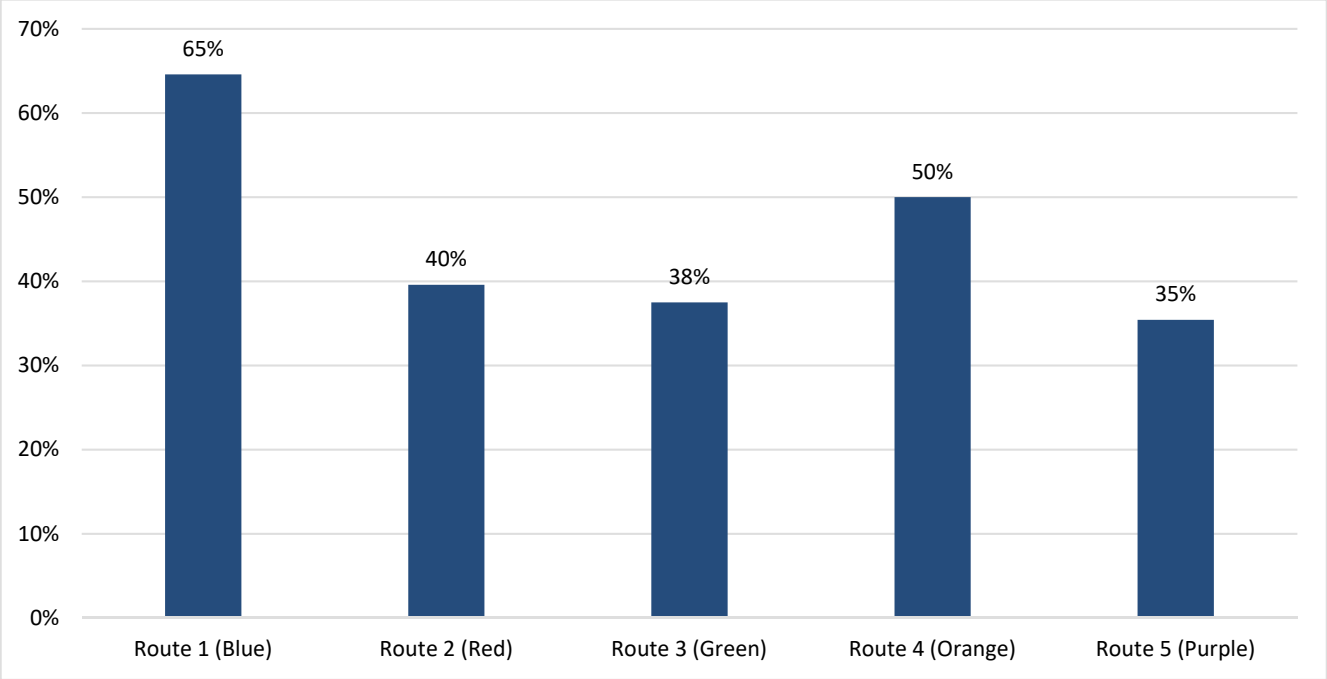
About 85% of respondents stated that they would be willing to pay higher fares for improved days/hours of service. Nearly 69% of these respondents stated that they thought ColumBUS should increase the fare to $0.50 from the current $0.25 fare (while keeping the senior/disability fare at $0.10). Only 16% of respondents reported that they thought ColumBUS increase the fare to $1.00 for the regular fare and $0.50 for the senior/disability fare. “Other” responses included suggestions of not raising the fare, free fares, daily flat-rate daily and monthly passes, and $0.30 for fixed route ($0.20 for seniors and those with disabilities).

Figure 7-2: Online Survey – What is the highest one-way bus fare you would pay?



Route 1 (Blue) was the route that the most respondents (65%) thought should be operated if later evening service was added, as shown in **Figure 7-3** below.

Figure 7-3: Online Survey – If ColumBUS began to operate later weekday evening service, on which routes would it be most needed?



Note: The total is greater than 100% since respondents could select multiple routes.

Figure 7-4: Online Survey – If ColumBUS began to operate Sunday daytime service, which routes would more frequent service be most needed?

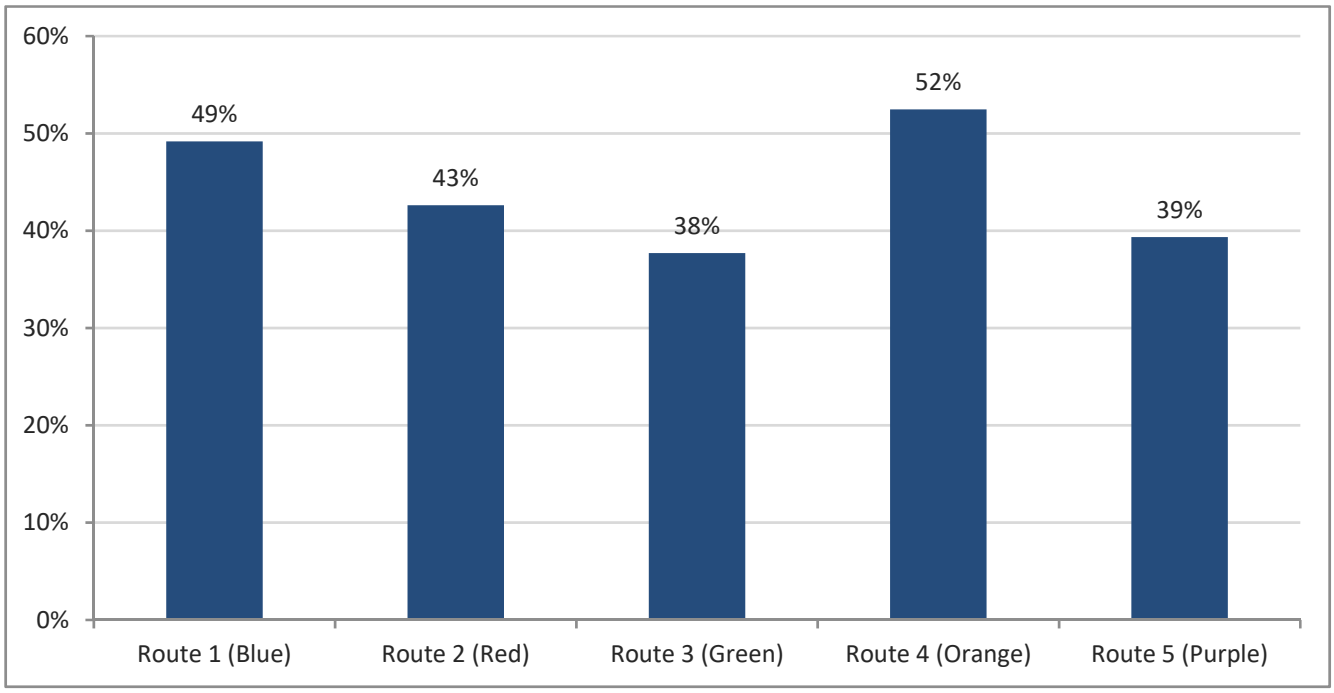
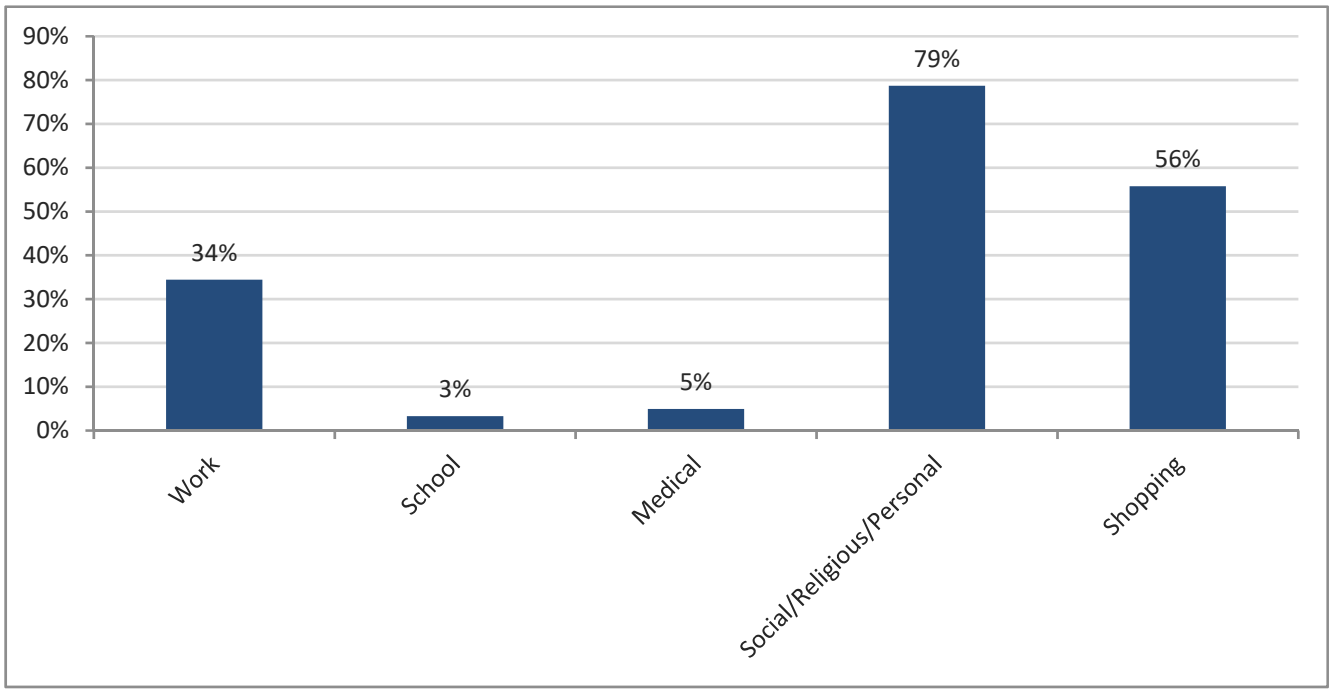
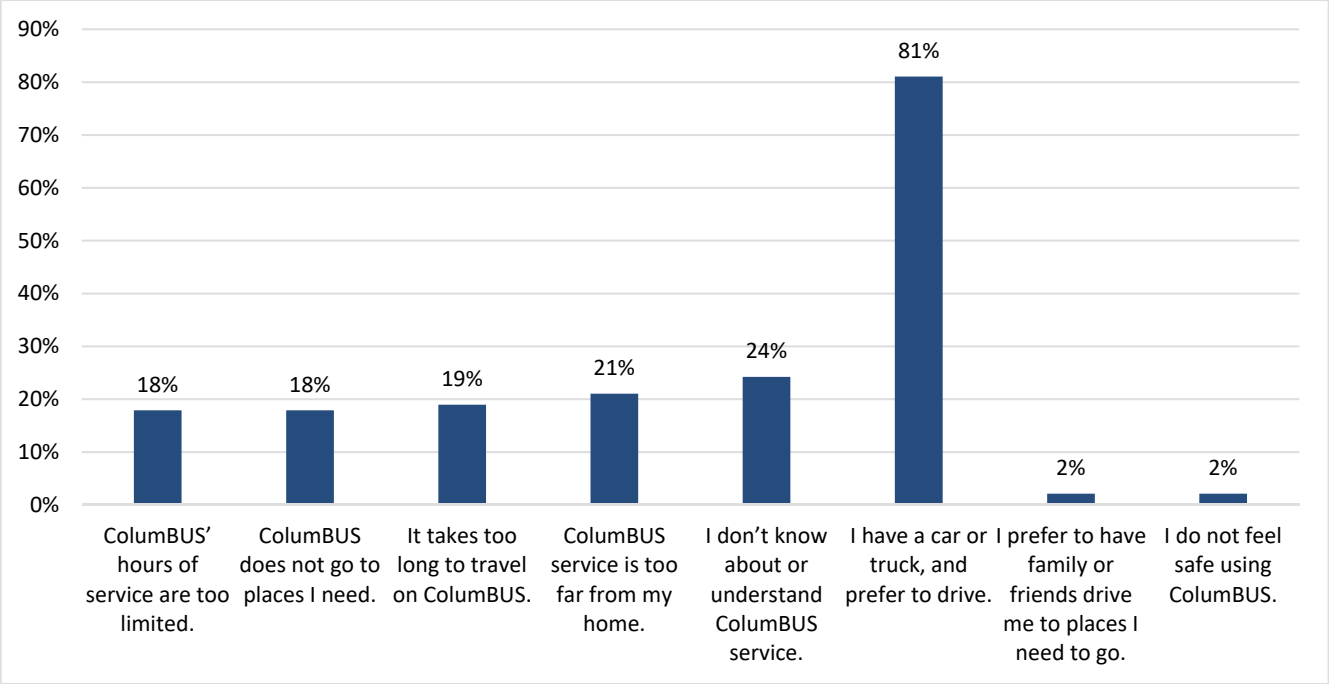


Figure 7-5: Online Survey – What kinds of travel would be better served by Sunday daytime service? Pick up to two.



The most cited reason (81% of respondents) for not using ColumBUS service within the last year is a preference for driving. The second most cited reason (24% of respondents) is that they don't know about or understand ColumBUS service, as shown in **Figure 7-6**. This represents a significant number of potential riders that may be attracted to using ColumBUS service routes and operations were more intuitive and better communicated.

Figure 7-6: Online Survey – Why haven't you used ColumBUS service within the last year?



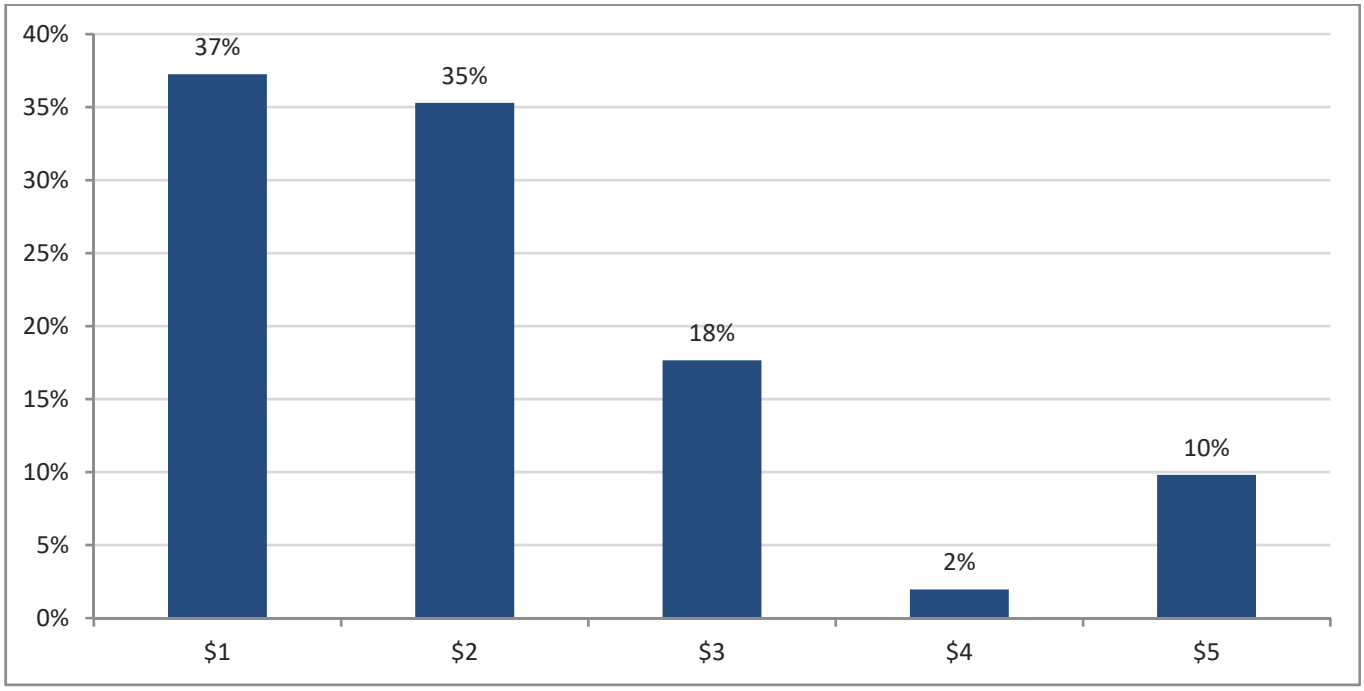
Note: The total is greater than 100% since respondents could select multiple responses.

7.4.2 Non-Resident Survey Results

Of the respondents that don't live in Columbus, about 53% live in rural Bartholomew County. Over 75% of respondents who live outside Columbus work within Columbus. 60% of those living outside of Columbus would consider using an express bus service to downtown Columbus. Of those, over half would use it one or two days per week.

As shown below in Figure **7-7**, 37% of respondents would be willing to pay a $1.00 one-way fare for the express bus service.

Figure 7-7: Online Survey – What is the highest one-way bus fare you would pay (for express bus service)?



Please refer to **Appendix F** for detailed tabulations of responses to each question.

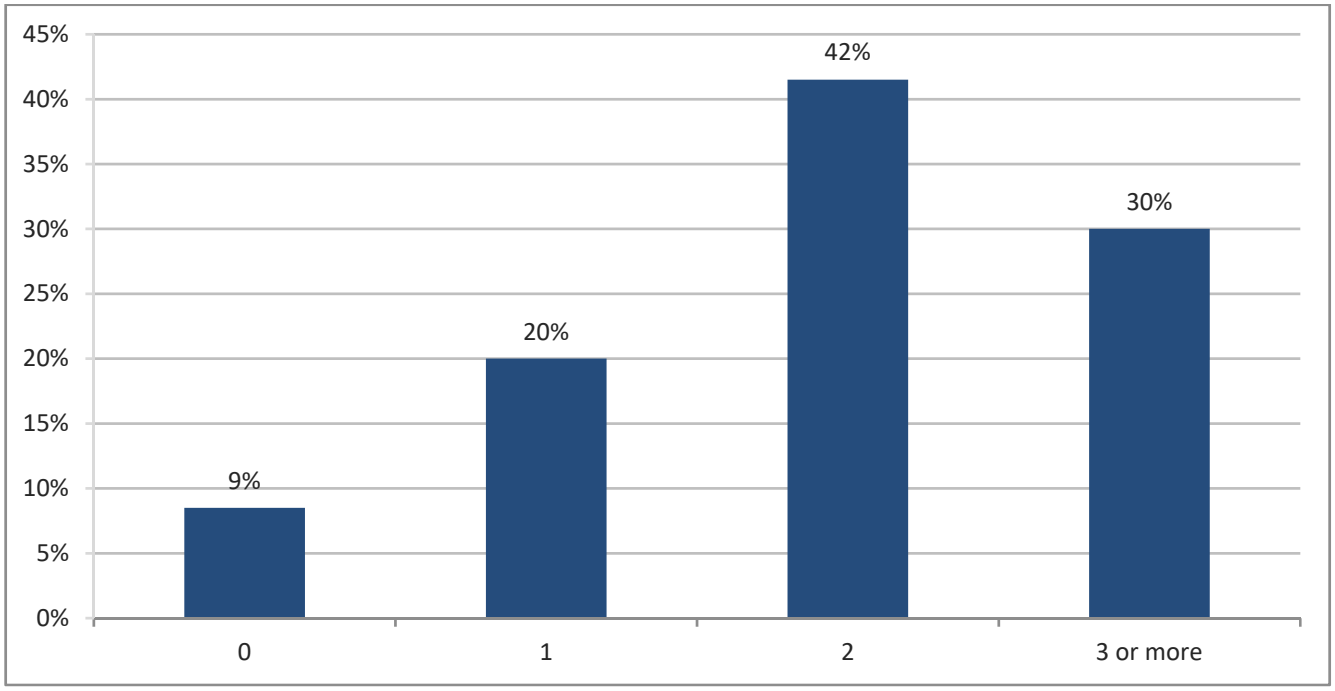
7.4.3 Survey Respondents: Demographics

Results from the survey closely reflected demographics reported from the US Census in **Section 2.3**. Respondents tended to be older and more female than the general population, consistent with the method of survey promotion and distributions that was chosen which included social media.

Out of the total respondents, nearly 70% were between the ages of 34 and 64. Only 3% were younger than 24 and 10% were over age 65. Almost 70% of respondents were female, 28% male, and fewer than 3% preferred not to answer.

Of the respondents, only 9% said they do not possess a valid driver's license. Over 90% of respondents reported owning at least one working vehicle per household which is slightly more than the community average, with over 70% of those reporting that they own at least 2 or more vehicles, as shown in **Figure 7-8**.

Figure 7-8: Online Survey – How many working vehicles does your household own?



The highest percentage of respondents were full-time employed (73%), followed by part-time employed (10%) and retired (7%). Only around 11% in total were either not employed due to disability or unemployed for other reasons. 7% of respondents were students, either enrolled in full-time or part-time college or high school courses. No respondents were enrolled in vocational education. More than half (53%) of respondents reported a household income above than $60,000.

7.4.4 Summary of Comments

Comments received through the ColumBUS online survey were in the following categories: schedules, new destinations, quality of life, routes, fares/finances, ColumBUS personnel, and public information. Of the 72 respondents who provided feedback -- with multiple comments—new destinations and schedules were the most common topic. The following is a summary of the comments received.

New Destinations

Over 20 respondents offered suggestions about adding new destinations to the ColumBUS service. Specific locations recommended include Love Chapel Food Pantry, Shadow Creek Neighborhood, Tipton Lakes, and local homeless shelters. A majority of suggestions were for locations in Bartholomew County but outside the Columbus City limits. These locations included Walesboro (3), Edinburg Outlet Mall (3), Hope (2), and the Human Services Center in Clifford (2). Other destinations mentioned were Indianapolis, Whiteland/Greenwood, Elizabethtown, Taylorsville, Bethel Village, East Columbus, and senior living communities.

Schedules

Altogether, 18 comments concerning days and hours of service were submitted. The need to expand the hours of service was the comment most often made. In total, 8 respondents requested Sunday service, and 8 requested more frequent service, and 5 requested later evening hours. One commented that the need for child pickup and drop off makes bus use inefficient. Two respondents suggested adjusting bus schedule to accommodate the 3:15 release time to allow for and encourage high school students to ride.

Quality of Life

14 comments were submitted in this category. Comments included: clean, attractive, and comfortable buses, great service, and positive experiences. Many commenters mentioned they prefer to bike rather than drive or take the bus. Three respondents expressed thanks to ColumBUS for their service to the community.

Routes

Five respondents offered suggestions about changes to existing routes. The majority of suggestions were to improve Route 4, make it more user friendly, and extend the route further down 2nd Street to the “five point” area. Another commenter suggested that Route 1 was too long and should be split into two routes to provide express service to River Edge Apartment.

Fares and Finances

Five comments were submitted concerning fares and finances. Many commenters mentioned the bus fare was very affordable. Some commented they would like to see more frequent service, but would prefer not to increase fares to achieve that end. A respondent suggested that they would be willing to pay an increased fare only during extended hours or only during hours where service frequency was increased. One suggested the routes were underutilized and a reduced but more frequent economic schedule should be considered. One commenter requested free transfers.

ColumBUS Personnel

Three comments pertained to ColumBUS Personnel. One commented, "All staff are very helpful in trying to make it the best - and most-affordable - option for riders. One commented that drivers avoid speeding and disregarding stop signs. The third suggested improvements to administration.

Public Information

Four comment were made regarding public information. All commented that they did not know about a service or found the schedule or routes to be too difficult to understand. One commenter mentioned that bus stops appeared to be randomly located and not all were marked.

7.5 Project Steering Committee

The Steering Committee met from 2:00 to 4:20 pm at Columbus City Hall. Comments were provided based upon a PowerPoint presentation which was provided to both the Steering Committee and the Public Information Meeting. A copy of that presentation is attached to this memo.

The presentation had four main sections:

- Peer system comparison
- Summary of on-line survey
- Summary of stakeholder and driver interviews
- Route ridership profiles
- Committee members provided the following input and comments.
-

Overall Project Purpose

One of the study's purposes is to assess how to modify the ColumBUS system to serve the new transit center at 13th/Hutchins. In response to a question from the committee, Mr. Grovak stated that this location is taken as a "given." The study does not include an evaluation of alternative locations for the transit center.

Peer Systems

One member asked why Bloomington, Indiana was not selected as a peer system. Michael Grovak explained that it is a much larger system, and not comparable to Columbus. The member noted this, while stating that Bloomington's system has "aspirational" qualities for the Columbus system.

The FTA software used in this analysis is the Urban Integrated National Database. It compiles data from the National Transit Database reports for all US transit operators. It also computes a "likeness" score for any system to quantitatively identify similar systems. The closer to 1.0 a likeness score is, the more similar that other system is. Peer systems were chosen to emphasize systems in the Midwest with high likeness scores to Columbus.

The committee noted the low farebox recovery and revenues per passenger for Columbus compared to its peers. This reflects that the fare in Columbus has not changed from 25 cents for more than 40 years. This disparity is seen in both fixed route and demand response services.

Online Survey

Committee members stated that there is some segment of the fixed route bus ridership for whom any fare increase could be a financial burden. At the same time, members recognized the fare is quite low, and has not been increased in decades.

There was some feedback from the committee supporting the survey results that more frequent weekday service is a definite need. At the same time, later weekday and Sunday service also is needed.

Interviews

There was some feedback supporting the interview findings that service to the Walesboro Industrial Park was needed. Cindy Rohm from Elwood Staffing stated that her company is working with employers in the Industrial Park to begin employer-based vanpool service which CAMPO intends to provide in the near future. There was a request for more information about the safety issues which the drivers identified as an issue for Route 5. Mr. Grovak described how the present routing required drivers to stop at a railroad track while they travel in the middle lane.

Route Ridership Profiles

A committee member asked how we will encourage bicycle use as part of this study. Mr. Grovak replied that we will be analyzing existing pedestrian and bicycle infrastructure to identify opportunities to emphasize more direct service on main roads. Good pedestrian infrastructure lessens the need for indirect bus routing. Bicycles can act as the "first mile/last mile" portion of a transit trip. In a recent Lochmueller Group survey of the Indianapolis transit system, it found that 3% of bus riders (about 1,000 trips/day) use bicycles to and from the transit route. All ColumBUS vehicles have bicycle racks.

8 Transit Service Guidelines

Service Guidelines address the design, quality and efficiency of fixed route transit service. These Service Guidelines will achieve the following purposes:

1. Ensure that an acceptable level of service quality is provided to customers on all transit services;
2. Provide a consistent and fair basis for evaluating proposed changes to existing transit services and for considering new transit services; and
3. Balance improving the level of transit services with the need to use transit resources efficiently.

The Service Guidelines focus on the service goals outlined in the table below.

Table 8-1: Service Goals

Service Goal	Achievement Method
Simple	Services should be easy for customers to understand, ensuring consistency and ease of use across the system. This includes clock-face schedules[4] and routes which are direct and consistent in both directions (to the extent feasible).
Comprehensive	Transit service should be available within a reasonable walking distance for most residents. Transit services should provide access to major destinations in the service area.
Convenient	Transit service should be available from early in the morning until the evening at least five days a week, especially on routes serving major destinations, or in high density neighborhoods. Transfers should be quick and convenient.
Comfortable	While riding on transit vehicles, customers should be provided with adequate space for a comfortable ride and should not have to stand for long periods of time.
Reliable	Services should be designed to ensure on-time performance, avoiding being early and minimizing running late.
Efficient	Transit service should be reasonably cost-efficient by providing appropriate levels of service for the level of customer demand. This ensures that the overall transit system can provide the most effective service within available financial resources.

[4] "Clock-face" schedules correspond to frequencies which have buses scheduled to arrive at the same time after the hour for a period of time. For example, if buses operate every 30 minutes and are scheduled to arrive at 5 and 35 minutes after the hour, riders can plan trips without having to consult a written schedule. Intervals of 10, 12, 15, 30 and 60 minutes all provide "clock face" headways.

To achieve these goals, the following specific guidelines are proposed for each service characteristic. These guidelines should be applied evenly across the service area to ensure equitable service provision for all neighborhoods.

Route Coverage

Route coverage refers to the availability of service within the geographic service area. The guideline for route coverage is often related to population density. High density areas will have bus routes spaced closer together than low density regions. A density of four residential units per acre is generally considered the minimum density required for fixed route service.

Bus Stop Spacing

On fixed route services, optimal bus stop spacing balances short walking distances to stops with faster service overall (by stopping the bus less often). We recommend bus stops be spaced ¼ mile (1,320 feet) apart. This spacing may be reduced to serve major traffic generators on a case-by-case basis.

As of the preparation of these guidelines, ColumBUS allows flag stops at any location where passengers desire to board or alight (and it is safe to do so). Modifying this policy will require installation of signage at all stops, as well as a public outreach campaign to explain how this will enable ColumBUS to provide faster and more reliable service to all riders.

Route Directness

Route Directness, or the operation of a route along the most direct possible path, is a standard to improve travel speed and reliability. Routes will be designed to operate as directly as possible, using arterial streets. Route deviations to serve traffic generators located away from the direct path will only be considered if: 1) the deviation's one-way travel time is three minutes or less; and 2) the total additional travel time for all through passengers, divided by the number of passengers using the deviation, is less than five minutes. This is expressed in the following calculation:

$$(X * Y) / Z < 5 \text{ minutes}$$

Where: X = Number of through passengers
Y = The additional one-way vehicle travel time (minutes)
Z = Number of passengers served by the deviation

These route directness guidelines are provided for consideration of future plans/requests to deviate a route operating on a direct path to serve a specific traffic generator.

Span of Service

Span of Service refers to the times that service is provided on each day of the week. Span of service is often adopted as a minimum policy standard for all routes in the system, while individual routes may exceed the minimum based on ridership. Current ColumBUS policy is to provide service on all routes between 6 am and 8 pm on weekdays, and between 6 am and 6 pm on Saturday. As of preparation of these guidelines, all ColumBUS routes operate every 60 minutes during all hours of service.

Hours of transit service should serve most residents traveling to school, work and other purposes. Extending service to other hours and time should be considered if there is a demonstrated need based on ridership. As a general rule, if the number of riders on the first or last trip of the day is higher than the one or two adjacent trips, then additional service should be considered. Service also must meet the minimum ridership thresholds showing in Table 8-x. Conversely, if the first and last trips have consistently low ridership, then elimination of that trip should be considered. Consideration of changing hours of service also should take into account transfer patterns to and from other routes.

Table 8-2 shows 10 riders per vehicle hour as the minimum cut off for fixed route service. If ridership is during a time period below that level, the route should be considered for shortening hours of service and/or restructuring.

Extending hours and/or days of service requires added office, maintenance and supervisory staff in addition to the bus operators. Such increases also require added complementary American with Disabilities Act (ADA) paratransit service. Plans for Sunday service should consider that ridership and revenue from Sunday service may be less than 50 percent of Saturday service on the same route.

Service Frequency

The frequency guidelines establish intervals between scheduled bus arrivals. The interval is determined by ridership levels. More riders per hour on a route justify more frequent service.

Service frequency is a function of ridership and vehicle capacity. A common maximum fixed route service frequency (which ColumBUS presently operates) is 60 minutes. More frequent service should be considered when ridership warrants. The following table provides a guideline for the relationship between riders/hour and scheduled service intervals for fixed route service.[5]

Table 8-2: Online Survey – How many working vehicles does your household own?

Riders per Bus Hour	Frequency (in minutes)	Riders per Bus per Vehicle Hour
< 10	No fixed route service	
10 – 30	60	15 - 30
30 – 60	30	15 - 30
60 – 100	20	20 - 33
101 – 140	15	25 - 35
These guidelines are applicable either as averages during the entire AM/PM Peak Period, midday, or evening on a given route. For Saturday or Sunday service, they are applicable for any period of 4 to 6 hours with relatively consistent ridership levels.		

[5] These guidelines are more generous than those used in some other areas. For example, in recent Lochmueller Group work for the Southern Illinois MPO (SIMPO) and Evansville (IN), the recommended riders per vehicle hour required to sustain 30 minute service is 40 riders per bus hour.

Service frequency is also a function of vehicle size. When ridership at peak load points exceeds vehicle capacity, one of two steps is required. The most cost-efficient step is to assign higher capacity vehicles. If that is not an option, the number of buses scheduled must increase, improving frequency. If ridership on a route declines, the number of vehicles (and frequency) declines. Ridership counts taken for this project indicate that ColumBUS service does not have passenger loadings at or near vehicle capacity.

Vehicle Load

Vehicle Load refers to the maximum number of passengers on a bus at the route's maximum loading point. It is closely related to Service Frequency guidelines. This guideline often is given as the ratio of passengers to seats. The maximum scheduled vehicle load should not exceed the manufacturers' recommended capacity for passengers seated and standing. Higher capacity vehicles should be assigned to routes with the highest passenger demand, and lower capacity vehicles to routes with low demand.

On-Time Performance

Service reliability is essential to retain and attract transit customers. On-time performance is one of the best indicators of service reliability. Typically, on-time performance is defined as the vehicle arriving within a certain number of minutes of the scheduled time.

Fixed route service is considered on time if the bus arrives not more than one minute early or more than five minutes late at established time points when compared to scheduled arrival times. The On-Time Performance Guideline is to provide "on time" service 90% of the time. On-time performance should be monitored occasionally, or in response to specific requests/customer input.

Transit Amenities Distribution

Transit Amenities include passenger shelters, benches and bicycle racks. These amenities are distributed based on passenger volume and activity. Placement of amenities may be influenced by physical space requirements, safety concerns or pedestrian infrastructure.

The Transit Amenities Distribution Guideline for each amenity is as follows:

- Provision of a passenger shelter requires a minimum daily boarding of 30 passengers and adequate space in the right-of-way. Provision of shelters will be governed by available funding.
- Placement of benches requires minimum daily boarding of 30 passengers and adequate space in the right of way. Benches may also be provided upon request, and when resources are available, at bus stops serving medical facilities and trip generators patronized primarily by senior citizens or disabled individuals.
- All ColumBUS buses are equipped with bicycle racks. All future bus procurements should include bicycle racks.

The Columbus MPO has a vigorous bicycle and pedestrian planning process and devotes significant resources to improved bicycle and pedestrian infrastructure. The Federal Transit Administration published in 2017 the *Manual on Pedestrian and Bicycle Connections to Transit* (FTA Report 0111). Section 2, *Access Sheds and*

Networks, provides guidance about to how assess the ability of infrastructure improvements to support transit. The basic concept this section provides is "access sheds" (the area around a focal point, such as a bus stop, to which a person would reasonably travel). Such access sheds pertain to both walking and bicycling. Using this guidance to evaluate infrastructure improvements will be especially important when the recommendation of using only designated bus stops is implemented.

Public Participation

Public participation is an important component in the provision of service. Public participation ensures that service continues to meet the needs and expectations of its customers. Public participation includes direct, unsolicited feedback from customers, as well as outreach to individuals and groups to elicit comments on proposed adjustments.

An on-going, regular dialogue with residents, businesses and elected officials should be the goal of any public participation process. In addition to on-going communication, more formal and specific outreach efforts are required when major changes to service or fares are considered.

The public participation process for major changes in fares, facilities and/or service applies under any of the following circumstances:

- Route changes that affect more than 25 percent of any route or service's passengers, route miles or vehicle miles
- Service changes that require new facilities and/or capital expenditures at a cost that requires city council approval
- A fare increase of 25 percent or more on any fare type or media

For major service changes or fare increases as defined above, a public meeting to present the proposed change(s) and obtain public comments is required. Schedule the public meeting at a time and place accessible and convenient for the general public to attend. Notify the public of the meeting at least 30 calendar days prior to the meeting through local media. Place notices on transit vehicles and on appropriate webpages. Social media is also a tool to disseminate service change information and seek public input. A formal record of the public involvement should be prepared for consideration prior to making a decision on the final recommendation.

9 Recommended Service Plan

9.1 Draft Service Plans

Serving a new transit center at 13th/Hutchins requires a large-scale restructuring of ColumBUS service. The new transit center will be located approximate 2 miles from the Mill Race Transit Center. The present route designations will to some extent be modified. The following study findings and route planning principles were applied in proposing these recommendations.

- ***Most routes now operate largely or predominantly in a one-way fashion.*** Service is not easy for customers (especially potential new customers) to understand. The proposals realign services on main thoroughfares, in consideration of available pedestrian infrastructure.
- ***Existing productive route segments are linked to provide routes with high ridership potential.*** The routes in this category are considered for expansion to 30-minute weekday service.
- ***Peak ridership times generally are between 11 am and 4 pm (trips leaving Mill Race).*** This will guide the recommended times for implementing 30-minute service on selected routes.
- ***Lochmueller believes that the confusing route patterns explains a significant portion of ColumBUS' underperformance compared to its peers.*** ColumBUS has the second lowest passengers per revenue hour of its peer system (**Figure 2-3**) and rides per capita somewhat below its peers (**Figure 2-5**). This is remarkable, given that ColumBUS' peers have adult fares ranging between $1.00 and $1.50, compared with ColumBUS' $0.25 fare.
- ***Some routes will be "through-routed at the new transit center.*** This will be important for efficient route design, given the location of the new transit center in the middle of Columbus.
- ***Service will continue to operate to the Target transfer location.*** However, the current practice of multiple routes having timed meets no longer can be assured.
- ***Some service should be maintained to the Mill Race Center.*** This will allow for meeting with intercity bus service operated by Miller Transportation, as well as addressing potential FTA concerns with ColumBUS no longer serving the facility.
- ***The restructuring emphasizes service to residential trip generators.*** The most productive route segments serve residential trip generators. This includes the segments along Routes 2 and 3 east of Taylor Road and segment of Route 4 between East High School and Target.
- ***Columbus High School/Columbus Christian High Schools also are significant trip generators.*** Both schools are located near Marr Road/Indiana Avenue.
- ***Implementing these recommendations will require significant public involvement and marketing efforts.*** New maps and schedules need to be widely publicized by both print and electronic means. The recommendation of stopping only at designated stops (at approximately one-quarter mile intervals) will be a significant part of the public information effort. About one rider in six boards or alights other than at a designated stop.

9.1.1 Plan Description

All references to the "Transit Center" are to the new Transit Center at 13th/Hutchins.

Draft recommendations have accounted for (to our knowledge) all one-way street patterns. We invite input to identify any recommendations which overlook existing one-way street operations, or other significant operating issues.

All routes are assumed to operate on their existing 60-minute headways, with trips on Routes 1, 2, 4 and 5 leaving at the top of the hour. Route 3 will operate through the Transit Center (stopping only for passengers to board and alight) at other times, to be determined when schedules are finalized. In addition, Route 2 and 4 are recommended to operate every 30 minutes weekdays midday. These added trips will leave the Transit Center at 30 minutes after the hour between 11:30 am and 4:30 pm, weekdays. Increases in weekday headways was the service improvement option most preferred by 46% of resident responses to the online survey (**Section 7.4.1)**.

No changes in days or hours of service are recommended at this time. Recommended route changes will be implemented weekdays and Saturdays.

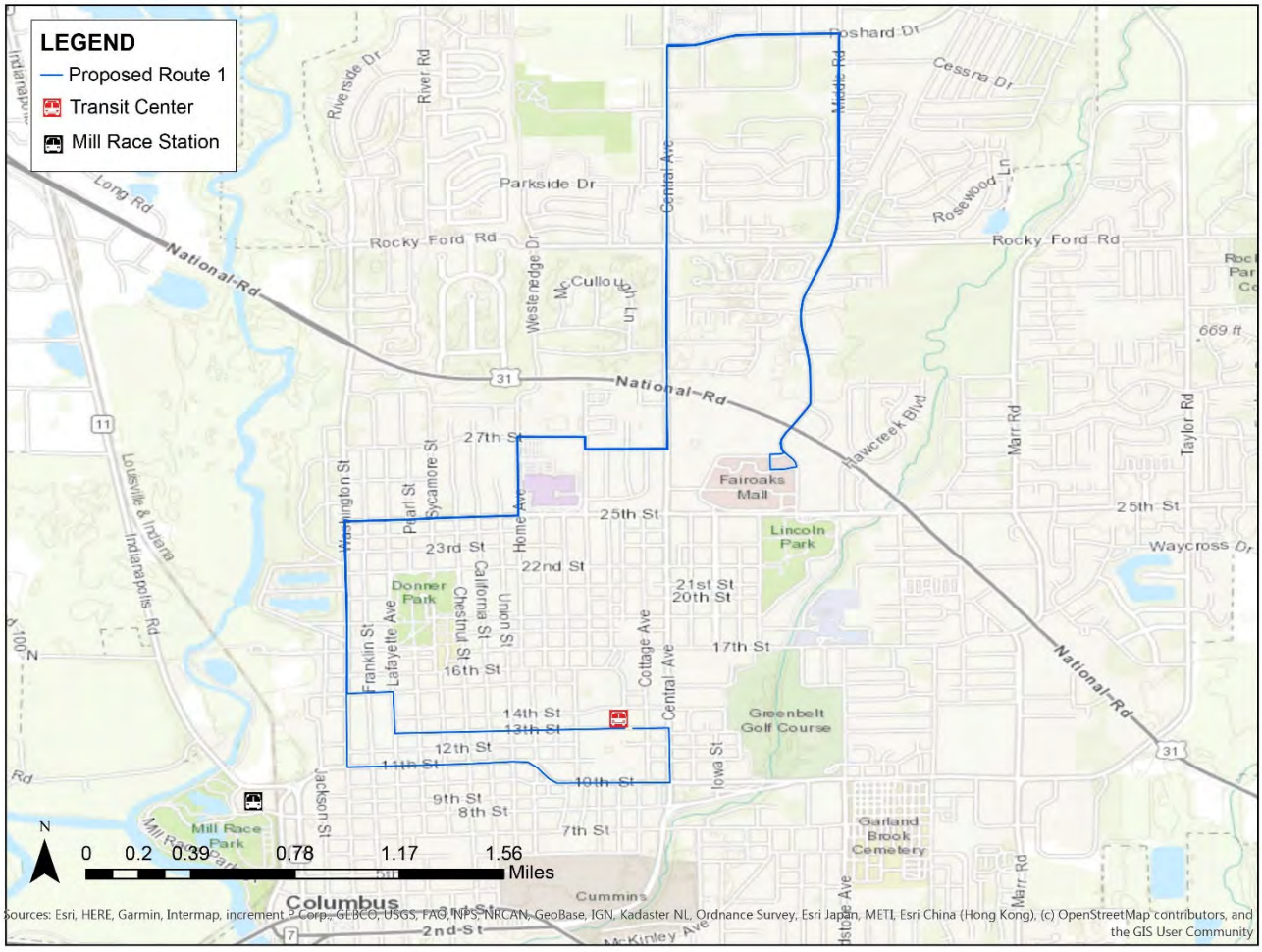
Route 1

Introduction
Public input was received in December 2018 about the desirability of extending service along US 31/Indianapolis Road to the vicinity of Lowell Road and points north. Two options were considered for extending Route 1 to serve this area. Both had more negative than positive aspects. The first would have entailed removing all Route 1 service north of National Road. This would eliminate most of the existing route. The second entailed extending service from Central Ave./Cunningham Dr. via River Rd. and CR 400 North to US Highway 31/Indianapolis Rd. At this point, the recommended new service area is about 2.5 miles south, and any routing would be too indirect.

Recommendations for Route 1 focus on eliminating one-way loops. These are confusing to understand and contribute to adverse (reverse-direction) travel. This route's poorer performance is attributed in part to the confusing service patterns.

Routing
It is proposed to operate outbound via 13th St., Lafayette Ave., 15th St., Washington St., 25th St., Home Ave., 17th St., Central Avenue, Poshard Rd., Middle Rd., to Fair Oaks Mall. The inbound operation is proposed via Middle Rd., Poshard Rd. Central Ave. 27th St., Home Ave., 25th St., Washington St., 11th St./10th St., Central Ave., 13th St. to Transit Center. **Figure 9-1** shows a map of the new proposed Route 1.

Figure 9-1: Proposed Route 1



Added Information

Some existing riders will need to walk further to access service on the "streamlined" Route 1. Counts show 9 riders boarding and 3 alighting on all trips Ivy Tech. These riders will need to walk several hundred feet to Poshard Rd. Counts showed 2 riders boarding and 6 riders alighting at the Social Security Office. These riders also will need to walk to Poshard Rd. to access service. Counts show 5 riders boarding and 9 riders alighting at Marr Rd. and Rocky Ford Rd. These riders will need to walk to Middle Rd. to access service. This is the only designated stop which will be bypassed when all trips operate via Middle Rd. and 25th St.

On-board counts showed that this route has significant problems with schedule adherence. On current routings, each trip required 54 minutes for a route trip. This allows insufficient running time to maintain 60-minute service.

Service along 10th/11th Sts. will replace Route 3 service, which will now operate in both directions via 7th St.

The proposed route is 6.7 miles one-way. One-way running time would be about 26 minutes. There is insufficient running time in the schedule to extend this route to Target. As noted in **Section 4.3**, this route has inadequate running time, and requires truncation to maintain timely operations. Transfers will be available to Route 2 on 25th St. Route 2 is proposed to operate every 30 minutes for six hours each weekday.

Route 2

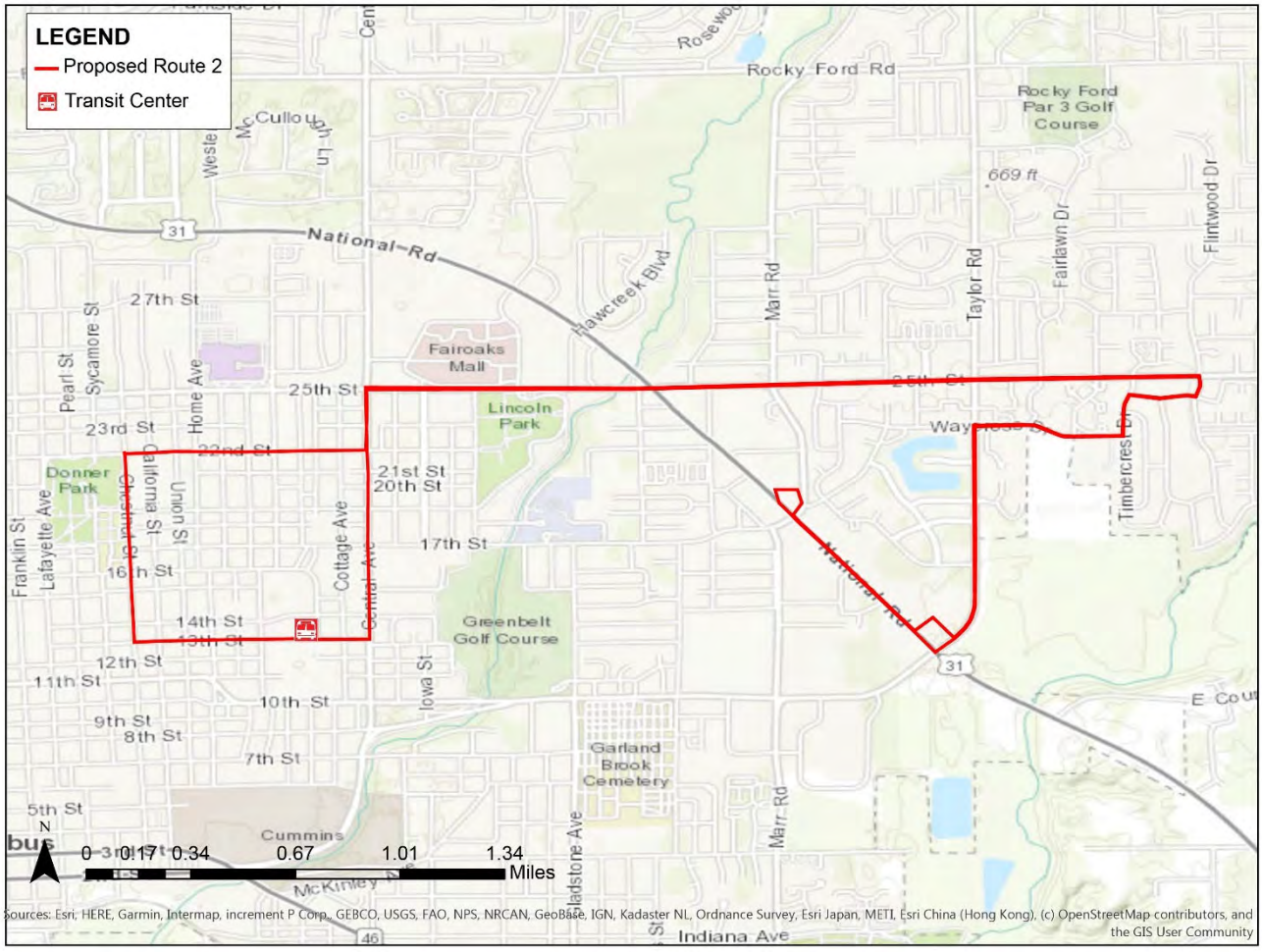
Introduction

This is one of two routes proposed for doubling to 30-minute service (between 11 am and 4 pm leaving the Transit Center). It replaces Route 3 service east of Taylor.

Routing

It is proposed to outbound via 13th St., Chestnut St., 22nd St., Central Ave., 25th St., Lockerbie Dr., Eastgate Dr., Timbercrest Dr., Waycross Dr., Taylor Rd., Clifty Crossing, National Rd. and Target. It is proposed to operate inbound via National Rd. Clifty Crossing, Taylor Rd., Waycross Dr., Timbercrest Dr. Eastgate Dr., Lockerbie Dr., 25th St., Home Ave., 17th St. Central Ave., 13th St. to Transit Terminal. All trips operate on the same outbound and inbound routing between Target and 25th St./Taylor Rd. **Figure 9-2** shows a map of the new proposed Route 2.

Figure 9-2: Proposed Route 2



Added Information

This will replace Route 3 service now operating east and north of 25th St./Taylor Rd. Ride counts show that he large loop on Route 3 picks up only 5 riders (dropping off none) north of 25th St. other than at the two designated stops at Fox Point and Williamsburg/Holiday Center. Counts show 23 boarding and 10 alighting all day on both of these Route 3 stops. Riders now using Williamsburg stop will need to walk about an added 700 feet to/from service which now will operate up to every 30 minutes on 25th. Consideration should be given to providing a sidewalk on the east side of Taylor Rd. between 25th and 26th Sts.

Route 2 also replaces present Route 3 service on 25th St. west of Taylor Rd.

Route 3

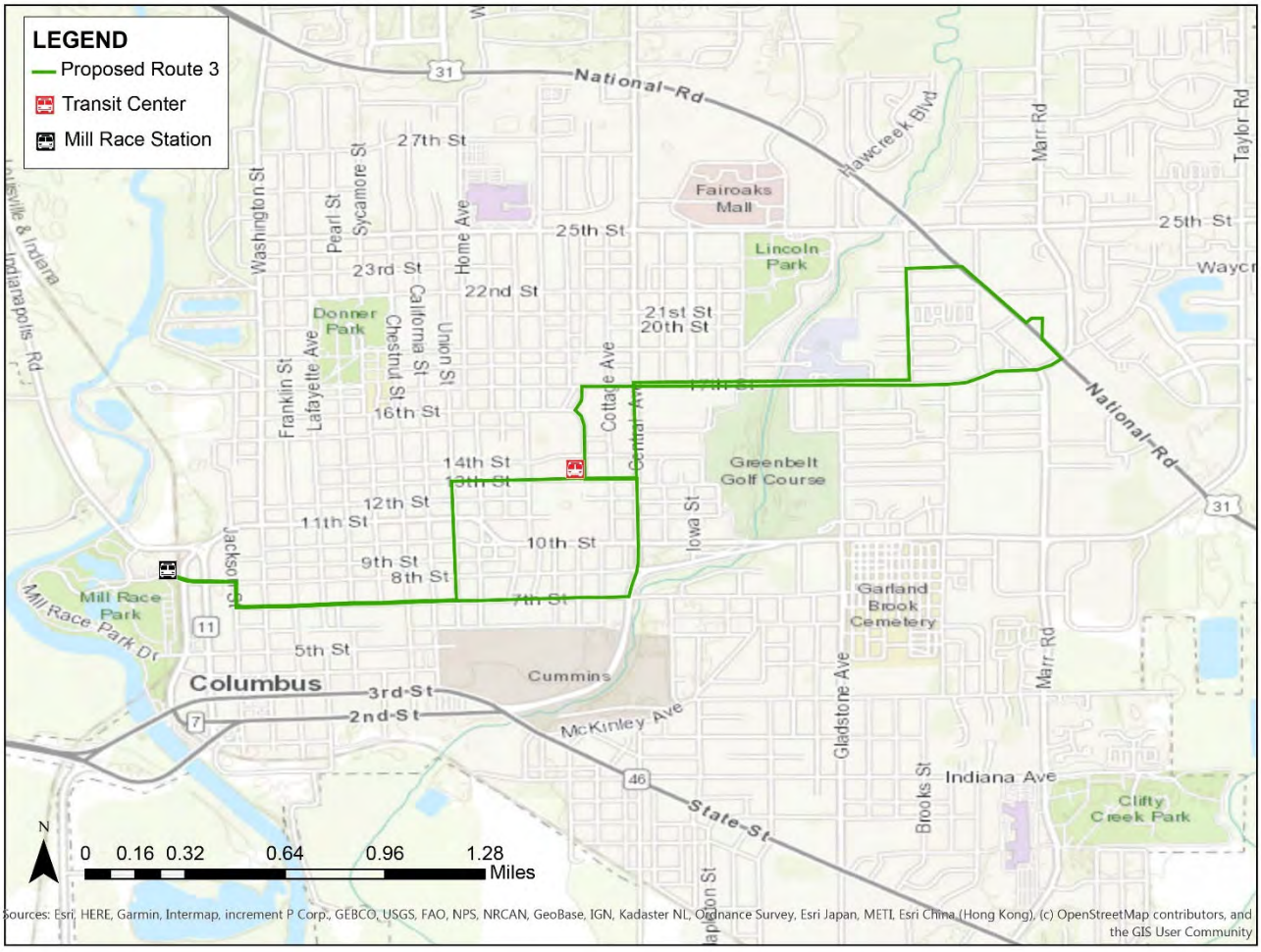
Introduction

This is one of two routes recommended for maintaining service to Mill Race. It will operate via the Transit Center but will not terminate there.

Routing

Outbound routing is recommended from Mill Race via 8th Street, Jackson St., 7th St., Central Avenue, 13th St., Transit Center (stopping only for passengers to board and alight), Hutchins Ave., Orinoco St., Orinoco Ave., 17th St., National Rd. to Target. Inbound routing is recommended for National Rd., 23rd St., Midway St., 17th St., Central Ave., 13th St., Transit Center (stopping only for passengers to board and alight), 13th St., Union St., 7th St., Jackson St., 8th St. to Mill Race Center. **Figure 9-3** shows a map of the new proposed Route 3.

Figure 9-3: Proposed Route 3



Added Information

This route will not terminate at the Transit Center. Its termini will be at Target and at Mill Race. It is one of two routes (along with Route 5) maintaining service to downtown Columbus. Another downtown terminus (other than Mill Race) can be identified if desired. It also continues to serve Columbus Hospital.

This route will no longer will operate to Fair Oaks Mall. Fair Oaks Mall will continue to be served by Route 1, as well as 30-minute service along 25th St. during weekday daytimes. This route no longer will serve the area

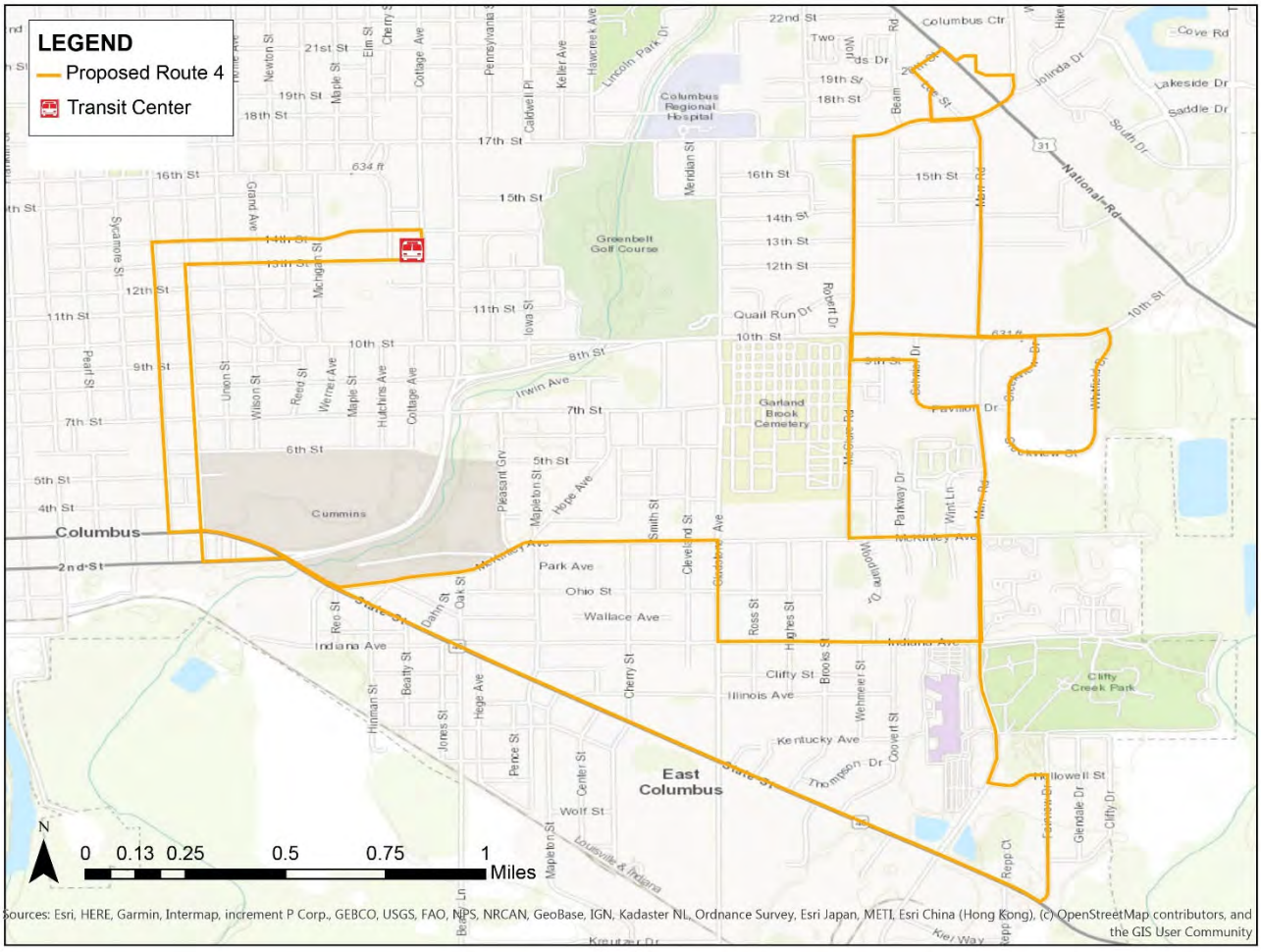
north and west of Target. This service will be replaced by Route 2, which is recommended to provide service weekday middays every 30 minutes along 25th St. and in the area east of Taylor Rd.
On-board counts show 7 passengers boarding and 10 passengers alighting daily at 7th St./Smith St. These passengers will be served by Route 4 on McKinley St.

Route 4

Introduction
This is ColumBUS' most productive route. It is proposed for doubling to 30-minute service (between 11 am and 4 pm weekdays leaving the Transit Center).

Routing
The existing route is largely maintained. It is proposed to operate outbound (from the Transit Center) via 13th St., California St., to 2nd St., and from there operating over the existing route to Target. Leaving Target inbound it is proposed to operate over the existing route to Chestnut St., 14th St., Central Ave. and 13th St. to the Transit Center. **Figure 9-4** shows a map of the new proposed Route 4.

Figure 9-4: Proposed Route 4



Added Information

This route has significant ridership on its one-way portions. On-board counts show 37 riders on and 29 off outbound between Mill Race and East High School (where there are no designated stops). Counts also showed 16 on and 12 off at McKinley Ave./Hope Ave. Recommendations include establishing designated stops along State Street.

Route 5

Introduction

This route will be revised to operate "non-stop" between the Transit Center and downtown. It will continue to serve the Mill Race. It will provide an express connection between the Transit Center and downtown Columbus.

Routing

It is recommended to operate inbound from the Transit Center via 13th St., Hutchins Ave., 14th St., Central Ave., 3rd St., Franklin St., 8th Street to Mill Race. Its only stops between the Transit Center and Mill Race will be at

one location along Franklin St. and one location along 8th St. From Mill Race (where it will stop only for passengers to board and alight) it will operate via the present route to Route 46 west of I-65. The recommended inbound route is via the present route from Route 46 west of I-65 to Franklin St., 8th St. to Mill Race. From Mill Race (where it will stop only for passengers to board and alight) it will operate via 8th St., Franklin St., 2nd St., Central Ave., 13th St. to Transit Center. Its only stops between Mill Race and the Transit Center will be at one location along Franklin St. and one location along 8th St. **Figure 9-5** shows a map of the new proposed Route 5.

Figure 9-5: Proposed Route 5

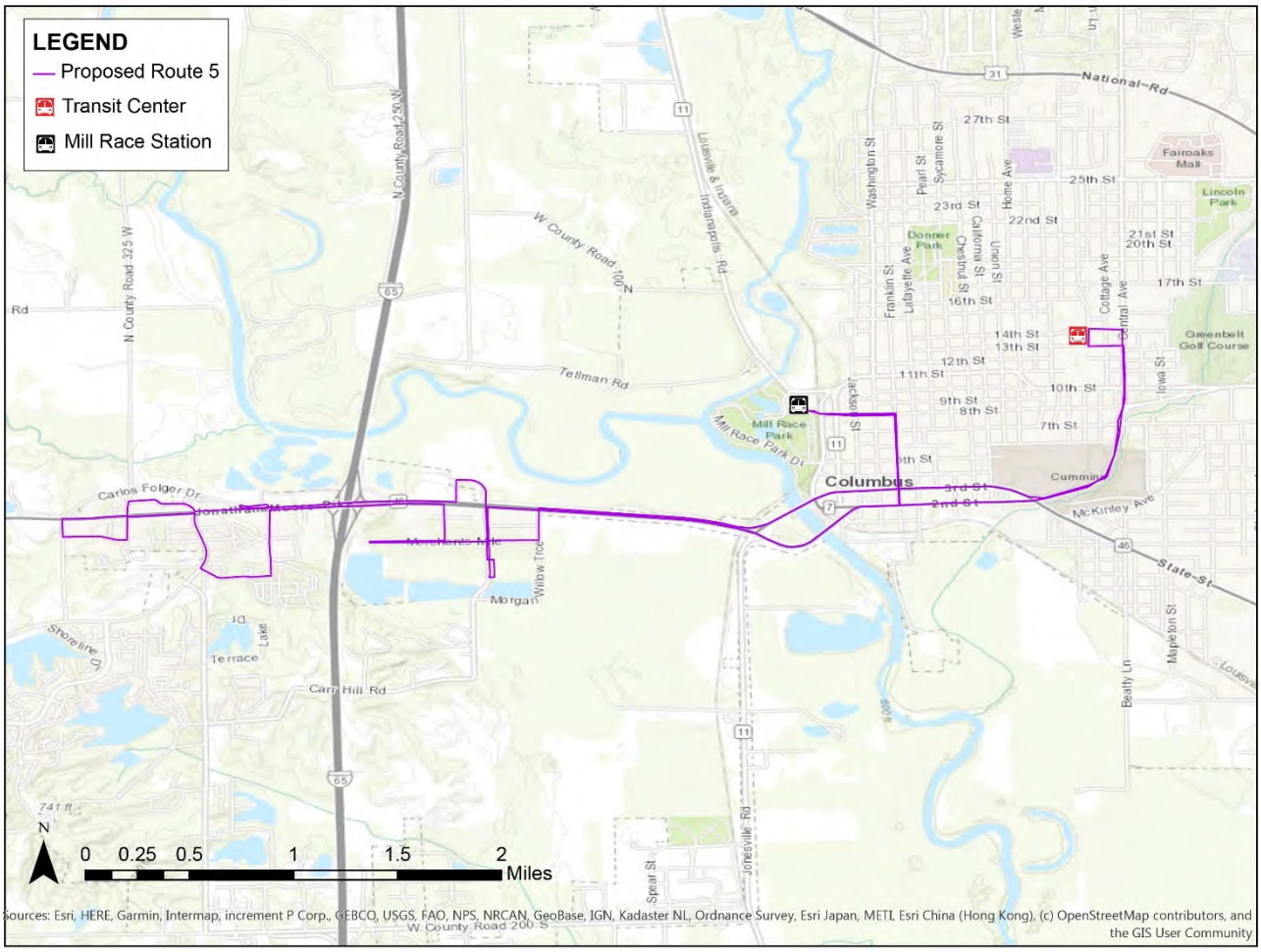
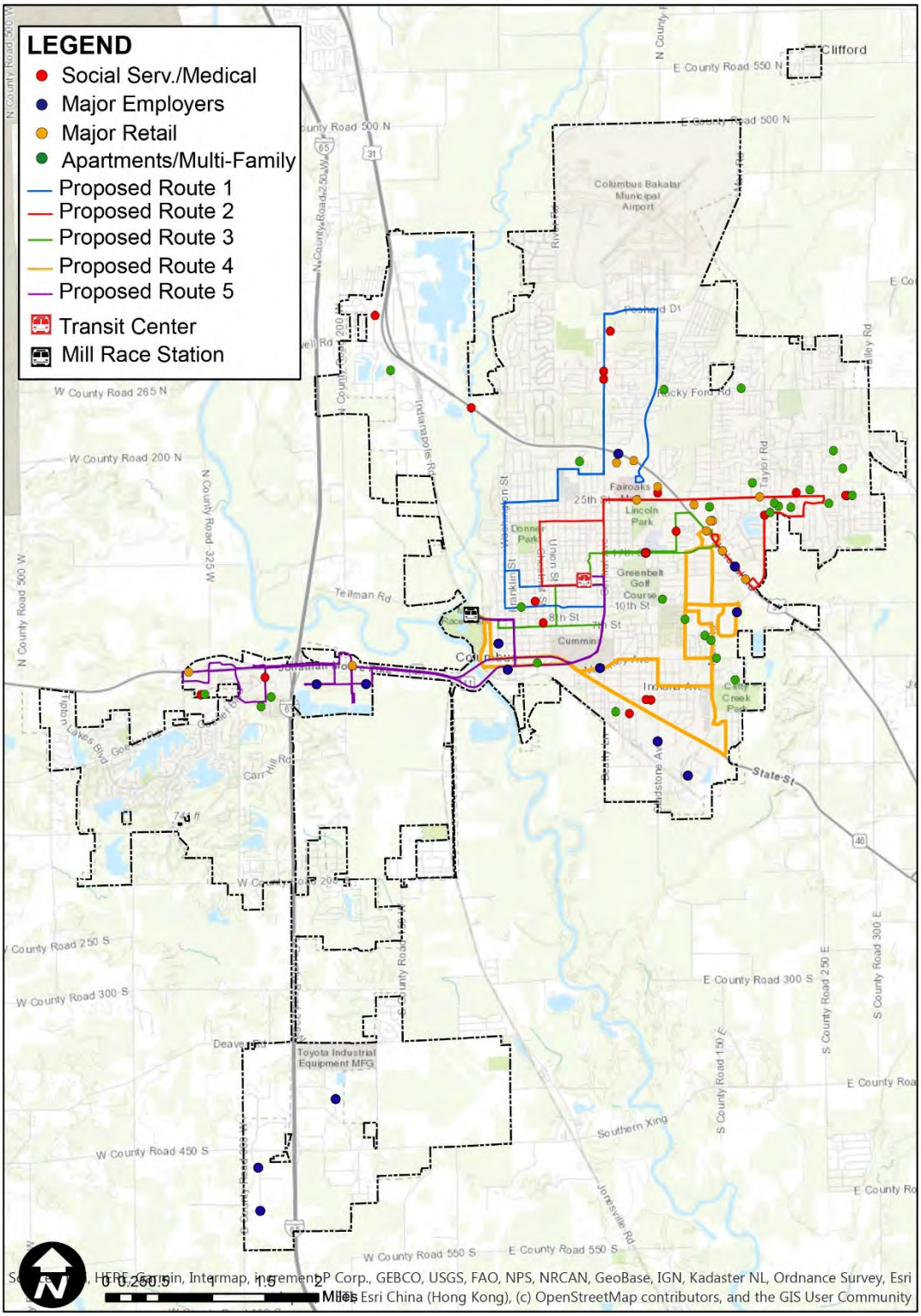


Figure 9-6 shows a map of all five recommended new routes superimposed over the major trip generators shown in **Figure 2-6** through **Figure 2-10.**

Figure 9-6: All Proposed Routes



Added Information
The express operation between Mill Race and downtown will allow quick connections between downtown Columbus and the Transit Center, providing convenient connections to all routes. As noted in Section 4.3, Route 5 presently requires significantly less than its scheduled running time to maintain schedules. This provides the flexibility to extent Route 5 to provide express service between downtown and the Transit Center.

Fare Recommendations

The ColumBUS adult fare has remained unchanged since at least the late 1970's, at $0.25. All ColumBUS' peer systems have adult fares ranging from $1.00 to $1.50. During the public input process, there was a consensus that a fare increase was overdue. Such an increase will help to support the recommended expansions in service. A fare increase to $0.50 for adults is recommended. It is further recommended that the City of Columbus index the transit fare to inflation going forward, so that small incremental increases can be made over time.

Call-a-Bus Operations

No changes are recommended in days or hours of service, which in turns implies no modifications of the level of Call-a-Bus service provided. As noted in Section 6.5, there is a significant potential for cost savings by tightening eligibility requirements for Call-a-Bus as well as providing service only within three-quarter miles of fixed-route bus service, as provided in FTA Circular C 4710.1 (pp. 8-7f). The most recent ColumBUS NTD reports showed annual Call-a-Bus operating costs of approximately $430,000. We anticipate that a review of rider eligibility and application of FTA's dispatching guidelines would easily allow for a 5% to 10% decrease in these costs (roughly $20,000 to $40,000 annually).

9.1.2 Financial Projections

Other than increases in operating costs and ridership due to increased frequencies on some routes and decreases in ridership and increases in revenue due to fare increases, it is assumed that existing ridership, revenue and operating costs will remain stable. Recommended service changes have no other significant effects on the number of routes, vehicle hours and vehicle miles operated. The discussion below estimates the changes in ridership, revenue and operating cost for the recommended service changes.

Fare and Service Elasticities

For this study, we will be using transit fare and service elasticities to estimate the changes in ridership and revenue resulting from fare and service changes. An "elasticity" is a concept from economics, measuring the percent change in an output value given a one percent change in an input value. For example, a fare elasticity of -0.3 with respect to ridership indicates that every 10% increase in fare results in a 3% decrease in ridership.

In *Transit Service Elasticities* (Lago, Mayworm, McEnroe, 1981) bus headway elasticities were determined for three off-peak cases and 10 cases involving service at all times for circumstances where the original headways

were over 50 minutes. The two elasticities (found in Table 1) were -0.71 and -0.58, respectively. The negative sign means that as headways go up. Using this range of values, a change in service from every 60 to every 30 minutes would result in an increase in ridership during the period of the headway increase of between 16% and 42%. We anticipate that the route simplification process now ongoing will result in ridership increases at the higher end of this range.

In our judgment, the very low fare which ColumBUS has charged for a long time (as well as the widespread acceptance of a fare increase) make it inappropriate to apply standard elasticity methodology to forecast ridership changes due to the fare increase. We anticipate a 10% to 15% decrease in ridership due to an increase from $0.25 to $0.50. Applying standard fare elasticities (such as those in Table 1 of *Transit Elasticities and Price Elasticities*, Litman, 2014) would result in forecasts of 12% to 22% decreases in ridership.

Operating Cost Changes

No changes in operating costs are anticipated due to the fare increase. Routes 2 and 4 each will operate six additional round trips daily due to increased service frequencies (decreased headways). This will result in 12 added bus-hours daily and 72 added bus-miles daily. Routes 2 and 4 are similar in length, their increases in operating costs will be similar. Following are the annual increase in operations for the proposed headway improvements (from 60 to 30 minutes between 11 am and 5 pm leaving the Transit Center.

- Annual added bus hours – 3,060
- Added annual bus miles – 36,800
- Added peak buses – 2

Table 3-1 uses data from ColumBUS' NTD reports to determine its marginal operating costs per bus hour (for bus operations), per bus mile (for maintenance and fuel), and per peak vehicle (managerial and dispatching costs). It must be recognized that ColumBUS has some flexibility in managing its bus fleet. However, there will be real costs for overseeing a 7-vehicle fixed-route bus operation between 11 am and 5 pm, weekdays. The marginal operating costs shown in **Table 3-1** include:

- Cost/bus hour - $36.43
- Cost/bus mile - $1.18
- Annual cost/peak bus - $36,600

Applying these cost factors to operating resources yields an estimated annual operating cost increase of $226,000 for the reduced headways on Routes 2 and 4 between 11 am and 5 pm, weekdays. It should be noted that 32% of these costs ($73,000) are for added managerial and dispatching costs. These costs may be less than indicated. However, it should not be assumed that increasing the fixed route operations (to 7 buses from 5) for six hours each weekday is a "no cost" item.

Increased Frequencies

Service is recommended to double (from every 60 to every 30 minutes) on Routes 2 and 4 (as reconstituted). These routes have the largest concentration of ridership for existing ColumBUS service. The on-board counts during these hours (**Table 4-10** and **Table 4-18**) were adjusted for annual normalization factor to forecast potential annual increases in ridership due to the increased frequencies. To compute annual revenue increases, the average fare/rider for ColumBUS service ($0.19) was taken from the INDOT 2018 Indiana Public Transit Annual Report.

For both routes combined, forecasted increases in daily ridership, annual ridership, and annual fare revenue are:

- 40 to 110 added daily riders
- 10,500 to 27,300 added annual riders
- $2,000 to $5,200 additional annual fare revenue.

Increased Fares

In the INDOT 2018 Indiana Public Transit Annual Report, ColumBUS reported 244,000 annual riders. Assuming a fare increase from $0.25 to $0.50 and a loss of ridership of 10% - 15% yields the following forecasts.

- Annual ridership of 207,000 – 220,000
- Annual fare revenue increase of $32,000 - $37,000

9.1.3 Consistency with CAMPO Long-Range Plan

To be provided when service plan is finalized

9.1.4 CAMPO Travel Demand Model Evaluation

To be provided when service plan is finalized

9.2 Final Service Plan

To be provided when service plan is finalized

9.3 Bicycle and Pedestrian Accessibility

To be provided when service plan is finalized

Appendix

Appendix A

To be provided when service plan is finalized

Appendix B

To be provided when service plan is finalized

Appendix

Appendix A

To be provided when service plan is finalized

Appendix B

To be provided when service plan is finalized