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TECHNICAL MEMORANDUM #3

2045 in Motion FAST Planning Metropolitan Plan Update

Needs Assessment

Date:	March 13, 2023	Project #: 26291
To:	Jackson Fox, FAST Planning	
From:	Andrew Ooms, PE, PTSO, RSP, Matthew Hagen, Nick Foster, AICP, RSP, and Polina Polikakhina	
cc:	FAST Planning Technical Committee	

INTRODUCTION

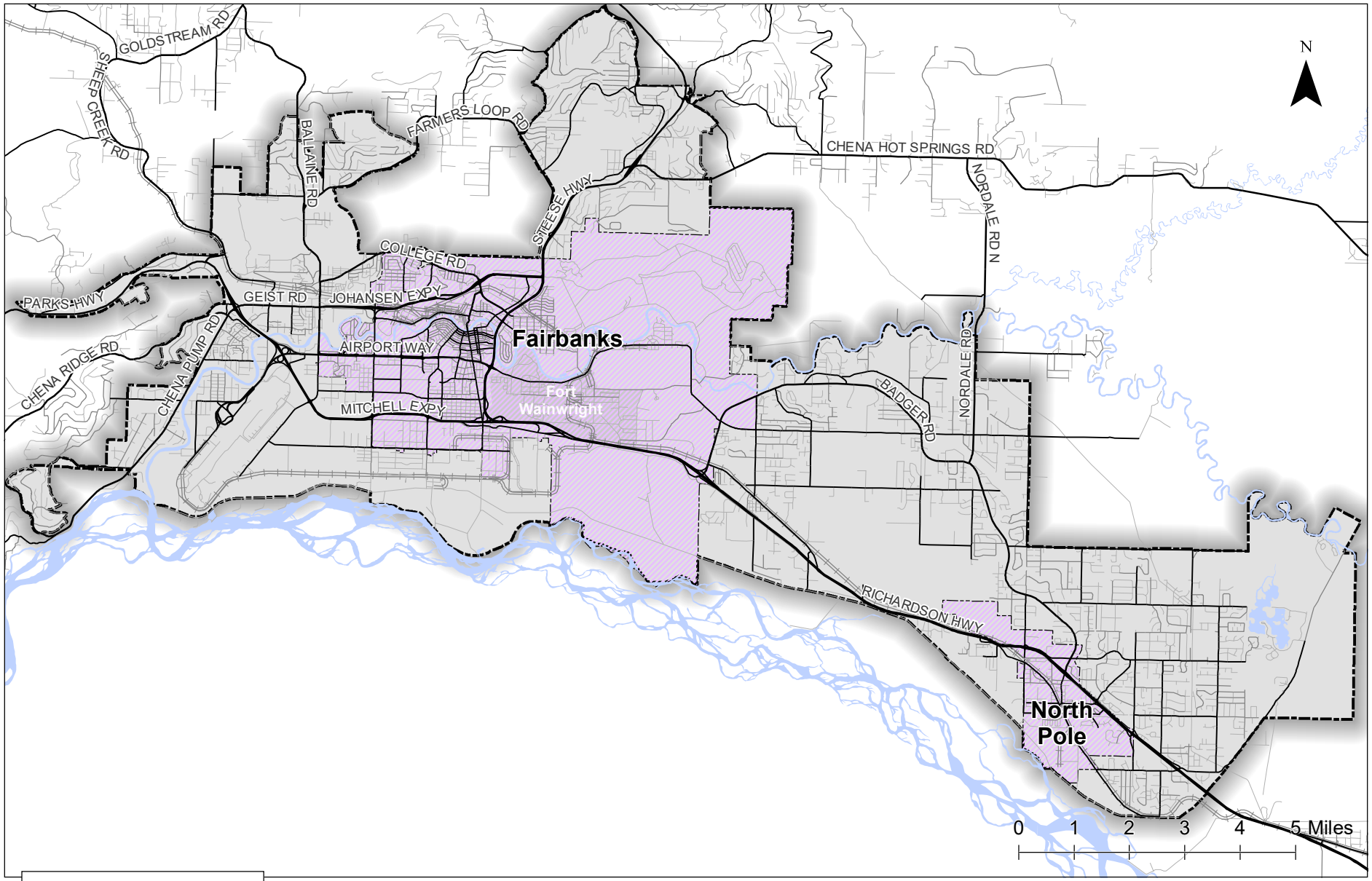
This memorandum provides an overview of the future needs (year 2045) of the multimodal transportation system within the Fairbanks Area Surface Transportation (FAST) Planning boundary. The study area is shown in Figure 1. This memorandum is prepared as a part of the effort to update the current FAST Planning Metropolitan Transportation Plan (MTP), which was adopted in 2018. Future needs for the transportation system are based on the existing conditions assessment, planned improvements, and forecast transportation conditions.

ROADWAY FACILITIES

Future roadway needs have been identified based on forecast year 2045 travel demand. The projected volumes were developed through a regional travel demand model. These volumes were then evaluated to determine where additional capacity may be needed beyond what is currently planned. The following summarizes this process.

Model Background

The travel demand model used for this analysis was created in 2013 based on a new land use inventory and household activity survey. The current model represents the roadway network, households, and jobs that exist in 2021-2022. The model has been calibrated to measured traffic volumes counted in 2021. Estimates of new jobs and households expected by 2045 were developed by an expert panel assembled by Fairbanks North Star Borough (FNSB) and based on historical trends and published economic forecasts. Final growth rates were confirmed through an interagency consultation review. Growth allocations to geographic areas within the region were developed by an expert panel that provided input on where growth is thought to most likely occur. The panel included FAST Planning, FNSB, and Alaska Department of Transportation & Public Facilities (ADOT&PF) planning staff and real estate experts.



FAST Planning Study Area
Fairbanks, Alaska

Figure
1

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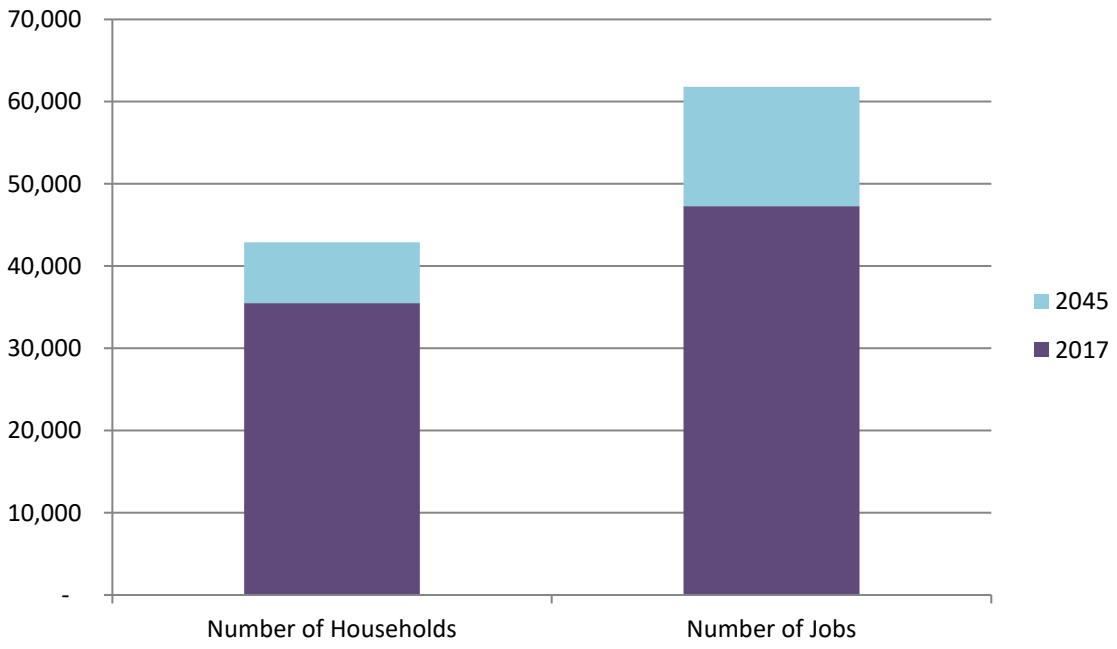
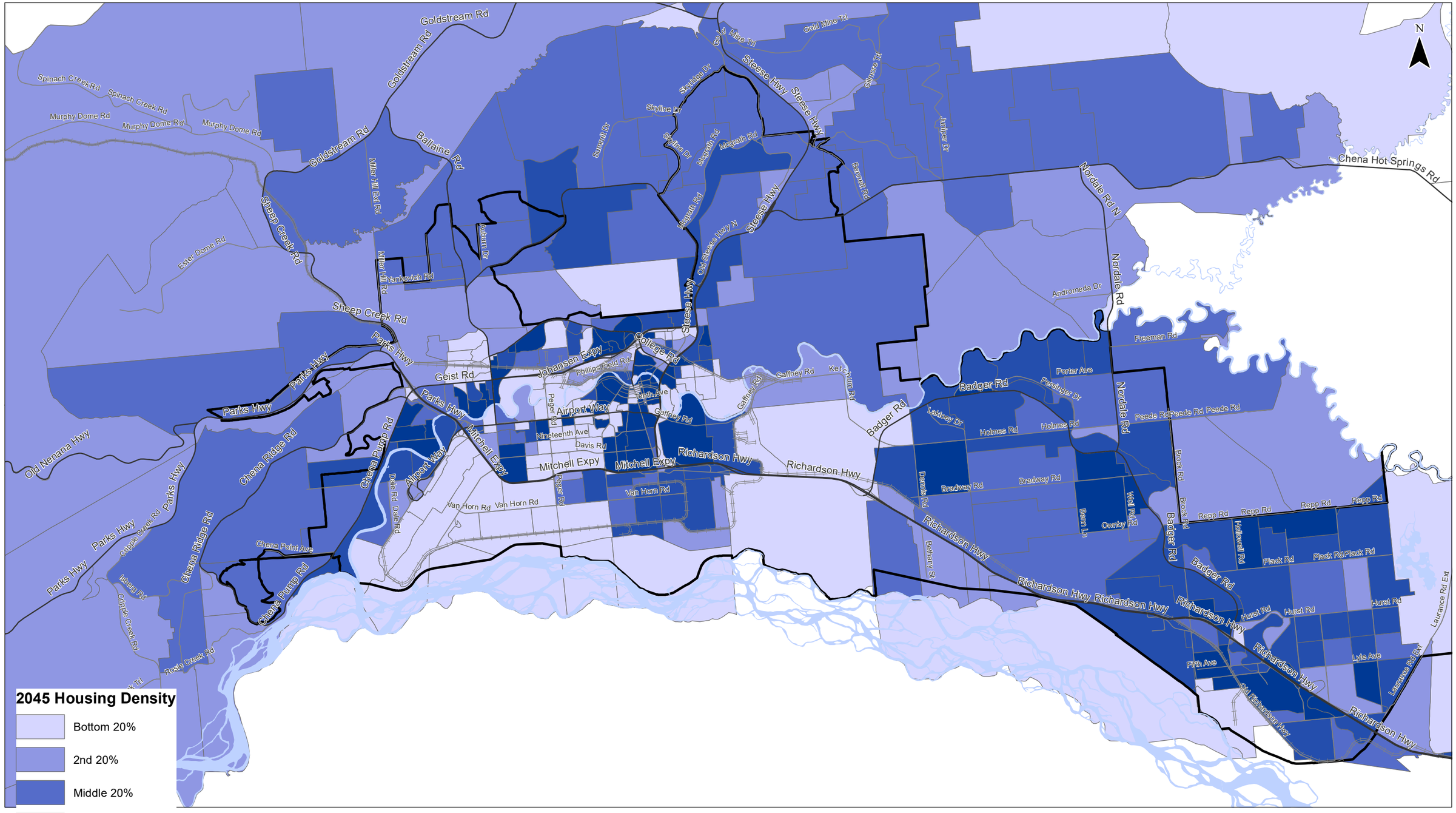
Current economic forecasts and potential changes in military base activity were also considered in the growth projections and allocation process. Finally, the list of transportation projects contained in the 2045 FAST Planning MTP were added to the existing roadway network in the model and a 2045 travel demand forecast was produced.

Figure 2 shows the regional housing density projections by transportation analysis zone (TAZ) for 2045. Figure 3 shows the projected employment density from in 2045.

Exhibit 1 depicts the total growth for housing and employment from 2017 to 2045. The year 2017 is used because development data more recent than 2017 was not available for this modeling effort. The number of households is expected to increase by 21 percent, from about 35,500 to 42,900, and the number of jobs is forecast to increase by 31 percent, from about 47,300 to 61,800. This growth ultimately yields a jobs-household ratio of approximately 1.4, which is fairly typical for a metropolitan area.

Exhibit 1 Total Household & Job Growth (2017-2045)





2045 Housing Density

- Bottom 20%
- 2nd 20%
- Middle 20%
- 4th 20%
- Top 20%

Projected 2045 Housing Density
Fairbanks, Alaska

Figure **2**

Coordinate System: NAD 1983 2011 Alaska Albers
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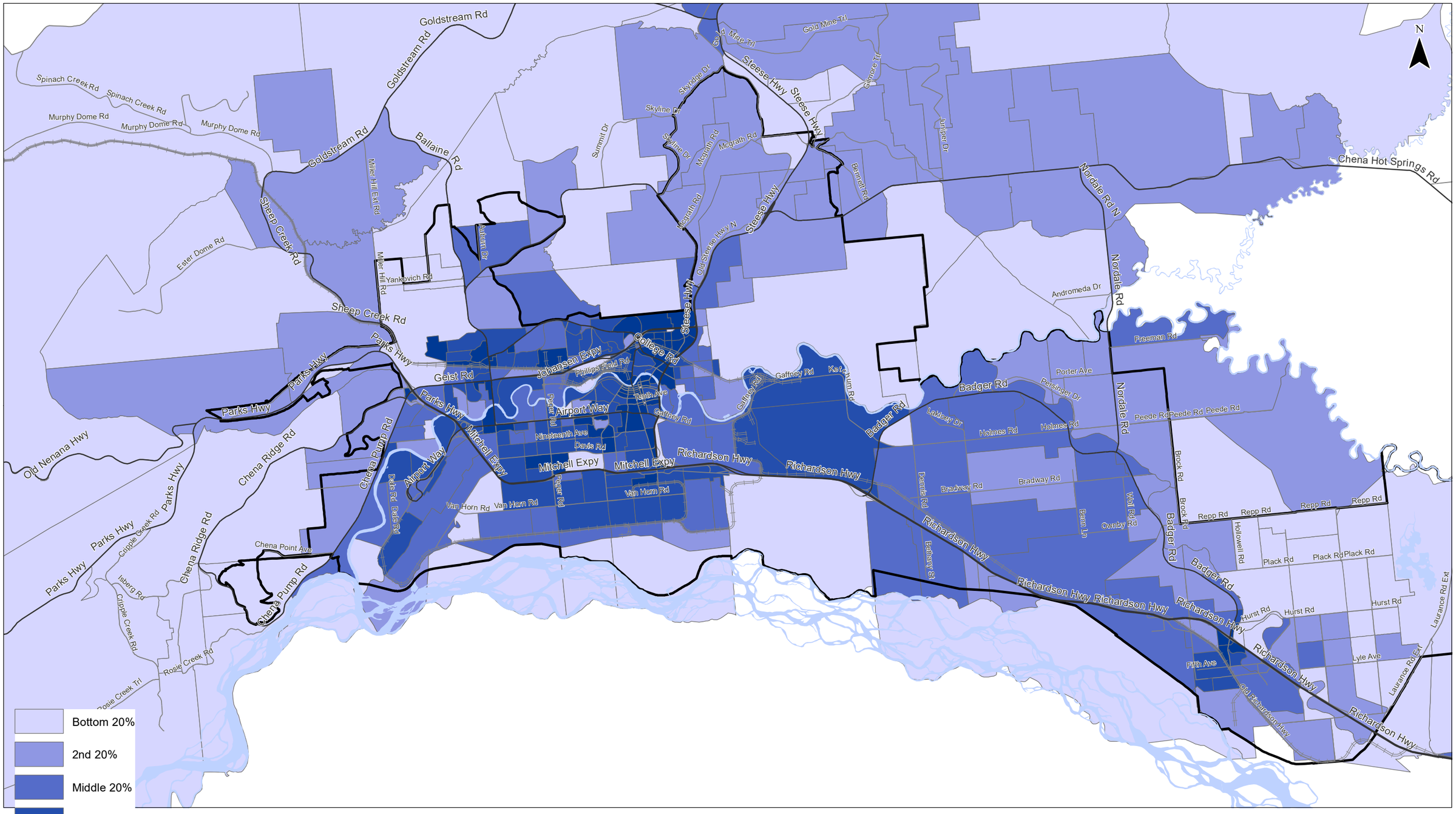

Projected 2045 Employment Density
Fairbanks, Alaska

Figure
3

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Vehicle Volume Growth

Table 1 summarizes travel demand model estimates of 2021 and 2045 average annual daily traffic (AADT) volumes and the resulting growth rates on select roadway sections. Traffic volumes are generally expected to grow at annual rates under 2% per year.

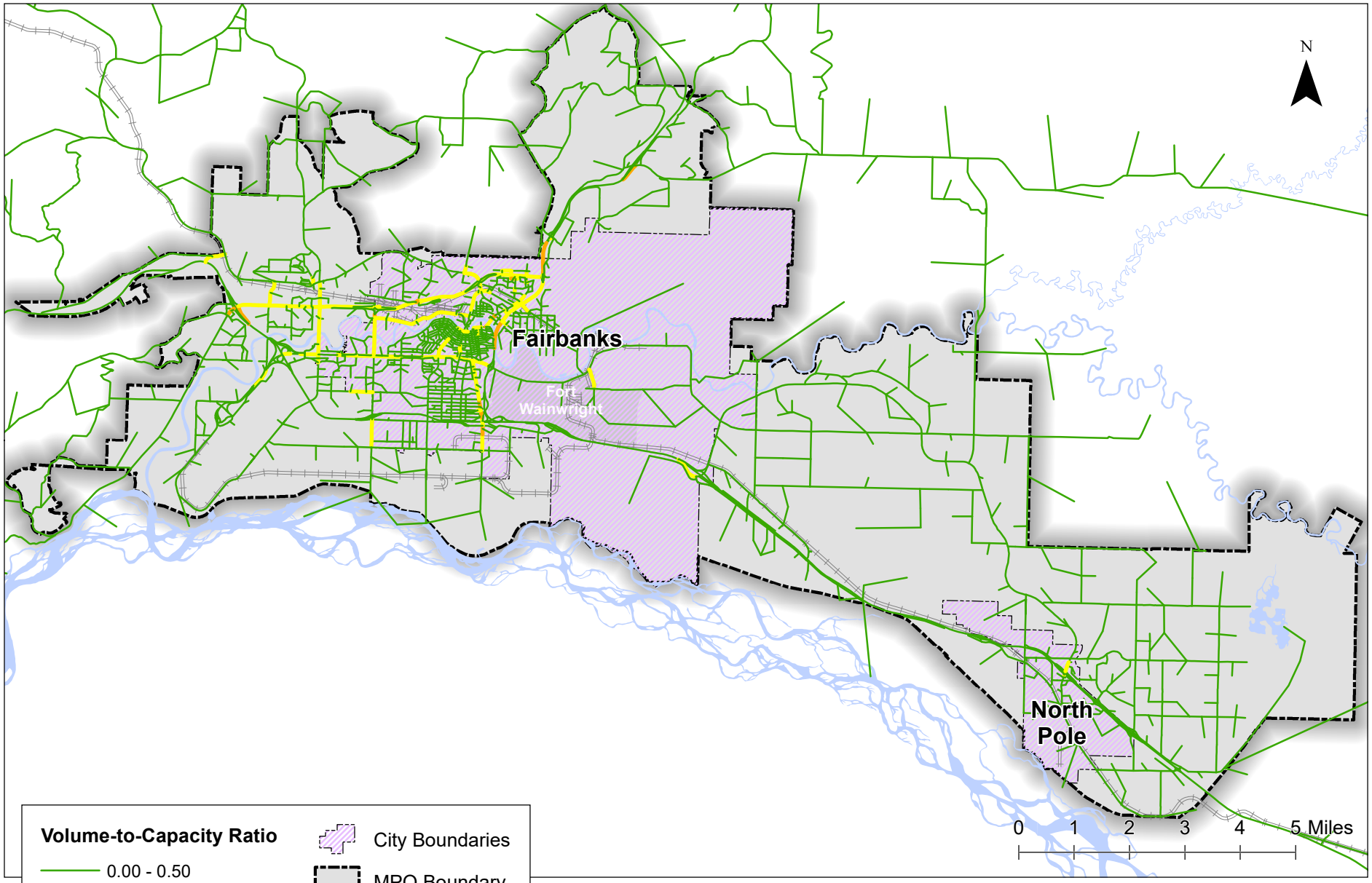
Table 1 2013-2045 Growth Rates on Select Segments

Roadway	Segment	2021 AADT Volume	2045 AADT Volume	Annual Growth Rate
Mitchell Expressway	West of Peger Road	13,100	17,963	1.60%
Johansen Expressway	East of Peger Road (Aurora Junction)	19,800	26,995	1.14%
Steese Expressway	South of 3rd Street	25,300	33,543	1.23%
	North of 3rd Street	20,600	26,988	0.99%
	North of Johansen Expressway	20,000	29,072	1.45%
Richardson Highway	West of Old Richardson (Fairbanks)	15,300	13,898	-0.46%
	West of Badger Road	25,500	35,760	1.80%
	East of Badger Road (North Pole)	18,800	27,565	2.33%
Airport Way	East of Wilbur Street	14,500	16,128	0.33%
College Rd	West of Johansen Expressway	12,500	19,668	2.15%
University Avenue	North of Airport Way	15,548	20,564	1.31%
Peger Road	North of Airport Way	18,200	21,937	0.80%
S Cushman St	North of 23rd Avenue	7,780	8,899	0.55%
Badger Road	South of Montgomery Road	10,100	12,663	1.29%

Future Roadway Needs Analysis

Future capacity needs have been evaluated on specific roadways based on their forecast future volume-to-capacity ratio (V/C). The volume to capacity ratio is calculated by taking the peak hour volume of vehicles in relation to the estimated volume of vehicles that can move through the roadway in an hour. This analysis assumes all the planned financially constrained projects from the 2045 MTP have been constructed by 2045. Therefore, this analysis identifies locations that may require additional work beyond what is proposed in the current MTP to meet ADOT&PF's operational standard.

For planning purposes, ADOT&PF maintains an operational standard of a V/C ratio less than 0.90 for its roadways. Per the model output, no segments in the model area are forecast to exceed a V/C of 0.90 in year 2045, as shown in Figure 4.



Year 2045 Volume-to-Capacity Ratios
Fairbanks, Alaska

Figure **4**

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FREIGHT SYSTEM

Future freight needs have been compiled from a review of the draft FAST Planning Freight Mobility Plan (FMP) Existing and Future Conditions reports. The following summarizes the freight needs in the FAST Planning area, as identified in those reports.

- Freight bottlenecks and congestion exist at the following locations and are expected to degrade as travel demands increase over time. Descriptions of the needs are provided in the FAST Planning FMP:
    - 3rd Street and Steese Highway Intersection
    - Peger Road and Van Horn Road Intersection
    - Cushman Street and Airport Way Intersection
    - South Cushman Street and 23rd Avenue Intersection
    - Mitchell Expressway and Peger Road Intersection
    - Buzby Road and Laurence Road Intersection
    - Richardson Highway and Old Richardson Highway (12-mile) Intersection
    - Old Steese Highway and Trainor Gate Intersection
    - 34th Avenue from South Cushman Street to MacArthur Street
    - Northbound Buzby Road/Dawson Road exit from Richardson Highway
    - Richardson Highway/ARRC 3-Mile Crossing
    - Richardson Highway and Peridot Street Intersection
    - Chena Ridge Road and Chena Pump Road Intersection
    - Driveway Street
    - Parks Highway and Geist Road Interchange
    - College Road
    - Airport Road
    - Van Horn Road
    - Phillips Field Road
- The FMP also identifies the at-grade railroad crossings of most concern are:
    - University Avenue Rail Crossing
    - Trainor Gate Road and Steese Highway Rail Crossing
    - Trainor Gate Road and Old Steese Highway Rail Crossing
    - Sheep Creek Road Extension Rail Crossing
    - Old Richardson Highway to the Richardson Highway in the North Pole Area

Further descriptions of the needs are provided in the FAST Planning FMP.

Additionally, the 2021 Fairbanks Road/Rail Crossing Reduction/Realignment Plan identifies the following 15 crossings as priorities for improvement. The crossings that are included in this plan and the FMP are indicated in **bold** print.

- **University Avenue Crossing**

- College Road Crossing
- Helmericks Avenue Crossing
- Old Steese Highway Crossing (*planned ADOT&PF project*)
- **Steese Expressway & Bike/Ped Pathway Crossings**
- C Street Crossing
- Farewell Avenue Crossing
- Richardson Highway (3 Mile) Crossing (*planned ADOT&PF project*)
- Richardson Highway (12 Mile/Peridot) Crossing
- **5th Avenue Crossing** (*planned ADOT&PF project*; identified in the FMP as "Old Richardson Highway to the Richardson Highway in the North Pole Area")
- **8th Avenue Crossing*** (*planned ADOT&PF project*; identified in the FMP as "Old Richardson Highway to the Richardson Highway in the North Pole Area")
- Laurance Road Crossing
- VFW Street Crossing
- Dyke Road Crossing

TRANSIT SYSTEM

The future needs of the transit system are arrived at through a review of previous plans, including the current MTP and the 2013 *Fairbanks North Star Borough Short & Long Range Transit Plan*; a density analysis based on forecast population and employment figures in each transportation analysis zone (TAZ) in the travel demand model; an interview with transit staff; and needs identified in the existing conditions analysis.

In Figures 5 and 6, current MACS routes are overlaid on TAZs that have been divided into five groups (quintiles) by predicted 2045 employment and household density, respectively. This is done to identify areas that may be underserved by transit. An analysis of the information shown in Figures 5 and 6 reveals that the current transit system is projected to continue serving the most dense areas of the FAST Planning region.

Two areas expected to have higher housing densities that should be considered for future transit expansion are:

- East and northeast of North Pole
- The area between the New Steese Highway and Skyridge Drive-Skyline Drive, east and north of Fox

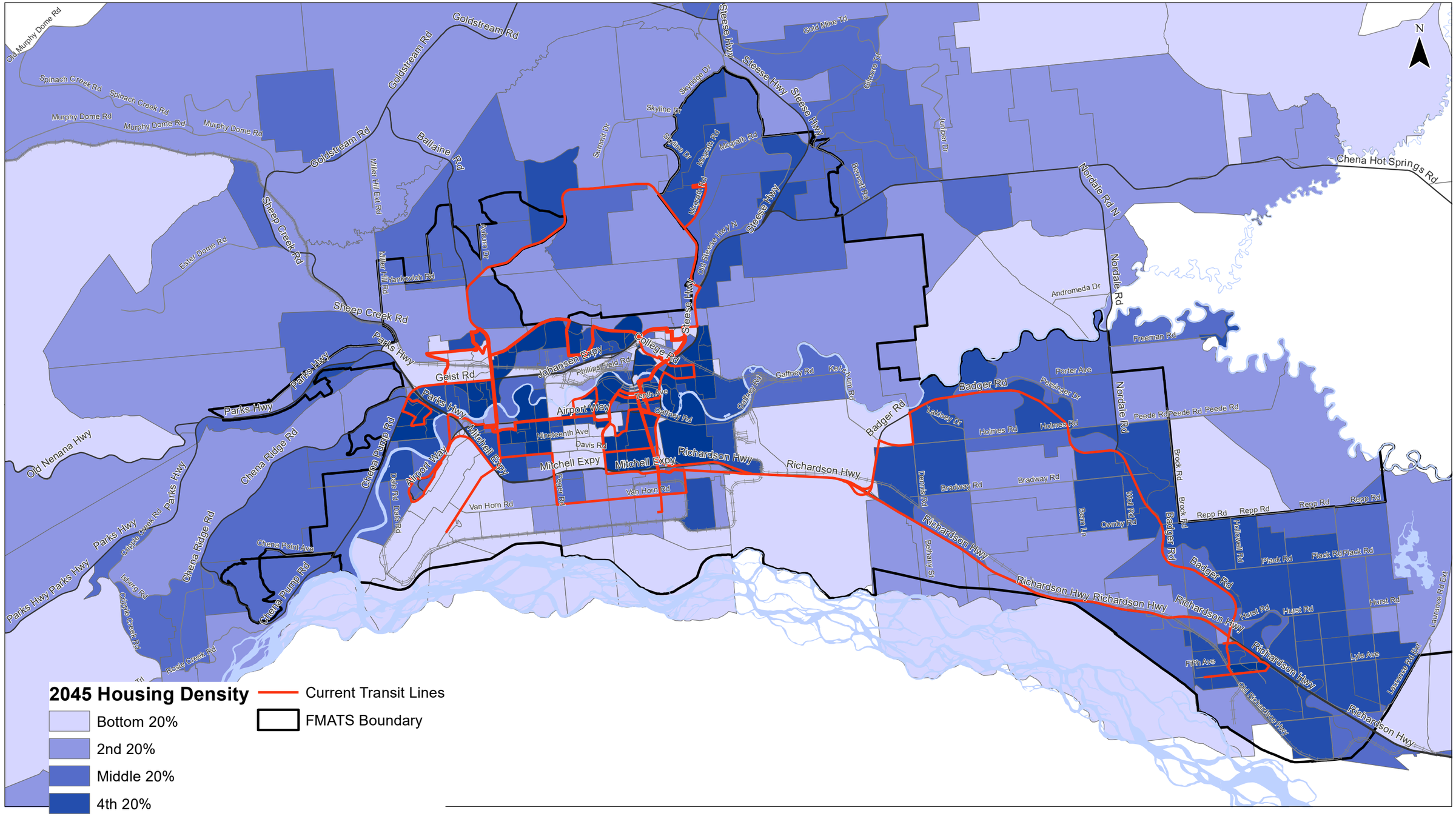
Specific Needs

- A lack of service to Eielson Air Force Base and Salcha
- Inadequate transit maintenance center capacity (*expected to be addressed by the Transit Garage Expansion Project: Phase 1*)

General Needs

These general needs relate to the transit system as a whole and apply to multiple or all routes:

- New transit and paratransit vehicles
- Lack of service on Sundays
- Inadequate headways on Red and Blue Lines
- Inadequate and insufficient bus stop shelters and amenities
- Updated transit planning and network analysis (*planned by FAST Planning*)



Projected 2045 Housing Density and Transit
Fairbanks, Alaska

Figure **5**

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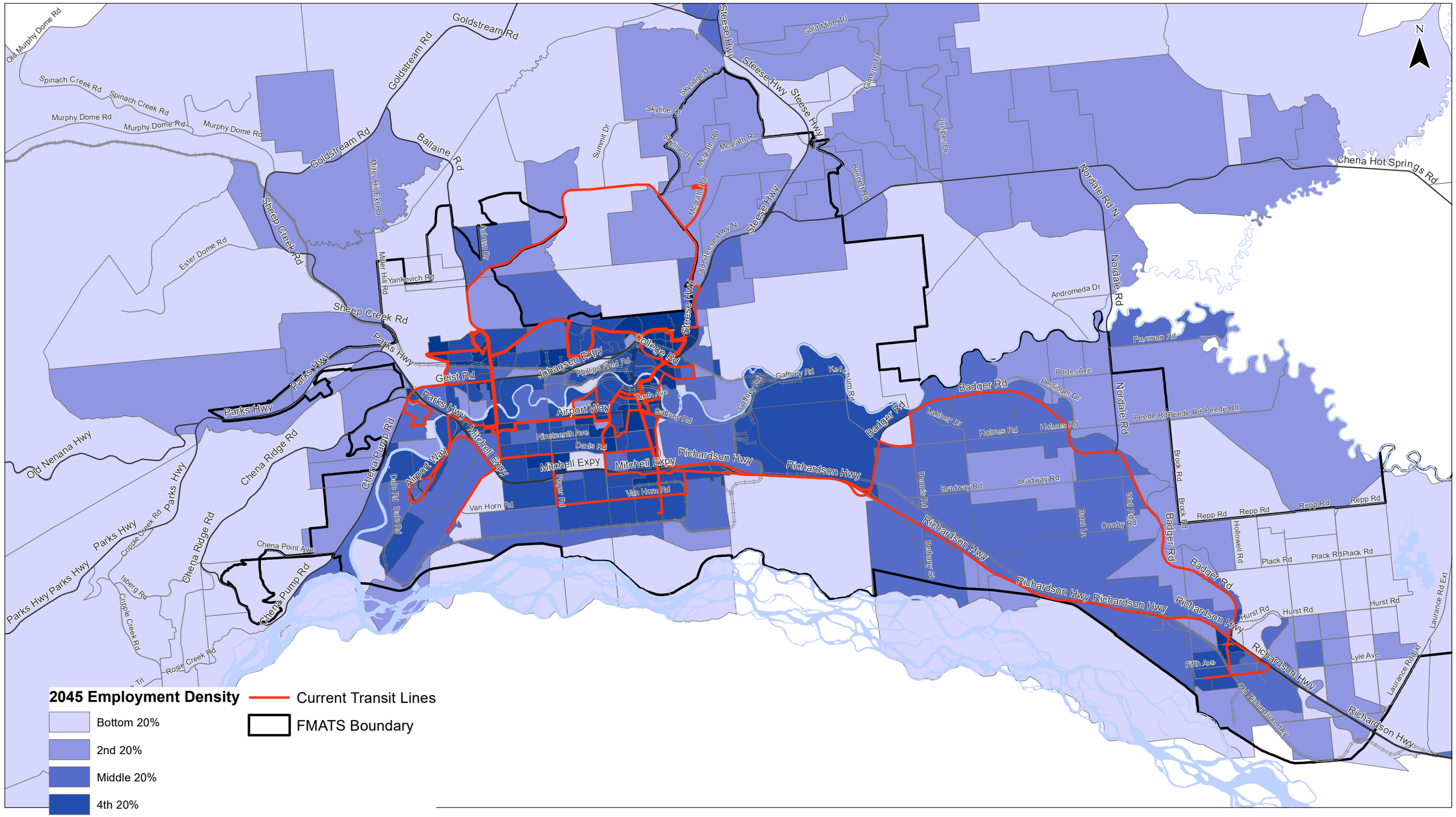

Projected 2045 Employment Density and Transit
Fairbanks, Alaska

Figure **6**

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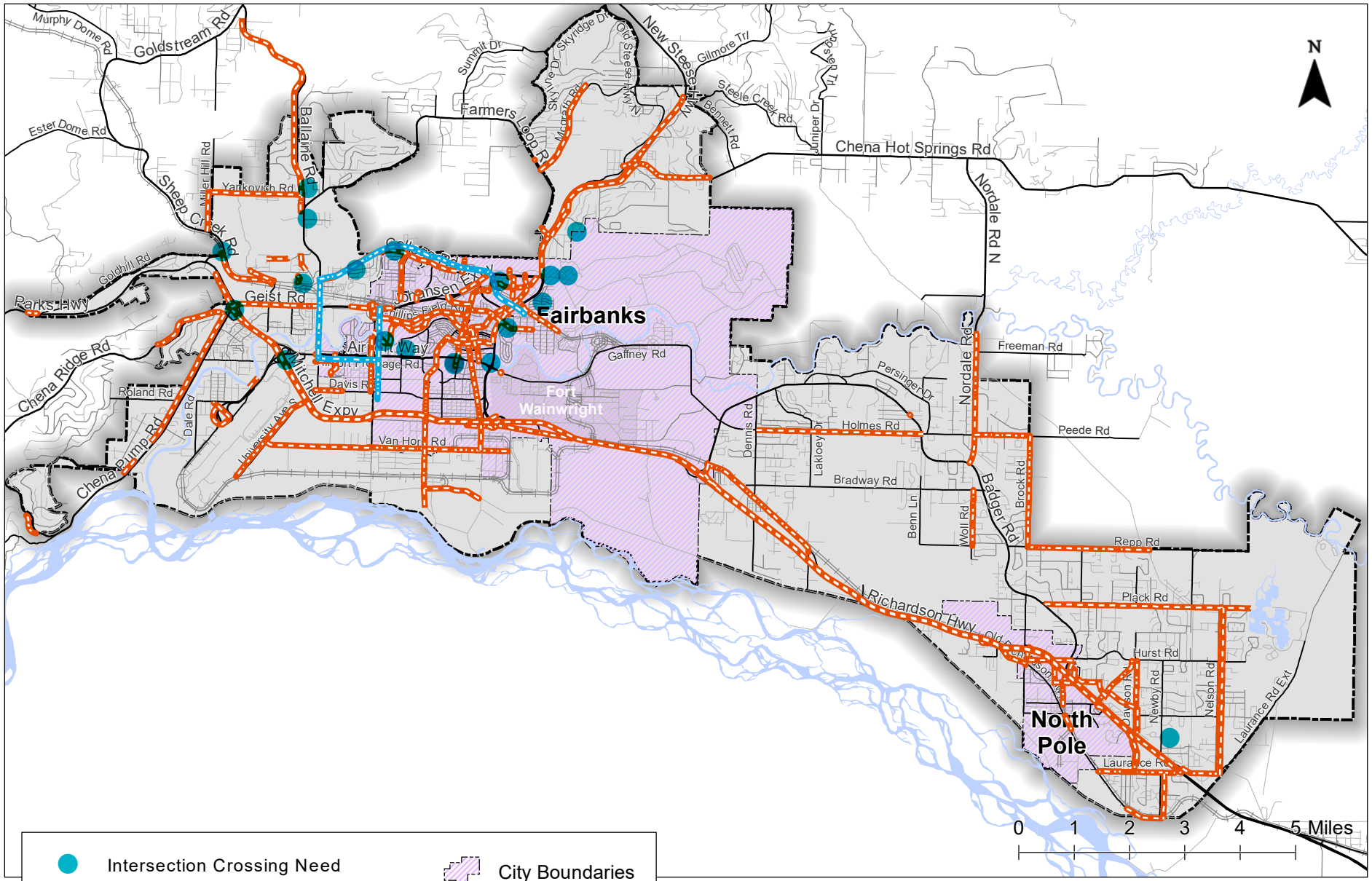
BICYCLE AND PEDESTRIAN FACILITY NEEDS

Specific bicycle and pedestrian needs are shown in Figure 7 and Figure 8 (duplicated from the Existing Conditions Summary). General system needs include:

- Creating a more integrated non-motorized network throughout the Fairbanks-North Pole region
- Widen or provide parallel bicycle facilities where pedestrians and bicyclists currently share the same space
- Provide connections to/from transit service
- Providing year-around maintenance efforts to keep bicycle and pedestrian facilities free of snow, ice, and gravel
- Expanding the number of facilities maintained to provide greater safety for pedestrians and bicyclists
- Continued improvement in transitioning sidewalks to comply with ADA standards
- Provide safe intersection crossings for pedestrians and bicyclists



Bicycle Facility Needs
Fairbanks, Alaska

Figure **7**

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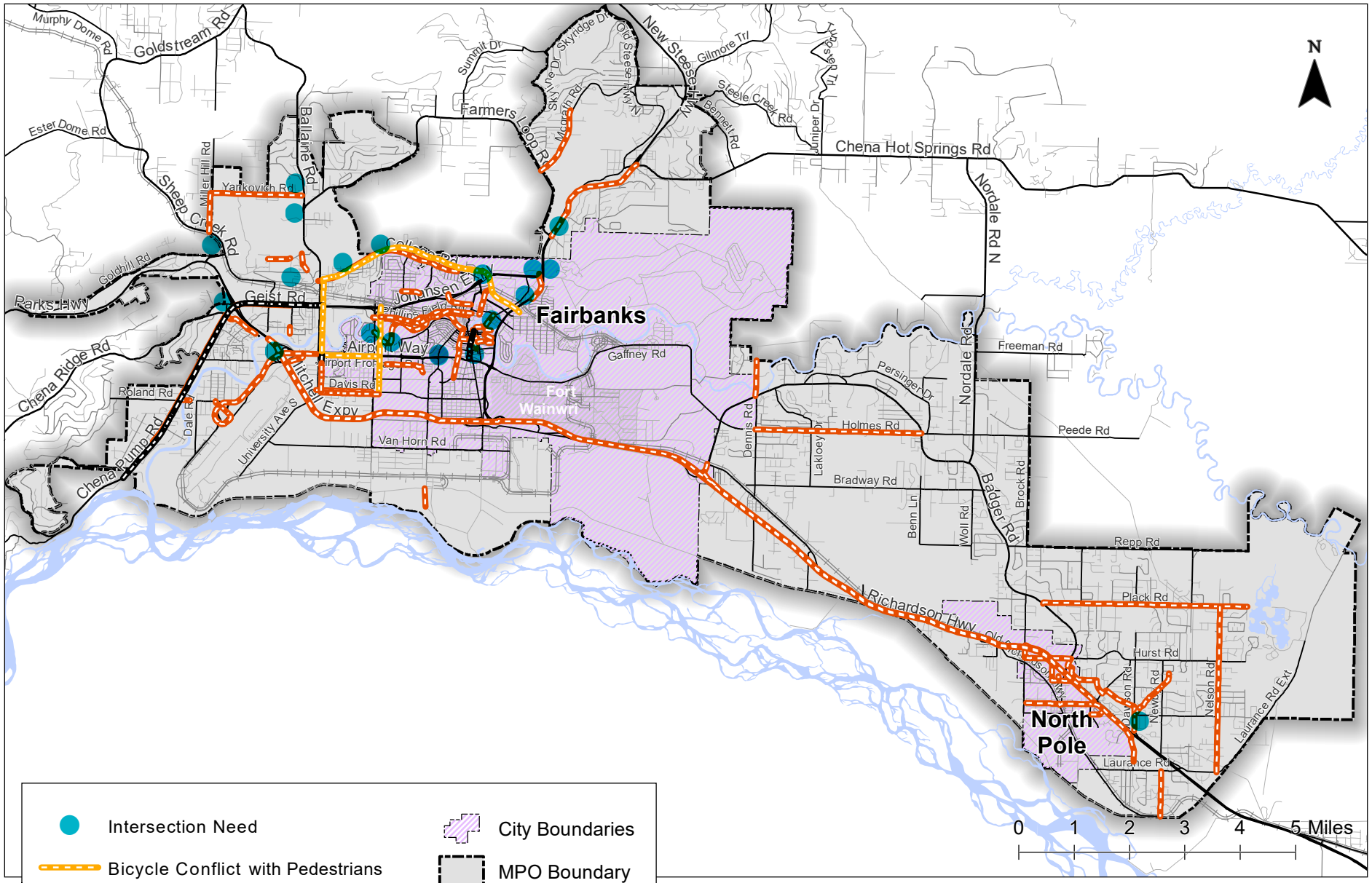

Pedestrian Facilty Needs
Fairbanks, Alaska

Figure
8

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OPERATIONS, MANAGEMENT, AND PRESERVATION

Based on a workshop with the FAST Planning area agencies, the following future operations, management, and preservation needs were identified to address winter maintenance, construction impacts, and roadway surface conditions. These future needs are:

- Share DOT&PF real-time weather, surface conditions, and traffic operations center data with FNSB and City of Fairbanks.
- Expand the mobile sensor and vehicle-to-infrastructure communications system.
- Improve and expand public communications about roadway conditions and construction routing information.
- Expand and refine pavement condition assessments at DOT&PF, City of Fairbanks, and City of North Pole.
- Expand the preventative pavement maintenance program to optimize maintenance expenditures.
- Develop an advanced speed management and winter maintenance plan for the Richardson Highway between Fairbanks and Eielson Air Force Base.

Create an intra-agency public mapping system for reporting roadway and non-motorized path conditions and maintenance needs. Consider utilizing a mobile application for advancing such program.