



LINN-BENTON LOOP SERVICE DEVELOPMENT PLAN

Final Plan

Approved
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Cover photo: Linn-Benton Loop at the Corvallis Transit Center.
Source: City of Corvallis

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EXECUTIVE SUMMARY

The Albany and Corvallis areas are important centers in the Mid-Willamette Valley and serve as economic and educational hubs. Many people travel daily to and from the two cities, including residents, employers, visitors, and students. Future growth will further reinforce the symbiotic relationship in the region.

Public transportation is a key part of the region's transportation system: it provides a critical mobility for people who do not have access to a vehicle, provides an alternative to driving and parking on busy roads, and can help reduce personal vehicle emissions.

The Linn-Benton Loop ("the Loop") bus system connects Albany and Corvallis. It has been in service for almost 40 years, connecting people to education, work, shopping, and play.



The Linn-Benton Loop is an important service in the Mid-Willamette Valley.

Source: City of Corvallis

In 2019 public transportation providers in Oregon will begin receiving funds from the Statewide Transportation Improvement Fund (STIF). The transit funds were part of the legislature's

transportation package passed in 2017 (House Bill 2017 Keep Oregon Moving). The Loop Governing Board has since then preliminarily agreed to plan for up to \$600,000 in service enhancements, based on each County contributing an additional \$300,000 each in new STIF revenues.

The Plan was developed in collaboration with the Linn-Benton Loop Technical Advisory Committee (TAC), and included analysis of the existing system and historical data, an on-board survey of Loop passengers in October 2018, and a regional stakeholders workshop in December 2018.



Stakeholders at the December 2018 workshop discuss the tradeoffs of proposed service options.

Source: Nelson\Nygaard Consulting Associates

Recommended Service Plan

The Linn-Benton Loop Service Development Plan (SDP) was developed to identify and prioritize service changes to the Loop. Recommendations described in this Plan include:

- Additional service frequency when demand is highest
- Bi-directional service to improve access, convenience, and reduce travel times
- Later service until 10:00 p.m.
- Maintain service to most locations that are served today.

The Linn-Benton Loop vision is to provide reliable and efficient transportation for commuters, students, residents, and visitors. The Loop strives to be a clear and easy-to-understand service.

The Linn-Benton Loop system will be composed of three routes:

- **Regional Route:** weekday and Saturday service between Oregon State University (OSU)/Downtown Transit Center, Linn-Benton Community College (LBCC) and Albany Station via OR-34 and OR-99E

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- **Campus Connector:** weekday service between OSU/Downtown Transit Center and LBCC via OR-34
- **US-20 Commuter:** weekday peak-hour service between OSU/Downtown Transit Center and Albany Station via US-20

Routes and service characteristics and the regional transit network are shown in **Figure 1** and **Figure 2** respectively.

Figure 1 Regional Transit Vision Routes

Route	Service Days	Time of Year	Hours of Service	Frequency (min)	Vehicles ^[A]
Regional Route ●	Monday-Friday	All year	6 am – 10:15 pm	75	1
	Saturday	All year	8 am – 6 pm	90	
US-20 Commuter ●	Monday-Friday	All year	6:00 – 9:00 am 4:30 – 7:30 pm	60	1 ^[B]
Campus Connector ●	Monday-Friday	OSU/LBCC academic term ¹	Midday: 9:30 am – 4 pm	30	
			AM/PM: 7 – 9:30 am & 4 – 7 pm	60	1

Notes:

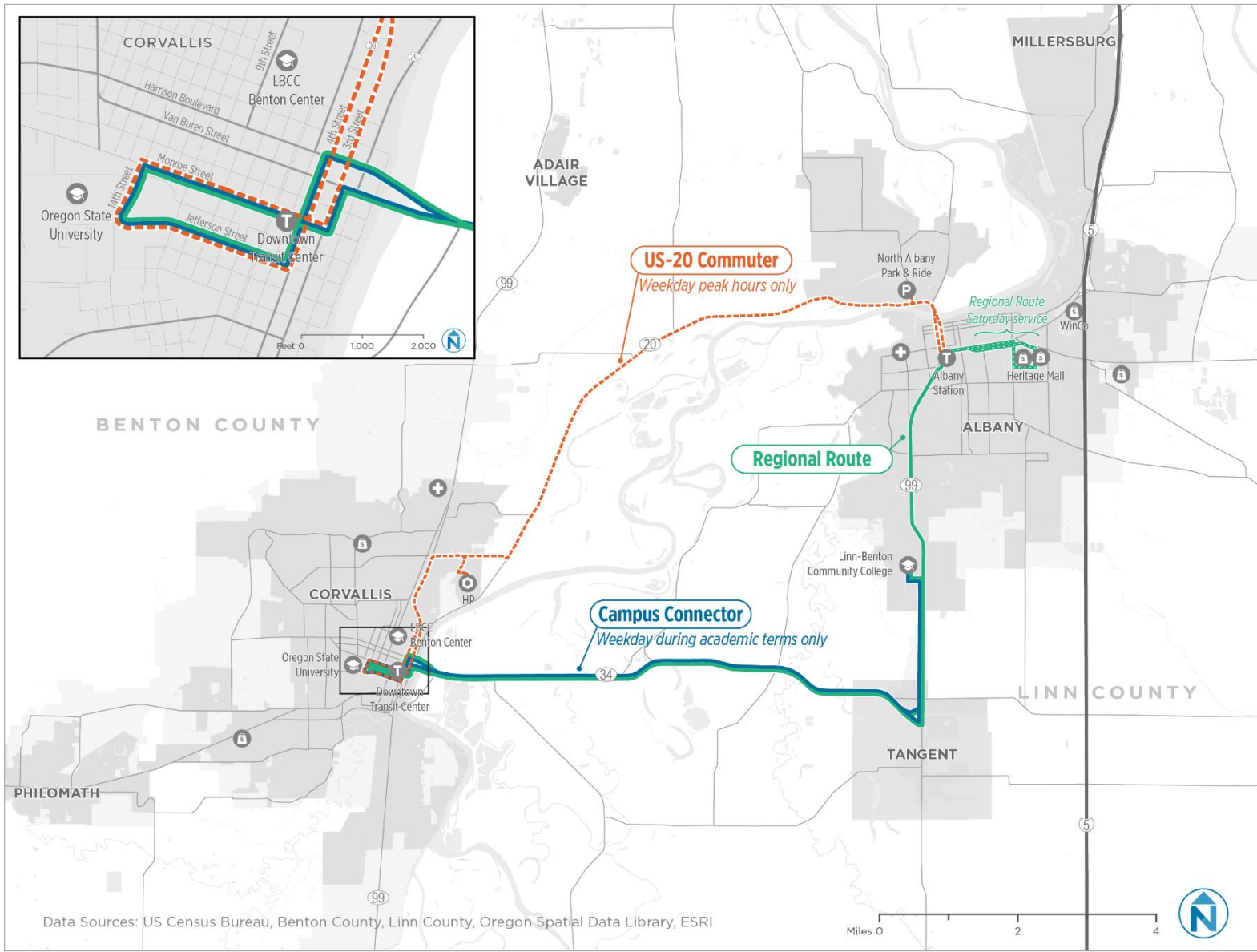
[A] Number of vehicles does not include spare vehicles necessary to support bus services.

[B] Preliminary analysis suggests one vehicle could serve both the morning and afternoon Commuter route, and the mid-day Campus Connector; Campus Connector at 30 minute frequencies will require two vehicles.

¹ Fall, Winter and Spring terms only

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Figure 2 Regional Transit Vision Network



1 INTRODUCTION

The Loop is a public transportation partnership that links two communities to critical educational, employment, and activity centers. The Loop began operating in 1980 to provide transit service between Albany and Corvallis. Over the decades the route has expanded capacity on its busiest segments and is an integral part of the transit system in the region.

The Loop has financial, political, and public support from a broad base of partners, including Linn and Benton Counties, the Corvallis Area Metropolitan Planning Organization (CAMPO), Albany Area Metropolitan Planning Organization (AAMPO), Linn-Benton Community College (LBCC), Oregon State University (OSU), Oregon Department of Transportation (ODOT), Hewlett-Packard (HP), and Good Samaritan Regional Medical Center. Many regional partners and the public recognize there are opportunities to improve service and provide improved connectivity and access for people traveling between the two cities.



Source: Nelson\Nygaard

In 2019 public transportation providers in Oregon will begin receiving funds from the Statewide Transportation Improvement Fund (STIF). The transit funds were part of the legislature's transportation package passed in 2017, a transit-specific fund developed after passage of Oregon House Bill 2017 (known as Keep Oregon Moving). The Loop Governing Board has since then preliminarily agreed to plan for up to \$600,000 in service enhancements, based on each County contributing an additional \$300,000 each in new STIF revenues. This SDP provides the specific steps and service adjustments for the Loop to achieve a 10-year transit vision using the additional funds from STIF. Recommendations from the plan include additional frequency of service on the busiest corridors when demand is highest, bi-directional service to enhance access and reduce travel times, extended service into the evening, and maintaining service to all major locations that are served today.

PROCESS

The SDP was developed through a collaboration with the **Linn-Benton Loop Technical Advisory Committee (TAC)** based on an analysis of the existing system and historical data. Meeting with the TAC occurred monthly between September 2018 and February 2019.

Students in an OSU Sustainability Assessment course conducted an **on-board survey** of Loop passengers in October 2018 over a five day period. They collected 239 responses. The survey was used to understand who was riding the Loop (including their affiliation with local institutions and income levels) and the type of service improvements they were looking for most.

In December 2018, a Loop **regional stakeholders planning workshop** brought together regional transit providers, partners and advisors to discuss the range of service changes that could be implemented on the Loop. The workshop was designed to understand participants' priorities, weigh the tradeoffs of different operating models, and generate new ideas to address rider needs. The result of the workshop was draft service vision that included preferred frequency, alignment, and span.

Findings from technical analysis, input from TAC members, results from the on-board survey, and outcomes from the workshop were all used to develop the Linn-Benton Loop Service Development Plan.

2 ISSUES AND OPPORTUNITIES

This chapter presents key issues, findings, and opportunities for the Loop, and travel between Albany and Corvallis in general. These issues were identified through analysis, the on-board survey, and feedback from regional stakeholders.

The key findings include the following issues. These are presented in more detail on the following pages.

1. Commute trends indicate a demand for region transportation services.
2. Low-income populations in Linn and Benton Counties are increasing.
3. Most passengers on the Linn-Benton Loop live in households within incomes less than \$50,000, many of whom are students (based on 2018 passenger survey).
4. The Loop serves two limited markets: commuters and students.
5. There is limited service for people traveling across the region on weekends.
6. People who depend on transportation in the evening have unmet transit needs.
7. The Linn-Benton Loop is scheduled at frequencies that do not coordinate well with other regional schedules, presenting barriers for operations and passengers.
8. Ridership on the Linn-Benton Loop has remained relatively flat over the past several years, with a slight downward trajectory.
9. Most ridership on the Linn-Benton Loop is at LBCC, Downtown Corvallis, and OSU.
10. The top improvements for Linn-Benton Loop service are increased frequency and later service in the evening (based on 2018 passenger survey).
11. Many of the region's transit agencies have unique brands and provide information independently of each other.

1. Commute trends indicate a demand for regional transportation services.

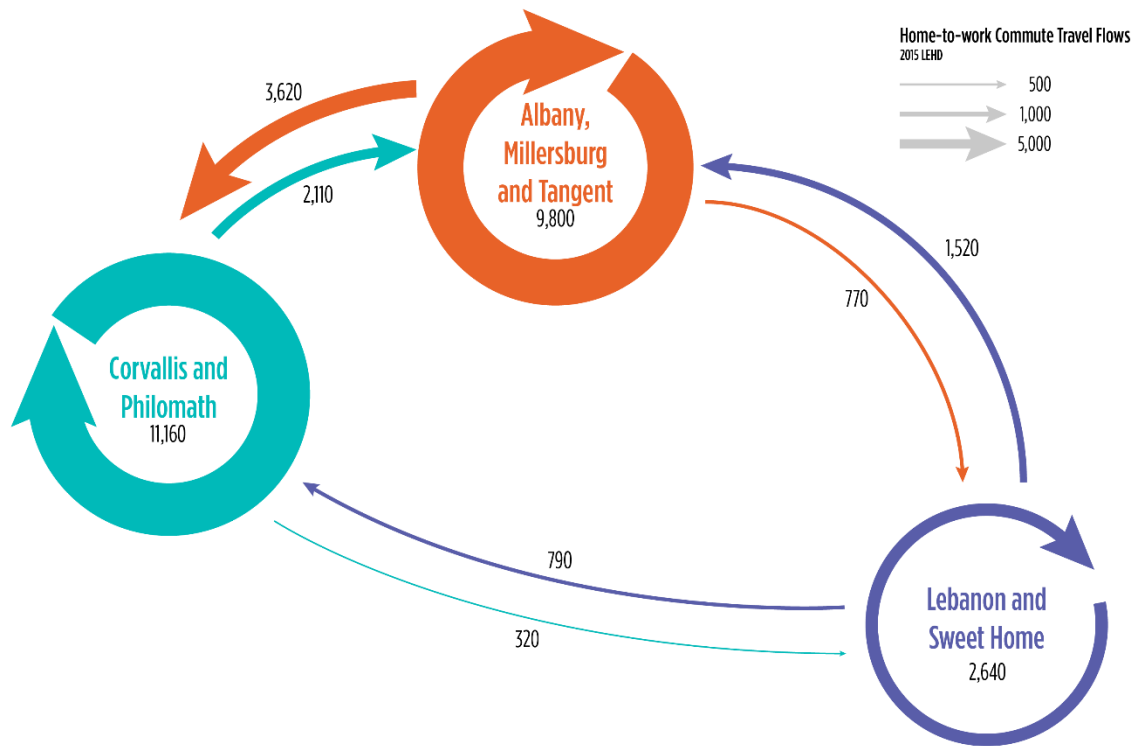
Current commute travel patterns indicate that approximately 5,700 workers travel between Corvallis or Philomath and Albany, Millersburg, or Tangent on a daily basis (see **Figure 3**).² The largest flow is from people who live in Albany, Millersburg, or Tangent and commute to jobs in Corvallis or Philomath. Between 2009 and 2015, the strongest growth in travel flows has been

² This data is based on Longitudinal-Employer Household Dynamics (LEHD) data. It represents commute trips contained within the Corvallis, Albany, and Lebanon/Sweet Home areas. Residents of communities outside the region who commute to jobs in the region, and employees that live in the region but commute to jobs outside the region (such as to Salem, Eugene, or Portland) are not included in these values. LEHD data include information from IRS records that are based on addresses provided by employers. Some work location addresses may not be for actual location of employment, but for corporate or main offices. Therefore someone who lives in Corvallis may be shown as commuting out of the city, even though they work for a company within Corvallis city limits or telecommute.

from people who commute between Lebanon/Sweet Home and the Albany area (29% increase) and between Lebanon/Sweet Home and the Corvallis areas (23%). Growth in commutes between Albany and Corvallis also grew notably (22%).

As population and employment grows in Linn and Benton Counties, travel demand between major cities within the region is likely to continue increasing. Transit service will be a key part of the transportation mix to provide people an option to avoid driving and for people who do not have access to a private vehicle. To accommodate future demand, transit services will need to operate more frequently and for longer periods of time.

Figure 3 Regional Commute Flows (2015)



Source: Longitudinal-Employer Household Dynamics (2015)

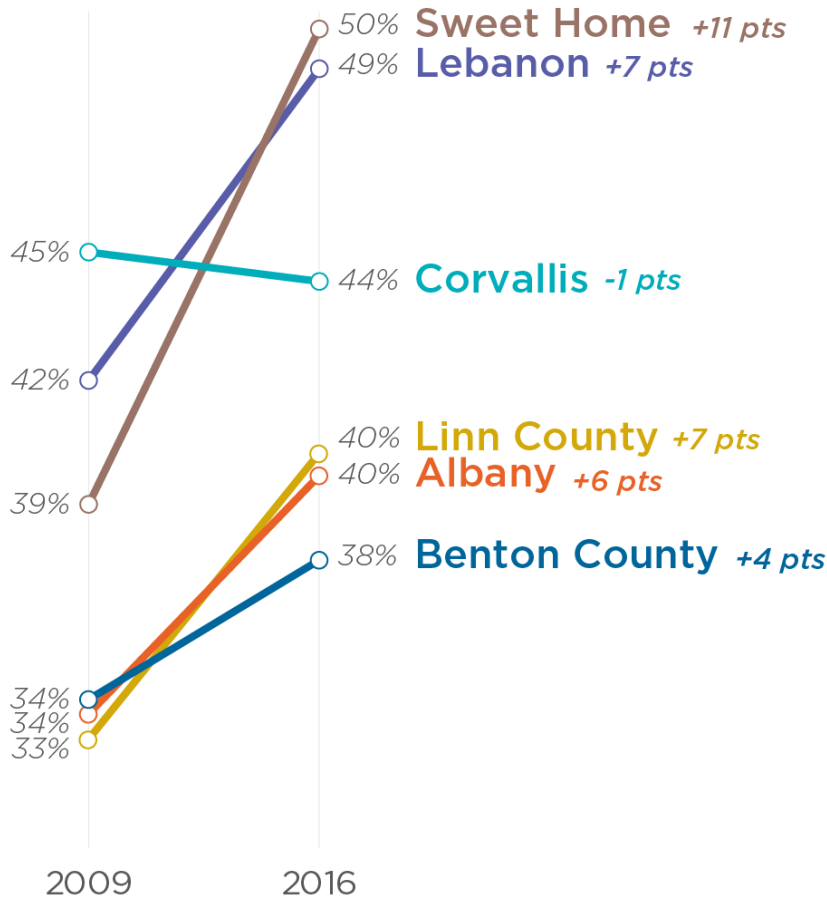
2. Low-income populations in Linn and Benton Counties are increasing.

Low-income populations are defined in the STIF rules as households below 200% of the federal poverty level.³ Lebanon and Corvallis have the region’s highest share of low-income households. Between 2009 and 2016, most jurisdictions saw increases in the percent of people defined as low-income (see **Figure 4**) and all jurisdictions experienced increases in the total number of households defined as low-income (see **Figure 5**). Geographically within the region, the density of low-income households at the Block Group level is highly concentrated in the region’s cities (see **Figure 6**).

³ STIF guidance on estimating low-income households recommends applying the percent of population classified as low-income to the number of households.

Low-income households benefit most from affordable, accessible, and reliable transit options. Future transit demand will be influenced by where low-income individuals live and work. As low-income households increase in the region, demand for transit service is expected to grow.

Figure 4 Percent of Households Defined as Low-Income (2009 to 2016)



Note: Low-income defined as people with incomes below 200% of the Federal Poverty Level.
Source: US Census Bureau, American Community Survey, 5-Year Estimates, 2005-09 to 2012-16, Table C17002

Figure 5 Number of Low-Income Households

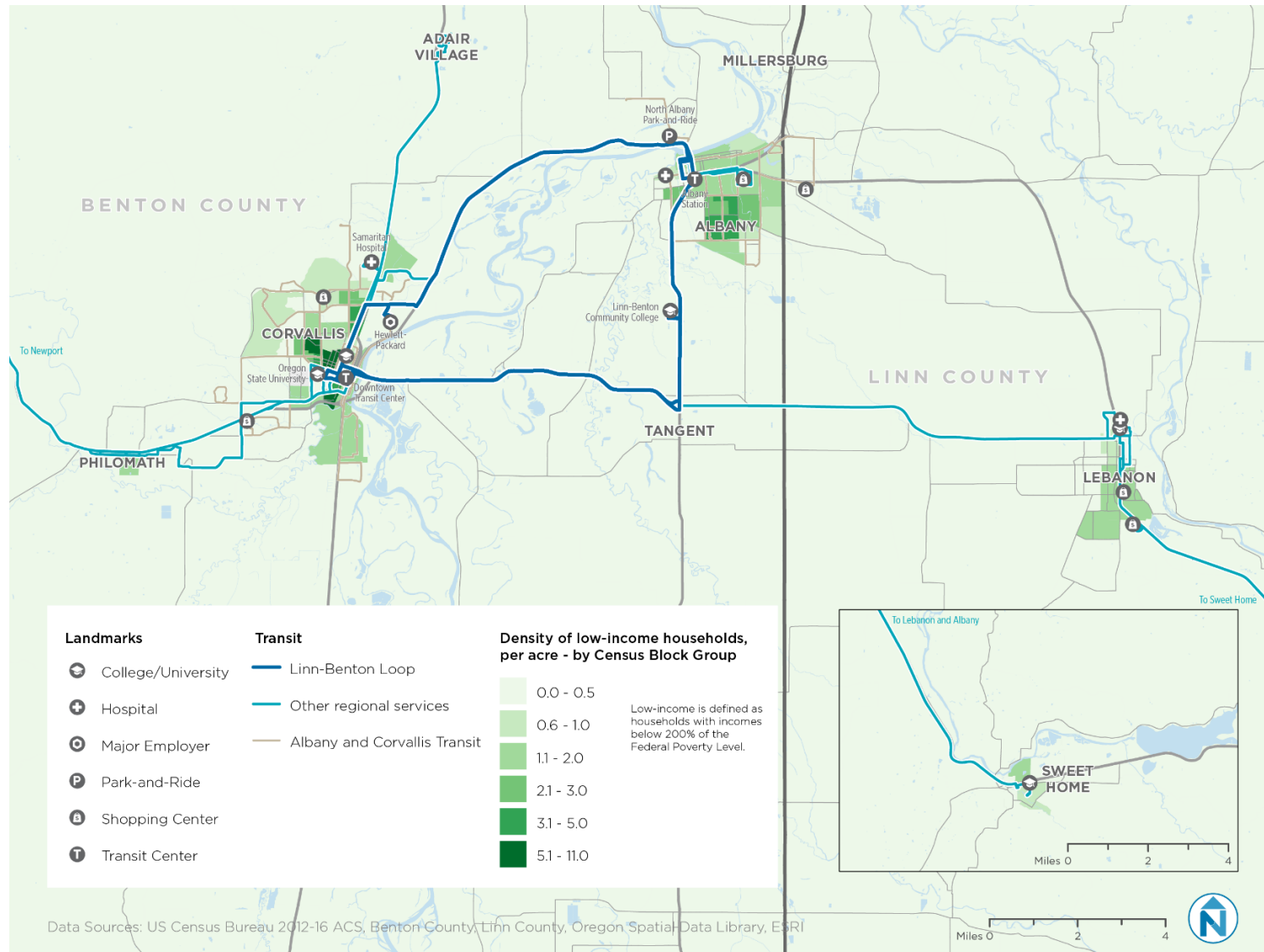
City / County	2009	2016	Change	Percent Change
Benton County	11,321	12,933	1,612	14.2%
Linn County	14,421	18,238	3,817	26.5%
Albany	6,236	7,841	1,605	25.7%
Corvallis	9,466	9,766	300	3.2%
Lebanon	2,405	3,257	852	35.4%
Sweet Home	1,283	1,770	487	40.0%

Notes: Low-income households calculated by dividing the total number of people with incomes below 200% of the Federal Poverty Level by the average household size of occupied housing units. American Community Survey data is an estimate and values from smaller communities have a higher margin of error.

Source: US Census Bureau, American Community Survey, 5-Year Estimates, 2005-09 to 2012-16, Table C17002 and Table B25010

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Figure 6 Density of Low-Income Households (by Census Block Group, 2016)



Note: American Community Survey data is an estimate and values from rural areas or Census Block Groups with few people have a high margin of error.

Sources: US Census Bureau, American Community Survey, 5-Year Estimates, 2012-16, Table C17002 and B25010

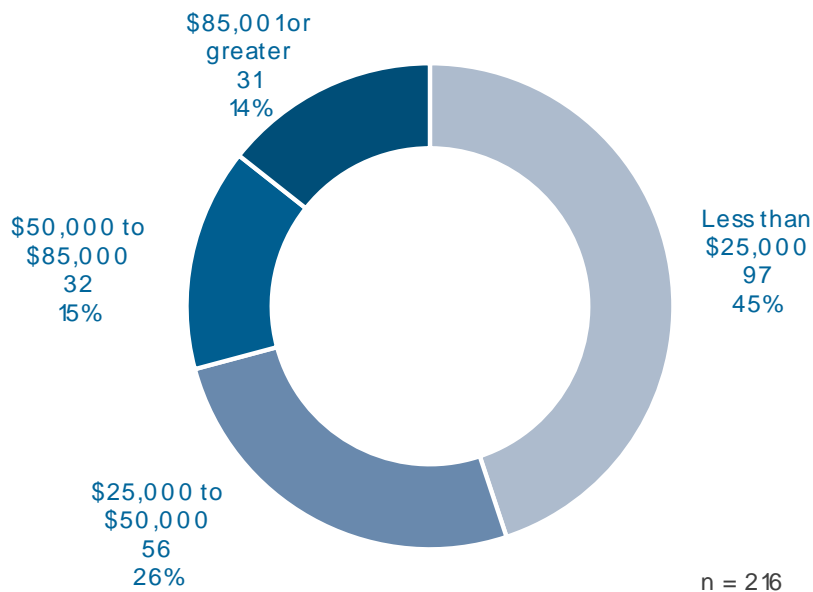
3. Most passengers on the Linn-Benton Loop live in households within incomes less than \$50,000, many of whom are students (based on 2018 passenger survey).

The Linn-Benton Loop on-board survey in October 2018 asked respondents to indicate their household income. The most common response, representing 45% of surveyed passengers, was less than \$25,000. Another quarter of respondents live in households with incomes between \$25,000 and \$50,000 (see **Figure 7**).

The survey also asked respondents for the number of people who live in their household. If a respondent answered both of these questions⁴, their responses were compared to determine if they lived in a low-income household (i.e., incomes below 200% of the federal poverty level based on total household income and number of residents). Based on this evaluation, approximately 64% of respondents were classified as low-income.

Transit service provides an important option for people who lack the financial means to own or operate a vehicle. Approximately two-thirds of the Loop ridership is low-income, indicating the important role the Loop serves in connecting low-income individuals in the region.

Figure 7 Household income of respondents



4. The Loop serves two limited markets: commuters and students.

As a large region, travel needs in the Linn-Benton County area are diverse. The Loop, as currently designed, primarily serves commuters and students at OSU and LBCC. However, travel between Corvallis and Albany includes more than just work week commuters, or students. People use the Loop to travel to and from work for non-traditional work shifts, to access healthcare facilities, and to go shopping and run errands.

⁴ 216 respondents provided their household income. 211 respondents provided their household size. 196 respondents provided responses to both questions.

There are needs for additional transportation services to support regional mobility for all trip types. More frequent service throughout the day and longer spans of service on weekends are potential service adjustments that would expand the utility of the Linn-Benton Loop for more people.

5. There is limited service for people traveling across the region on weekends.

The Loop currently provides most service during the weekday, with a focus on serving commuters and college students. However, weekend travel needs are also present in the region, including needed connections to weekend jobs, shopping centers, and medical facilities. In addition to limited number of trips, the Linn-Benton Loop service on Saturday operates in the counter-clockwise direction only.

Weekend trips are not well served because the limited frequency reduces the usefulness of the service for spontaneous trips. Additionally, the one-way direction results in out-of-direction travel for all passengers; but is greatest for passengers who only travel a relatively short distance. For example, consider a passenger who needs to travel from Albany Station to LBCC (a distance of approximately three miles). To make the journey on the Loop on Saturday, they would need to travel all the way to Corvallis, a trip that would take approximately one hour.

6. People who depend on transportation in the evening have unmet transit needs.

Classes start as early as 6:20 am at OSU and at 7 am at LBCC – both before the Loop begins. The first Loop trip arrives (via US-20) at OSU at 7:05 am, and the first Loop trip arrives at LBCC at 7:25 am. Most students start classes later (between 8 and 9:30 am) and enrollment peaks at more than 10,000 students around 11 am. Class enrollment remains relatively high until after 5 pm when it begins to drop. Classes are in session on both campuses until after 9 pm.

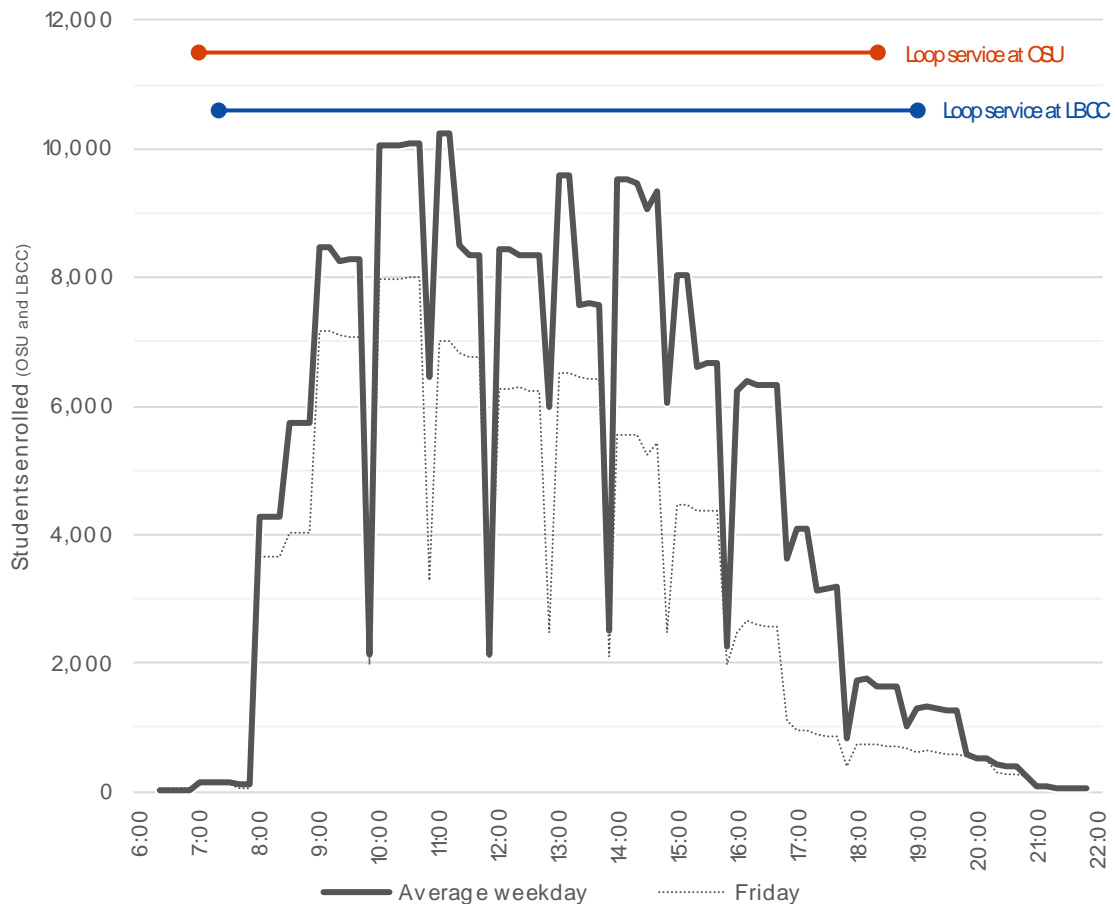
The last trip from LBCC to Corvallis departs at 5:50 pm, and the last trip from OSU to Albany departs at 6:20 pm⁵. There are still more than 1,000 students actively in classes after service ends for the day.

Figure 8 shows the total number of students enrolled in classes at both OSU and LBCC Main Campus by time of day. The span of Loop service at each campus is shown as the horizontal bars and faded backgrounds.

Service on the Linn-Benton Loop does not serve the needs of people who travel late in the evening, including students, faculty, staff, or other late evening non-university affiliated commuters. If these individuals lack access to a car, they may not have any dependable transportation from campus or work to return home. These limited hours may deter students and faculty at LBCC or OSU or regional employees from using the Loop.

⁵ The last direct trip from Corvallis to LBCC (via OR-34) departs the Downtown Transit Center at 4:35 pm. Passengers who catch the 6:20 pm trip can travel to LBCC via US-20 and Albany Station, with a 40-minute travel time.

Figure 8 Student Class Enrollment at OSU and LBCC by Time of Day



Source: Oregon State University (Fall 2018) and Linn-Benton Community College (Fall 2018) schedules.

7. The Linn-Benton Loop is scheduled at frequencies that do not coordinate well with other regional schedules, presenting barriers for operations and passengers.

Most Loop trips in the morning and afternoon, in addition to the express trips between LBCC and Downtown Corvallis, cycle in approximately 75 minutes. Service at this frequency makes it difficult for passengers to easily remember the schedule, connect with other services, and get to and from classes consistently.

Service every 75 minutes means individual stops are never served at the same time each hour. This requires passengers to consult a schedule to know when the next bus arrives and makes the service more difficult to remember or understand. Passengers typically find it easier to remember a single time every hour, rather than mixed arrival times throughout the day.

Both CTS and ATS operate on a consistent schedule with pulses at their transit centers at the same times each hour. Because the Loop’s schedule does not match the local services, riders cannot connect to CTS or ATS consistently. The lack of consistent connections between the Loop and each city’s system limits how easily riders can make transit connections. Passengers who need

to make connections and want to minimize their wait time must therefore travel at specific times throughout the day when connections are easiest.

Similar to connections to CTS and ATS, the Linn-Benton Loop does not coordinate well with class schedules at OSU and LBCC. The majority of classes at OSU and LBCC start or end hourly.⁶ During the midday, Loop service is hourly and this provides greater consistency for students to use the Loop to travel to or from classes. At LBCC – which has classes that start or end approximately every 30 minutes – there is a slight mismatch between service and class schedules. For example, midday Loop buses arrive at LBCC 45 minutes after the hour, and depart at the top of the hour. Classes that begin at the top of the hour are well served on both ends of the class if students can get between the bus stop and the class in 10 minutes. Classes that start at 30 minutes past the hour and end at 20 minutes past the following hour require at least 40-45 minutes of wait time before and after the classes. Hourly service would provide the greatest simplicity to passengers and allow the Loop to coordinate well with other transit providers and class schedules.

The Linn Shuttle connects with the Loop at LBCC and Albany Station. There is a similar mismatch between these schedules. While the Linn Shuttle schedule is not departing at consistent times each hour, a consistent Loop schedule would provide a base from which to coordinate transfers between the routes.

However, if service were to operate hourly using existing one-way loop structure and 75-minute cycle times, the Loop would require an additional bus and driver. Because the cycle time of the Loop trips are just over an hour, drivers would return to the starting point relatively soon after the previous trip had departed. Therefore, to maintain consistent hourly service, the drivers would need inefficient layover times between runs. In short, the Loop's existing cycle time limits opportunities to increase frequency of service in ways that are financially and operationally efficient.

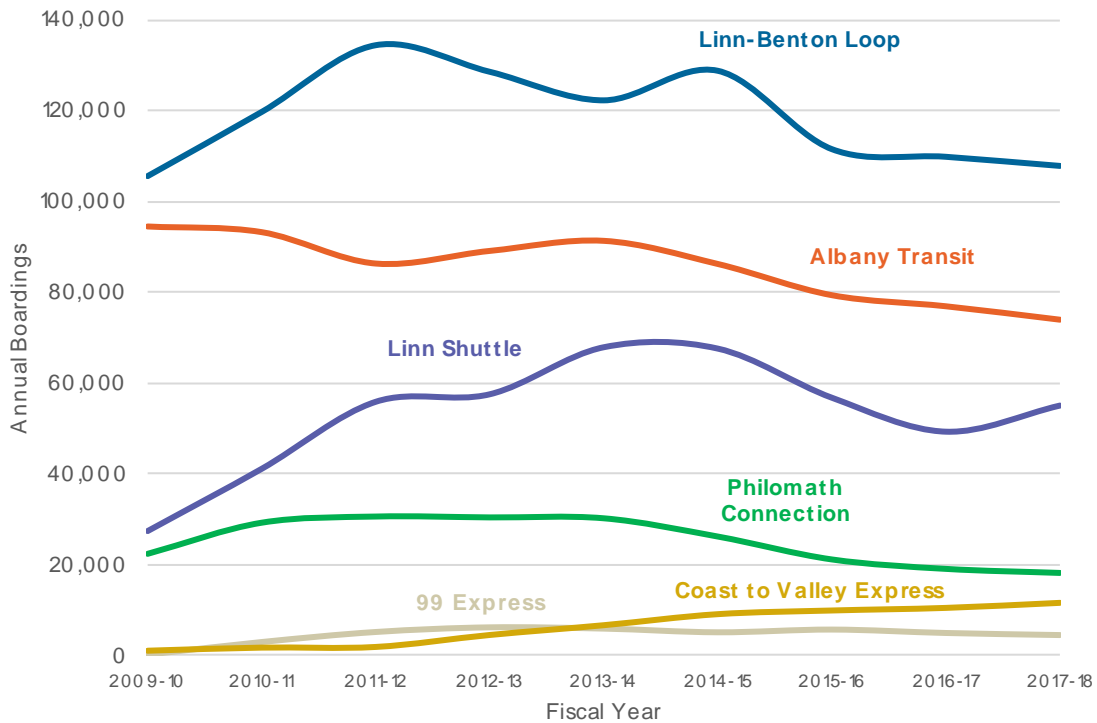
8. Ridership on the Linn-Benton Loop has remained relatively flat over the past several years, with a slight downward trajectory.

Ridership on the Linn-Benton Loop has remained relatively flat between 2009–10 and 2017–18. Although ridership grew more than 20% above 2009–10 levels between 2011 and 2014, ridership has returned to its 2009–10 level, at approximately 110,000 boardings per year (see **Figure 9**).

The Linn-Benton Loop has maintained strong ridership in the past decade, but has seen some small declines. These ridership trends are not consistent with the growth in the region's population, employment, and student enrollment. This suggests less transit use and reduced relevance of the Loop in the region's transportation system. However, as the Loop has not undergone significant changes in service for many years. This suggests service changes may be necessary to improve its usefulness for residents, employees, and students.

⁶ Most courses are scheduled from :00 to :50. Eighty-four percent (84%) of class enrollments at OSU, and 72% of class enrollments at LBCC are on this cycle. Three percent (3%) of class enrollments at OSU, and 12% of class enrollments at LBCC are in classes that start at a time other than the top of the hour.

Figure 9 Ridership Trends (FY 2009–10 to FY 2016–17)



Sources: Benton County, Corvallis Transit System, Albany Transit System, Linn-Benton Loop

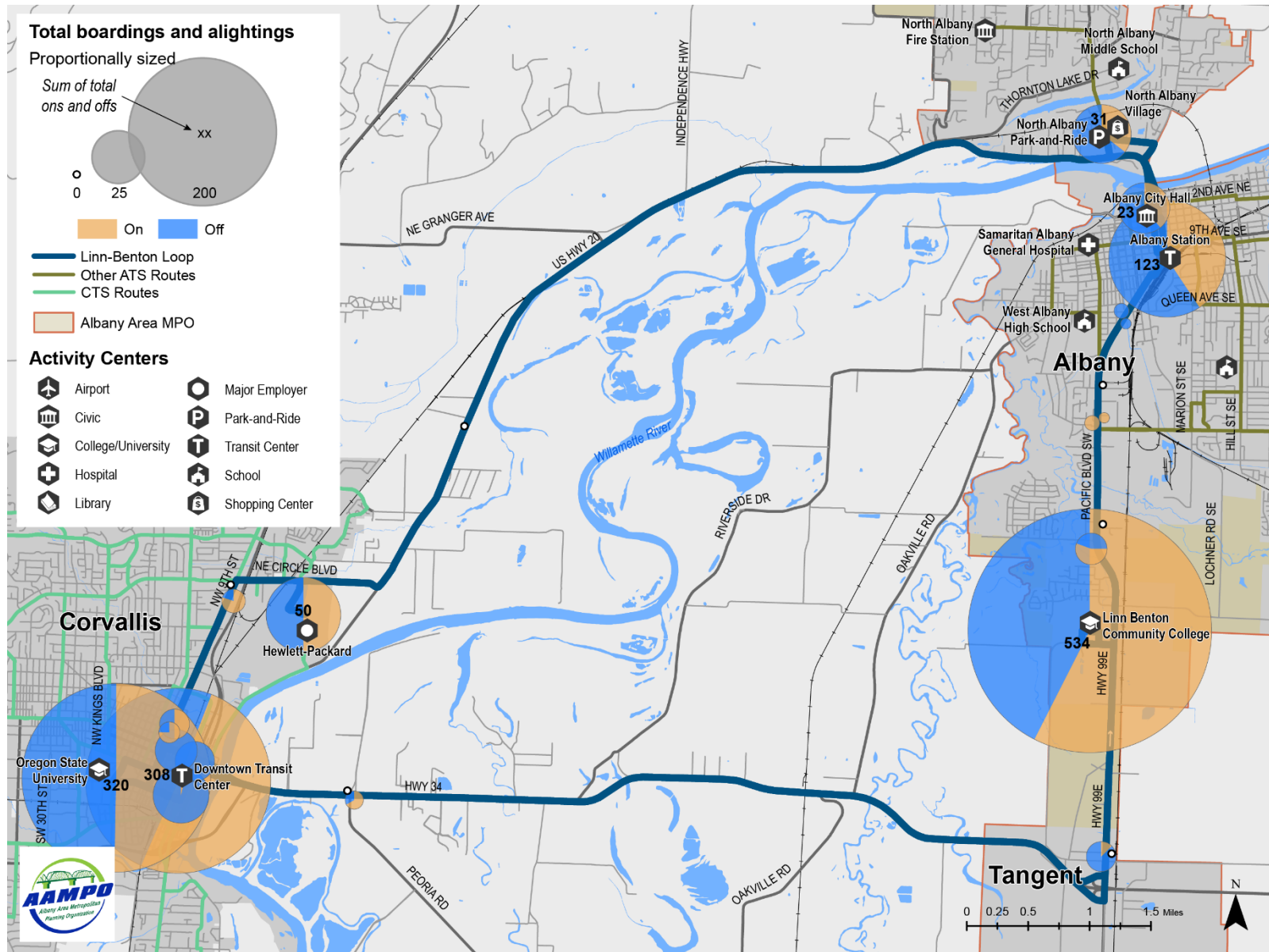
Note: Ridership on Corvallis Transit is not included because its ridership is almost ten times larger than the Linn-Benton Loop and does not compare well with the region's other transit services. Corvallis Transit served approximately 710,000 trips in 2009–10, 900,000 in 2010–11, and has ranged between 1,110,000 and 1,190,000 between 2011–12 and 2016–17.

9. Most ridership on the Linn-Benton Loop is at LBCC, Downtown Corvallis, and OSU.

The Loop's busiest stops are at LBCC, Corvallis' Downtown Transit Center, and OSU (**Figure 10**). Other stops with relatively high ridership are Albany Station, Hewlett-Packard, and North Albany Park-and-Ride. Service between LBCC and Downtown Corvallis via OR-34 has the highest demand and this corridor is likely to continue to have strong ridership and have the highest productivity in terms of riders per service hour.

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Figure 10 Loop Weekday Ridership by Stop (Fall 2014)

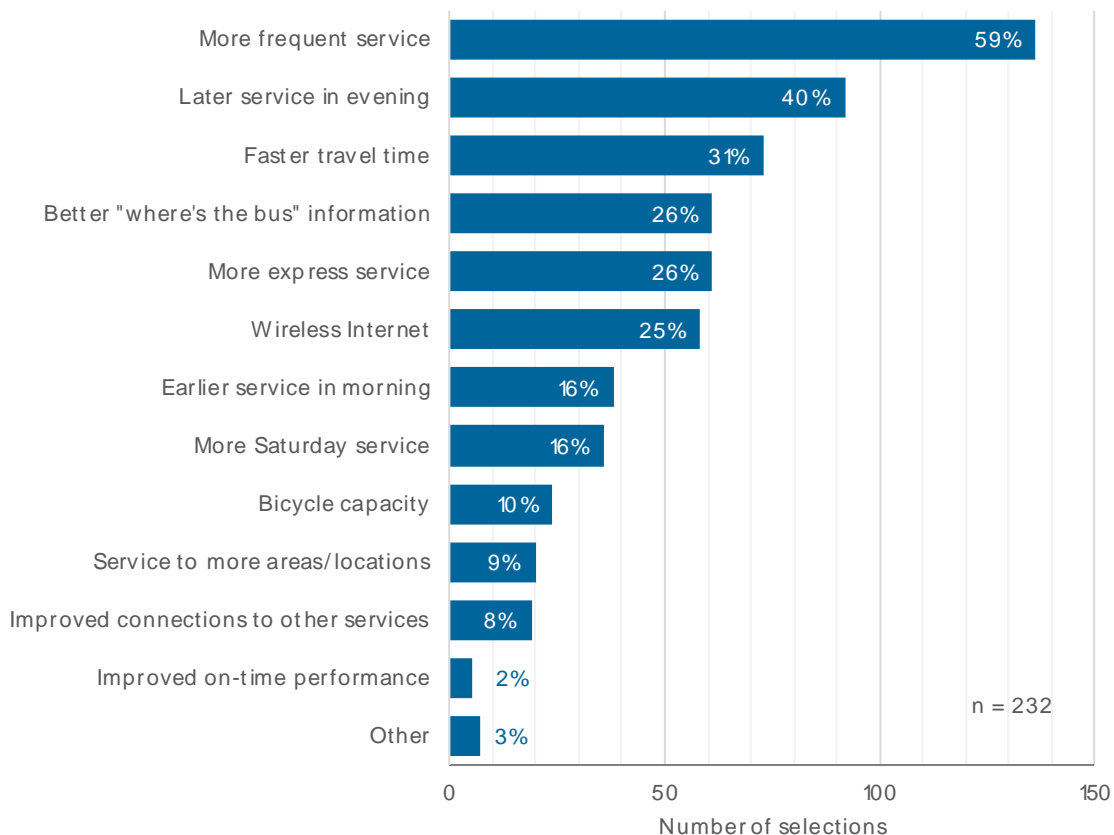


10. The top improvements for Linn-Benton Loop service are increased frequency and later service in the evening (based on 2018 passenger survey).

The on-board survey of Linn-Benton Loop passengers asked respondents to select their top three improvements that would encourage them to ride more often. Twelve options were provided and respondents were given the option to provide their own improvement if it was not listed. The results (**Figure 11**) indicate frequency, span of service, reduced travel time, and improved information were the most supported improvements. More frequent service was selected much more often – 19 percentage points higher than later evening service – indicating there is broad support for Loop buses to run more often throughout the day.

Earlier morning service, additional Saturday service, new service to more areas, and improved connections to other services were low on their list of priorities and suggests passengers prefer improvements to the existing services over adding service at times, on days and in places where none exist today (with the exception of later evening service). Faster travel time – selected by 31% of respondents – may be provided in coordination with more frequent service because reduced wait time at the start of a trip will reduce overall travel time, even without any increase in speed.

Figure 11 Top Service Improvement Requests



Source: Linn-Benton Loop 2018 Passenger Survey

11. Many of the region’s transit agencies have unique brands and provide information independently of each other.

Many agencies and transit services operate in the Linn-Benton region, including two urban transit systems and six regional or intercity routes – each with their own unique name and branding. Each agency provides their own maps, schedules, fare information, and contact information on their independent websites. Some agencies provide additional information that others do not, such as trip planners and service alerts. Additionally, each agency provides different fare types and has different costs for riders.

Inconsistent information and branding can make connections to and from the Linn-Benton Loop more confusing for transit riders, and particularly new or inexperienced ones. The transit rider experience could be improved with consistent information and branding across the region. This can be accomplished through a regional effort, which could range from small changes (e.g., each organization reorganizes their webpages so they are consistent), to larger changes (e.g., developing a unified brand for services across the region).

Figure 12 Transit Brochures in the Linn-Benton Region



3 TRANSIT ENHANCEMENTS

OVERVIEW

This chapter describes the proposed 10-year operating plan to achieve the Loops service vision. This includes proposed route alignments, frequency, span, and days of service. This plan was established based on service requests from passengers, technical analysis, the workshop with regional stakeholders, and refinements based on TAC guidance.

The specific service improvements were grouped into three phases. All phases are constrained within the Loop’s expected operating budget (\$1.1 million annually, or \$600,000 above today’s operating budget).

Figure 13 provides the operational and financial assumptions used to develop the Linn-Benton Loop phasing plan.

Figure 13 Assumptions

Assumption	Value	Details
Weekday service days	252	5 days per week, 52 weeks per year, excluding eight holidays
Saturday service days	53	52 Saturdays per year, plus service on the day after Thanksgiving
OSU/LBCC Fall-Spring session days	165	Based on 2018–19 academic calendar
OSU/LBCC Summer semester days	53	Based on 2019 Summer academic calendar
Average operating speed	25 mph	Based on Loop data. Speeds range from 17 to 30 miles per hour (mph), average 25.7 mph
Revenue hour cost	\$105	2018–18 annual budget divided by annual revenue hours
Annual budget (2017–18)	\$500,000	2017–18 Loop operating budget (rounded)
Annual revenue hours (2017–18)	4,700	2017–18 Loop data (rounded)
Additional revenue from Oregon STIF	\$600,000	Estimated combined commitment from Benton and Linn Counties (\$300,000 each per year)
Total scenario planning budget	\$1,100,000	Existing annual budget + Additional STIF revenue

VISION

The Linn-Benton Loop will continue to be a robust regional service for many years, connecting the Albany and Corvallis areas, and providing reliable service for residents, commuters, university students, and people making intercity connections at Albany Station.

The Linn-Benton Loop will be a regional transit service designed around three coordinated routes:

- The **Regional Route** will operate bi-directionally between Albany Station and Downtown Corvallis/OSU via OR-99E and OR-34, with a stop at LBCC. On weekdays it will operate for 16 hours per day from 6 am to 10:15 pm, with service every 75 minutes, using one vehicle. On Saturdays, it will operate for 10 hours, from 8 am to 6 pm with service every 90 minutes using one vehicle.
- The **Campus Connector** service will operate bi-directionally between LBCC and Downtown Corvallis/OSU via OR-34 on weekdays during OSU/LBCC academic term (i.e., no service during summer term or semester breaks). It will operate for 12 hours between 7 am and 7 pm. Buses will run every 60 minutes in the morning and afternoon, and every 30 minutes during the rest of the day. The 60-minute frequency will require one vehicle to operate, and the 30-minute frequency will require two vehicles. The second vehicle will be shared with the US-20 Commuter route, which runs only in the morning and afternoon.
- The **US-20 Commuter** service will operate bi-directionally between Albany Station and Downtown Corvallis/OSU via US-20, HP and OR-99W. Service will operate on weekdays with three bi-directional trips in the morning (6 am to 9 am) and three in the evening (4:30 pm to 7:30 pm). This route will require one vehicle.

Figure 14 summarizes the routes, and identifies key operational characteristics. **Figure 15** presents a map of the future system on weekdays, and **Figure 16** shows Saturday service.

Figure 14 Proposed Regional Transit Routes

Route	Service Days	Time of Year	Hours of Service	Frequency (min)	Vehicles ^[A]
Regional Route ●	Monday-Friday	All year	6 am – 10:15 pm	75	1
	Saturday	All year	8 am – 6 pm	90	
US-20 Commuter ●	Monday-Friday	All year	6:00 – 9:00 am 4:30 – 7:30 pm	60	1 ^[B]
Campus Connector ●	Monday-Friday	OSU/LBCC academic term ⁷	Midday: 9:30 am – 4 pm	30	
			AM/PM: 7 – 9:30 am & 4 – 7 pm	60	1

Notes:

[A] Number of vehicles does not include spare vehicles necessary to support bus services.

[B] Preliminary analysis suggests one vehicle could serve both the morning and afternoon Commuter route, and the mid-day Campus Connector; Campus Connector at 30 minute frequencies will require two vehicles.

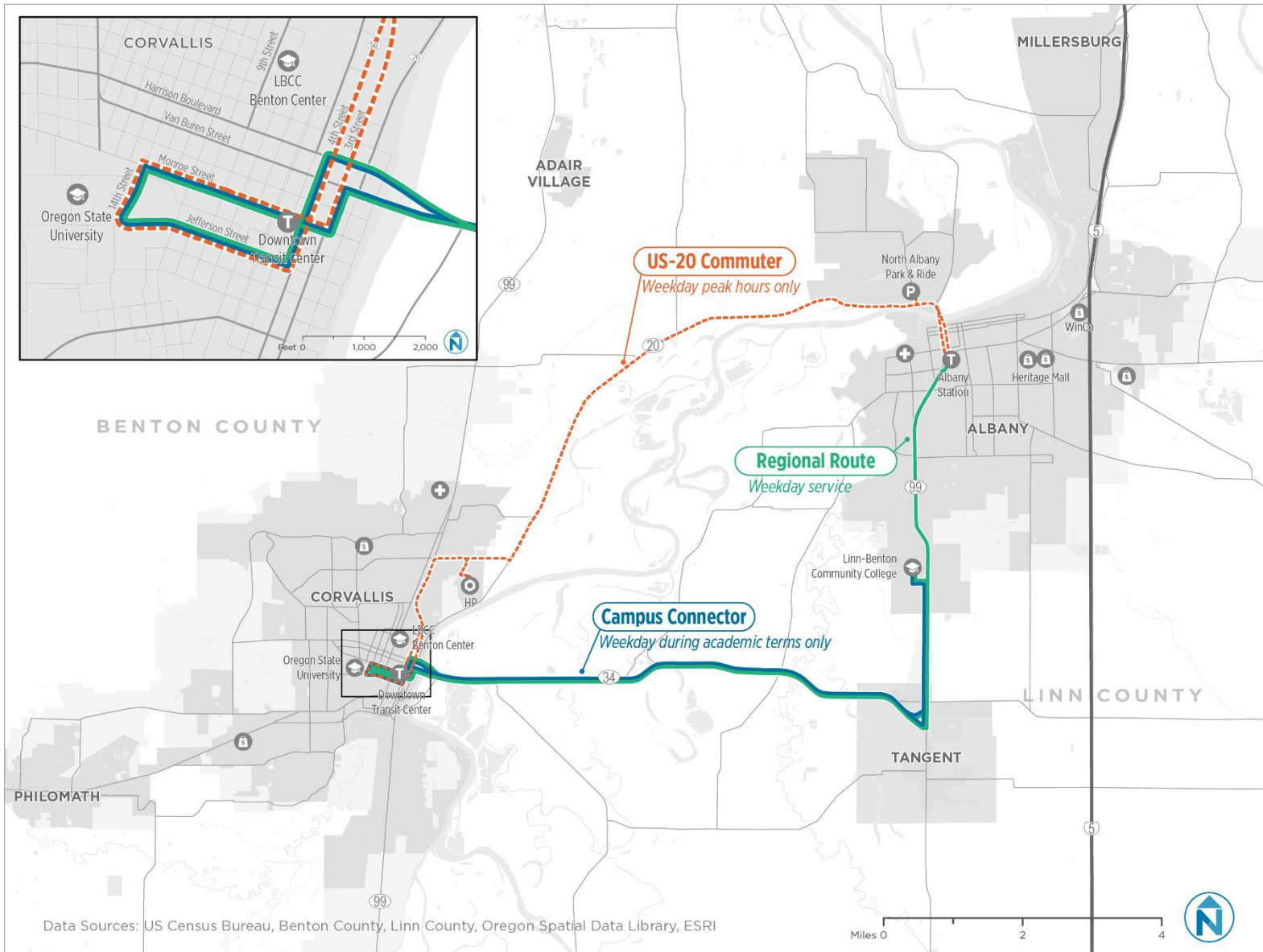
⁷ Fall, Winter and Spring terms only

Notable changes from the existing Loop service include:

- **Transforming the loop-based system to three independent bi-directional routes.** This allows the headways and service hours for each route to be scaled independently to accommodate demand within its service area. The bi-directional service design also makes the service easier to understand, which makes it easier for people to plan their trip and catch the bus.
- **Extended evening service on weekdays** until 10:15 pm between Albany Station, LBCC and Corvallis. Later service will accommodate student travel markets, and non-traditional employment schedules.
- **Direct midday service between Corvallis and Albany Stations** (via OR-34, LBCC and OR-99E). Passengers will no longer need to transfer to ATS at LBCC to travel between the region's two major transit centers during the midday.
- **Realignment of service in Corvallis off of 9th Street onto OR-99W** to reduce travel times and maintain three round trips between Downtown Corvallis/OSU, HP and North Albany. Service along 9th Street will continue to be provided by CTS (all day Monday through Saturday).
- **Reduce Saturday service to North Albany** (on US-20) and 9th Street in Corvallis. Saturday service will operate bi-directionally along OR-34 and OR-99E to provide consistency with weekday Regional Route service. To maintain service to Heritage Plaza in Albany, Saturday service frequency will operate consistently every 90 minutes.
- **The Campus Connector will supplement the Regional Route with more trips and increased capacity between OSU and LBCC** during the Fall, Winter and Spring academic terms. Service will operate at least hourly. In Phase 3 service will increase to every 30 minutes during most of the day.

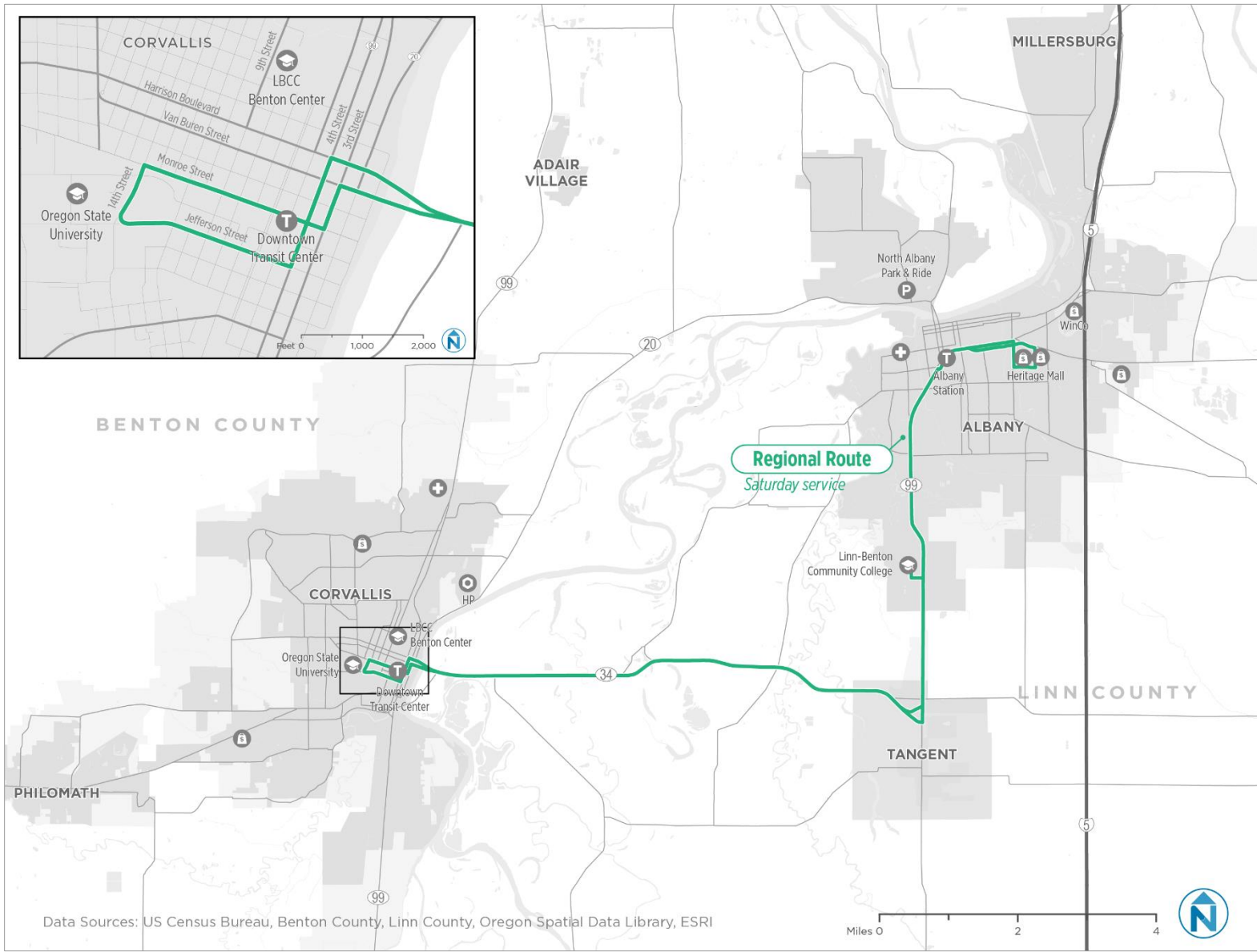
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Figure 15 Proposed Regional Transit Map (Weekdays)



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Figure 16 Regional Transit Map After Implementation (Saturdays)



PHASING

The vision will be implemented in three phases. Service data are summarized in **Figure 17** and described in more detail below.

Figure 17 Phasing Summary

Service Details	Existing	Phase 1	Phase 2	Phase 3
		Nov 2019 – Dec 2020	Jan 2021 – Jun 2022	Jul 2022 - ongoing
Loops				
Frequency (min)	75	<i>no change</i>	-	-
Days of service	Monday-Friday and Saturday	<i>no change</i>	-	-
Span	Weekdays: 6:30 – 10 am / 3 – 7 pm Saturdays: 8 am – 6 pm	<i>no change</i>	-	-
Vehicles	1	<i>no change</i>	-	-
Express and Midday				
Frequency (min)	60-75	<i>no change</i>	-	-
Days of service	Monday-Friday	<i>no change</i>	-	-
Span	6:40 am – 5 pm	6:40 am – 9 pm	-	-
Vehicles	1	<i>no change</i>	-	-
Regional Route				
Frequency (min)	-	-	75 (90 on Saturday)	<i>no change</i>
Days of service	-	-	Monday-Friday and Saturday	<i>no change</i>
Span	-	-	Weekdays: 6 am – 10:15 pm Saturdays: 8 am – 6 pm	<i>no change</i>
Vehicles	-	-	1	<i>no change</i>
Campus Connector (during OSU/LBCC academic terms only)				
Frequency (min)	-	-	60	30 during midday
Days of service	-	-	Monday-Friday	<i>no change</i>
Span	-	-	7 am – 7 pm	<i>no change</i>
Vehicles	-	-	1	+ 1 (shared with US-20 Commuter)
US-20 Commuter				
Frequency (min)	-	-	60	<i>no change</i>
Days of service	-	-	Monday-Friday	<i>no change</i>
Span	-	-	6 – 9 am; 4:30 – 7:30 pm	<i>no change</i>
Vehicles	-	-	1	Bus shared with Campus Connector

Phase 1 (November 2019 – December 2020)

The first phase of the Linn-Benton Loop service enhancement will continue the current operating pattern of service with the AM/PM Loops, Midday and Express services. However, service will be extended later in the day on the Afternoon Express to provide service for LBCC students who attend evening and night classes. Service will begin directly after STIF funds are disbursed in November 2019.

This change will not require any additional vehicles. However, the Loop will procure two vehicles during Phase 1 to support Phase 2 service enhancements, given that transit vehicles can take up to 18 months to receive.

The following are the specific tasks within this phase:

- Extend Afternoon Express by four hours to provide bi-directional service between LBCC and Downtown Corvallis every hour (i.e., extend end of service from 5 pm to 9 pm).
- Purchase two 40-foot buses to expand the Loop fleet to four vehicles.⁸ The new vehicles are expected to take 12-18 months to manufacture and deliver.
- In coordination with ATS and CTS, identify potential bus stop improvements, including new shelters, seating, lighting, and bus stop signage. Prioritize improvements at the busiest stops and where service will continue to operate in Phase 2 and Phase 3.
- Develop an outreach and marketing strategy to educate existing and potential riders on service changes in future phases including improved frequency and the new route structure.
- A brand “refresh” in Phase 2 could highlight the service changes. For example, the “Loop” name may not fit the new service design – although this should be tested with riders.
- Consider allocating funds into a reserve to support later capital purchases, or to cover unforeseen operations and maintenance expenses.

Phase 2 (January 2021 – June 2022)

Phase 2 will restructure the Linn-Benton Loop system into three coordinated routes in January 2021. The date may change based on vehicle delivery timelines and/or coordination with changes to CTS and ATS services.

Phase 2 maintains service at most locations where the Loop operates today. The frequency, span, and direction of service will change depending on location and time of day. This restructuring will allow service levels to be more easily adjusted without disrupting the entire network. The three routes are the Regional Route, Campus Connector and US-20 Commuter.

Like in Phase 1, Phase 2 includes funds for marketing, bus stops, and planning/coordination. Phase 2 includes \$110,000 annually in reserve funds to purchase a new vehicle every four years, consistent with the Albany Transit (dba Linn-Benton Loop) vehicle useful life benchmark (12 years for heavy duty buses).

⁸ The Loop's 2010 EIDorado vehicle will be retired in 2022 (the 2014 and 2017 Gillig buses will continue to operate). The net result will be four total vehicles. Three vehicles will be needed to operate Phases 2 and 3. The fourth vehicle will serve as a spare. In practice, in-service vehicles would be rotated to balance service across the Loop fleet.

Phase 3 (July 2022 – ongoing)

Phase 3 will enhance the service established in Phase 2, with the Regional Route and US-20 Commuter continuing to operate as in Phase 2. The Campus Connector will increase service frequency from every 60 to 30 minutes between 9:30 am and 4 pm. This is when Loop vehicles are most full today.

The Campus Connector hourly service will remain unchanged from 7 am to 9:30 am, and from 4 pm to 7 pm. The route will operate when OSU and LBCC classes are in session, but not during semester breaks, including winter, spring and summer breaks. The vehicle for this 30-minute service will also serve the US-20 Commuter route.

Phase 3 includes funds for ongoing planning/coordination and marketing. Although planned for implementation in July 2022, Phase 3 may be implemented earlier or later based on agency capacity.

FINANCIAL PLAN

Figure 18 provides the financial details of the Enhancement Plan, including the source of funds for operations, vehicles, and bus stops and the expected available budget. The financial plan includes \$600,000 in new revenue annually from the STIF Formula Fund.

Each phase fits within this budget. The amount assumes \$300,000 each from Linn and Benton Counties, which are the STIF Qualified Entities receiving STIF funds and responsible for developing and submitting the STIF Plans.

Regional stakeholders may consider other funding sources to supplement existing revenues and improve service. Any new funding options will require further analysis to determine consistency with local and state laws, effectiveness, and expected ongoing revenue potential. For more information on these options, see Technical Memorandum #2.

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Figure 18 Expenditure Details (Fiscal Year Ending)

Fund	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
	<i>Existing</i>	<i>Phase 1</i>	<i>Phase 1 / 2</i>	<i>Phase 2</i>	<i>Phase 3</i>	<i>Phase 3</i>	<i>Phase 3</i>	<i>Phase 3</i>	<i>Phase 3</i>	<i>Phase 3</i>	<i>Phase 3</i>
Task 1: Operations											
STIF Formula	-	\$47,000	\$212,000	\$352,000	\$465,000	\$465,000	\$465,000	\$465,000	\$465,000	\$465,000	\$465,000
Federal	\$241,000	\$241,000	\$241,000	\$241,000	\$241,000	\$241,000	\$241,000	\$241,000	\$241,000	\$241,000	\$241,000
Other State	\$25,000	\$25,000	\$25,000	\$25,000	\$25,000	\$25,000	\$25,000	\$25,000	\$25,000	\$25,000	\$25,000
Local	\$166,000	\$166,000	\$166,000	\$166,000	\$166,000	\$166,000	\$166,000	\$166,000	\$166,000	\$166,000	\$166,000
Other	\$68,000	\$68,000	\$68,000	\$68,000	\$68,000	\$68,000	\$68,000	\$68,000	\$68,000	\$68,000	\$68,000
Subtotal	\$500,000	\$547,000	\$712,000	\$852,000	\$965,000	\$965,000	\$965,000	\$965,000	\$965,000	\$965,000	\$965,000
Task 2: Vehicles											
STIF Formula ^[3]	-	-	\$528,000	\$110,000	\$110,000	\$110,000	\$110,000	\$110,000	\$110,000	\$110,000	\$110,000
Discretionary ^[1]	-	-	\$352,000	-	-	-	-	-	-	-	-
Subtotal	\$0	\$0	\$880,000	\$110,000	\$110,000	\$110,000	\$110,000	\$110,000	\$110,000	\$110,000	\$110,000
Task 3: Planning, Bus Stops and Marketing											
STIF Formula	-	\$40,000	\$50,000	\$120,000	\$25,000	\$25,000	\$25,000	\$25,000	\$25,000	\$25,000	\$25,000
Subtotal	-	\$40,000	\$50,000	\$120,000	\$25,000	\$25,000	\$25,000	\$25,000	\$25,000	\$25,000	\$25,000
EXPENDITURES	\$500,000	\$587,000	\$1,642,000	\$1,082,000	\$1,100,000	\$1,100,000	\$1,100,000	\$1,100,000	\$1,100,000	\$1,100,000	\$1,100,000
Total Revenue	\$500,000	\$587,000	\$1,642,000	\$1,082,000	\$1,100,000	\$1,100,000	\$1,100,000	\$1,100,000	\$1,100,000	\$1,100,000	\$1,100,000
Existing	\$500,000	\$500,000	\$500,000	\$500,000	\$500,000	\$500,000	\$500,000	\$500,000	\$500,000	\$500,000	\$500,000
STIF^[2]	-	\$87,000	\$1,142,000	\$582,000	\$600,000	\$600,000	\$600,000	\$600,000	\$600,000	\$600,000	\$600,000

Note: All figures in constant 2018 dollars; it is assumed that both costs and revenues will increase with inflation over time. Vehicle match is typically 20% in both federal and STIF Discretionary programs, but can be as low as 10% for qualifying projects.

[1] Discretionary funds represent any non-STIF Formula revenue sources, whether from state, federal or other agencies.

[2] Includes STIF Formula and STIF Discretionary funds.

[3] FY 2021 STIF Formula funds include \$440,000 for one vehicle, plus \$88,000 in matching funds for a potential STIF Discretionary grant award, to fund another vehicle.

FUTURE CONSIDERATIONS

The funding amounts assumed in the phasing plan are estimates that could change in the future, based on increases or decreases in employment, wages, and taxpayer compliance rates in both Linn and Benton Counties. The lists below present an array of potential options for how to adjust service plans based on funding levels. The two counties and the Linn-Benton Loop Governing Board will need to work collaboratively to identify the service changes that make sense based on available funding, regional priorities, and how far along the region is to achieving the regional transit vision.

Additional funds available

If there are additional funds available, the following are potential options that could be considered to expand service:

- Invest in AVL technology to provide bus tracking and real-time arrival information to passengers. Purchase real-time displays for busiest stops.
- Extend the Campus Connector and/or Regional Route to the Benton Center in Corvallis on weekdays.
- Extend the Regional Route to Albany Heritage Mall on weekdays.
- Extend the Regional Route to Albany WinCo on Saturdays (or all week – Monday through Saturday).
- Add extra trips on the US-20 Commuter (new midday trips or more frequent peak hour service).
- During academic terms, expand the hours of the day when the Campus Connector operates every 30-minutes, rather than only between 9:30 am and 4 pm.
- Use three buses on the Regional Route to provide 30-minute frequencies between Albany and Corvallis. Eliminate the Campus Connector.
- Add Sunday service.

Insufficient funds available

If there are insufficient funds to proceed with the next phase of the enhancement plan, the priority should be to maintain service and defer additional enhancements until funding is available. However, if funding levels drop below the level needed to sustain service, the following should be considered:

- Use local funds to provide stopgap funding (either public funds, or contributions from local/regional intuitions and businesses).
- Reduce frequency on the Campus Connector to every 60 minutes.
- Eliminate the Campus Connector and provide service on OR-34 and OR-99E with the Regional Route only.
- Terminate US-20 Commuter in Corvallis at HP or 9th & Circle and ensure timed transfers with CTS.
- Eliminate or reduce frequency on the US-20 Commuter.

- Eliminate or reduce service on the Regional Route between LBCC and Albany Station. Ensure timed transfers to/from ATS at LBCC for people traveling between Corvallis and Albany Station.
- Eliminate Saturday service to Heritage Plaza.

CAPITAL, MARKETING AND OTHER SUPPORTIVE ELEMENTS

Successfully implementing the service improvements depends upon investments in capital elements (including vehicles, bus stops, and real-time bus arrival infrastructure) as well as marketing and planning efforts. These elements serve important functions in the transit system by improving passenger comfort and convenience and enhancing the overall operation of the system.

Vehicles

The vision requires the purchase of one additional vehicle for service (for a total of three buses) and a second additional vehicle as a spare. The current fleet includes one 35-foot bus, one 40-foot bus, and one 32-foot bus used as a spare vehicle. Due to high passenger loads, future vehicles are expected to be large heavy-duty buses to ensure sufficient capacity and reduce likelihood of pass-ups. The plan also includes funding for a new replacement vehicle every four years to maintain a state of good repair and ensure the system is able to provide effective service. Each vehicle costs approximately \$440,000, although grants should be pursued to leverage local funds.

Planning, Bus Stops, Marketing and Other Supportive Elements

The elements outlined below are provided with the funding listed under Task 3 in **Figure 18**. Specific line items are not identified for each element; the Linn-Benton Loop and its regional partners should adjust funding levels between these elements as needs or priorities are determined.

Planning and Coordination

Loop operators and regional stakeholders should continually keep an eye toward future service changes and trends in regional travel needs and travel demand, while also ensuring existing services continue to provide efficient and reliable service to passengers. An effective transit operator continually evaluates and monitors service to identify needs and make changes or adjustments as issues arise. Additionally, transit service needs to be well coordinated with other regional services to ensure effective outcomes for the region and the people who depend on the services.

Bus stops

Transit trips require at least some time spent waiting at a bus stop. Bus stop amenities should be provided at stops with the highest number of passenger boardings, with consideration for stops likely to serve more people with disabilities or older adults. Amenities may include new shelters, seating, lighting, and bus stop signage. A high-end shelter with a bench costs approximately \$20,000 (including the cost of installation). Large passenger information boards with maps and schedule information cost approximately \$750 each.

Real-time arrival information and displays

Provide real-time arrival information and displays, and coordinate implementation with other regional service providers. Real-time arrival information helps passengers know when to expect

the bus. Studies have shown real-time arrival reduces perceived wait time by passengers.⁹ At a basic level, real-time arrivals can be provided by telephone, text messages, or an app-based system. Some agencies have invested in real-time arrival displays at bus stops that update automatically to show the wait time for the next several bus arrivals. Maximize service delivery efficiency and coordination by coordinating and integrating technology with Corvallis Transit System, Albany Transit System and the Linn Shuttle. A single real-time arrival display costs approximately \$15,000 each.

Marketing and Information

The Loop should provide information on upcoming service changes in advance and inform passengers in real-time about delays and service disruptions. The change from Phase 1 to Phase 2 will likely be the most significant adjustment of the Linn-Benton Loop service since its inception in 1980. It will require the Linn-Benton Loop to provide detailed and effective outreach to inform and educate the public about the major service changes and how to navigate the new system once it is operational.

Marketing plays a critical role in attracting new riders, retaining existing riders, and building support from community members, businesses and partner agencies. Marketing includes publishing maps and schedule materials, providing information on a website and through social media, and providing advertising and targeted marketing and training programs.

MEASURING SUCCESS

The table in **Figure 19** presents the evaluation of the service enhancements through Phase 3. The metrics demonstrate an increase in service span, increased frequency, more trips between most destination pairs, and improved connectivity.

The most notable result of the evaluation is the significant increase in total trips available by market. Trips available by market is a numerical measure that represents both access to people and jobs and frequency of service provided to those people and jobs. It multiplies the number of people or jobs within ¼ mile of stops on each route by the number of trips. The numbers for each route were added together to represent the overall scenario totals.

The four metrics (population, jobs, low-income households, and students) all have significant changes, increasing by more than 200%. These values indicate that people, jobs, and households within ¼ mile of stops would have much more frequent service than the existing service.

The number of people, including low-income households, and jobs within ¼ mile of bus stops on weekdays in Phase 3 is expected to be slightly reduced from the existing service. This is a result of consolidating the routing in downtown Corvallis for consistency between routes and moving the Commuter service from 9th Street to US-20 to maintain consistent cycle times. However, the “trips available by market” measure demonstrates the Phase 3 service increases the total number of trips available to people (including in low-income households) and jobs. Specific bus stop and route alignments should be further evaluated in detail before implementing expanded service; any adjustments to stop locations may impact these evaluation results. Access and coverage metrics on Saturday are reduced due to the elimination of service on US-20 and 9th Street.

⁹ Rabi Mishalani, Mark McCord and John Wirtz. “Passenger Wait Time Perceptions at Bus Stops: Empirical Results and Impact on Evaluating Real-Time Bus Arrival Information.” *Journal of Public Transportation*, Vol. 9, No. 2, 2006.
https://www.nctr.usf.edu/jpt/pdf/JPT_9-2_Mishalani.pdf

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Figure 19 Service Evaluation

Category	Metric	Detail	Existing	Phase 3	Difference
Cost	Annual operating cost	-	\$ 500,000	\$ 1,100,000	+ \$ 600,000
Schedule and Frequency	Days of operation	-	Monday-Saturday	Monday-Saturday	--
	Service span (hours)	Monday-Friday	12.5	16	+ 3.5
		Saturday	9	10	+ 1
	Headway (minutes)	Monday-Friday	60-75	30-75	New 30-min service
		Saturday	65-90	90	Consistently 90-min
	Number of weekday vehicle trips connecting select destinations (trips in each direction)	North Albany Park-and-Ride to HP	3	6	+ 3
		North Albany Park-and-Ride to LBCC	11 (including ATS)	8 (on ATS only)	- 3
		LBCC to DTC	12	31 ^[A]	+ 19
		LBCC to OSU	8	31 ^[A]	+ 23
		Albany Station to DTC	6	19	+ 13
Quality of Service	Travel times on weekdays between select destinations (in minutes; during OSU/LBCC academic term)	North Albany Park-and-Ride to HP	15	15	--
		North Albany Park-and-Ride to LBCC	20 on Loop 30 on ATS	30 on ATS	--
		LBCC to DTC	25	25	--
		LBCC to OSU	25	25	--
		Albany Station to DTC	40	30	- 10 ^[B]
	Transit connectivity and integration (Percent of trips with connections to Linn-Benton Loop within 20 minutes at LBCC, DTC or Albany Station based on conceptual Loop schedules and existing ATS, CTS and Linn Shuttle schedules)	ATS	44%	50%	+ 6 pct pts
		CTS	24%	83%	+ 59 pct pts
Access and coverage	Population within ¼ mile of stops	Monday-Friday	9,600	6,300	- 3,300 (- 34%) ^[C]
		Saturday	7,700	7,400	- 300 (- 4%)
	Low-income households within ¼ mile of stops	Monday-Friday	2,100	1,200	- 900 (- 43%) ^[C]
		Saturday	1,600	1,600	--
	Jobs within ¼ mile of stops	Monday-Friday	9,300	6,200	- 3,100 (- 33%) ^[C]
		Saturday	7,100	6,800	-300 (- 4%)
	Total weekday trips available by passenger market (vehicle trips * passenger market size)	Population	102,000	326,000	+ 224,000 (+ 217%)
		Low-income households	15,000	45,000	+ 30,000 (+ 200%)
		Jobs	99,000	300,000	+ 201,000 (+ 203%)
		Students	867,000	3,108,000	+ 2,241,000 (+ 258%)

Notes: [A] In Phase 3, there will be 31 bi-directional trips each weekday between LBCC and Corvallis. All trips will serve the Downtown Transit Center and OSU. Today, there are 12 trips, but only 8 of these also serve OSU. [B] The decrease of 10 minutes is a result of traveling on OR-99W instead of 9th Street, and the faster assumed operating speed. [C] The reduction in access comes as a result of increased trips on core segments and elimination of stops along 9th Street in Corvallis. Passengers will be able to rely on CTS or ATS for local service to connect to the Loop