

Existing Service and Market Evaluation

April 2020



Introduction to Redesign Streamline 2020

Bozeman, Montana is one of the fastest-growing micropolitan areas in the country. After the 2020 U.S. Census is fully processed, the population of Bozeman is expected to surpass 50,000.¹ This number is an important threshold in Federal Transit Administration (FTA) formula funding, changing Bozeman's classification from rural to a small urbanized area, impacting grant eligibility. The Streamline routes and network design have not had a major evaluation and update since the system started in 2006. With such rapid population growth and potential changes to funding, Streamline launched *Redesign Streamline 2020* to evaluate existing service and rethink Streamline service for the future.

The first step of *Redesign Streamline 2020* is a study of existing service and market conditions, the findings of which are detailed in this report. With the existing conditions analysis complete, the next step will be developing service strategies and recommendations, which will be vetted by the public outreach process and Streamline Board. Ultimately, the project will culminate in a transit development plan that solidifies the final service recommendations and provides implementation guidance.

System Overview and Regional Context

The local and regional context provides an important framework for Streamline service design. Understanding the organizational structure, origins of Streamline, and the service's role in regional travel is critical to designing service that is tailored to demand and coordinated with other public transportation services.

Streamline Service Area

Streamline is the primary transit service for residents and visitors of Bozeman, MT and surrounding communities. Bozeman is the county seat of Gallatin County, which is the third largest county in the state and the fastest-growing. Bozeman is also home to Montana State University (MSU), a public land-grant research university with nearly 17,000 enrolled students. While the area's economy was historically based in farming, ranching, and natural resource extraction and processing, growing tech and manufacturing sectors have contributed to the recent increase in population. Tourism has also become an increasingly important piece of Bozeman's economy, with its proximity to popular ski destinations in Big Sky and Bridger Bowl, as well as the north and west entrances to Yellowstone National Park.

Nearby communities of Belgrade, Four Corners, Livingston, Manhattan, and Three Forks are considered part of the same labor-market as Bozeman, with many residents commuting into Bozeman for work. The geographic focus of *Redesign Streamline 2020* includes the City of Bozeman as well as Belgrade, Four Corners and adjacent unincorporated areas, the anchors of the Gallatin County Triangle planning area.

Streamline System and Operations

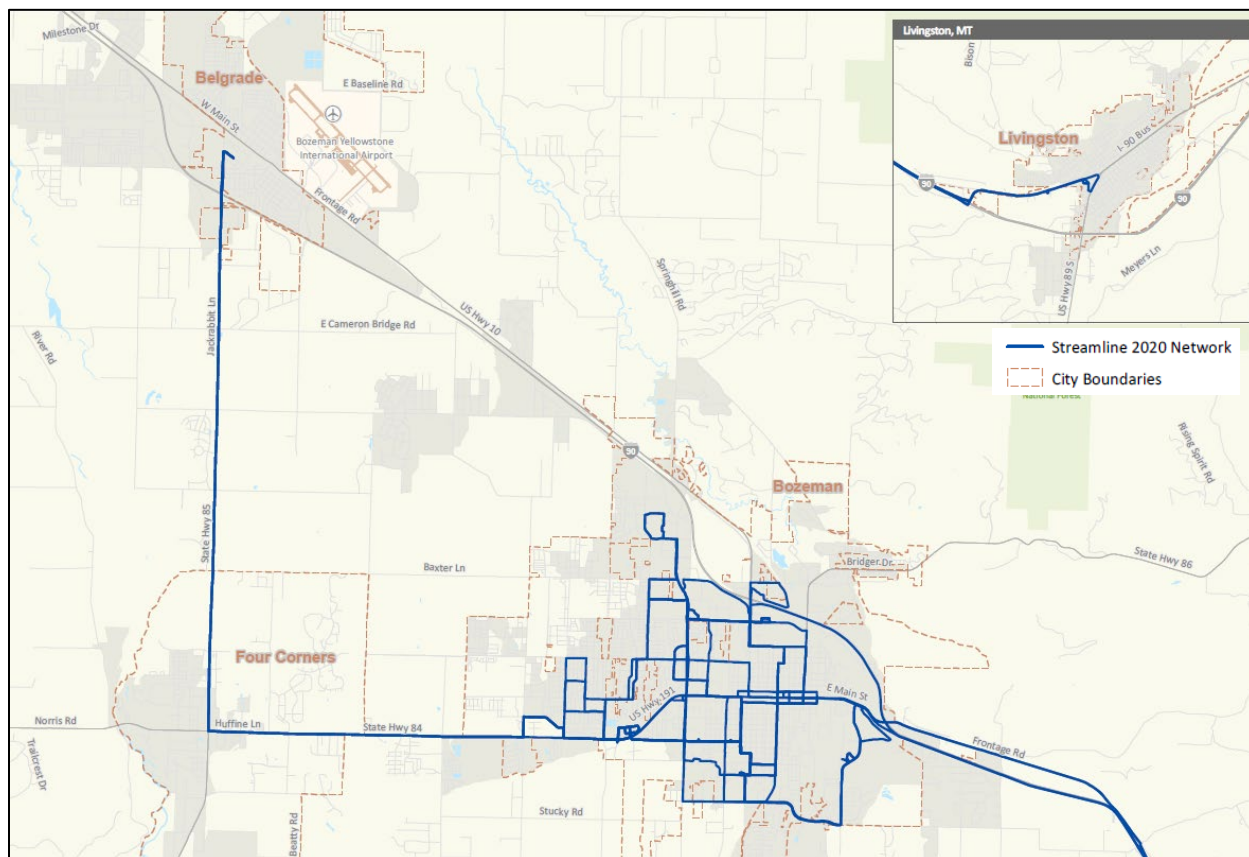
Streamline offers fare-free fixed-route transit service in the City of Bozeman and commuter service to Belgrade, Four Corners and Livingston. Streamline also provides seasonal service on weekends to the

¹ According to the 2010 Census, the City of Bozeman had a population of 37,280 people. The Census-estimated population for 2018 was 48,532. The micropolitan area of Bozeman (including the city) had a population of 89,513 in the 2010 Census. The estimated population in 2018 was 111,876.

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Bridger Bowl Ski Area for four to five months of the year and partners with MSU to operate two Late-night routes and a campus shuttle service. See Figure 1.

Figure 1: Redesign Streamline 2020 Study Area



Streamline is managed by the Human Resources Development Council of District IX, Inc. (HRDC), a 501(c)3 non-profit Community Action Agency serving Gallatin, Park, and Meagher Counties, with offices in Bozeman and Livingston. In addition to Streamline, HRDC administers and operates Galavan, a door-to-door transportation service for seniors (over age 59) and people with disabilities. Transportation is only one component of the HRDC organization, which also administers the regional Head Start preschool program, operates the food banks, and provides services to seniors, youth, and low-income households. Since 2010, HRDC has contracted with Karst Stage, Inc. for bus operators and vehicle maintenance on the Streamline buses.

HRDC appointed the Streamline/Galavan Advisory Board and its Operations Committee to provide oversight and guide service policy and strategies. However, a 15-member HRDC Board of Directors serves as the governing board and makes final decisions on Streamline budget and administration. HRDC's Board of Directors is comprised of individuals representing three groups: (1) customers and the community, (2) public officials, and (3) local government, private sector, and groups of community interest (business, industry, labor, education, etc.).

Program History

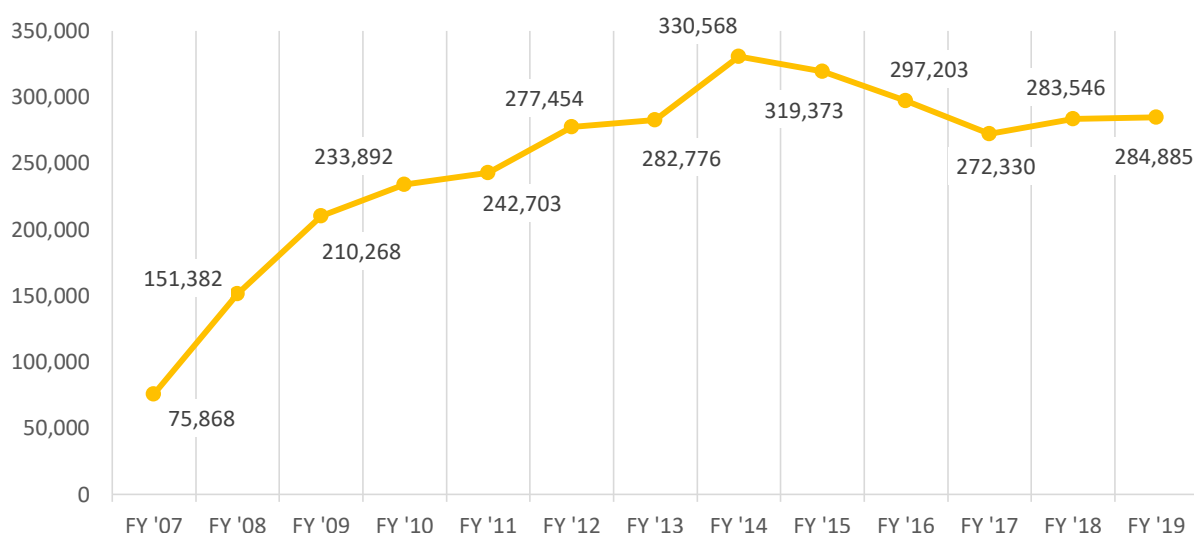
Public transportation service in Bozeman originated from a study out of the MSU College of Engineering, which informed the 2001 *Greater Bozeman Area Transit Development Plan* calling for the investment of resources in a public transportation system.

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In 2005, HRDC's Galavan on-demand transportation program and the Associated Students of MSU (ASMSU) Bobcat Transit program worked together to create an interim system to apply for FTA formula grant funding allocated by the Montana Department of Transportation (MDT). Funding from HRDC, ASMSU, the Greater Gallatin United Way, City of Belgrade and City of Bozeman provided the local match required for FTA funding and additional operating funds. In August 2006, once the HRDC-ASMSU service successfully acquired FTA 5311 formula grant funding for rural areas, Streamline service began operation.

System ridership and the level of service investment have grown significantly since Streamline was formed. In Fiscal Year 2019 (FY19), Streamline reported over 280,000 boardings, almost four times the annual ridership of Streamline's first year (FY17). See Figure 2.

Figure 2: Annual Ridership by Fiscal Year



The Streamline network largely resembles the original network comprised of Monday-Saturday daytime loop routes with LateNight service provided through ASMSU funding. A few key changes since service began are the extension of service hours on the core daytime routes (Blueline, Orangeline, Yellowline, and Redline) in FY 2013 and the addition of a Sunday route in FY 2018. Streamline also invested in improved frequency (service every half-hour on weekdays during peak times) in FY 2012 and added Redline to the Saturday services in FY 2014 (previously Blueline, Orangeline, and Yellowline were the only daytime routes operating on Saturdays). Along with these improvements in service availability, Streamline has also made some minor modifications to the route alignments since the system was first designed to better meet travel demands and to comply with permanent road closures and intersection changes.

Financial and Planning Context

To maximize accessibility and public benefit, Streamline was built as a fare-free service and has retained that model. Over the course of its history, Streamline has considered introducing fares to generate another revenue stream to cover operating costs. But, as is true for many agencies Streamline's size, the cost of fare collection would likely consume most of the potential revenue. Transit agencies with larger customer markets generally see a higher farebox recovery ratio. Many of Bozeman's peers with a large university market do not charge a fare, with student fees already subsidizing much of the cost. Examples

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of other communities with universities that provide free public transit include Missoula MT (University of Montana), Logan UT (Utah State University), and Corvallis OR (Oregon State University).

Federal grant funding through the FTA is a critical component of most transit agency budgets. FTA offers multiple formula grants, with 5311 and 5339 being the primary sources of funds for rural transit systems.

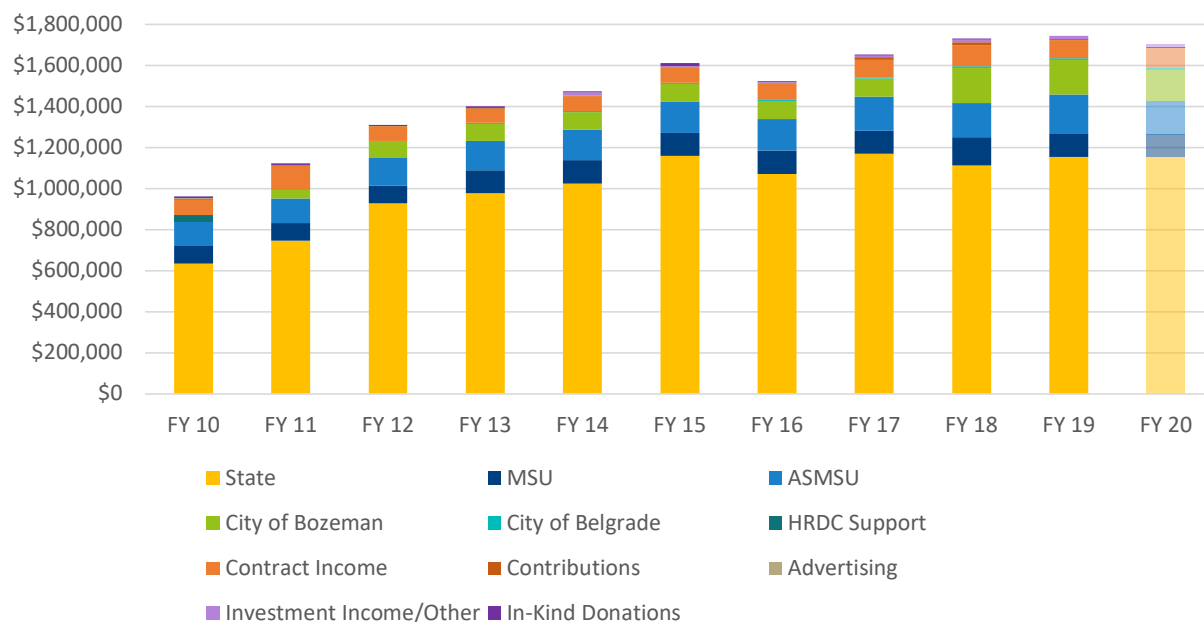
Each state is a recipient of 5311 funds, distributed based on a formula with 83.15% of funds apportioned based on land area and population in rural areas and 16.85% of funds apportioned based on land area, revenue-vehicle miles, and low-income individuals in rural areas. Funds can be used for both capital expenditures and operations expenditures.

The Bus and Bus Facilities program (5339) can be used to acquire buses and improve bus maintenance facilities. Each state receives \$1.75 million plus an apportionment based on population and other service factors. In addition there is a discretionary component in which states can submit applications for bus replacement on behalf of their sub-recipients.

As shown in Figure 3, state-distributed 5311 funds are the largest source of funding for Streamline service. Local funding sources include:

- Montana State University
- Associated Students of MSU (ASMSU)
- City of Bozeman
- City of Belgrade
- Contract Income
- Contributions/Advertising Revenue/In-Kind Donations/Investment Income/Other

Figure 3: Operating Budget by Funding Source and Fiscal Year

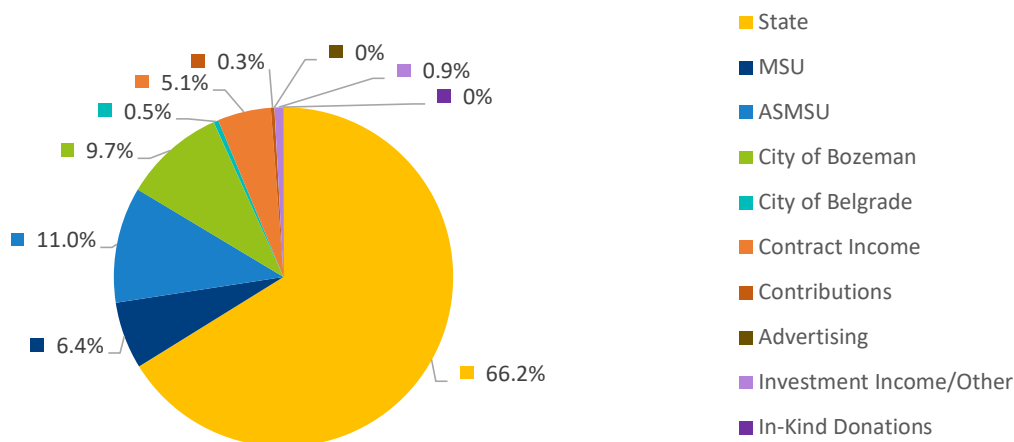


Note: The FY 20 budget (covering July 1, 2019 through June 30, 2020) is the projected budget, while all other figures reflect the actual budget at year-end.

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Together, FTA 5311 funds apportioned to the State of Montana and funding from MSU (both through ASMSU and the general university budget) accounted for nearly 84 percent of the FY 2019 budget. The next highest funding sources were the City of Bozeman (nearly ten percent) and contract income (about five percent). See Figure 4.

Figure 4: FY 19 Operating Budget by Source



After final 2020 Census results are released, it is expected Bozeman will surpass 50,000 in population, making it a metropolitan area. Each metropolitan area must have a designated Metropolitan Planning Organization (MPO) to meet federal transportation requirements (Title 23 USC). The MPO policy board should include representatives local governments and transportation agencies within its boundaries. MAP-21, the federal ground transportation authorization act signed into law in 2012, mandated public transit agency participation as a voting member on MPO boards.

Any transit system transitioning from a non-metropolitan area (also referred to as a rural area) to a metropolitan area will also transition from receiving FTA 5311 funds to FTA 5307 funds. Whereas 5311 funds are apportioned to the State and HRDC is a sub-recipient, HRDC cannot be a sub-recipient for 5307 funds. Sub-recipients must be a public entity such as a city, county or transit district. HRDC cannot be a 5307 sub-recipient, although a designated sub-recipient can contract with HRDC to provide transit service.

Chapter 14 of Title 7 of Montana State Code describes the how communities can create transit districts. In Montana, these districts are specifically named Urban Transit Districts (UTD). They can be created with a petition signed by 20 percent of the registered voters in the proposed district. If the petition is successful, the district creation can be placed on the ballot for voter approval².

Besides the need to change the governance of Streamline service to receive 5307 funding, the formula used to determine 5307 funding is different from 5311. It is impossible to determine if this will result in more or less funding at this time although the amount should not be dramatically different unless the overall size of the federal transit program changes to being higher or lower. Although this funding source is difficult to estimate, Streamline could be eligible for an additional new type of funding through

² https://leg.mt.gov/bills/mca/title_0070/chapter_0140/part_0020/sections_index.html

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the Small Transit Intensive Cities (STIC) formula. Most recipients of funding through this formula are college towns like Bozeman. STIC funding is dependent upon six performance measures. Additional funding is available for each of six performance measures that a transit system in a small metropolitan area performs above the national average³.

Regional Services

Additional public transportation service in the greater Bozeman area helps alleviate demand on Streamline service and provides opportunity for coordination.

Galavan – Bozeman, Belgrade, Livingston and Four Corners

HRDC has been the Galavan program sponsor since 1984. In 2006, Galavan became Streamline's fare-free paratransit service provider, in accordance with the Americans with Disabilities Act. Since 2006, Galavan has provided pre-arranged pick-up and drop-off service to certified customers who cannot access fixed-route transit service. Individuals aged 60 or older, or with a disability, qualify for certification.

Angel Line – Livingston/Park County

Angel Line is an affordable paratransit option for those aged 60 and older, or with a disability. Service is available for a variety of purposes (medical appointments, retail services, etc.) on weekdays to residents of Livingston and surrounding communities.

Windrider Transit – Livingston/Park County

Windrider provides fare-free, fixed-route transit and paratransit service within the City of Livingston on weekdays only. This service does not connect with the Streamline service to Livingston. While both services share a stop at Ace Hardware in Livingston, the AM trip from Livingston operates before the first Windrider trip serves that stop and the PM trip to Livingston arrives after the last Windrider departure.

Skyline – Big Sky

Skyline is the fixed-route public transportation service within Big Sky and provides service from Big Sky to the greater Bozeman area. Routes in service vary with different season schedules (Winter, Spring Shoulder, Summer, and Fall Shoulder). Operation is provided seven days a week, except during Shoulder season when service is available only on weekdays. Service is operated under contract by Karst Stage.

Skyline acknowledges increasing demand for regional service and is currently providing 13 round trips per day between Big Sky and the greater Bozeman area and is working with West Yellowstone to coordinate transportation from West Yellowstone to Big Sky. Skyline connects with Streamline Blueline at Walmart but according to its schedule, stops at Roskie Hall on the MSU campus instead of Strand Union precluding connecting opportunities with Streamline Red, Orange and Yellow line or the MSU Shuttle.

Foundation Bus West Yellowstone Foundation – West Yellowstone

Foundation Bus is operated by the West Yellowstone Foundation to provide transit service between West Yellowstone, Big Sky, and Bozeman twice a week. Advanced reservations are required, and service

³ The six measures are passenger miles per vehicle revenue mile, passenger miles per revenue vehicle hour, vehicle revenue miles per capita, vehicle revenue hours per capita, passenger miles per capita, passengers per capita.

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is provided on a first come, first serve basis. Service to individuals with medical appointments is prioritized.

Existing Service

Service Overview

Streamline operates four routes locally within Bozeman Monday through Saturday, one express route (Greenline Express) operates weekdays between Bozeman and Belgrade and the second express route connects Livingston to Bozeman on weekdays. Sunday service only operates in Bozeman and is provided by a single route. LateNight service is provided by two routes within Bozeman Thursday through Saturday from 8 p.m. until 2:30 a.m. An intra-campus shuttle has been inaugurated on the MSU campus during the current semester. This operates on weekdays that MSU is in session. See Table 1 for all service days.

Table 1: Days of Operations of Existing Service

Route	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Blueline Retail							
Redline Downtown							
Yellowline University							
Orangeline University							
Greenline Express							
Livingston							
Sunday Service							
Downtown Late-night							
Upstream Late-night							
Bridger Bowl							
Campus Shuttle							

Galavan is not part of the study but provides ADA-mandated paratransit service for Streamline fixed-route service. Any changes in Streamline fixed-route coverage or service span impacts Galavan as the ADA requires complimentary paratransit service to be provided with $\frac{3}{4}$ mile of local fixed-route service during all hours that service is provided.

HRDC provides contracted service to Bridger Bowl Ski Area and for Reach, Inc. Seasonal, fixed-route service to the Bridger Bowl Ski Area is in service from late fall to early spring. Hourly round trips between Bozeman and Bridger Bowl are provided. Reach, Inc. is a private, non-profit organization supporting adults with developmental disabilities via transportation, vocational, residential and recreational services. HRDC supports Reach's mission by operating the transportation service on their behalf.

Streamline Routes

Table 2 provides an overview of the Streamline routes including key destinations served, span of service frequency or number of trips, alignment length and number of stops. The backbone of Streamline are the four local routes serving Bozeman providing service 12 to 13 hours per day on weekdays and 10 to 11 hours on Saturday with half hour service during the AM and PM weekday peak hours and 60 minutes during weekday middays and Saturdays.

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Table 2: Description of Streamline Routes

Route	Description	Span	Frequency	Alignment Length	Number of Stops
Blueline Retail	Serves retail destinations in Bozeman and provides service to Downtown Bozeman, Bridger Peaks Town Center, Gallatin Center, and Montana State University	6:30 am-7:15 pm	Hourly, with half-hour service at peak hours while MSU is in session	13.45 miles	37
Redline Downtown	Serves central Bozeman, including Downtown Bozeman, Bozeman High School, Gallatin Valley Mall, Montana State University, and some residential neighborhoods in west Bozeman	6:40 am-7:10 pm	Hourly, with half-hour service at peak hours while MSU is in session	11.53 miles	38
Yellowline University	Serves the western portion of Bozeman, including the Gallatin Valley Mall, Valley Commons, Ridge Athletic Club, Montana State University, and residential neighborhoods in west Bozeman	6:45 am-6:45 pm	Hourly, with half-hour service at peak hours while MSU is in session	8.11 miles	23
Orangeline University	Serves the eastern portion of Bozeman, including Bozeman Deaconess Hospital, Bozeman Public Library, Downtown Bozeman, Montana State University, and Western Montana Mental Health Center	6:45 am-7:15 pm	Hourly, with half-hour service at peak hours while MSU is in session	7.37 miles	18
Greenline Express	Commuter route that offers weekday service between Bozeman, Four Corners, and Belgrade	6:25 am-7:00 pm	Four trips in each direction	31.32 miles	28
Livingston	Connects Bozeman and Livingston on weekdays, serving Montana State University, Bozeman Deaconess Hospital, and Livingston	5:50 am-6:45 pm	Two daily trips	59.29 miles	7
Sunday Service	Provides service in Bozeman on Sundays, when no other routes are running; locations served include Downtown Bozeman, Bridger Peaks Town Center, Gallatin Center, Bozeman High School, Gallatin Valley Mall, and Montana State University	9:00 am-5:00 pm	Hourly	14.42 miles	39

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Route	Description	Span	Frequency	Alignment Length	Number of Stops
Downtown Late-night	Provides service past 7:15 pm to Downtown Bozeman and Montana State University Thursday through Saturday	7:45 pm-2:30 am	Half-hourly	6.60 miles	21
Upstream Late-night	Provides service past 7:15 pm to Downtown Bozeman and portions of northern and western Bozeman Thursday through Saturday	7:45 pm-2:30 am	Hourly	12.16 miles	35

Service Utilization

While the previous sections have focused on the service supplied by Streamline, service utilization considers how consumers respond to that supply: where are riders accessing the network and which routes have the strongest ridership?

To evaluate system ridership, several sample days of ridership data from 2019 (prior to the October service changes) were collected and aggregated to generate an average weekday, Saturday, and Sunday boarding number by stop for each route. These numbers were mapped in ArcMap GIS software to visualize the data and are included in the appendix to this report. To create a snapshot of system usage, the average weekday boardings across all routes were summed to generate system ridership maps. See Figure 5 and Figure 6.

The highest-ridership stops in the Bozeman system included:

- MSU Strand Union Building (SUB) - 378
- Mendenhall & Black - 108
- Main & Rouse - 35
- Gallatin Valley Mall - 53
- Fowler & Laredo - 27
- College & 23rd - 26
- Tschache & 19th - 29
- Walmart - 58

The Blueline reports the highest average weekday ridership, with 260 boardings, while Livingston has the fewest number of average weekday boardings with 43. As expected, Livingston makes fewer trips than the Blueline, so the lower ridership is expected. Ridership is normalized by level of service investment in the productivity analysis (see Figure 7). Of the LateNight services, Downtown and Upstream, Downtown reports almost three times as much ridership as Upstream (65 average daily riders, compared to 23).

The activity at MSU stops indicates that student ridership constitutes a large share of the system ridership and that travel within the City of Bozeman, particularly near the university and Downtown Bozeman are the strongest-performing segments of the system. Figure 6 illustrates the density of ridership without overlapping symbols.

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Figure 5: Average Weekday System Ridership by Stop

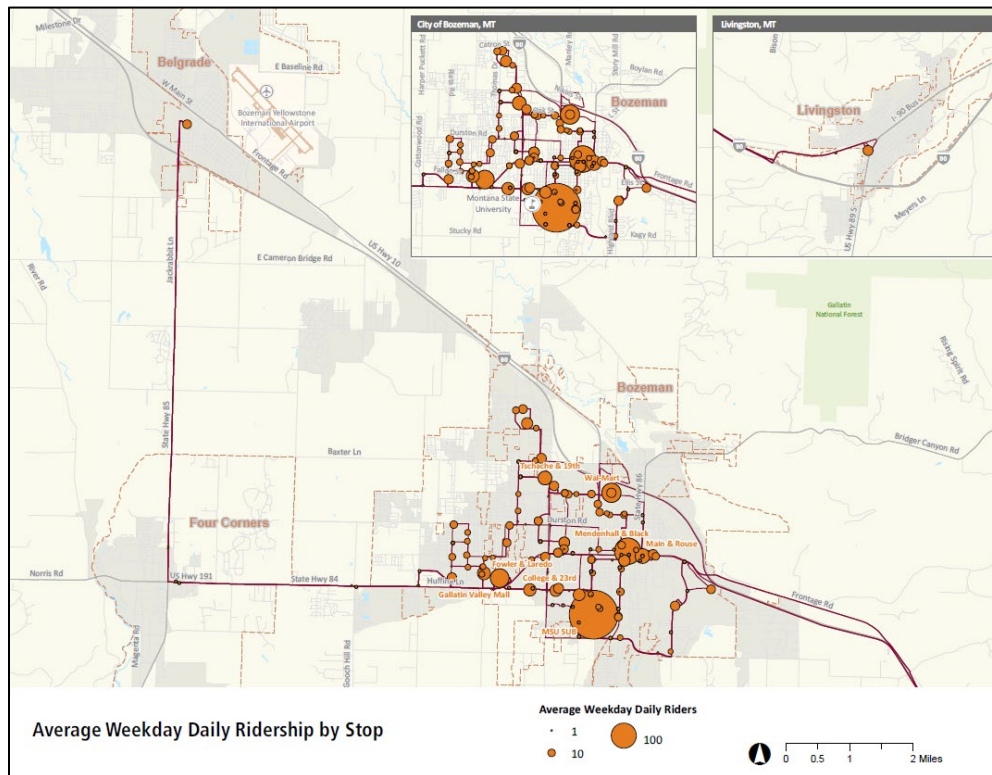
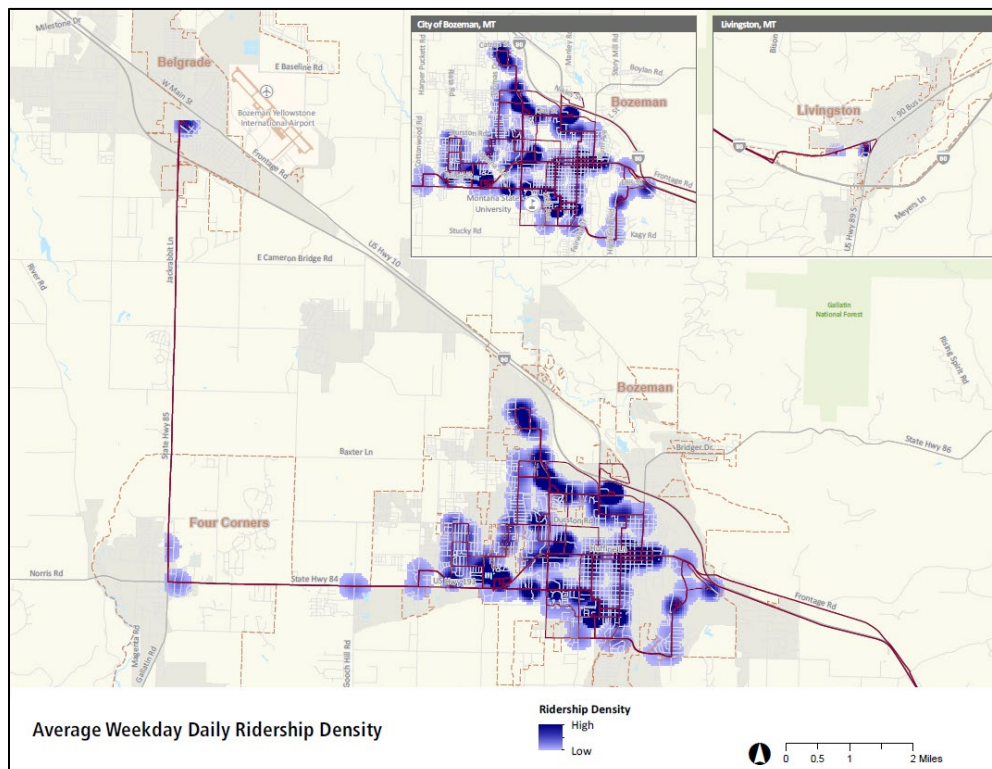


Figure 6: Average Weekday Ridership Density



Service Design

One-Way Service: The majority of Streamline routes operate as a one way loop. This strategy maximizes coverage at minimal cost and is commonly used when resources are limited. However, one-way service results in a poor experience for customers. Riders must typically ride through the entire loop to end up at their origin, requiring significant out-of-direction travel and additional travel time. For example a customer boards the Orangeline at Highland and Lomas to travel to the Bozeman Library. The trip to the Library will take 51 minutes. The return trip will take 9 minutes. With bi-directional service, the trip would take 9 minutes in both directions. Even a customer who is not sensitive to time will find this onerous and likely forgo the trip or find someone to drive them in lieu of using transit.

Out-of-Direction Deviations: Along route alignments, whether service is provided in both directions or one way, significant out-of-direction movements or route deviations increase travel time. Deviations are often used to shorten walk access for certain riders but come at the cost of increasing travel times for everyone else on the bus. Direct trips with few out-of-direction movements are generally desirable to make transit attractive to more potential customers. Shorter end-to-end running times can in some instances improve schedule coordination with other routes, improve reliability, and in the case of high frequency routes, reduce operating cost and/or improve frequency. Most Streamline deviations serve major destinations such as Walmart. A rule of thumb when considering a route deviation is, are the boardings and alightings on the deviation greater than the number of customers riding through. If yes, the deviation may be unavoidable unless good pedestrian infrastructure exists and the actual walking distance for most customers is within $\frac{1}{4}$ mile. On the other hand, if activity on the deviation is less than the number of customers riding through consideration should be given to eliminating the deviation. Balancing the need to minimize deviations while maintaining service to major destinations will be addressed as this study is developed.

Pedestrian Environment: In some cases, the lack of pedestrian infrastructure makes it unsafe or extremely unpleasant to walk to a bus stop on the main road. Since the responsibility to make the necessary improvements belongs to another entity (city, county, or state depending on the location); HRDC should coordinate with these entities to identify these locations. HRDC can supply a list of these locations once this study is complete. Until the necessary improvements are made a route deviation may be unavoidable.

Service Duplication: Service duplication where there is overlap between routes can be inefficient, creating confusion for customers, multiple routes competing for the same customers and utilizing resources that may be better deployed elsewhere. Not all duplication is bad, particularly if multiple routes share the same alignment for some distance and their headway (time between trips) is staggered to provide consistent and more frequent service. For example if two routes operate on a 60 minute headway over a common route alignment, if there headways are staggered, service over this alignment is every 30 minutes. Currently, Streamline has two segments where two routes operate over the same alignment the Orangeline and Blueline between MSU and Downtown Bozeman and the Yellowline and Greenline between MSU and Gallatin Valley Mall. In the former case service is somewhat staggered with Orangeline leaving at 45 minutes past the hour and the Blueline leaving at 21 minutes past the hour. The Greenline has only four trips per day with two of them operating at the exact same time as the Yellowline.

Service Efficiency and Effectiveness

The performance of the current system was evaluated using measures of productivity and financial effectiveness. Analyzing performance provides an opportunity to evaluate routes and better understand

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how they function within the system. Findings from the performance measures will identify opportunities for route restructuring and investment in order to grow system ridership.

This performance analysis reflects how HRDC collects and categorizes financial and ridership information. Most notably, that means that the Yellowline and Orangeline are categorized as a single route and that all Saturday service is categorized together. Therefore, references to the Redline, Blue, and Yellow/Orangeline refer solely to weekday service, despite these routes also running in a more limited manner on Saturdays. Similarly, although there are two separate LateNight services, they are categorized as a single service for this analysis.

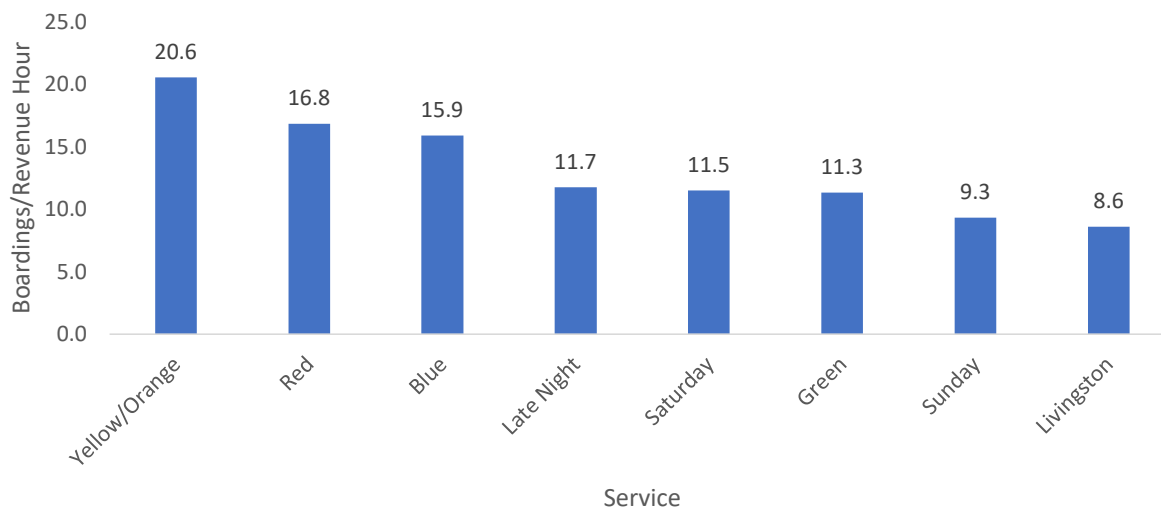
Ridership data for Sunday service in the months of July and August was not available, so ridership for those months were estimated based on June's productivity, to capture ridership in the summer when school is out of session.

Productivity

Productivity is measured by boardings per revenue hour⁴ and provides an understanding of the effectiveness of a route. Revenue hours include the entire time buses are operating and available to carry passengers including the break or layover time between trips.

Productivity varies greatly by service type. The most productive routes are the four main weekday routes, the Blue, Red, Yellow, and Orange, with the combined Yellow and Orange performing the best. Saturday service has lower productivity than any of the weekday routes that the Saturday service follows. Sunday service, which operates as a single route, has significantly lower productivity. The lowest performing service is the Livingston route, which offers relatively limited services over a long distance. Productivity by route is shown in Figure 7.

Figure 7: Service Productivity



⁴ Although Streamline does not charge a fare thus does not generate revenue from providing service, revenue hour is the term used by the Federal Transit Administration for National Transit Database reporting.

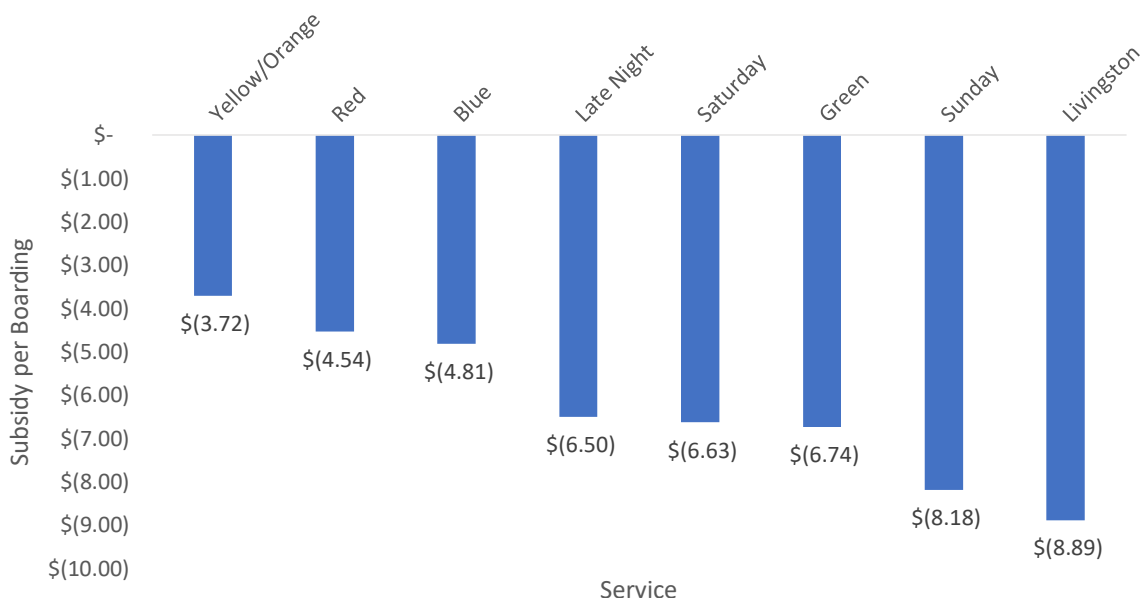
Subsidy per Passenger Boarding

Subsidy per passenger boarding measures the net cost of providing service on a per boarding basis. This measure provides an understanding of the efficiency of a route. Because Streamline has no fares, the subsidy per passenger boarding is equal to the cost of operating the service divided by the number of passenger boardings. To ensure fixed and administrative costs are distributed amongst each service, the cost of operating each service was determined by finding an average cost per revenue hour, and multiplying it by the number of revenue hours for each service. For the purposes of this analysis, the cost of the Galavan paratransit contract was removed from the total cost; fixed and administrative costs for the paratransit service are included, as those costs are not itemized.

The subsidies per boarding are reflective of average productivity, with services with highest productivity having the lowest subsidies. Because there are no fares, productivity and subsidy per passenger are directly correlated. As a result, the Yellowline and Orangeline have the lowest subsidies, and the Sunday and Livingston services have the highest subsidies. Figure 8 shows average subsidy per passenger boarding by route.

According to the 2018 National Transit Database the Streamline system subsidy per boarding of \$4.34 was well below the average of \$6.10 for other Montana fixed route transit systems with Missoula and Butte the only two systems with lower subsidies per boarding of \$3.42 and \$4.16 respectively.

Figure 8: Subsidy per Passenger Boarding



Service Quality

Service quality is evaluated by how easy it is for customers to understand the system as well as the convenience, comfort, and reliability of the service. High service quality is critical to ensuring a positive customer experience and retaining riders.

Reliability/On-Time Performance

Service reliability is the number one factor in retaining riders. Maintaining consistently reliable service directly affects how competitive the service is; even if service availability is not completely meeting demand, consistently operating on schedule allows customers to confidently include transit as a part of their day. Customers will plan their day around scheduled arrivals—especially in harsh weather conditions, customers do not wait at stops, but instead show up to stops based on scheduled arrival times.

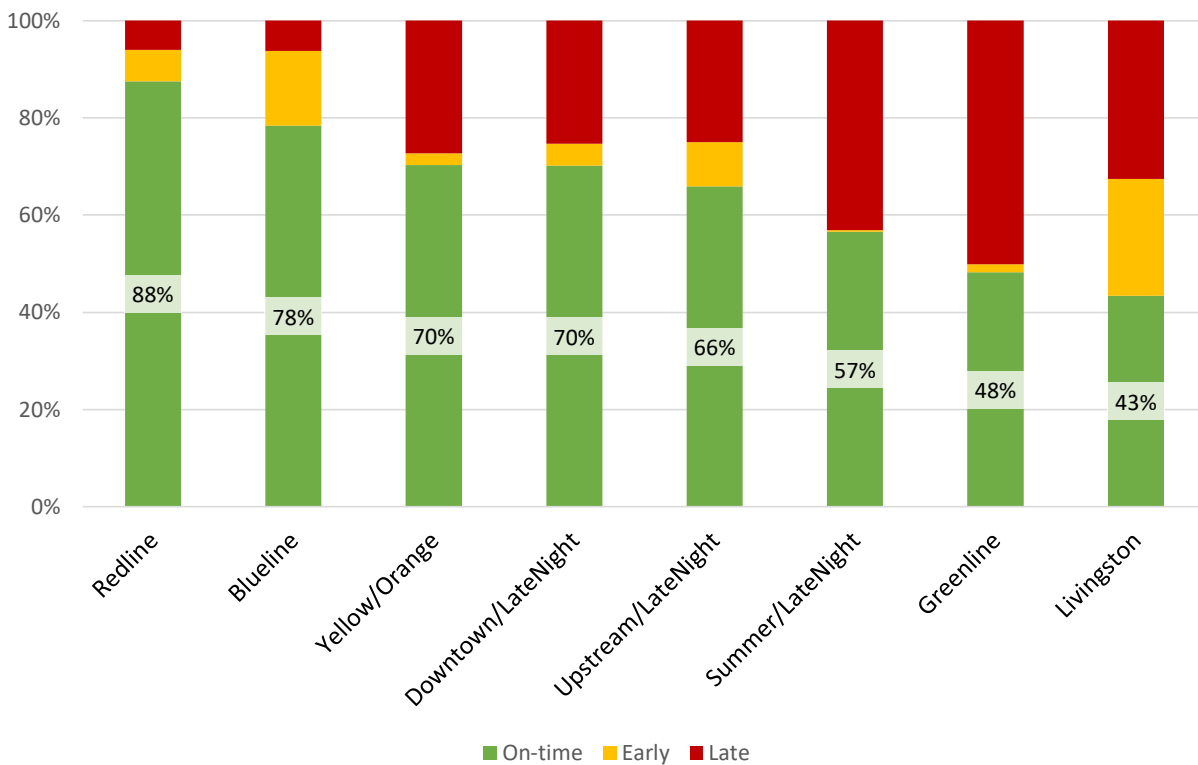
On-time performance (OTP) is a widely used metric to gauge overall reliability. Streamline defines ‘on-time’ as buses that depart up to one minute early and/or arrive less than five minutes later than scheduled. OTP is especially important in the Streamline system where routes operate at half-hour frequencies at peak times and at hourly frequencies otherwise. Missing a bus would leave customers having to dedicate substantially more time to plan for the next trip.

There is no industry standard goal for OTP, although 85 percent is commonly used by many systems. Establishing on-time performance targets balances reliability with reasonably fast travel. However, setting the target too high, such as at 90 to 95 percent will slow service down to the point where it is no longer attractive to customers and too costly to operate.

Weekday OTP: Current system wide on-time performance on weekdays is 65 percent, with 8 percent of buses arriving early and 26 percent late, based on data from FY 2019. Weekday OTP by route is shown in Figure 9 below. On-time performance is highest on the Redline and Blueline, and lowest on the Livingston and Greenline Routes. Fewer than half of Greenline trips are performing on time. The Greenline route may have lower on time performance since all but one round trip operate during the AM and PM peak hours. The Livingston Route also operates during the peak hour only but also is unique because of a high percentage of early trips. Since this measured on arrival times, early arrivals are not problematic as customers will not be inconvenienced.

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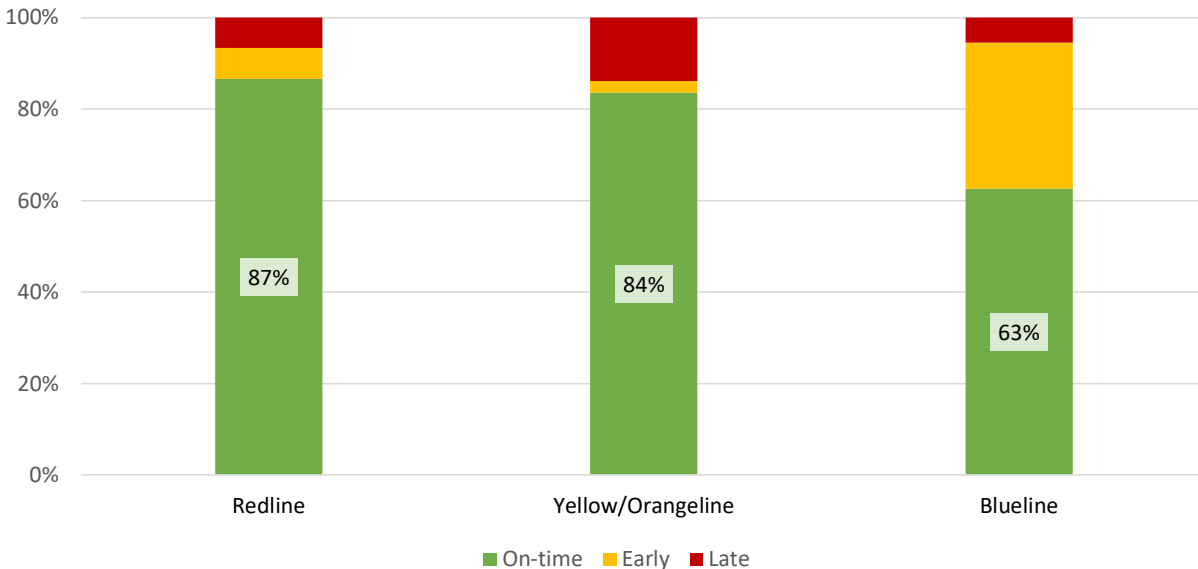
Figure 9: Weekday On-Time Performance by Route



Weekends: System wide on-time performance on Saturdays is currently 85 percent. Five percent of trips arrive early and ten percent are late. OTP is lowest on Saturdays on the Blueline, where nearly a third of trips are reported early. Saturday on-time performance by route is shown below in Figure 10. No on-time performance data was available for Sundays.

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Figure 10: Saturday On-Time Performance by Route



There are several causes of poor OTP. Streamline local routes currently have the exact same running time all day long not reflecting differences in traffic conditions that impact running time. However even when schedules are written to properly reflect normal traffic conditions, there can be significant differences from day to day. Traffic accidents, construction, special events, weather, and sick passengers are some of the unpredictable events that can disrupt a schedule. Therefore, adequate layover or recovery time needs to be built in between trips. There is no industry standard, but a rule of thumb used by many transit systems is 10% per round trip running time plus 5 minutes. Currently the Redline and Orangeline/Yellowline have exactly this amount of recovery time (though as noted above running times don't reflect regular variation of traffic conditions) while the Blueline recovery is 10%. Adding recovery time to a route to improve reliability will likely require modifications to running times or alignments in order to maintain even 30 or 60-minute headways.

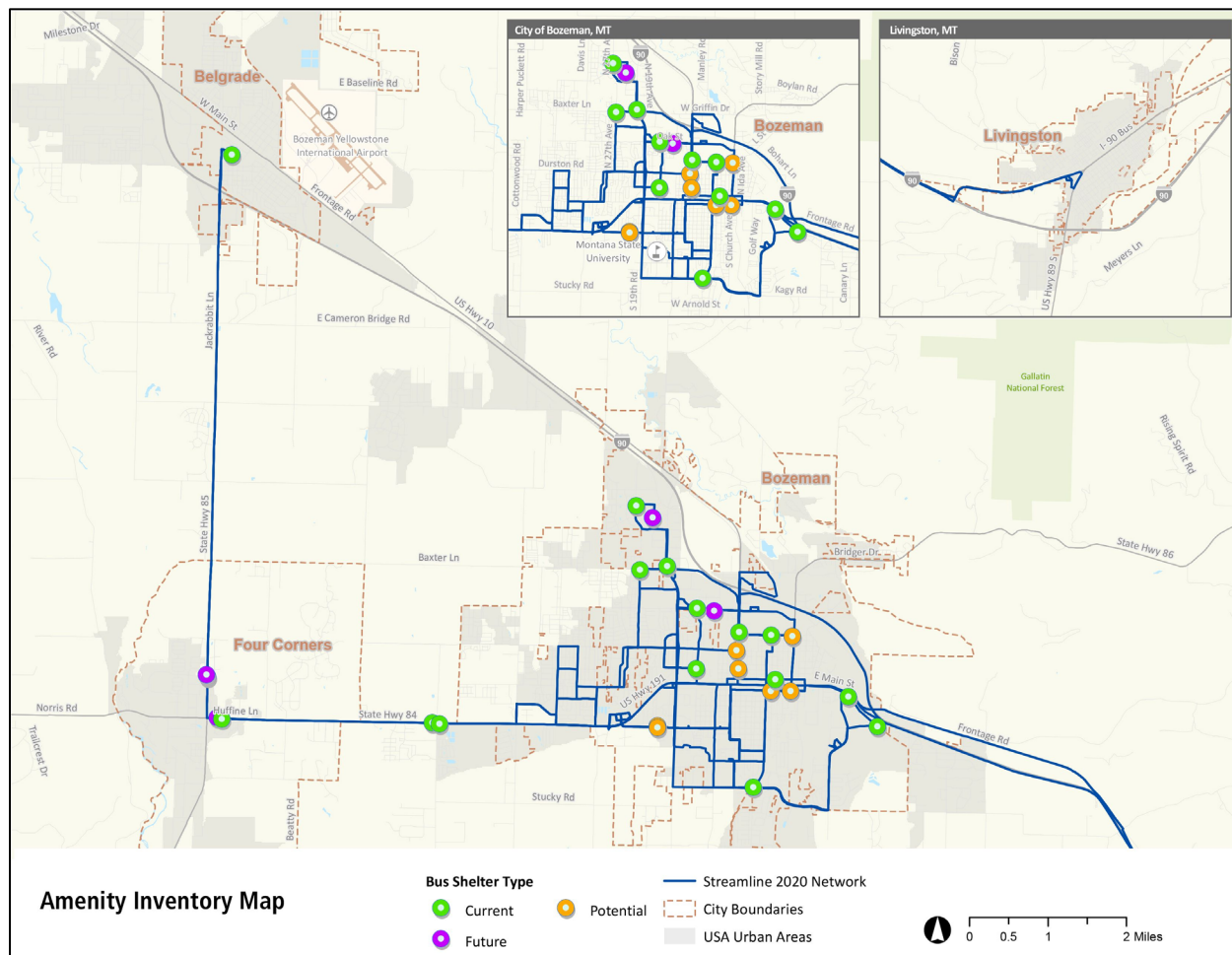
Capacity/Load

Without reliable alighting data (number of passengers exiting the vehicle) by stop and route, it is difficult to ascertain where there may be issues with vehicle overloading (more passengers than number of seats). Thus, a qualitative approach was taken, using a driver survey to identify potential load issues. According to surveyed drivers, the Blueline and Yellowline are sometimes overloaded on trips during peak hours (morning and evening commute times). The route with the most comments from drivers was the Blueline, which can get overloaded leaving the HRDC Warming Center (offering seasonal emergency shelter to those in need), particularly on the last Blueline trip in the evening. Drivers also reported some overcrowding on the Blueline during the academic year from 8:00 AM – 11:00 AM and the 1:15 PM and 3:15 PM afternoon trips, capturing peak times when students are going to or leaving classes. More reliable alighting data in the future could provide further insights, but for purposes of this study, Blueline and Yellowline vehicle assignment and trip frequency will be considered in the service recommendation process to address these reported load issues.

Service Amenities and Stop/Vehicle Accessibility

Of the active stops in the Streamline network, 10 have shelters for riders waiting for buses. An additional seven shelters have resources allocated or commitment from developers that are not yet built or complete. Streamline has also identified an additional eight locations where shelters might be appropriate, six of which are currently active stops. See Figure 11 for shelter locations. With the harsh winters in the Streamline service area, protection from wind and precipitation is critical to a comfortable rider experience.

Figure 11: Streamline Shelter Locations



In addition to the shelters shown on the map above, the existing shelter at Ellis Street and Haggerty lane (which is located on the wrong side of the street) will be relocated to Main Street in front of the Bozeman Public Library. A shelter is also to be constructed at the New West Bozeman high School, however at this time there is no Streamline bus route serving this location. How to serve the area around the new high school will be considered as part of this study. The Lions Club is interested in purchasing and installing one or more shelters at stops to be determined.

Through the driver engagement process of this study, some drivers reported difficulty in locating stops on the street when they are driving a new route. This challenge was also a common theme in the findings of Streamline's secret rider surveys, a tool the agency uses to evaluate the customer experience. Improved stop legibility can be addressed through the addition of shelters, which are easy

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visual indicators of where the bus will stop. However, changes to signage can also improve stop visibility. Some Streamline stop signs are placed on shared posts, making them easy for new riders and drivers to miss. Another benefit to more visible stops is increased public awareness of the Streamline service. Strong visual reminders that Streamline is an option have the potential to attract more riders.

An additional accessibility issue reported by customers is the consistency of audio stop announcements on vehicles. Stop announcements provided through an automated system or as a driver responsibility are critical to ensuring system practicality for those with visual impairments or limitations as well as new riders who may be unfamiliar with a route's stop locations. Announcements should announce approaching stops and announce the next stop during boarding/dwell time. Reader boards that provide this information visually are also useful to customers with hearing impairments or limitations. Currently all buses in the Streamline fleet have automated audio announcements or reader boards, however not all tablets are being used, therefore the announcements don't always work. All vehicles have external displays indicating the route and destination. Secret rider surveys indicate that these are functional on all equipped vehicles.

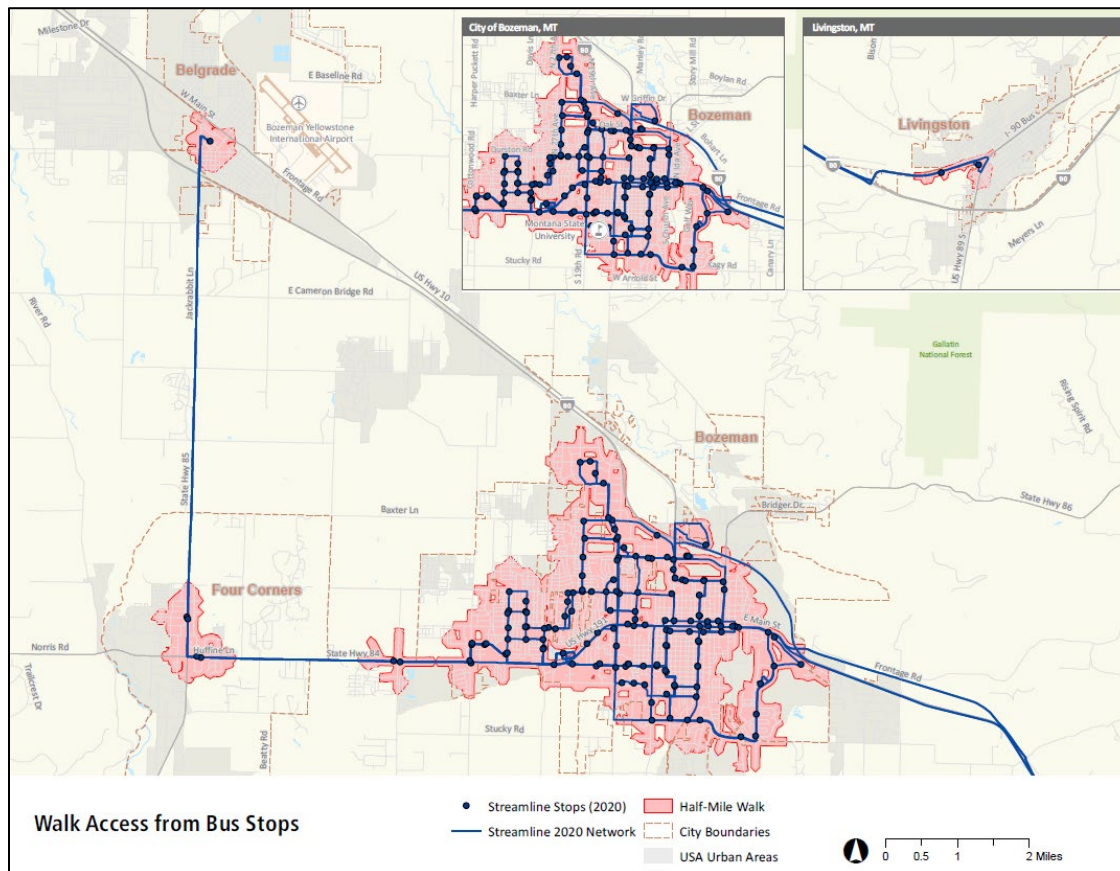
Easy trip-planning is the first opportunity for Streamline to attract or lose potential riders. If customers have an alternative to transit, like a personal vehicle, or if Streamline trip planning is not convenient, they will simply use an alternative. Furthermore, one of Streamline's functions is as a lifeline, ensuring mobility to the most vulnerable populations in the Bozeman area. To be a truly effective service, Streamline must make the system easy to understand for all customers—transit-dependent and choice riders. According to the secret rider surveys, most found the Streamline schedules easy to understand. Reviews of the Routeshout bus tracking (with both web and app options) are mixed. In the course of stakeholder engagement, many reported the tool was a very effective asset when it functioned, but that its functioning was not reliable/consistent. Exploring alternative real-time tracking software and travel training programs will be considered in this Redesign Streamline study.

Service Availability

Service availability for Streamline is generally high. Most of the urbanized area of Bozeman is within a half mile of a Streamline stop, as shown in Figure 12. Generally speaking, residents of Bozeman can access both their homes and most potential destinations using Streamline. Service availability in Belgrade, Four Corners, and Livingston, however, is lower. In all of these communities, service is primarily designed to bring people back and forth to Bozeman, and as a result, there are only a few stops at a maximum in each community.

Overall, there are approximately 29,948 jobs and 17,640 households within a half mile walk of a Streamline stop, or approximately 51.5% of Gallatin County jobs and 37.5% of Gallatin County households. These numbers exclude Livingston, which is located in neighboring Park County.

Figure 12: Walk Access from Bus Stops



Service Findings

Despite having one way routes, limited frequency and service hours and inadequate bus stop infrastructure; Streamline is still an efficient service that is valued by the community. Based on both the input received thus far in this project and a review of available data, there are opportunities for Streamline to increase ridership and play a larger role in meeting the mobility and accessibility needs of Bozeman and surrounding communities.

Summary of Outreach Efforts and Future Outreach

Engaging transit stakeholders and the public throughout the planning process is critical to developing community-sensible recommendations. One component of assessing the existing service and market conditions was collecting input from community stakeholders.

Initial Stakeholder Outreach Meetings

Streamline and the consulting firm identified community leaders and groups that utilize Streamline service or whose mobility would be significantly impacted by changes to Streamline service. Streamline contacted the following stakeholders to set up discussions with the consultant team. The consultant team developed interview questions and led each interview. A stakeholder interview was held with representatives from each of the following groups:

- City of Bozeman

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- City of Belgrade
- Gallatin County Department of Planning
- Bozeman Health/CHP/Gallatin Health Department
- Bozeman Yellowstone International Airport
- Bozeman Senior Center
- Streamline/Galavan Advisory Board
- Friends of Streamline
- MSU Transportation Advisory Committee
- Associated Students of MSU (ASMSU)
- Community Advocates for Disabled Persons

Major trends in the discussions with these stakeholders included increased level of service (span, frequency, bi-directional routes) and improved infrastructure to make service more accessible. Stakeholders also indicated increasing demand for service within Belgrade and all-week service between Bozeman and Belgrade (currently provided on weekday-only Greenline). While some stakeholders felt Streamline was already too university-focused, others indicated that the span and frequencies are not well-coordinated with university demand, particularly faculty, staff, and students studying or working on campus later into the evening. Several participants also expressed that the challenges to acquiring additional vehicles has had major service implications. Without functioning back-up vehicles, any breakdowns during service have a domino effect, often leading to missed trips.

Another key outcome from the stakeholder outreach was that coordinated transportation planning that includes Streamline is critical to effective and efficient resource allocation. From land use planning to traffic engineering, Streamline must be part of the equation. For example, considering Streamline stop locations in prioritizing sidewalk improvements would be mutually beneficial to both the City of Bozeman and Streamline. On-street parking placement and regulation can also have an impact on stop location feasibility and the amount of dwell time required for passengers to board/alight vehicles and for the bus to re-enter traffic lanes.

Qualitative information gathered through stakeholder engagement is integrated throughout this report, supplementing data analysis to ensure the study is comprehensive and reflects community opinion, values, and priorities.

Driver Engagement Survey

Streamline staff and the consultant team developed and distributed short surveys to Streamline drivers as part of this study. The function of the survey was to collect information to identify issues that might not emerge from the data analysis. The areas of focus for the survey included: load observations, common running time challenges, operational issues, and other feedback and suggestions. Findings from these surveys are included in the Capacity/Load and On-Time Performance sections of this report and the suggestions and feedback integrated with the stakeholder feedback. Operability issues will be considered as part of the redesign process. Drivers will be engaged in this study again to weigh in on proposed service alternatives and help identify any potential challenges.

Planned Public Outreach

Continuous public engagement is a hallmark of any effective planning process. To supplement the findings of this report, Streamline and the consultant team will issue a community survey to identify community priorities and factors that cause people to use or not use Streamline service. This feedback will inform the service recommendation process (the “redesign”). After initial service alternatives are developed, they will be shared with the public for input. The communities will be engaged through

workshops and online tools. This input, along with Streamline Board direction, will narrow down the alternatives to a final set of recommendations or highlight scenarios/options to consider.

Travel Demand and Transit Markets

The previous sections have provided an assessment of the current Streamline service and how riders engage with that service. The other function of any “blank slate” transit system redesign is to identify where there are markets for transit and make any necessary changes to ensure those markets are served by the transit network. The two questions addressed in this market analysis are:

1. Where is there travel demand for making trips in the Bozeman region?
2. Where would populations we expect to use transit need access to system?

Existing and Projected Population and Employment

Two key indicators of travel demand are where people live and where they work. The most recent version of the Bozeman Travel Demand Model, maintained and updated by the Western Transportation Institute (WTI) and MDT, generated population and employment projects for 2040, using 2014 as a base year for the model.

Figures 13 and 14 shows the population of the core Streamline service area in 2014 next to the projected population in 2040, using the model’s Traffic Analysis Zones (TAZs) as units. Population density (number of occupied dwelling/housing units per acre) is expected to increase most notably along the west and south boundaries of Bozeman, as well as in the core of Belgrade (on both sides of Main Street) and the River Rock development just west of Belgrade. These changes may warrant additional service investment in Belgrade and the west side of Bozeman, which were also suggested areas to expand service that emerged from the stakeholder engagement process. Stakeholders reported that the increasing cost of living in Bozeman has forced many households to relocate to Belgrade and Four Corners, which are considered more affordable and has seen more growth in both business and residential. Participants indicated that the one stop in Belgrade and lack of weekend service were barriers to utilizing Streamline.

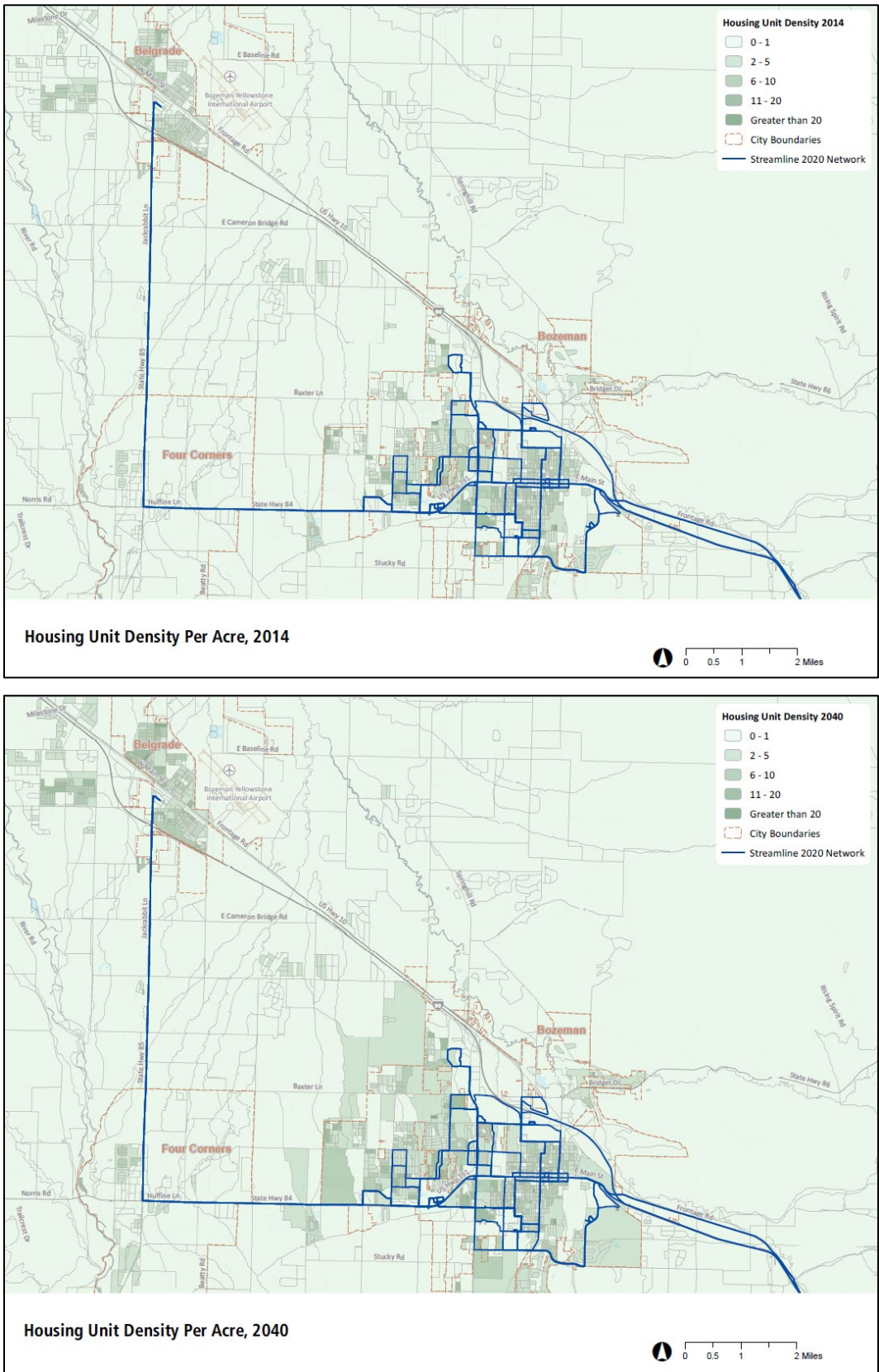
Most of the projected growth in jobs is expected to occur in Bozeman, particularly in the TAZs north of Baxter Lane within City of Bozeman boundaries and the southern TAZs within city limits. Modest job growth is also projected for Belgrade, but the vast majority of growth is expected to occur on the outer edges of the City of Bozeman. See Figures 15 and 16.

The combination of fast job growth and a growing share of the population in the retirement age bracket (exiting the labor market) has led to very low levels of unemployment in Gallatin County in recent years (lower than both the state and national rates). The tight labor market in the Bozeman area may limit employment growth if the labor market does not grow proportionally.⁵ In designing Streamline service around market demand, the travel patterns of the labor market, students, and retirees must all be considered, especially as students and retirees will continue to make up such a large share of the population of the Streamline service area.

⁵ Further details provided in the *Bozeman Area Labor Report*, published May 2019.
<http://lmi.mt.gov/Publications/PublicationsContainer/bozeman-area-labor-report>

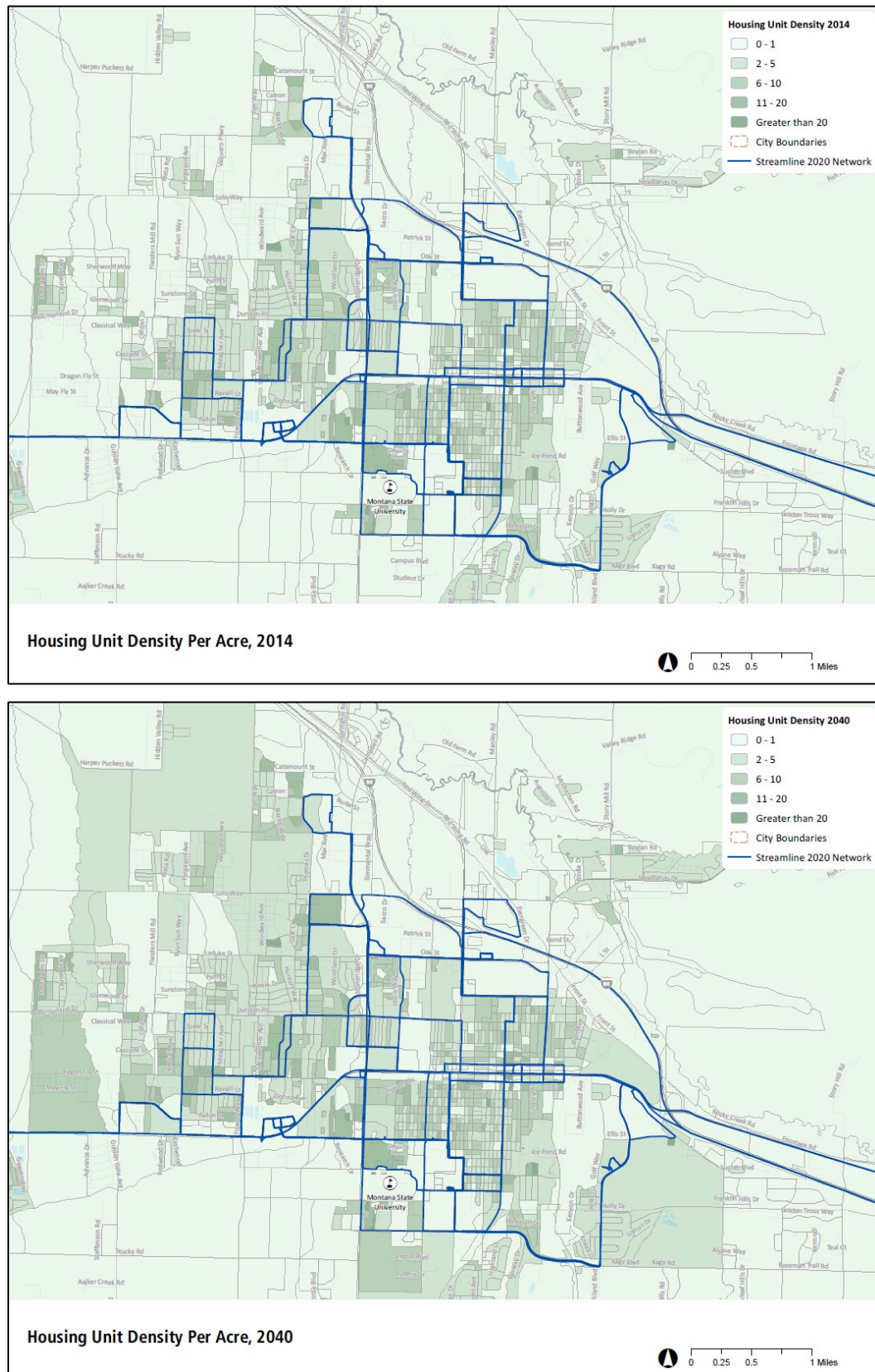
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Figure 13: Housing Density per Acre in Streamline Area, 2014 (top) and 2040 (bottom)



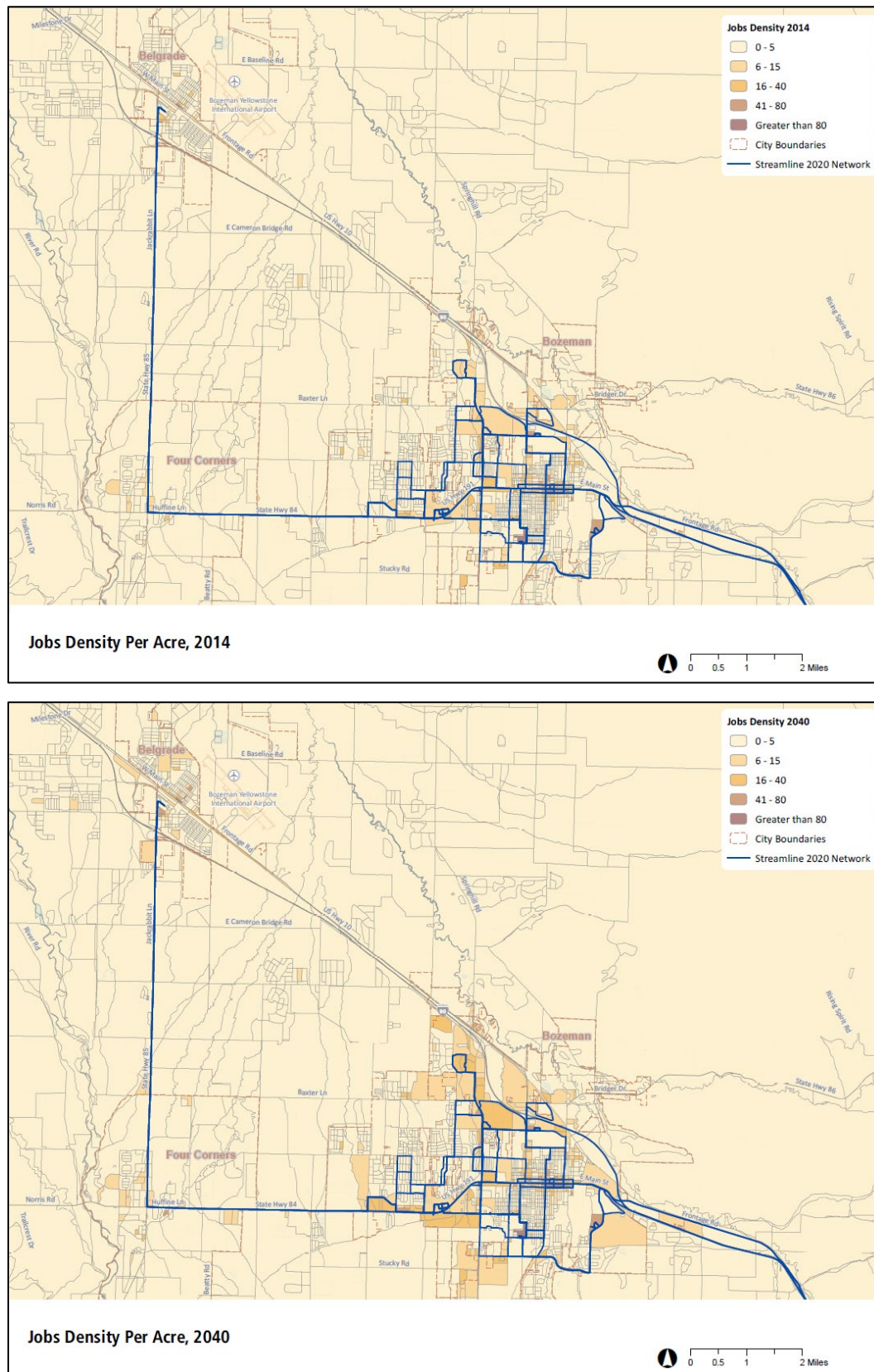
Redesign Streamline 2020: Existing Service and Market Evaluation

Figure 14: Housing Density per Acre in Bozeman, 2014 (top) and 2040 (bottom)



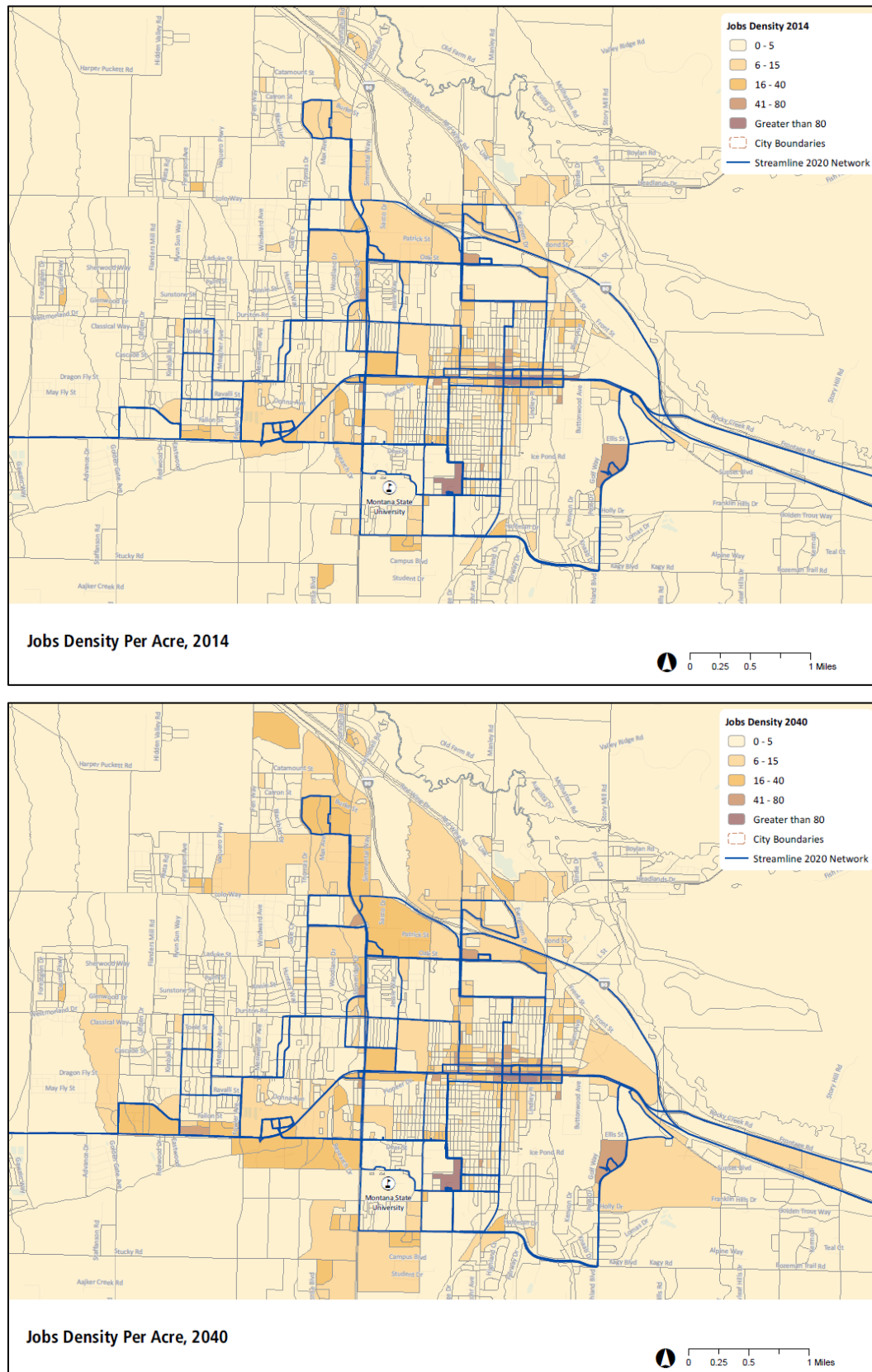
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Figure 15: Job Density per Acre in Streamline Area, 2014 (top) and 2040 (bottom)



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Figure 16: Job Density per Acre in Bozeman, 2014 (top) and 2040 (bottom)



Land Use and Urban Form

Downtown Bozeman and the residential areas near MSU are a walkable grid. This type of urban form is very conducive to transit. A thriving downtown and continuing growth in enrollment at MSU create market opportunities for transit. However newer areas of Bozeman and commercial areas outside of downtown are more auto-centric and harder for transit to serve. Densities in the city limits of Bozeman and some contiguous areas of unincorporated Gallatin County have densities that can support transit service operating on 30 minute headways, however improvements in pedestrian infrastructure and infill on underutilized land can improve transit effectiveness.

A walkable environment provides separate infrastructure for pedestrians that provides for safe passenger and a pleasant environment. Streets or pedestrian paths should be designed to minimize out of direction travel for pedestrian to reach transit stops or other nearby destinations. Parking lots should be designed to not create a barrier for individuals accessing commercial buildings on foot. APTA Urban Design Standards document Design of On-street Transit Stops and Access from Surrounding Areas <https://www.apta.com/research-technical-resources/standards/sustainability/APTA-SUDS-UD-RP-005-12/> provides further guidance.

Except on the MSU campus and Downtown, parking throughout the Bozeman area is plentiful and free. This creates a disincentive to use transit. In Downtown parking is free for two hours which encourages visitors to drive however employees who work all day are subject to paying for parking. On the MSU campus parking is not free and growth plans involve constructing new buildings on existing parking lots, potentially reducing the supply of parking as the campus grows. Also freshman students are allowed to bring autos on campus, however this practice could change in future years to a policy prohibiting freshman from bringing cars to campus as is practiced at many other universities. These factors bode well for growth in demand for transit service.

Belgrade is a small community with low to moderate densities. Many areas of the city lack sidewalks. Outside of Belgrade there is new housing development, the most notable is River Rock. Consisting of varying densities including attached housing, it is located about 1 ½ miles from the center of Belgrade. Transit service is warranted if future development in the area between River Rock and central Belgrade and adjacent areas are designed to be walkable with minimum densities of 5 to 7 dwelling units per acre⁶.

Development between Belgrade, Four Corners and Bozeman currently consists of small residential developments lacking good pedestrian infrastructure connecting them with the main roadways used by the Greenline. The density and walkability of future development will determine the viability of providing transit service.

Key Travel Patterns

The typical approach to evaluating travel patterns for transportation planning purposes is to identify trip origins and destinations provided through travel surveys that can be extrapolated using a travel demand model. This data was not available through the Bozeman Travel Demand Model, so Galavan paratransit trips and MSU student residential addresses were used as a proxy for identifying key travel patterns. This

⁶ Transit Capacity and Quality of Service Manual, TCRP Report 165, 2013 4.5 dwelling units per acre can support hourly bus service, 7 dwelling units per acre can support 30 minute service.

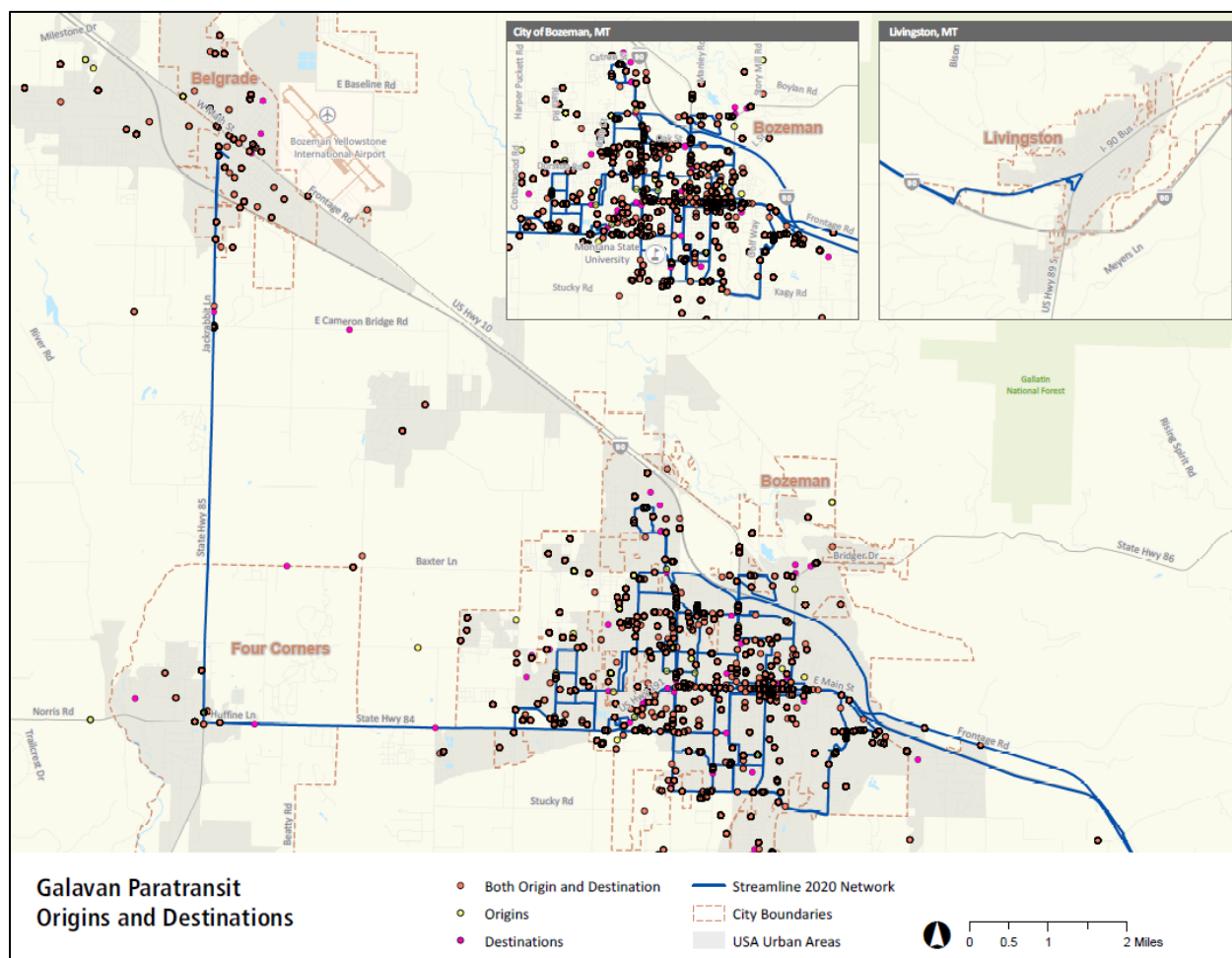
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analysis can be supplemented with data from the community survey planned for the next step of Redesign Streamline 2020.

Galavan is available within Bozeman City Limits during Streamline service hours. Additionally, Galavan provides service in Belgrade on Tuesdays and Fridays from 8:00 AM to 3:30 PM and to Manhattan and Three Forks Monday through Saturday from 7:00 AM to 6:00 PM. As part of Galavan's reporting, each trip origin and destination must be logged. All Galavan trips from 2019 were aggregated to identify the most prevalent trip patterns.

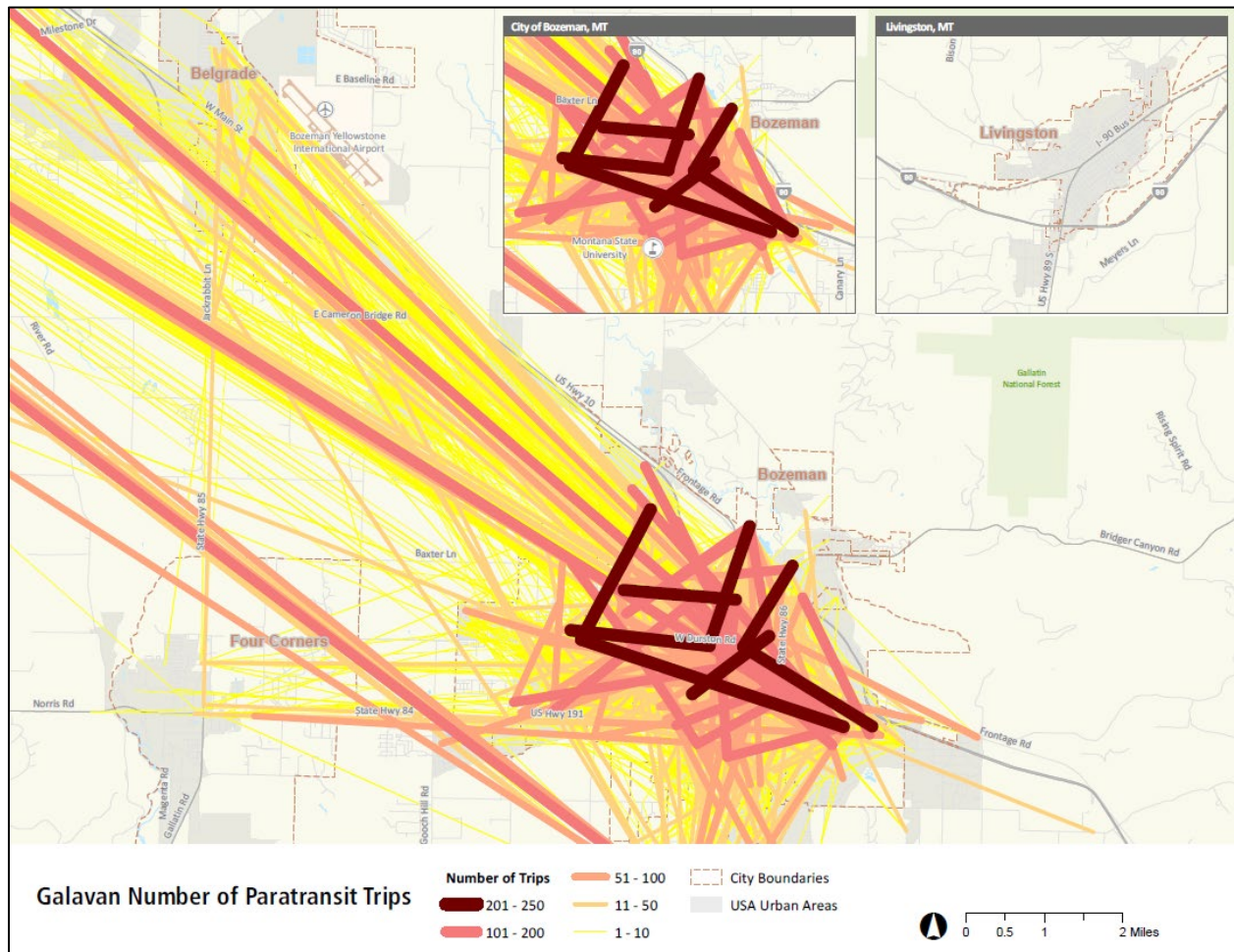
Trips internal to the City of Bozeman constituted the largest share of Galavan trips, as shown in Figure 18. Figure 17 illustrates origins and destinations more precisely. Notable point clusters include Mendenhall and Babcock in Downtown Bozeman and North 19th Street, particularly where it intersects with Oak (the Bridger Peaks Town Center area). The Galavan ridership base may not be representative of the general population, but still provides some insight into key origin and destination points for area travel.

Figure 17: Galavan Paratransit Origins and Destinations



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Figure 18: Galavan Trip Patterns



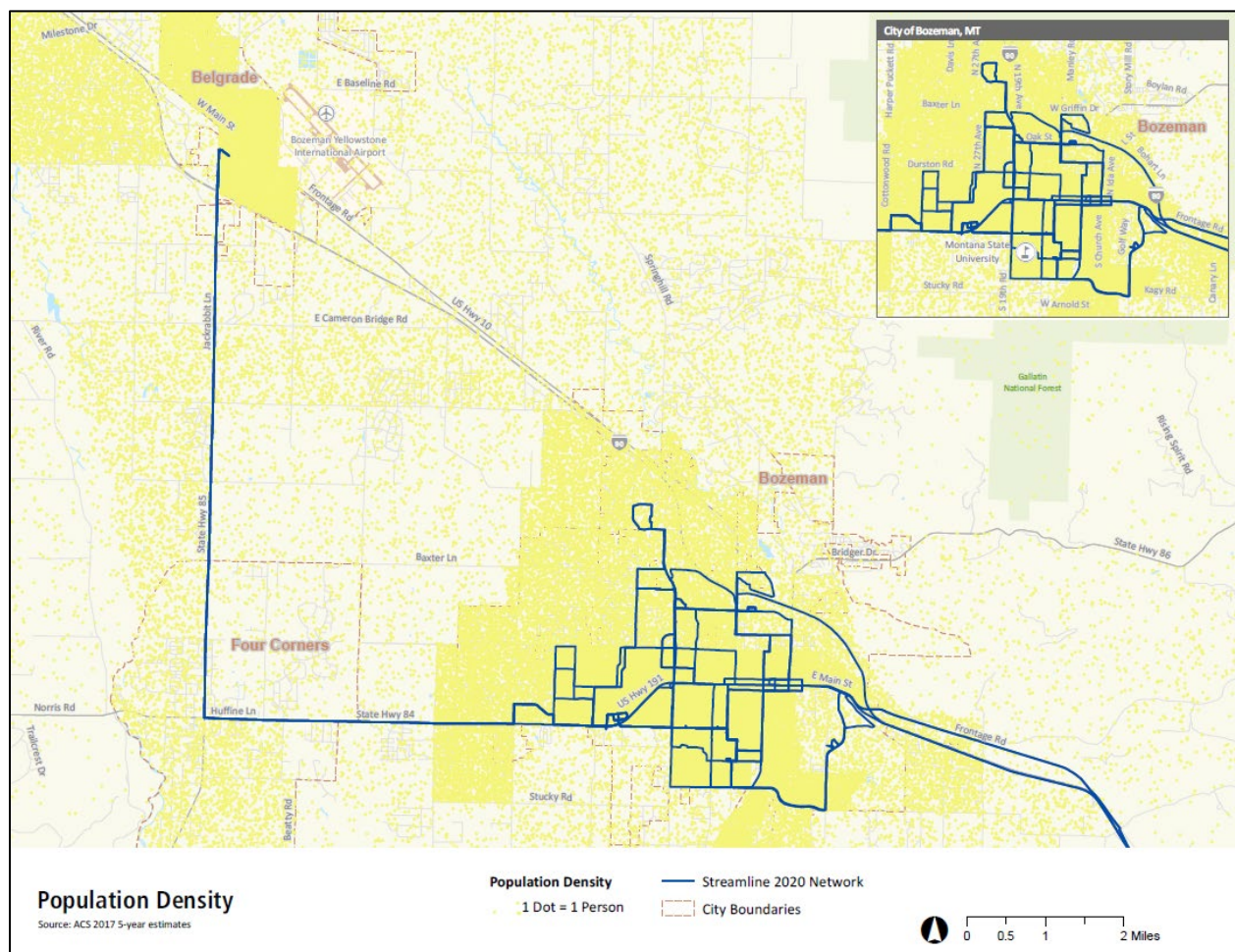
Densities of Transit-Prone Populations

In addition to determining the predominant travel patterns of the general population, it is also important to evaluate the distribution of populations that are more likely to use transit. Maps were created based on American Community Survey data provided by the U.S. Census Bureau for the following population segments:

- Total population
- Seniors
- Youth
- Minorities
- Persons with Disabilities
- Zero-Vehicle Households
- Low-Income Households

Additionally, data provided by MSU (without any information identifiable to an individual) provided the residential addresses for the MSU student population. The most informative maps were the student, zero-vehicle, and low-income household maps, which are provided here. All maps are included in the report appendix, for reference. To normalize the population segment density maps, a total population map is provided as Figure 19.

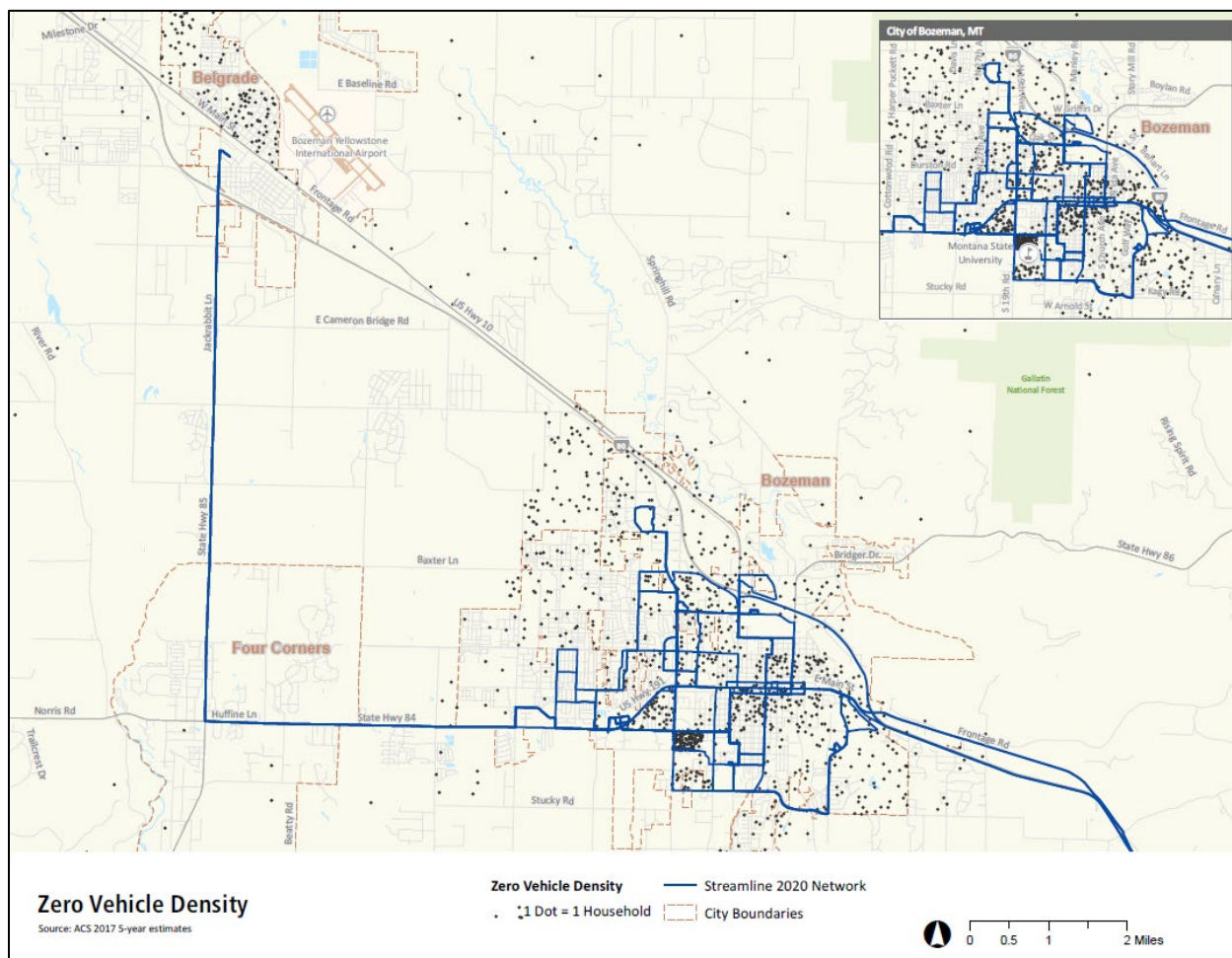
Figure 19: Population in Streamline Service Area, 2017 Estimates



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Zero-vehicle households (as reported in the U.S. Census) are generally a strong indicator of transit-prone populations. As shown in Figure 20, zero-vehicle households are relatively evenly distributed within the City of Bozeman, though there are concentrated clusters in the Census Block Groups near MSU and Downtown Bozeman. As the blue line, representing the Streamline network, demonstrates, these areas are currently served by Streamline. The zero-vehicle Belgrade homes are almost entirely north of Main Street, with many concentrated just west of the airport. Re-evaluating the Greenline and/or service alternatives for Belgrade may better serve these households with transit.

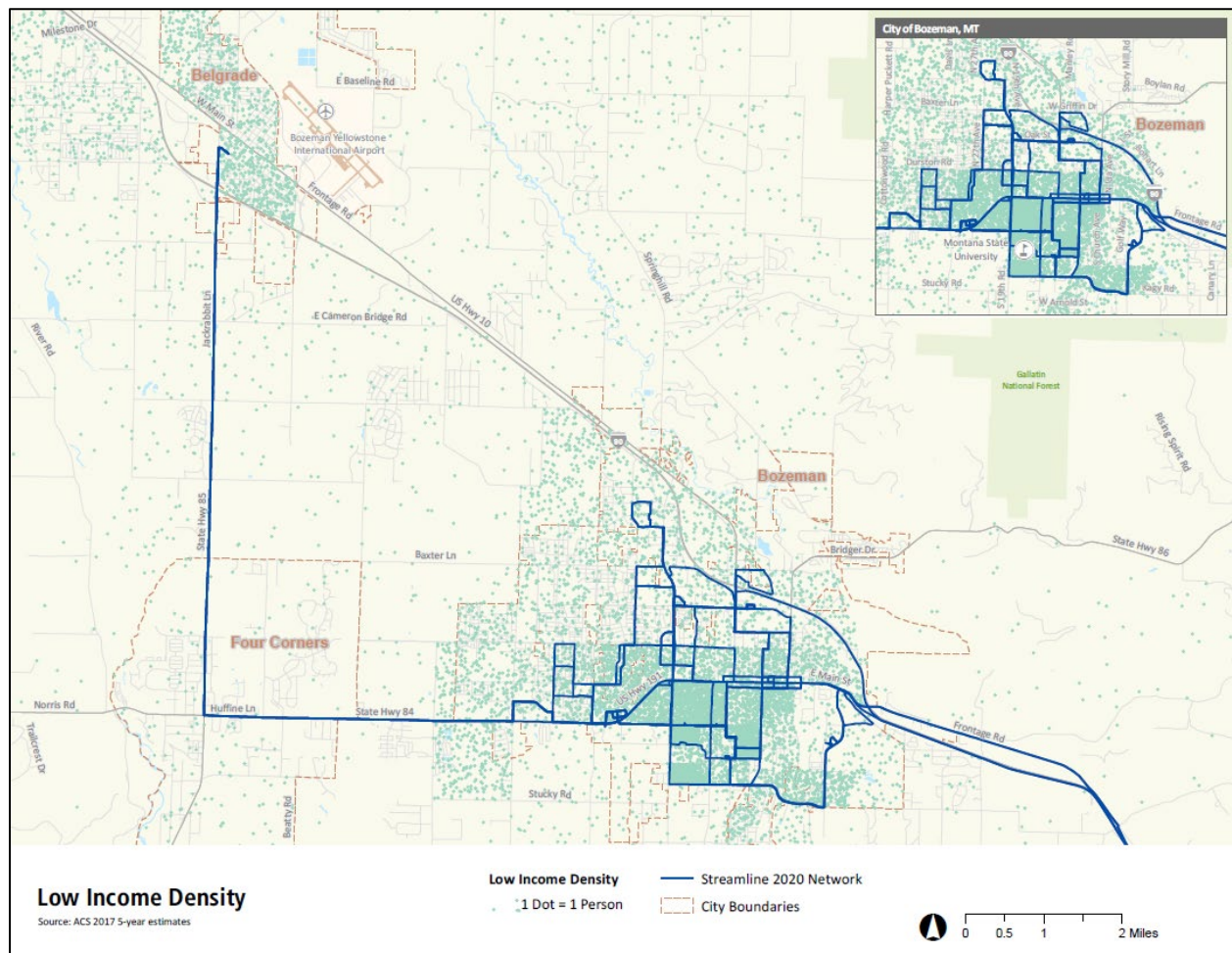
Figure 20: Zero-Vehicle Households, 2017 Estimates



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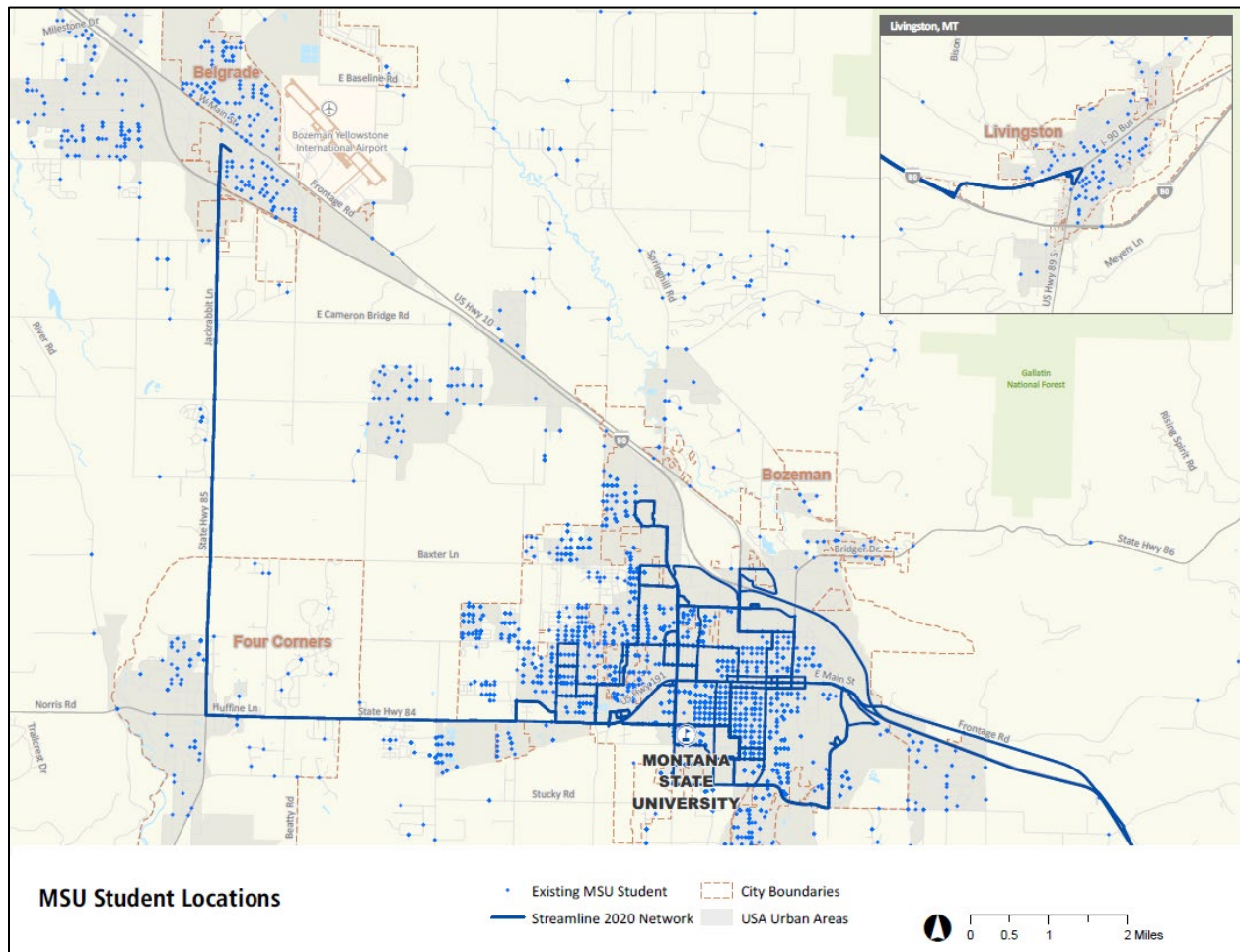
Low-income populations in the Bozeman area are also likely to use transit. These households are mapped in Figure 21. The highest density of low-income individuals reside near MSU and Downtown Bozeman. These areas have access to the existing Streamline network but might be good candidates for bi-directional service or improved frequency. The greatest concentration of low-income population is the area bounded by S. 19th, College St., 8th Ave, and Main St.

Figure 21: Low-Income Population, 2017 Estimates



As expected, there is significant overlap between the low-income, zero-vehicle and student populations. The highest density of MSU student residents is near the university, but, as shown in Figure 22 MSU students live all over the Streamline service area, with some living as far as Livingston. While Streamline cannot reasonably connect every student to the MSU campus, this map highlights those areas/routes that are most likely to be utilized by students and may warrant further investment, particularly where students may not have access to a personal vehicle.

Figure 22: MSU Student Residential Locations



Transit Competitiveness

Due to the limited resources of Streamline, service has only been offered at hourly or 30-minute frequency and the looped/round-trip alignments can only be operated in one direction. This creates challenges in attracting choice riders and offering a competitive travel time on Streamline. Increasing traffic congestion in the region should incentivize residents to use Streamline, but without bus-only lanes and infrastructure, Streamline offers the same or slower travel time (due to stopping) and less convenient departure times than a person has with a private vehicle. This challenge is compounded by abundant parking availability in many parts of the region. Investing in a higher level of service (frequency, bi-directional routes, more service on weekends) and improved reliability (improved on-time performance) is critical to attracting riders to Streamline.

Market Findings

The market maps highlight some key areas to consider investment in either more Streamline service (span, frequency, bi-directional service) or potentially new Streamline service. With a growing population and lots of low-income and zero-vehicle houses, Belgrade has a higher demand for transit than current service can meet. The route alignments and level of service investment on the Redline, Yellowline, and Greenline should be considered in the planning process to ensure transit-prone populations are fully served in those areas near MSU and Downtown Bozeman.

Regional Plan Coordination and Integration

Gallatin County and the City of Bozeman have developed plans for future growth and integration; the *Gallatin County Growth Policy (2003)* prioritizes the conservation of natural resources and open space; the *Triangle Community Plan* encourages infill development and clustering along existing development. Both plans are compatible in their priorities; however, neither specifically consider the role Streamline will play throughout anticipated growth.

Gallatin County overall maintains a stable economy due to the presence of MSU, the U.S. Department of Agriculture based in Bozeman, and steady tourism. Historically, Gallatin County maintained a robust agricultural industry, but as of 2000 only four percent of jobs are in agriculture. The 2003 update of the Gallatin County Growth Policy explains it is now more profitable to subdivide land for housing than to maintain for farming. As cost of living in Bozeman proper has gone up and pushed people out, development in the surrounding area is expected to take off as is the need for transit. A prime location for development is the Triangle Community, west of Bozeman. Coordination between Streamline and the leaders within the Triangle Area (including Bozeman, Four Corners, and Belgrade) will be crucial as Gallatin High School will be soon be finished and as housing prices in all areas continue to rise.

Key issues arise with the infrastructure and land use goals that are included in the County's Growth Plan. The Triangle Area boundaries consist of the three major transportation corridors, including Huffine Lane, Jackrabbit Lane, and Interstate 90. The heart of the triangle lacks transportation infrastructure, as land is primarily agricultural, but the plan does acknowledge the importance in maintaining a connected 1-mile and ½-mile grid system. Nodes along the major transportation corridors are the most desired locations for development, however, Streamline is already experiencing reliability issues partly due to increased roadway traffic. Infrastructure improvements require acknowledgement to ensure efficient transit travel is achieved along with good pedestrian access to it.

Both the Gallatin County Growth Policy and Triangle Community Plan focus heavily on management and protection of natural resources, wildlife habitats and open space. The growth policy guides mobility and circulation development to be consistent with countywide trails, parks, recreation, and open space plans, such as the Gallatin County Trails Report and Plan (2002). The Triangle Community plan prioritizes non-motorized transportation systems at three levels: neighborhood trails, connector trails and commuter pathways (the three transportation corridors). Transit travel requires its own distinguished guide as it is such an integral part of daily life for those outside of Bozeman proper.

Next Steps

Engage the community in the development of both short and long range transit improvements. TMD and HRDC will develop a detailed plan to involve the community throughout the planning process utilizing open houses, popup meetings, online engagement and a community survey.

Determine transit service strategies. The development of transit service strategies provides an opportunity for stakeholders, riders, and the general public to understand the trade-offs associated with rethinking transit service coverage and investment. All transit planning decisions require important trade-offs be made between cost, levels of service, and access to service; creating a strong framework for how these decisions are made will ensure the service recommendations consistently align with agency and community goals.

Develop service recommendations. Once the service strategies have been established, take a big-picture look at the network as a whole, while assuring the details of individual route recommendations

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improve efficiency and everyday operations. The goal is to create service recommendations that work well operationally for the agency and improve the transit experience for customers.

Identify funding opportunities. Identify innovative methods to meet the local match requirements, expand service area and enhance service frequency, as well as identify additional sources of funding that will be available if Bozeman is designated as a small urban after the 2020 Census.

Develop implementation plan. Recommendations will be phased as short-term, mid-term, and long-term. The short-term implementation/phasing plan will be provided on a year-by-year basis, including financial costs and operating revenue for each plan element. The goal in formulating the plan elements and associated implementation strategy would be to focus on “early wins” in the first few years, which helps gain community support through successful service improvements and demonstration of good financial stewardship. The short-term phasing plan will include detailed route alignments, headways, running times (by time period), and hours of operation. Mid-term and long-term recommendations would be prioritized based on their estimated cost, revenue, ridership and customer impacts.