

Transit Master Plan



2023 UPDATE



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1. Executive Summary

This document is the first draft of an updated Transit Master Plan (TMP) for the City of Wilsonville. It lays out a set of improvements to the City's public transit system that respond to changes in demand brought on by the COVID-19 pandemic; City goals for mobility, economic opportunity and the environment; and priorities expressed by the public during outreach conducted in 2022.

About SMART

South Metro Area Regional Transit (SMART) is the City of Wilsonville's public transportation system. SMART is a department of the City that provides fixed-route and demand responsive transit service, both within Wilsonville and making connections to neighboring communities.

In addition to fixed-route and demand-response service, the SMART Options Program provides businesses, residents and visitors of Wilsonville with the resources to participate in various transportation options such as vanpooling, carpooling, bicycling, walking, and telework. This program promotes a robust set of travel options to give people more choices in how they travel while reducing the number of single-occupancy vehicles on the road.

SMART Vision & Mission

SMART's mission is to provide convenient, safe, and reliable transportation services in

a fiscally responsible manner to meet the needs of Wilsonville residents, employees, and visitors of all ages, ethnicities, and income levels.

SMART is dedicated to providing mobility for those who do not have access to a personal car, and to creating an attractive transportation option for those who do.

An Ambitious Plan

Public transit providers around the U.S. are in a period of great change. The lingering impacts of the COVID-19 pandemic have dramatically reshaped ridership, travel patterns, and expectations from the public about what transit service should do. Yet SMART's mission to provide an attractive mobility option and meet the needs of the community remains important guidance even as conditions change. This Transit Master Plan (TMP) update provides a roadmap for the development of SMART's network between 2023 and 2028, expressing the priorities of Wilsonville residents and workers for better connections within town and to other nearby cities.

SMART is the largest transit provider in this part of the region, and located in a fairly central place relative to other smaller providers. As such, SMART has a unique opportunity to knit together south metro area communities and serve trips among them that are not well-served by either TriMet's network to the north or the state-wide POINT and Amtrak networks. This is a

role no transit provider currently occupies.

This document describes an aspirational network for 2028 that would result in a bigger, more extensive fixed-route network, doubling-down on SMART's role as a regional mobility provider for the south metro area and the north Willamette valley. Fixed route services would more than double, and demand response services would increase as well.

This is a growth plan, though the additional service would be added gradually in response to growth, increased travel demands and funding opportunities. The total increase in annual operating cost for the recommended 2028 network, compared to the 2021 network, would be about \$8 million, and this annual operating cost estimate does not include capital costs such as the purchase of additional vehicles. More information about costs and financial context is given starting on page 87.

Increases in state funding for transit are a major opportunity, and sure to make some of the service expansion described in this Plan possible. A major limitation is currently imposed by the difficulty in purchasing new transit buses, and the difficulty in hiring additional bus drivers. SMART is actively working around and through these two shortages.

Recent Changes

The past three years have presented major challenges for all transit agencies. Ridership declined at virtually all U.S. transit agencies, and many were forced to make service cuts as a result of either budget cuts or a shortage of drivers.

SMART was able to weather this period with more of its service intact than many other transit agencies.

Figure 1 shows how the amount of service and ridership on SMART services changed from January 2020 to December 2022. While ridership on SMART fell in March 2020, it has been steadily recovering since that time.

The fixed-route service level (at bottom) was held steady from early 2020 through December 2022, though in early 2023 some temporary service cuts were made due to the driver shortage. Because demand-response service is deployed in response to trip requests, the demand-response service level has tracked closely with demand-response ridership, which also fell early in the pandemic and has slowly recovered in the years since.

SMART has not made major changes to services in the past three years. It did limit the use of the demand-response services by non-ADA passengers for certain types of trips, and suspended the medical shuttle between Wilsonville and Legacy Meridian Medical Center.

SMART Ridership and Service 2019-2022
Demand-Response and Fixed-Route Service

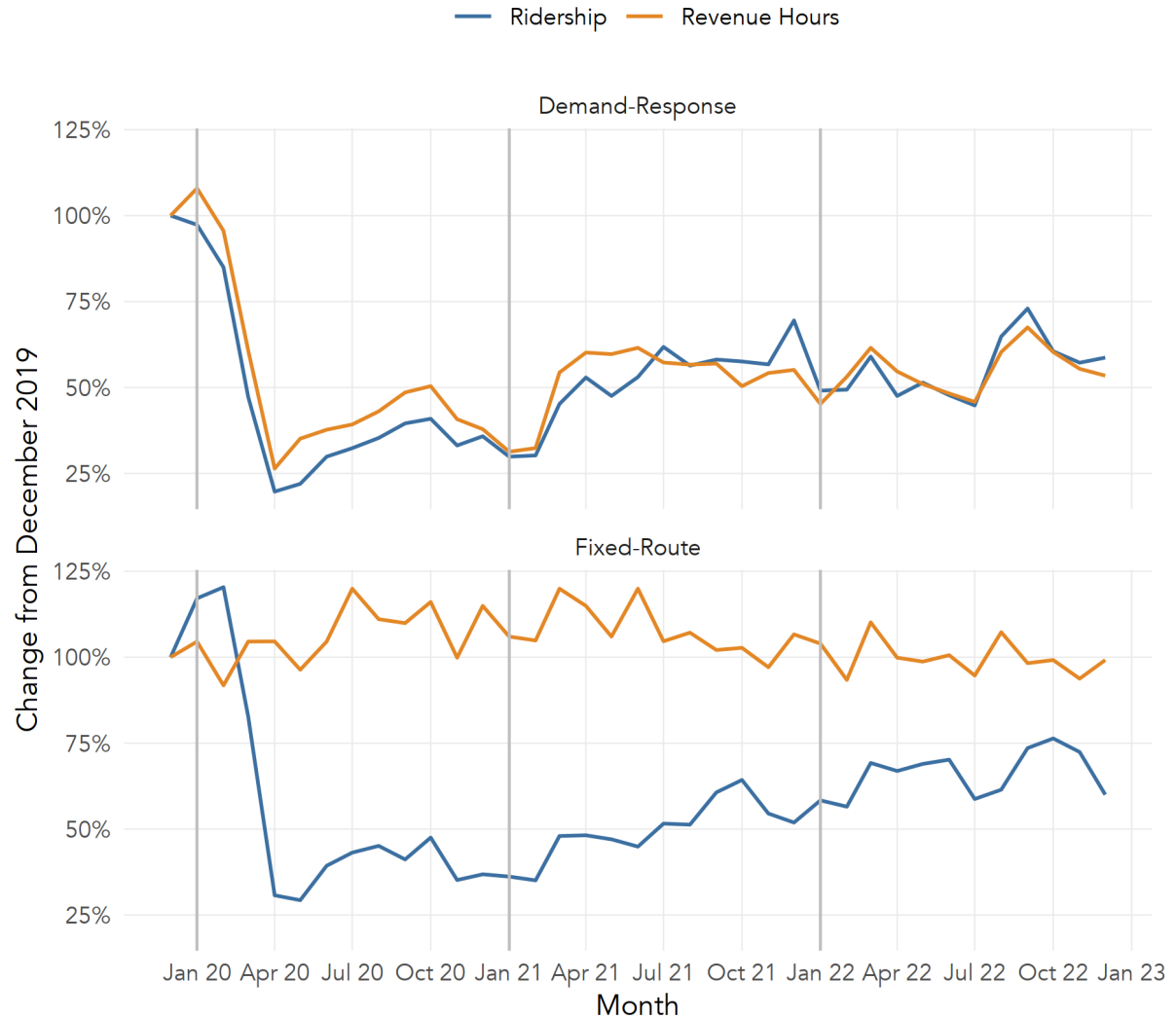


Figure 1: SMART ridership and service levels on fixed-route and demand-response services, 2020 - 2022.

Priorities from Public Input

The outreach process for this Plan shaped the recommended service and infrastructure improvements. Chapter 2 describes the public involvement process. Some of the priorities that emerged from public input are:

- **Improve weekend service, especially Sundays.** Both the survey and stakeholder input suggested that SMART should prioritize adding Sunday service, as well as making Saturday service available on more routes. The 2028 Network proposed in this Plan update would do both of these things.
- **Add more early morning and late evening service.**
- **Make better regional connections.** The top response in the community survey for where SMART should focus on improving its services was to bolster connections to neighboring cities. The 2028 Network would improve existing routes to Salem, Canby and Tualatin; and establish new connections to Tigard, West Linn, Oregon City, Clackamas Town Center and Woodburn.
- **Maintaining coverage of city neighborhoods.** Many people who provided input to this Plan expressed that maintaining all existing coverage inside the

City of Wilsonville was a high priority. The 2028 Network slightly increases service coverage within 1/2 mile by adding service along Canyon Creek and in Villebois, getting transit close to more residents and jobs.

Highlights of this Plan

The core of this Plan is a recommendation to improve SMART’s fixed-route network by adding routes to new places and by adding service at new times. Related recommendations are also made for improvements to demand-response service, staffing, infrastructure and amenities.

There are several “big moves” in the 2028 Network that would work together to make the network more useful for a variety of trips:

- **More frequency.** Today, the only route that runs every 30 minutes all weekday long is Route 4 on Wilsonville Rd. The 2028 Network would add an additional all-day 30-minute route connecting the west side Transit Center, east side Town Center, Canyon Creek Road, Tualatin and Tigard.
- **Better regional connections.** In addition to the existing connections to Salem and Canby, the 2028 Network would have the all-day connection to Tigard described above, plus service every 60 minutes to West Linn, Oregon City and Clackamas Town Center all day long, with better frequencies during rush hours. Additional service would be added to Woodburn, Salem and Keizer as well.
- **Improved customer service.** A regional customer service center,

related electronic information and additional personnel will help people living and working in Wilsonville take advantage of improved routes connecting to neighboring cities.

- **New connection points.** Instead of all services connecting only at the existing Transit Center near the WES station, some routes would also connect at a very small hub (consisting simply of nice bus shelters, a bus turnaround and an operator break room) in the Town Center east of I-5. This new, tiny hub would protect some routes and riders from delays associated with congestion around I-5, make Wilsonville Road service more direct, and support redevelopment of the Town Center area.
- **Improved weekend service.** With the 2028 Network, SMART fixed-route and demand-response services would run on Sundays for the first time, and more routes would operate on Saturdays.
- **Low- and no-emissions buses.** As the SMART fleet grows to support added service, low- and no-emissions buses will be added while the flexibility and resilience of the fleet is maintained.

Growing the SMART transit system to the degree foreseen by this Plan update will trigger increases in staffing, maintenance facilities, fleet and other infrastructure, which are described in this Plan.

Document Guide

The rest of this document is organized into six chapters.

- Chapter 2 provides a summary of public involvement in this Plan and how public input informed the Plan.
- Chapter 3 describes the 2028 Network and outcomes that relate to City goals.
- Chapter 4 describes the role of demand-response in the Plan. Changes to the fixed-route network will trigger additional needs for demand-response service.
- Chapter 5 describes the supporting physical infrastructure and fleet investments that would be needed to meet the goals of the Plan. It also covers some of the operational changes that would accompany the 2028 Network, and the non-transit programs SMART administers.
- Chapter 6 summarizes SMART’s current financial forecast and describes the federal, state and local funding sources available for enhancing services and investing in infrastructure.

2. Public Involvement

Overview

SMART and the consulting team led an inclusive process to engage a diverse group of existing and potential transit users. This included historically underserved communities, seniors, people with disabilities and others who live in Wilsonville, people who travel for work, appointments, shopping, or to visit family and friends.

Outreach activities in 2022 included:

- Consistent, reliable, accessible information with an identified SMART contact person.
- Sharing information on the Let's Talk Wilsonville website.
- A Public Involvement Plan.
- Representative stakeholders individually invited to participate in a variety of ways.
- Special efforts to reach people in senior facilities, apartment complexes, schools, lower income residents & workers, and people who speak predominantly Spanish.
- Emails to an Interested Parties List to keep people informed about project updates.
- Updates to the Planning Commission and City Council.



Figure 2: Wilsonville community members attend an interactive stakeholder workshop in September 2022.

SMART conducted the following community engagement processes:

- **Project website development.** An inviting and accessible page on the Let's Talk Wilsonville website was provided for the SMART Plan update. It gave community members a way to learn about the project, see upcoming events, participate in the survey, and sign up for the Interested Parties List. The project page was published and updated in English and Spanish.
- **Community Survey.** An online survey was launched on August 12, 2022 and was available on the Let's Talk Wilsonville website for one month. A total of 210 responses were collected, 185 in English and 25 in Spanish.
- **Stakeholder Workshop.** Project staff hosted a workshop on September 20, 2022 to walk participants through the service planning decisions being considered in the Plan update. Staff invited around 150 participants by email or phone calls. A total of 18 people joined

the workshop held at the Wilsonville Library.

- Tabling Events.** During the Summer of 2022 SMART staff attended eight community events to invite participation in the Plan update. They collected feedback by asking people to put dots on a map indicating where they thought SMART service should go. A total of 32 participants put 99 dots on the local and regional maps.
- Operator Survey.** A survey was offered to SMART operators to ask them what they had been hearing from riders about transit service and what ideas they had that could help the community. A total of 7 operators shared thoughts through the survey.

Survey Respondent Demographics

The survey was the vehicle through which the majority of participants shared input into the Plan.

In total, 210 people took the survey. The table in this page provides a summary of their demographics. While respondents were not required to complete a set of demographic questions, most did.

Most of the respondents (85%) live or work in Wilsonville, while 21% neither live nor work in Wilsonville but visit the city for other reasons.

The largest response groups by age were people born between 1980 - 1999 (23-42 years old) and 1960 - 1979 (43 - 62), who made up 35% and 32% respectively.

91% of respondents provided their gender. 49% responded "female", 39% responded "male", 2% responded "non-binary" and 1% responded "transgender".

The survey also asked respondents to share their household income. About 76% of respondents answered this question. 21% of respondents reported having an income that was at least twice the federal poverty level (which is \$26,500 for a four-person household).

Not shown in the table at right are responses related to transit use. About 30% of respondents had been regular transit riders over the last year (August 2021 - August 2022). A total of 26% of respondents said they were occasional riders.

Figure 3: Plan survey respondent characteristics

All responses	210	100%
By Connection to Wilsonville		
Resident	113	54%
Worker	66	31%
Business owner	7	3%
Visitor	45	21%
By Age (what decade were you born?)		
Before 1960	39	19%
1960-1979	67	32%
1980-1999	74	35%
2000 and After	16	8%
By Gender		
Female	103	49%
Male	81	39%
Transgender	2	1%
Non-binary	4	2%
By Race/Ethnicity		
People of Color	86	41%
White	117	56%
By Primary Language at home		
English	153	73%
Spanish	27	13%
Other	9	4%
By Income		
Less than \$25,000	44	21%
\$25,000 - \$49,999	35	17%
\$50,000 - \$99,999	32	16%
\$100,000 - \$149,999	20	10%
\$150,000 or more	25	12%

Survey Results

The survey asked respondents to share their views on a variety of future priorities for the development of SMART’s network. These questions addressed topics about where and when service should be available. The survey was administered through the City of Wilsonville’s “Let’s Talk Wilsonville” online platform.

What do you think are the highest priorities for the TIMES when new service could be added to the SMART transit network?

This first asked respondents to share how they thought SMART should improve in terms of the days and hours that service is available. Respondents were able to select

from options for more service at midday, during rush hours, later in the evening, or on weekends. Respondents could also select an option for more frequency.

Figure 4 shows the breakdown of responses to this question. The top three priorities for new service added to the SMART transit network among community survey respondents were “More Saturday or Sunday service”, “Longer hours of service each day – earlier morning and later evening”, and “Better frequencies”.

What do you think are the highest priorities for the PLACES where new service could be added to the SMART transit network?

This question was designed to discover whether respondents want SMART to invest in even more service inside Wilsonville, or in improving connections to other communities.

Figure 5 shows the responses to this question. A majority of respondents asked for more regional service for long trips to other cities, as opposed to short local trips within Wilsonville. The regional connections identified in open-ended comments were: Canby, Tualatin, Downtown Portland, Woodburn, Sherwood, Tigard, and Oregon City.

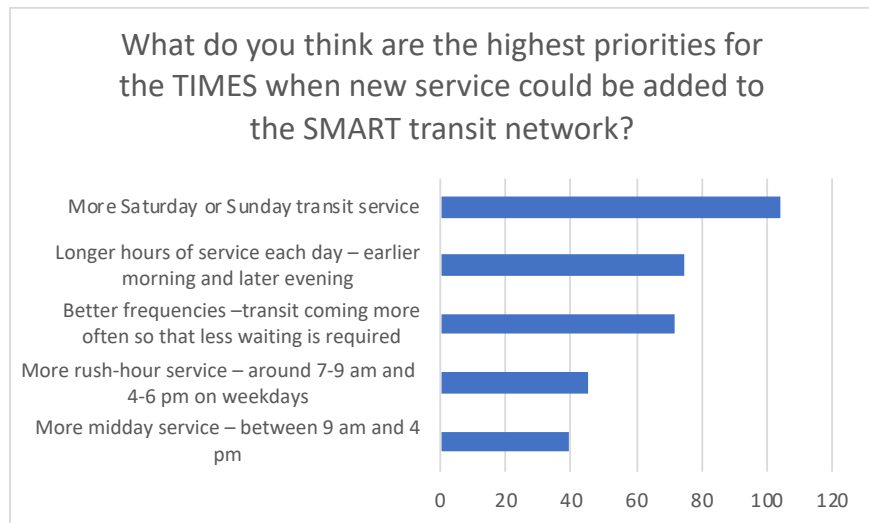


Figure 4: Plan Community Survey - Question 1

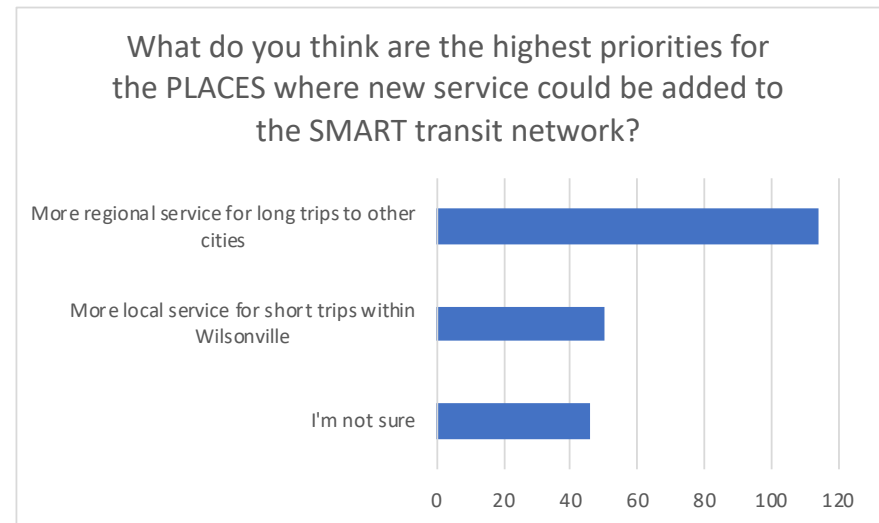


Figure 5: Plan Community Survey - Question 2

In general, INSIDE Wilsonville, what should SMART prioritize when adding new transit service over the next five years?

The third question asked respondents to share whether they think SMART should prioritize getting service close to more of the city, or invest more in the busy places within the city where people are already using transit.

Figure 6 shows the responses to question 3. The largest group of people (88 respondents) said it was more important for SMART to add service in new areas than to add more frequent service to areas already served. Sixty-nine respondents said SMART should add service to places where many people are using transit. Both goals were important to this group, but adding new coverage was slightly more important.

What places inside Wilsonville do you think are most important for SMART to serve?

The last survey question asked respondents to share their priorities for which types of places in Wilsonville SMART should focus on. **Figure 7** shows the responses to question 4. The top four responses, each garnering over 100 responses, were “transit connections to other cities”, “shopping centers”, “places with many jobs”, and “places with many residents”.

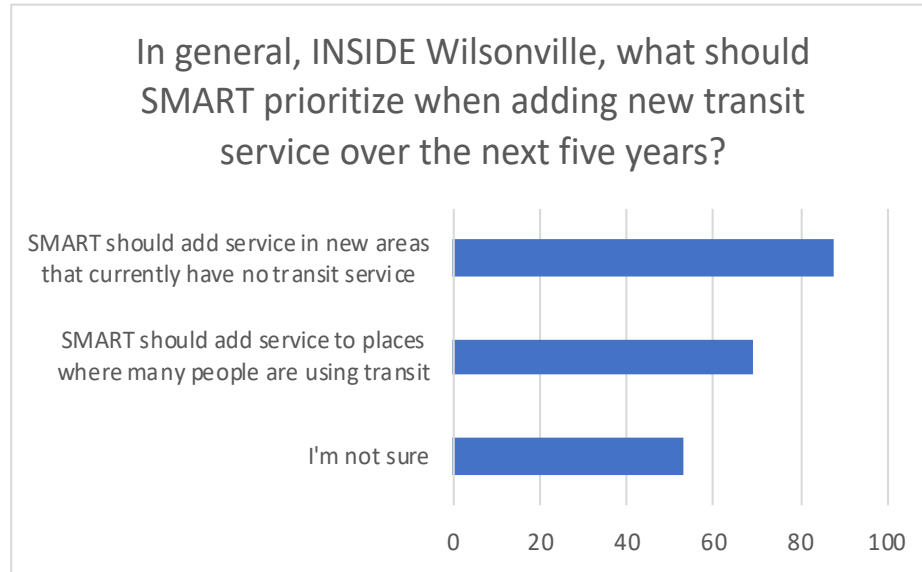


Figure 6: Plan Community Survey - Question 3

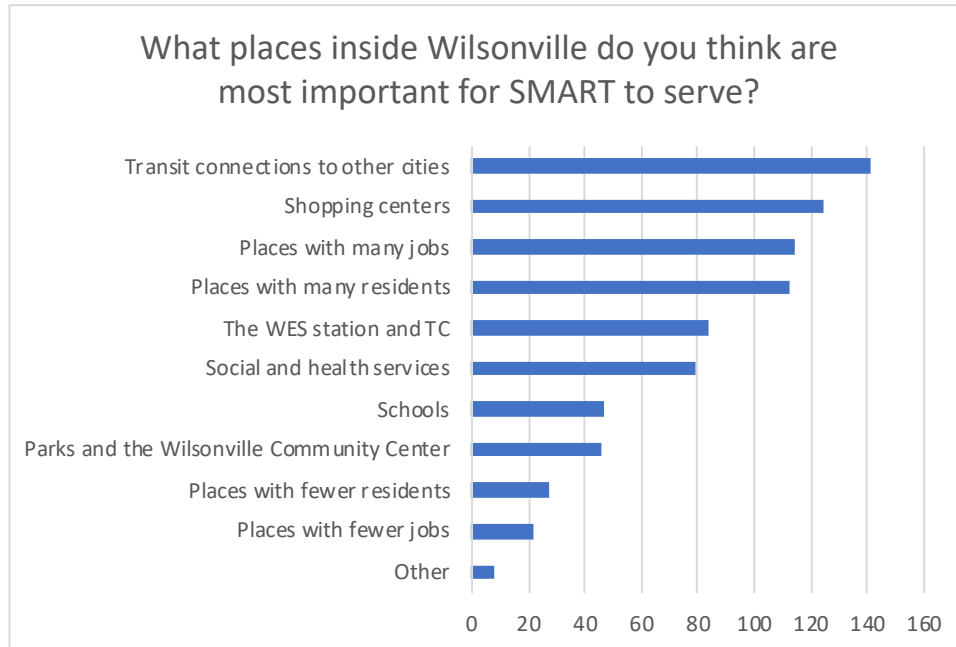


Figure 7: Plan Community Survey - Question 4

Stakeholder Workshop

In September 2022, SMART held a workshop focused on key questions about how future transit should be planned, both within Wilsonville and around our part of the region. The workshop was held in-person from 4:00 p.m. to 7:00 p.m. at the Wilsonville Library. Staff and consultants reached out to 150 stakeholders by email or phone to recruit them to this workshop. A total of 18 people attended.

The workshop included:

- A fun, interactive transit planning game introducing trade-offs and service considerations in and around Wilsonville
- Live polling about key questions
- A presentation about existing Wilsonville transit services and how they're performing.
- Questions and discussion.

The images on this page show some results of the first activity, a game in which stakeholders worked in groups to design their own transit networks for Wilsonville. SMART staff and consultants assisted participants, and engaged in conversations about what types of trips and services participants hope to see in future SMART improvements.

After the planning game, the group discussed future priorities for SMART using a set of anonymous polling questions.

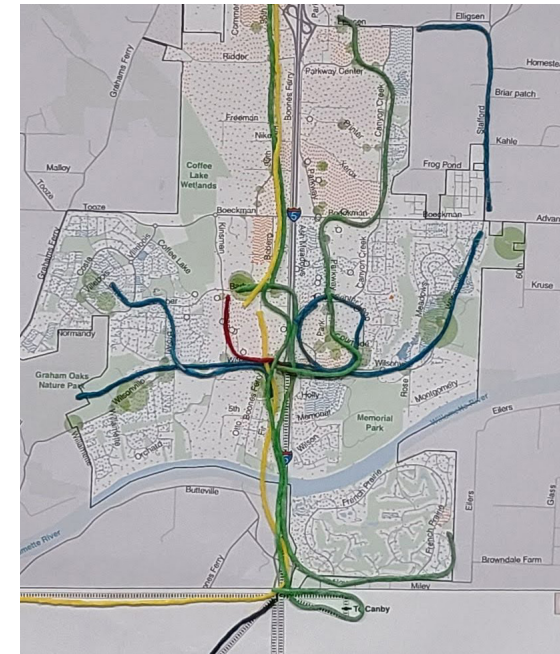
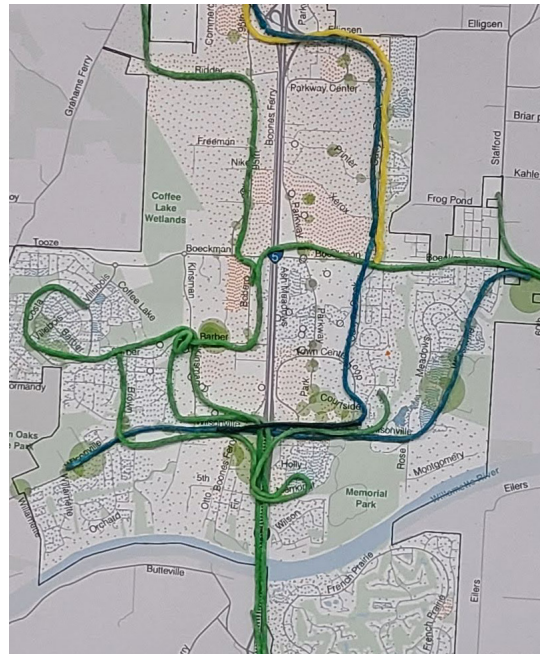


Figure 8: A close-up of two networks designed by participants in the stakeholder workshop. Different colors stand for different frequencies of service. This exercise gave participants a way to discuss and show their desired improvements to SMART service.

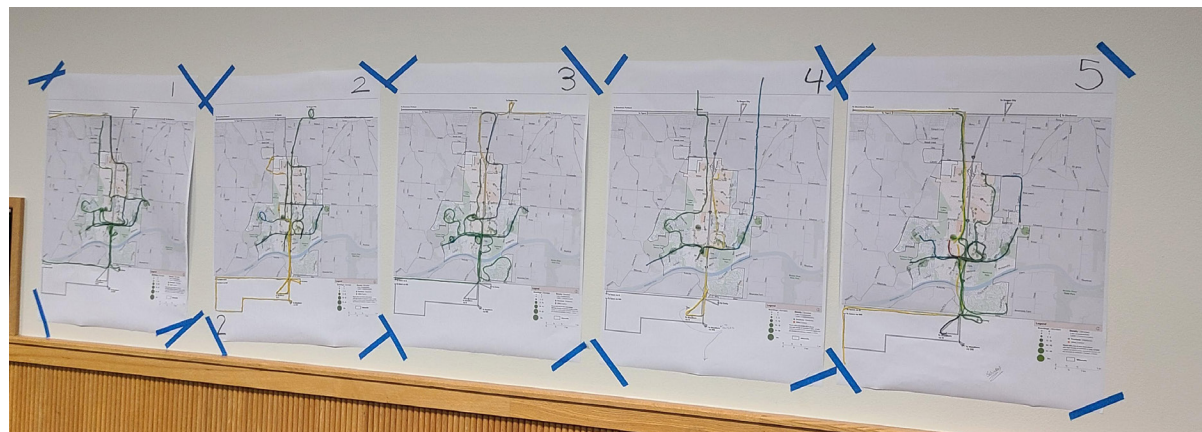


Figure 9: At the end of the exercise, stakeholders were able to compare and contrast the transit networks each group designed for Wilsonville.

Participants were able to respond to questions displayed on a screen using their phones (via text message or a web app).

The images on this page show the results of each of the polling questions asked to the stakeholders.

How important are rush hours?

Today, SMART’s network is very oriented towards rush hour trips, in three senses:

- Routes are designed to focus on the station for the WES train, but WES only operates during weekday rush hours.
- Some routes only operate during rush hours.
- Other routes offer better frequencies at rush hours than at midday.

A majority of stakeholders at the workshop said that rush hours should not be the main priority, but that a little extra service made sense during those periods.

Weekend Service

The next two questions were about weekend service. The first was about the importance of weekends. Stakeholders split evenly on whether weekend service should be improved only with new funding, or whether some service should be taken from weekdays to improve weekends. Nobody said “weekends aren’t very important”.

Figure 10: Stakeholder workshop - Question 1

Poll: On weekdays, how important are rush hours?

017

Rush hours should be the priority.



A little extra service at rush hour makes sense.



Having consistent schedules all day long should be the priority.



Figure 11: Stakeholder workshop - Question 2

Poll: How important are weekends?

018

Weekends are so important that we should cut some weekday frequencies to offer more weekend service.



We should add weekend service only when new funding is available.



Weekends aren’t very important.



Figure 12: Stakeholder workshop - Question 3

Poll: If you could add weekend service, what would you add first?

018

Longer Saturday hours for routes that already run on Saturdays.



More routes running on Saturdays.



Start running some routes on Sundays (as well as Saturdays).



The next question asked more specifically about when on the weekend should be the priority for new service. All three options garnered at least 1/4 of responses, but the top option with 44% was to start running some routes on Sunday (even before adding more service to Saturdays). Currently no SMART service operates on Sunday and adding Sunday fixed-route service would trigger numerous requirements and costs, which were discussed by the group.

Ridership or coverage?

The final polling question asked stakeholders to weigh the competing goals of attracting high ridership or providing wide (but minimal) service coverage.

Many people want service to run more often, and for more hours of the day and week. High frequency, all-week service is a proven way of increasing ridership, but it requires focusing buses into fewer routes on fewer streets. At the same time, many people want transit service to be available to as many people as possible, on all of the main streets in a city. This requires spreading service out into more routes, which means poorer frequencies and shorter hours of service. With a fixed budget, a transit agency cannot do both things at once: focus service to make it more frequent, and spread it out to cover more places.

A majority of stakeholders said that SMART should balance these goals about

Figure 13: Stakeholder workshop - Question 4

Poll: How should SMART balance the goals of high ridership and wide coverage?

017

The top priority is to run routes that many people use.

18 %

Use about half of SMART's budget on busy routes, and the other half covering areas that area important even if few people ride.

76 %

Spread service evenly across the entire city, so that every street has a little bit of service on it.

6 %

I'm not sure.

0 %

evenly. Currently, SMART provides extensive coverage within Wilsonville; there are only a few areas that are more than a short walk from service.

Only 6% of the stakeholders said that coverage should be prioritized more, while about 18% said that the top priority should be on running service that are used by many people.

The existing service standard for coverage, cited in SMART's 2020 Title VI policy, is that 85% of the city's residents should be within 1/3 mile walk of a bus stop.

For both the existing 2022 and proposed 2028 SMART networks, only 54% of residents are within a 1/3 mile walk of a bus stop at midday on weekdays, and 59%

during rush hours.

As a coverage standard, "85% within a 1/3 mile walk" is a very hard to meet, especially for a low-density city. With many residents living down cul de sacs or against barriers like the Willamette River and the I-5 freeway, for transit to be within 1/3 mile of so many people, buses would have to go down small neighborhood streets and cul de sacs. Adding this coverage – even if it were desired by those neighborhoods – would require either new funding, or cutting service on high-ridership routes like Wilsonville Road or Salem.

This coverage standard may be changed in the 2023 update to SMART's Title VI policy.

Tabling Events

SMART staff tabled at eight community events in summer 2022. At these events, people were able to place dots on a pair of maps to indicate which connections they thought SMART should focus on. There was one map focused on Wilsonville for local destinations, and a second map showing a range of regional destinations.

The top regional destinations in this activity were Sherwood, Tualatin, and Canby. The top three local destinations for SMART to serve were Argyle Square Shopping Center, Villebois, and the Town Center Loop area, Memorial Park area, & Old Town Square.

The events where this input was gathered were:

- Wilsonville Farmers Market on Thursday July 14th.
- Rotary Concert in the Park event Thursday July 21st.
- Wilsonville Farmers Market on Thursday August 4th.
- WLWV Family Empowerment Open House on August 17th, 2022.
- Bridging Cultures events on July 30th, 2022 and Saturday August 27th, 2022.
- City of Wilsonville’s Community Block Party on August 25th, 2022.

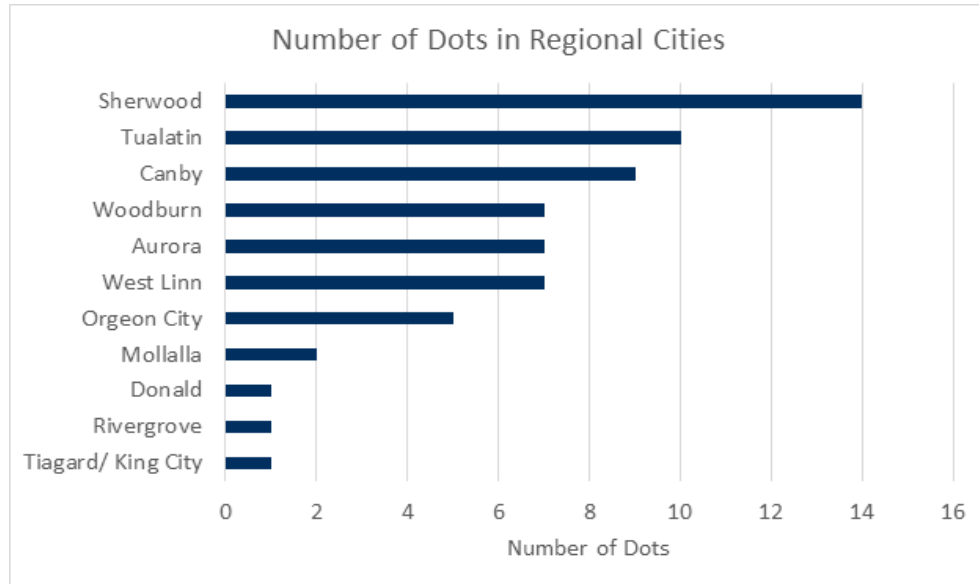


Figure 14: Results of Tabling Dot Exercise - Regional Destinations

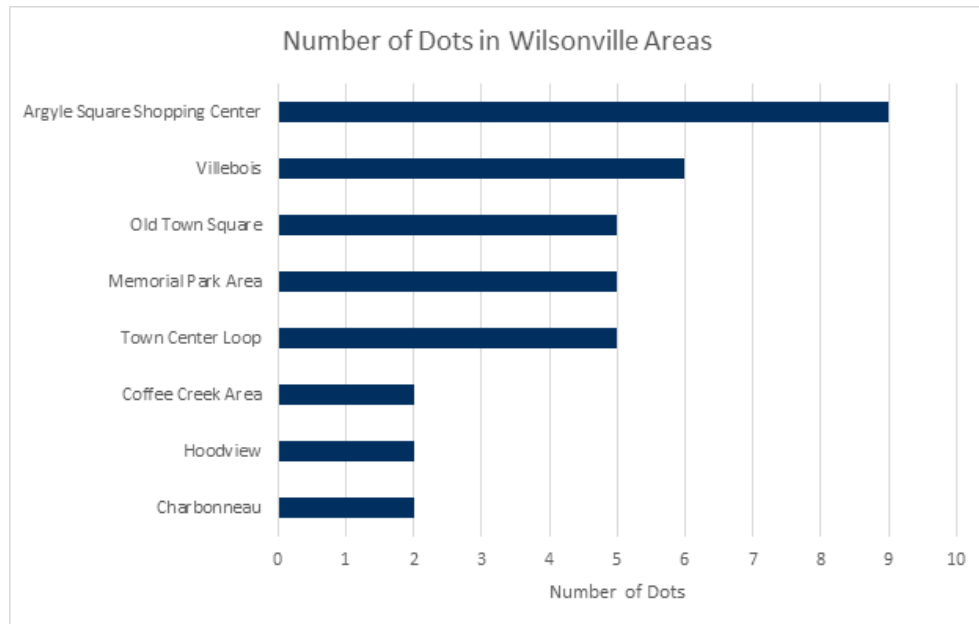


Figure 15: Results of Tabling Dot Exercise - Local Destinations

- Heart of the City’s Gear Up 4 School on August 13th, 2022, from 9 a.m. to 12 p.m.

The dot map activity ended with a total of 32 participants and 99 total dots.

Operator survey results

Seven SMART bus drivers completed a short survey asking similar questions about which destinations the agency should prioritize for future service improvements. Drivers were asked to respond based on what they have heard from riders. They reported having heard from riders that SMART should serve Woodburn, Barbur Transit Center, Clackamas, Oregon City, East Portland and Canby.

Key Takeways

The Plan outreach process shaped the future network improvements that have been included in the plan. The 2028 Network described in this document is oriented towards these major priorities.

- **Adding weekend service, especially Sundays.** Both the community survey and stakeholder input suggested that SMART should prioritize adding Sunday service, as well as making Saturday service available on more routes. The 2028 Network would do both of these things.
- **Adding early morning and late evening service.** This was the second highest priority, and is reflected in the 2028 Network as earlier starts and later ends to service on existing routes, and long hours of service on proposed new routes.
- **Better regional connections.** The top response in the community survey for **where** SMART should focus on improving its services was to bolster connections to neighboring communities. The 2028 Network enhances services to Salem and Tualatin, establishes new routes to Tigard, Oregon City and Clackamas Town Center, and retains the existing connection to Canby.
 - o Sherwood, the most-often requested location from the map-dot exercise, would be reachable via multiple TriMet routes from Tigard, as would Beaverton, downtown Portland and SW Portland.
- **Maintaining coverage.** Survey-respondents and stakeholders expressed that maintaining coverage within Wilsonville was important. The 2028 Network keeps the same number of residents within 1/2 mile of service, while improving slightly the number of lower-income and minority residents near service. The 2028 Network also provides shorter walks to service for residents along Canyon Creek Road and in Villebois.

3. Fixed-Route Services

This plan lays out a network of future SMART services oriented around the top priorities from public input:

- Additional regional connections.
- Higher frequency for regional and local routes.
- Weekend service, and longer hours of service.

The network described here is intended to make transit more useful to more people, for a greater variety of trips. It would give people more choice in when to travel within Wilsonville and between Wilsonville and neighboring cities.

Figure 16 shows the recommended SMART network for 2028 with each route distinguished by a unique color.

The map on the next page shows the same recommended network, with each route color-coded based on its weekday midday frequency.

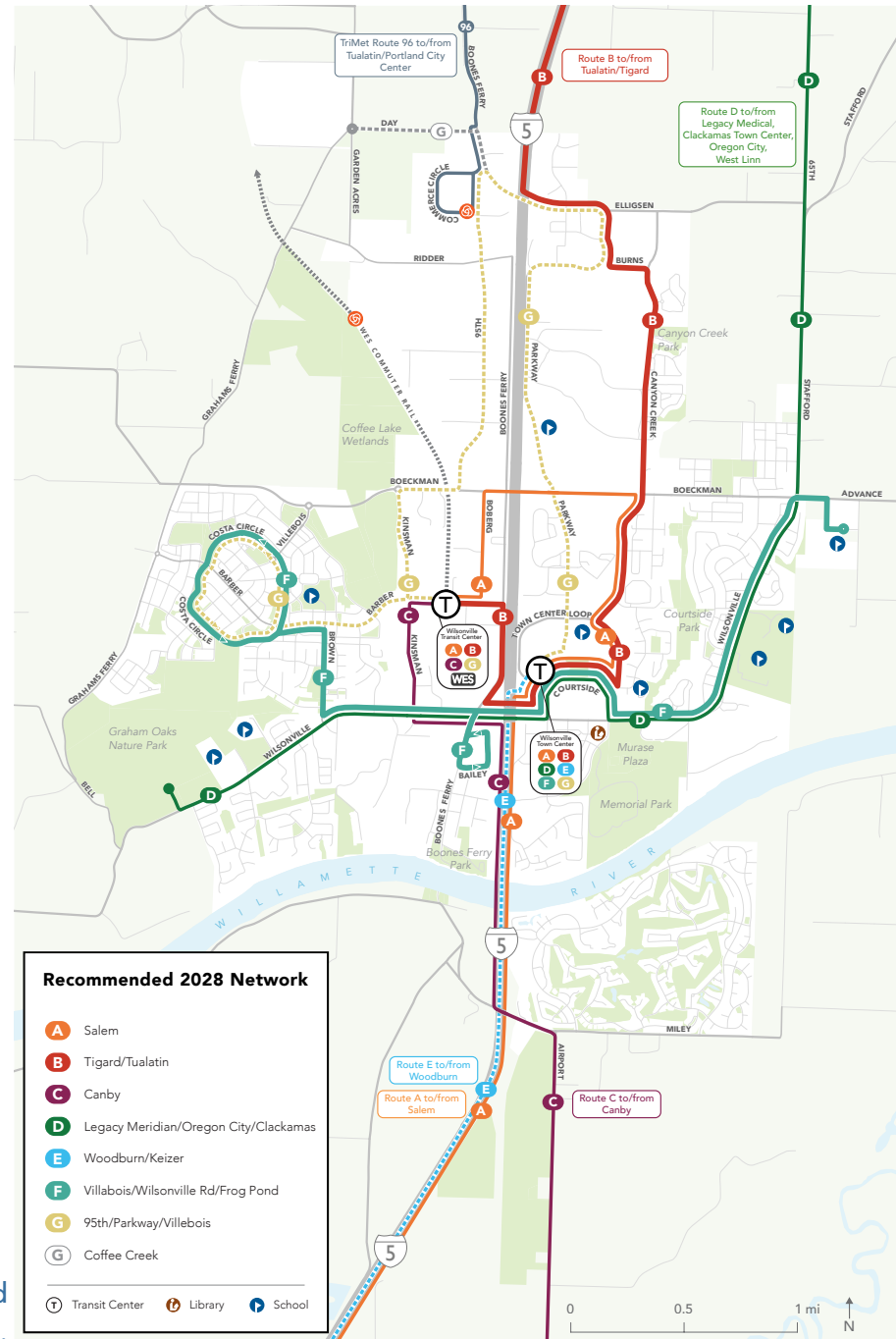


Figure 16: The planned 2028 fixed route transit network.

The map at right in **Figure 17** shows the same recommended network as on the previous page, but each route is color-coded by how frequently buses would arrive:

- **Dark blue lines** (Routes B and F) would run every 30 minutes all weekday.
- **Light blue lines** (Routes A, C and D) would run every hour all weekday.
- The dashed line (Route G) would only run during rush hour.
- The **yellow line** (Route E) would offer trips every two hours, all day on weekdays.

There are several “big moves” in the 2028 Network that together make it more useful to more people, for more trips:

- **Shorter waits.** Today, the only route that runs every 30 minutes is Route 4 on Wilsonville Rd. The 2028 network would add a new 30 minute service (Route B) that would serve the Wilsonville Transit Center, Wilsonville Town Center, Canyon Creek Rd, and then continue north to Tualatin and Tigard via I-5.
- **Better regional connections.** In addition to the existing connections to Salem and Canby, the 2028 network

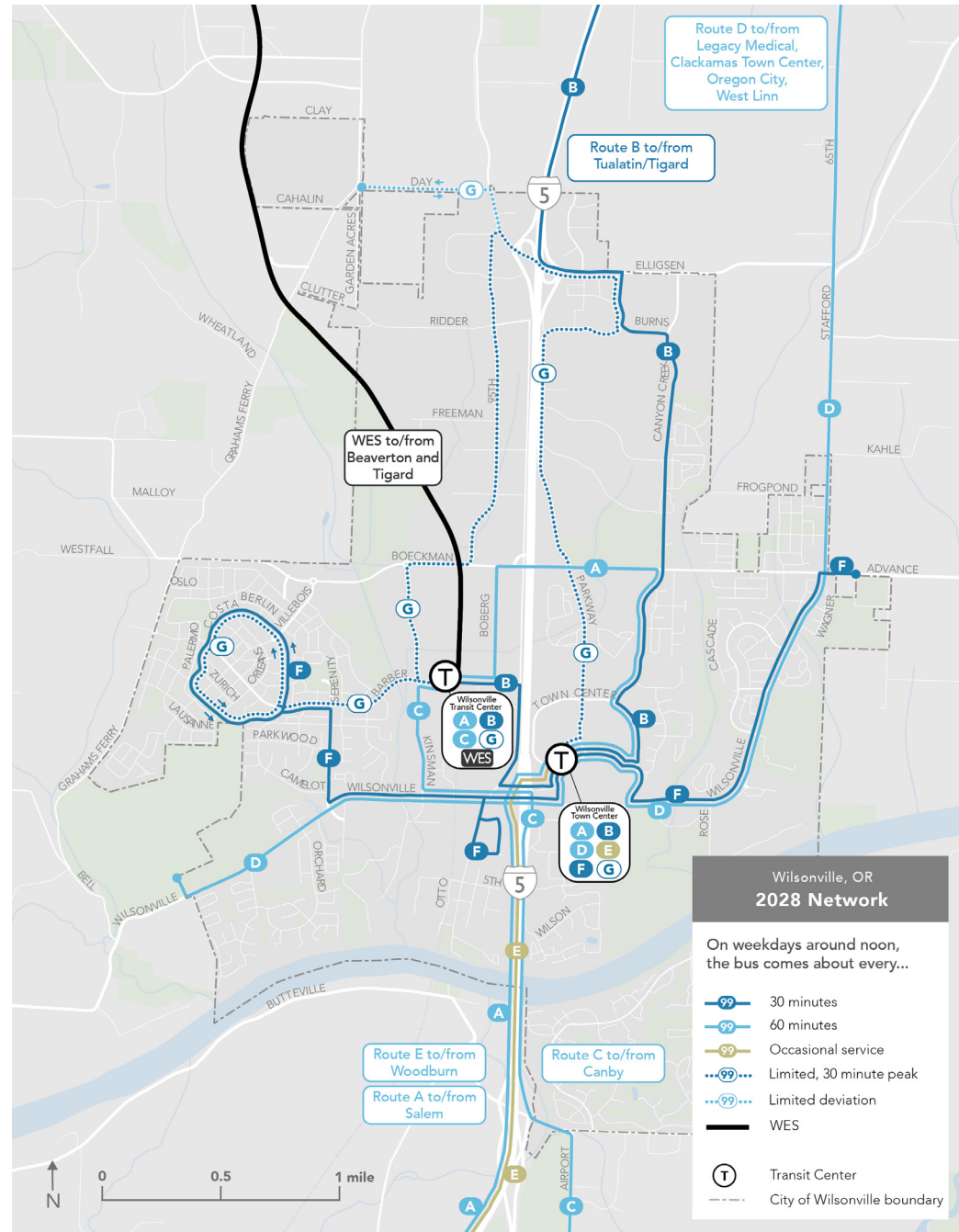


Figure 17: The planned 2028 fixed route transit network, with routes color-coded by midday frequency.

would have service every 30 minutes to Tualatin and Tigard, and every 60 minutes to West Linn, Oregon City and Clackamas Town Center. Many of these places offer transfers to other transit routes going further. For example:

- o Sherwood, Beaverton and Portland can be reached through Tigard;
 - o Milwaukie can be reached through Oregon City; and
 - o East Portland can be reached through Clackamas Town Center.
- **New connection points.** Instead of all services connecting only at the west side Transit Center / WES station, some routes would connect at the Town Center east of I-5.
 - **Improved weekend service.** With the 2028 network, SMART service would run on Sundays for the first time, and more routes would operate on Saturdays.

This network plan is not achievable with SMART’s current resources, and especially not until constraints on the number of bus drivers and the number of transit buses are relieved. It is a ambitious plan, with the maps and tables here showing the end state of a five-year process of network improvement.

Better Frequencies, Close to More People

With today’s SMART network, the only route that runs every 30 minutes all day long is Route 4, the line serving Wilsonville Road. Most other routes run only every hour, but many have gaps in their schedule during the middle of the day that makes actual waiting times even longer.

Thirty-minute frequency throughout the whole day means that people traveling along Wilsonville Rd have more opportunities to make trips by transit, which makes it more likely that a transit trip will be an option that works for their daily schedule. It is therefore no surprise that Route 4 on Wilsonville Road is

SMART’s most productive route.

Figure 18 shows the frequency on weekdays for SMART’s 2022 routes, while **Figure 19** shows weekday frequencies for the 2028 Network.

In the 2028 Network, there would be two all-day 30-minute routes for local trips within Wilsonville:

- Route F would be an east-west service, running mostly on Wilsonville Road. Route F would connect Villebois, Fred Meyer, the Town Center and Frog Pond.

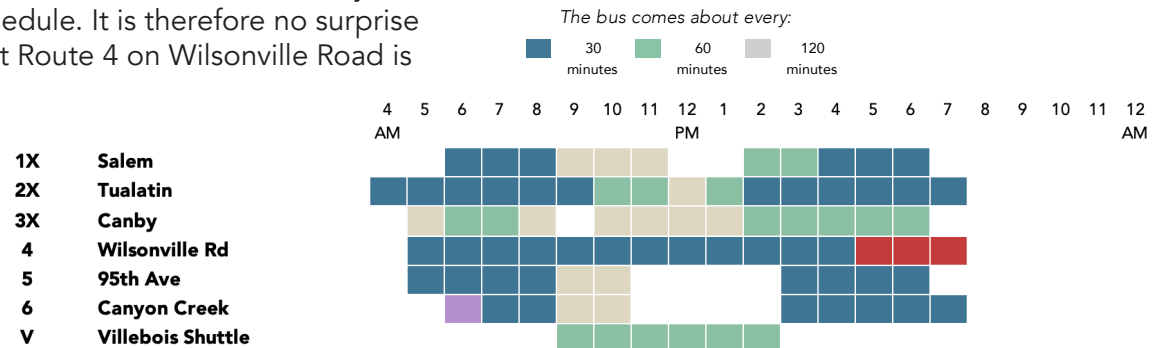


Figure 18: Weekday Frequency by Hour by Route - 2022 SMART Network

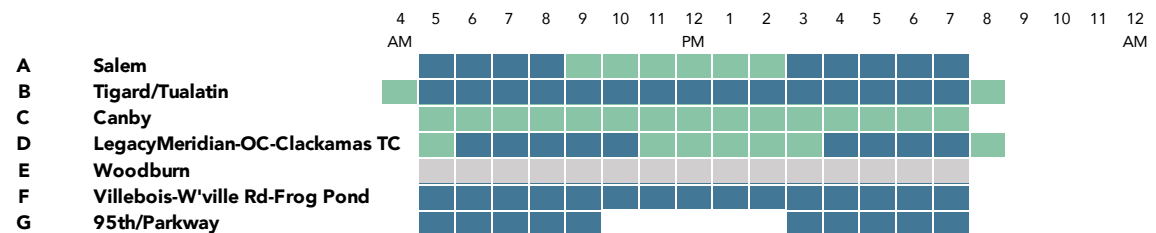


Figure 19: Weekday Frequency by Hour by Route - 2028 Network

- Route B would be a north-south service. It would connect the west side Transit Center / WES station, the Town Center, Canyon Creek Road and Argyle Square. It would then continue north to Tualatin and Tigard.

Most other routes would offer consistent hourly frequencies through the weekday, with extra rush-hour frequency on Routes A (Salem) and D (Legacy Medical-Oregon City-Clackamas).

Two routes would be nearly identical to existing routes:

- Route C, similar to the existing 3X (Canby), would offer a consistent hourly frequency all day, Monday-Saturday.
- Route A, similar to the existing 1X (Salem) would also offer a consistent all-day hourly frequency Monday-Sunday, with extra frequency during weekday rush hours.

The increases in frequency on local and regional routes represented in the 2028 Network would address two important limitations of the existing network.

- First, more routes would run through the entire midday, making them useful for a wider range of trips than rush-hour commutes, especially the commutes of people working service, retail, hospitality or industrial jobs, and the commutes of people going to school or college.

- Second, the better frequencies would make many trips faster by reducing the waiting time required to use service.

SMART provides real-time arrival information about its routes, but frequency still has a big effect on how much time it takes to use transit, especially for local trips.

For example, a person wishing to travel from Villebois to an appointment at Wilsonville Town Center today would use the Villebois Shuttle, which runs every hour during weekday middays. Since they have to be on time for their appointment, they have to take the last bus that will get there early enough to be on time – which will often be painfully early. An hourly bus sometimes makes people arrive 50 minutes early to their destination. If a route offers just one opportunity to travel per hour, then someone will wait an average of half an hour to use it – if not at the bus stop, then at their destination because they were forced to arrive too early.

In this example, in the 2028 Network, Route F would serve Villebois every 30 minutes. The average wait to use it would be just 15 minutes, with two opportunities to depart per hour. Saving people an average of 15 minutes waiting per one-way trip makes a big difference in busy people's days. By focusing on frequency with this Plan, SMART can reduce people's travel times and make its network much more useful to more people.

Note that the frequencies recommended

in this Plan, as shown in the graphic on the previous page, are approximate. There is a value to providing a consistent frequency (for example, a bus that comes at 8:10, 8:40, 9:10, 9:40 and so on) as opposed to an ever-changing schedule (such as 8:10, 8:35, 9:05, 9:45, and so on). The frequencies that recur in memorable patterns are 15-, 20-, 30- and 60-minutes, and they are called "clockface."

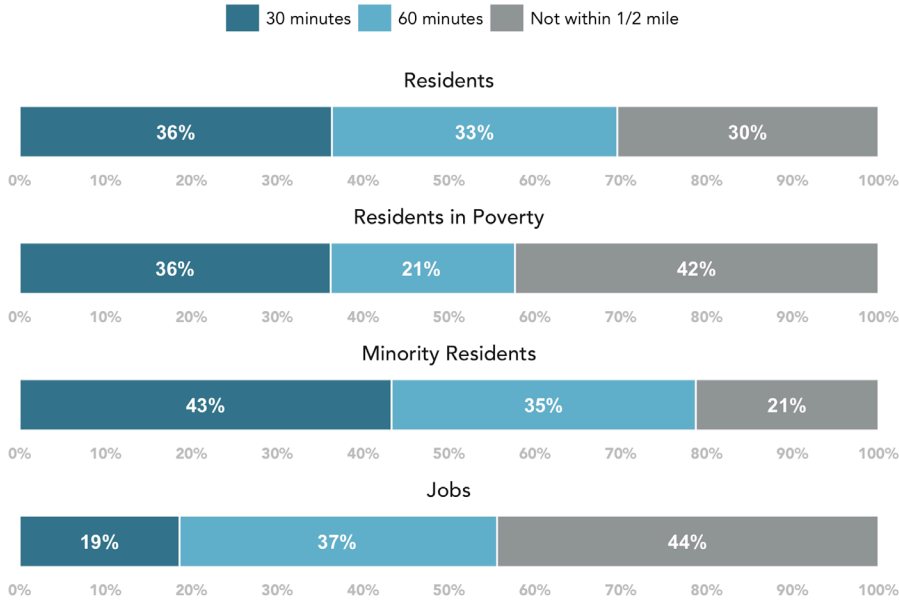
However, in scheduling bus routes, there are also valuable reasons to deviate slightly from a "clockface" frequency. For example, a slight change to timing may allow for a connection to another bus route or train line. Changes to timing are also sometimes necessary to provide drivers with meal breaks, or adapt the schedule to afternoon congestion.

The 2028 Network would put more residents near routes running all day, from early morning to late evening. It would especially put more Wilsonville residents near more frequent service.

Today, only about 36% of Wilsonville residents are within a 1/2-mile walk of Route 4, the only 30 minute service, while about 33% are near a 60-minute service.

SMART 2022 - Weekday at noon

What percentage of the SMART service area is near transit that comes every

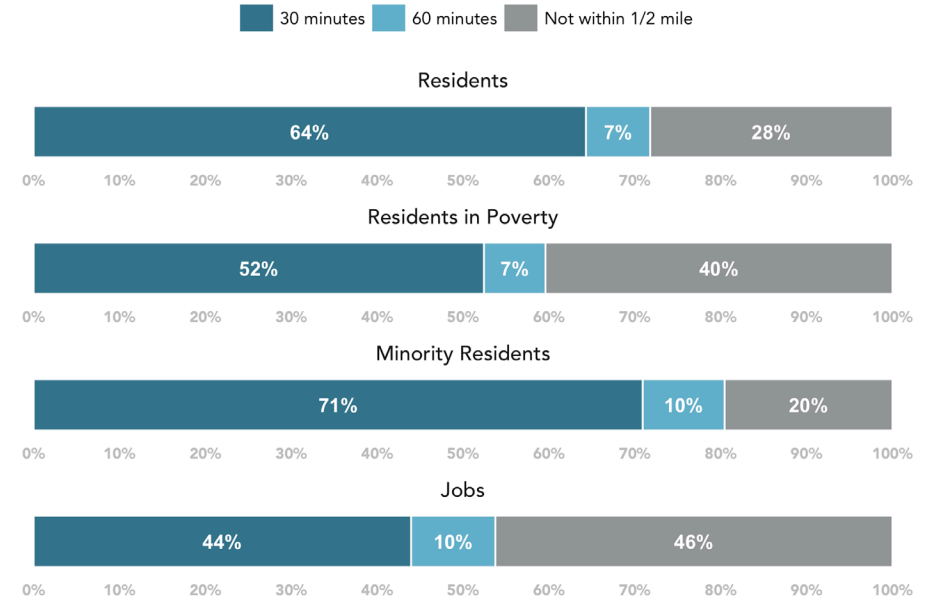


Note: Proximity is measured as being located within 1/2 mile of a bus stop.

Figure 20: Proximity to Transit Service - SMART 2022 Network

SMART 2028 - Weekday at noon

What percentage of the SMART service area is near transit that comes every



Note: Proximity is measured as being located within 1/2 mile of a bus stop.

Figure 21: Proximity to Transit Service - SMART 2028 Network

With 30-minute service extended to Brown Road, Villebois and Canyon Creek Road, the 2028 Network would put more people near a route coming more often. About 64% of residents would be near a 30-minute route.

Better Regional Connections

One of the priorities expressed by the public in 2022 was improving connections between Wilsonville and other communities. The 2028 Network includes three new routes that will make it easier to travel between Wilsonville and other cities:

- Route B, a new service running every 30 minutes among Wilsonville, Tualatin and Tigard.
- Route D, a new service running every 60 minutes among Wilsonville, Legacy Meridian Medical Center (Tualatin), West Linn, Oregon City and Clackamas Town Center.
- Route E, a new service running every two hours among Wilsonville, Woodburn and Keizer.

These new routes would supplement SMART's existing regional connections to Salem (Route A) and Canby (Route C). The routes to Salem and Canby would both be improved with additional trips for a more consistent frequency throughout the day.

These routes are also designed around the principle that there need not be a categorical separation between "local" and "regional" or "express" routes. Rather, regional routes should enter Wilsonville along paths that get the service close to many residents, jobs and businesses. This

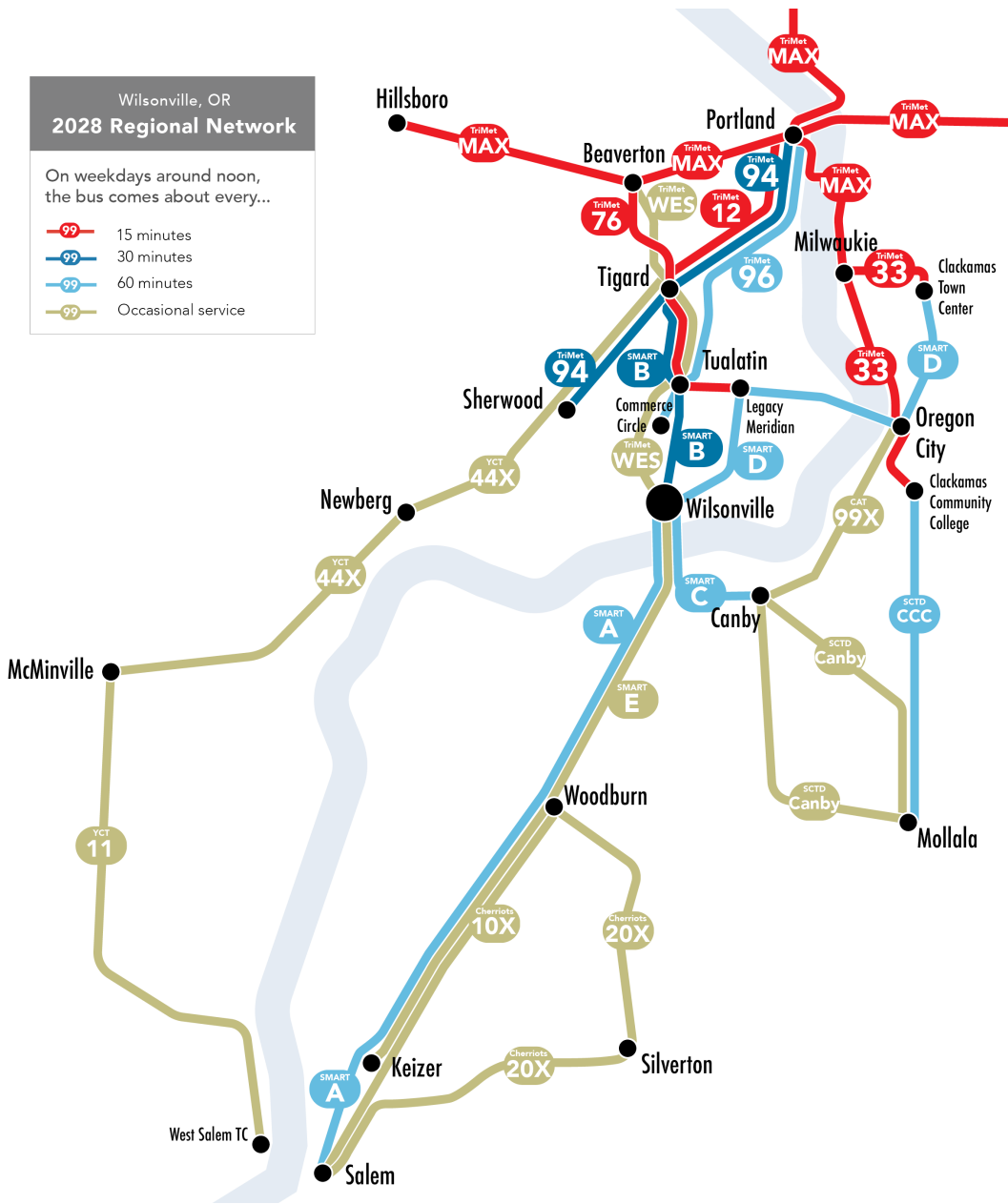


Figure 22: Regional Transit Network Operated by All Transit Agencies, with 2028 Recommended SMART Routes

is reflected in the existing SMART network, on which Route 2X provides both regional service (to Tualatin) and local service (in Wilsonville west of I-5). However Route 2X is the only existing route to combine regional and local service in this way. In the recommended 2028 network, Routes A, B and D would offer at least 1 mile of local stops in addition to regional connections. This will enable more people to use SMART to reach neighboring cities without having to make a transfer in Wilsonville, making SMART more useful for several different types of trips.

First, transit connections for the most common commute patterns would be improved. **Figure 23** charts the south metro area cities by the number of workers traveling between them each day (based on 2018 LEHD data). The largest south metro commuting partners with Wilsonville are Tualatin, Tigard, Woodburn, Canby and Oregon City.

The **yellow highlights** on the table in **Figure 23** show the cities that would be directly connected to Wilsonville by routes in the 2028 network, making it easier for residents and workers to travel between Wilsonville and these other cities during more of the day and week.

Commuting trips only tell part of the story, because people travel for many other reasons. Prior to the pandemic, national research suggested that only 1 in 5 trips by Americans was a trip to work.

In Tualatin, Route B would serve Bridgeport Village and Nyberg Woods. By ending in Tigard, Route B would also connect to many TriMet and Yamhill County bus routes, making it easier to continue trips to Beaverton, Hillsboro, Sherwood, Newberg, or into Portland.

In fact, the trip to Portland would be very similar to the trip available years ago,

via the Barbur Transit Center: Wilsonville residents would ride a SMART bus north and transfer to TriMet’s Line 12. By making that connection in Tigard instead of at Barbur TC, SMART can offer many other connections to more lines and places compared to what’s available at Barbur TC.

South Metro Area Job Flows
Number of workers with paired home-work location by city

	Aurora	Barlow	Beavercreek	Butteville	Canby	Dayton	Donald	Dundee	Hubbard	Keizer	McMinnville	Molalla	Mulino	Newberg	Oregon City	Sherwood	St. Paul	Tigard	Tualatin	Wilsonville	Woodburn
Aurora	7				39		7	1	28	11	6	12	2	12	10	9	2	22	21	46	51
Barlow		0			4										1	4		4	4	10	2
Beavercreek			67		54		4		4	13	7	48	19	14	314	10		80	67	48	18
Butteville		1		2	15		4		2	6	3	5		5	4	3	1	6	7	15	7
Canby	39	4	54	15	1378		29	12	127	94	68	260	54	118	595	131	4	396	455	722	383
Dayton			1	1	3	61	2	10	1	4	267		1	96	11	13	5	34	37	17	16
Donald	7	0		4	29		12		18	18	22	13	2	40	21	16	4	22	28	45	41
Dundee			1		12	10	2	31	1	10	335	3		270	9	48	2	74	92	57	27
Hubbard	28	0	4	2	127		18	1	67	43	31	39	7	33	40	21	7	80	103	161	265
Keizer	11		13	6	94	4	18	10	43	1450	243	40	4	118	92	47	19	266	221	247	466
McMinnville	6		7	3	68	267	22	335	31	243	5894	28	3	1132	117	140	6	358	333	176	195
Molalla	12	1	48	5	260		13		39	40	28	572	82	51	304	32	2	152	138	158	162
Mulino	2		19	1	54		2		7	4	3	82	31	8	105	10	1	42	22	37	14
Newberg	12	3	14	5	118	96	40	270	33	118	1132	51	8	2226	156	537	24	822	887	509	181
Oregon City	10	1	314	4	595	11	21	9	40	92	117	304	105	156	2411	184	4	963	780	619	167
Sherwood	9	4	10	3	131	13	16	48	21	47	140	32	10	537	184	834	10	1022	1115	575	155
St. Paul				1	4		4		7	19	6			24	4	10	9	5	9	6	24
Tigard	22	4	80		396	34	22	74	80	266	358	152	42	822	963	1022	5	3587	2911	1364	432
Tualatin	21	4	67		455	37	28	92	103	221	333	138	22	887	780	1115	9	2911	2081	1560	736
Wilsonville	46	10	48	15	722	17	45	57	161	247	176	158	37	509	619	575	6	1364	1560	803	718
Woodburn	51	2	18	7	383	16	41	27	265	466	195	162	14	181	167	155	24	432	736	718	1866

Figure 23: South Metro Area cities by number of workers commuting

Route D would connect to Clackamas Town Center, a major employment and social destination, and also a hub for transit connections to many parts of Portland, Gresham and even (in the future) Sandy.

Rather than proceeding “express” all the way to Clackamas, Route D would stop at busy places on the way especially Legacy Meridian Medical Center, West Linn and Oregon City. While this makes the route slower, it also makes it useful for a larger number of people than an express route between the endpoints would be. With more passengers, it will be easier for SMART to justify the high frequency offered on the route, and the frequency in turn supports higher ridership.

Oregon City is important not only because it’s dense with residents and jobs, but also because as the county seat of Clackamas County, it is the location of important public and medical services. It is also where connections are available to the main Clackamas Community College (CCC) campus. From the envisioned Route D stop in downtown Oregon City, both CCC and the Providence Willamette Falls Medical Center would be reachable with a transfer to TriMet lines.

Less Reliance on WES for Regional Connectivity

One regional connection that would be de-prioritized in the 2028 Network is the timed connection between SMART bus

routes and WES. All of the recommended routes in the 2028 Network have been presented here with “clockface” frequencies, which are frequencies that people can easily remember because they repeat their pattern from one hour to the next. For example, a 30-minute route would pass someone’s bus stop at 7:07 a.m., 7:37 a.m., 8:07 a.m., and so on.

Clockface frequencies are easy for people to learn and remember. However, they trade-off against other scheduling details that can be valuable, such as scheduling buses to arrive at the right time for connections with other buses (for example in Canby or Salem) or with trains. In the past, when WES ridership was higher, there was an obvious value to timing bus arrivals and departures around WES trains.

However, WES trains are scheduled to come every 45 minutes. If local routes are scheduled to meet WES trains, then they must operate every 15-, 45- or 90- minutes (multiples of 45). But 15- or 90-minute frequencies are often wrong for local Wilsonville routes (unaffordably high or inadequately low), while a 45-minute frequency is not clockface and makes the schedule throughout the day hard to remember.

In addition, ridership on WES has been extremely low for many years, even predating the pandemic.

For these reasons, the frequencies and routes in the 2028 Network have been set

to depend less on WES and operate more as a complete regional and local network. WES is one element of the regional network, but not the overriding priority.

Some route details that result from this decreased emphasis on WES are:

- Route frequencies of 30- or 60- minutes, rather than every 45 minutes.
- The terminating of a few routes (D, E and F) in the proposed east side Town Center facility rather than at the west side Transit Center / WES station.
- No deviation off of Wilsonville Road north to the WES station by the regional Route D or local Route F, making them more linear routes for people not traveling to or from WES.

Regional Routes Near Residents and Businesses

In public input, regional services were given high priority for SMART’s future network. Today, only a minority of residents live near one of SMART’s services that can take them beyond the Wilsonville city boundary. **Figure 24** shows that about 40% of residents live within a 1/2-mile walk of a regional route.

With the 2028 Network, not only would the range of destinations available via SMART regional services increase, but so would

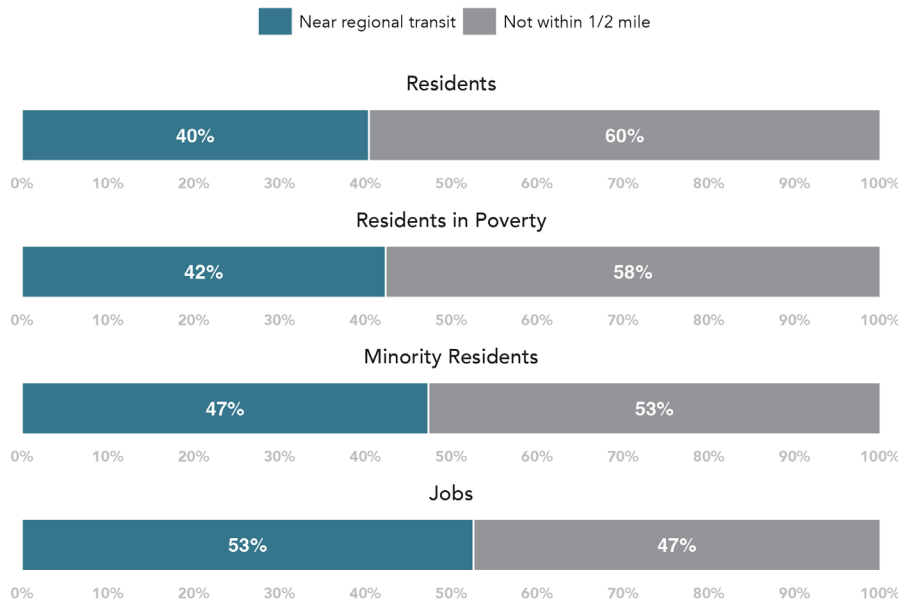
the number of residents living near those routes. As **Figure 25** shows, the percent of Wilsonville residents living near a regional route would increase to 53%. This is mainly a result of the new Routes B and D.

Route D would replace SMART’s temporarily suspended Medical Shuttle with a regular hourly route from Wilsonville to Clackamas Town Center. Within the City, it would run on Stafford Rd and Wilsonville Rd, and would terminate at Graham Oaks Park. That means that a large portion of the River Fox and Mayfield neighborhoods at the west end of Wilsonville Rd would

now be within walking distance of a route to Legacy Meridian, West Linn, Oregon City and Clackamas.

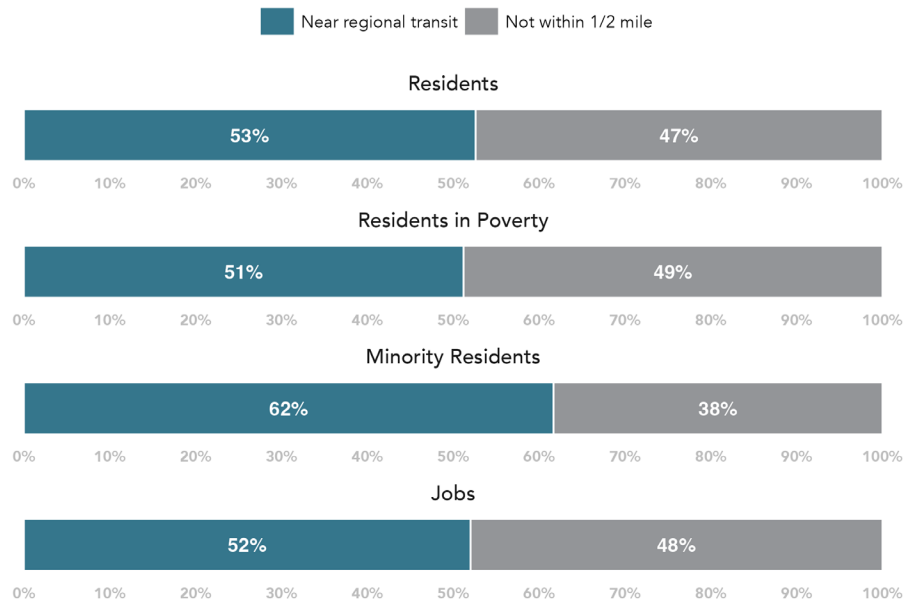
Route B would replace the existing 2X, but it would also serve a longer segment of Canyon Creek Rd. Canyon Creek Road has some dense apartment neighborhoods along it, as well as low-density employment campuses. South of Boeckman Road Canyon Creek Road is separated from Wilsonville Road by the creek, making walks for some residents to existing service rather long.

Proximity to Regional Transit
2022 - Weekday at noon



ote: Proximity to a regional route is measured as being located within 1/2 mile of a bus stop along Routes 1x, 2x, 3x, 80x, and M.

Proximity to Regional Transit
2028 - Weekday at noon



ote: Proximity to a regional route is measured as being located within 1/2 mile of a bus stop along Routes A, B, C, D, and E.

Figure 24: Proximity to Transit Service - SMART 2022 Network

Figure 25: Proximity to Transit Service - SMART 2028 Network

Adding service on Canyon Creek Road, and all-day regional service, would put many more residents and jobs in Wilsonville one bus away from Tualatin and Tigard.

New Transfer Points Inside Wilsonville

In the existing SMART network, most routes come together at the Wilsonville Transit Center on the west side, adjacent to the TriMet WES station. WES connects to Tualatin and Tigard, but since its inception it has only operated during rush hours, and its high cost of operation and low ridership has made it difficult for TriMet to justify longer hours of service. Mixed use development is being added near the Transit Center, but the area surrounding it is foreseen to be fairly low-density industrial and open space for years to come, land uses that don't generate much transportation demand.

On the other hand, Wilsonville Town Center east of I-5 has a combination of retail and service businesses, a community college campus, public services and offices, and nearby apartments. The City of Wilsonville has an ambitious plan to redevelop portions of this area in the future. In this Plan, the Town Center is foreseen as an important node with fairly high demand for transit. Establishing a small transit center there would also help SMART avoid some congestion around I-5, and make some bus

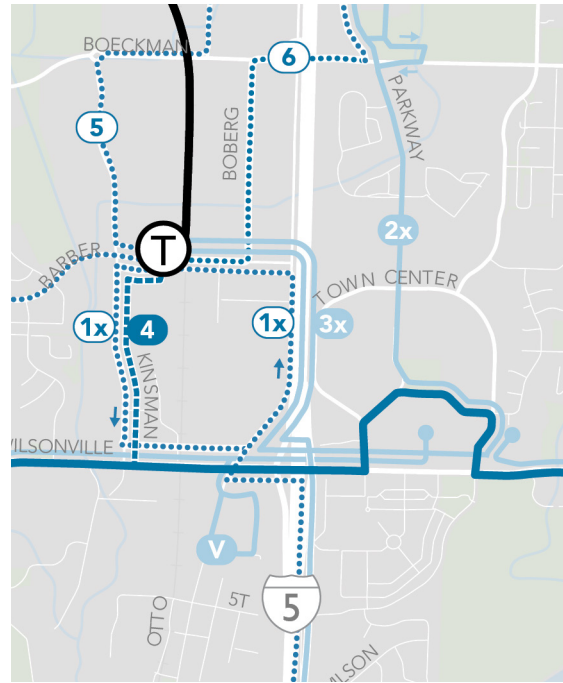


Figure 26: SMART Existing Network - Central Wilsonville

routes more linear and direct by relieving them of the need to deviate north to the west side Transit Center.

Figure 26 and Figure 27 compare the existing and 2028 networks in the central area of Wilsonville. In the existing network, every route goes to the Wilsonville Transit Center. In the 2028 network, this will work a little differently. Of the two connection points:

- Routes A, B, and G will serve both the west side Transit Center and the east side Town Center. Route B will connect the two centers every 30 minutes.

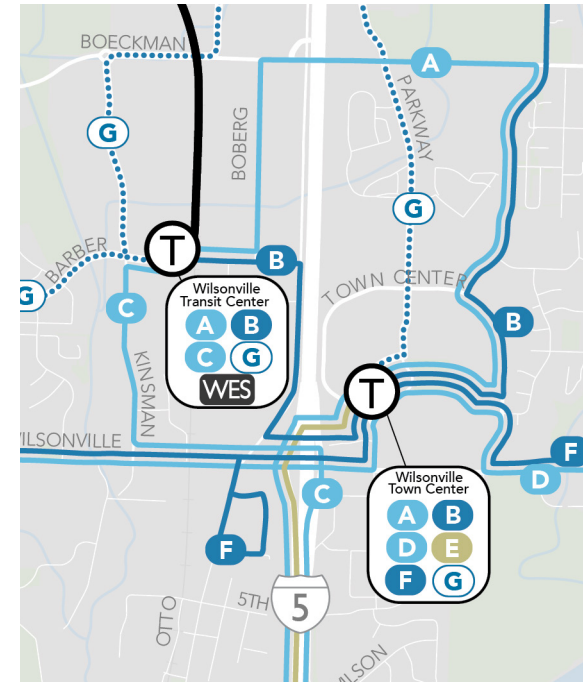


Figure 27: SMART 2028 Network - Central Wilsonville

- Routes D, E and F will only serve the east side Town Center.
- Route C will only serve the west side Transit Center.

Both locations are important as places where riders can transfer between routes, and as places where layover can take place. However, these centers are not the only places where transfers can be made – transfers between most routes will still be possible elsewhere in the city.

Transfer from route...

	A	B	C	D	E	F	G
A		Both	W. TC	E. TC	E. TC	E. TC	Both
B	Both		Both	E. TC	E. TC	E. TC	Both
C	W. TC	Both		OS		OS	W. TC
D	E. TC	E. TC	OS		E. TC	E. TC	E. TC
E	E. TC	E. TC		E. TC		E. TC	E. TC
F	E. TC	E. TC	OS	E. TC	E. TC		E. TC
G	Both	Both	W. TC	E. TC	E. TC	E. TC	

Figure 28: Locations for potential transfers among routes in the 2028 Network

Figure 28 shows where transfers between pairs of routes could take place.

- “W. TC” means a rider could transfer at the west side Transit Center (also known as Wilsonville Transit Center or the WES station).
- “E. TC” means a rider could transfer at the new east side Town Center facility, which will be on or near Park Place.
- “Both” means that a transfer would be possible in either place.
- The transfers marked “OS” would take place on-street away from either facility.

Connections between Routes C and D, and between Routes C and F, would happen along Wilsonville Road, at stops at either Boones Ferry Road or Kinsman

Road. Figure 29 shows an example of a potential transfer using Routes C and D.

Because some routes would pass through the east side Town Center before terminating at the west side Transit Center, more transfers would be possible at the east side location than the west side location. However, depending on scheduling, the timing of transfers might mean that some

passengers prefer to use one transit center or the other, when they have the option to use either.

The only routes that wouldn’t connect easily with one another would be Route C (Canby) and Route E (Woodburn/Keizer). However, the towns of Woodburn and Canby are already connected to one another by CAT’s Route 99 service on Highway 99E, so there is unlikely to be much demand for this transfer in Wilsonville.

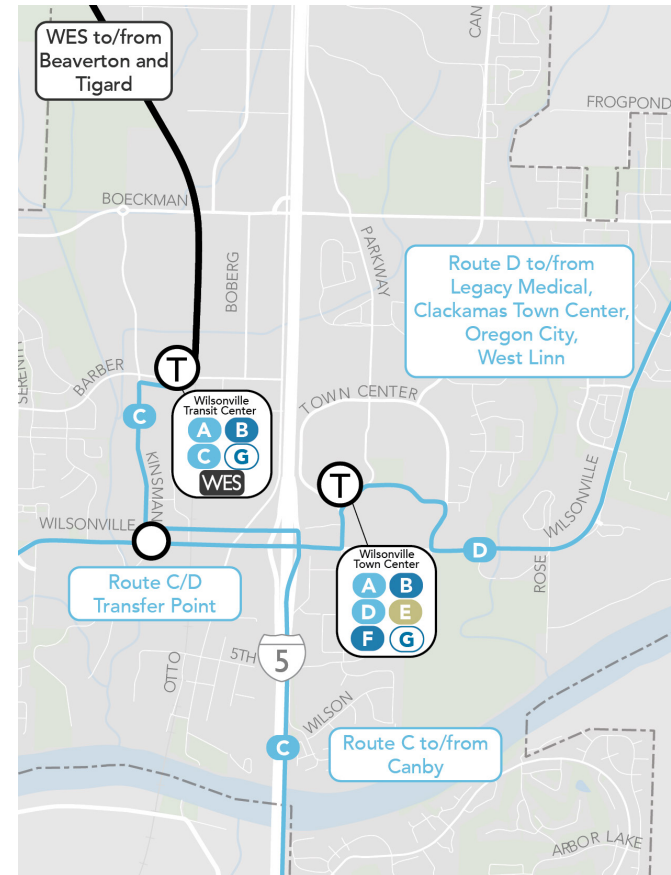


Figure 29: Example of a transfer between Routes C and D along Wilsonville Road in the 2028 Network.

Better Weekend Service

Saturday Service

Figure 30 and Figure 31 compare the frequency of each route on Saturdays between the 2022 and proposed 2028 networks.

As of 2022, only three routes were running on Saturdays:

- Route 4 on Wilsonville Road, every 30 minutes with some longer waits at midday.
- Route 2X between Wilsonville and Tualatin, every 30 minutes with some longer waits at midday.
- The Villebois Shuttle, which made just three trips per Saturday.

Demand-response service (“Dial-a-ride”) is currently offered on Saturdays over the same hours as fixed-routes.

Limited weekend service severely limits the usefulness of transit for most people. A person who works on weekends can’t chose transit if it is barely there or not there at all on Saturdays.

With the 2028 network, the amount of service available on Saturdays would increase dramatically. All of the regional routes would run on Saturdays, making it possible to travel among Wilsonville

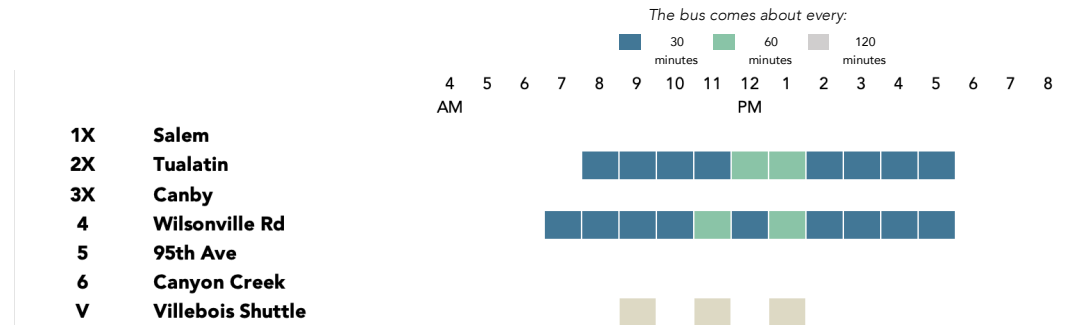


Figure 30: Saturday Frequency by Hour by Route - Existing SMART Network

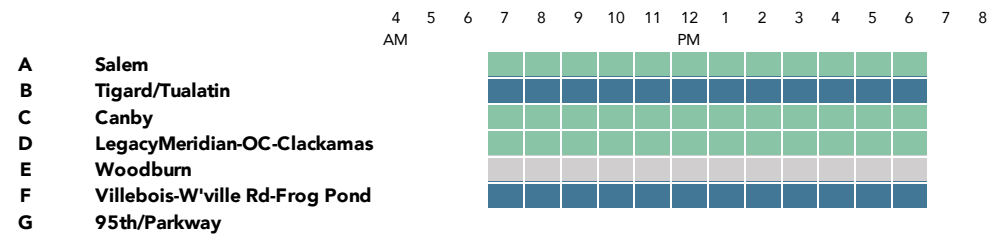


Figure 31: Saturday Frequency by Hour by Route - 2028 Network

and Salem, Tualatin, Tigard, Canby and Woodburn 6 days of the week. Except for Route E to Woodburn, all of these routes would run at least every hour, with the Tigard/Tualatin and Wilsonville Rd routes running every 30 minutes.

The only parts of Wilsonville that would not have Saturday service with the 2028 network are those served by Route G at rush hour only; these are also mainly employment and industrial areas, and service designed for them is particularly adapted for a 9-5 commute.

Sunday Service

Today, no SMART routes run on Sundays. That means that transit is not an option for

people in Wilsonville who need to travel on Sundays, and once someone purchases a car to solve their Sunday transportation problem they are likely to use it for the rest of their week.

The 2028 Network establishes a basic level of SMART service on Sundays. This service level would actually exceed what is currently provided on Saturdays by the existing network. The Sunday network would be:

- Route F - Wilsonville Rd would run every 60 minutes.
- Route A - Salem would run every 60 minutes.
- Route B - Tigard / Tualatin would run

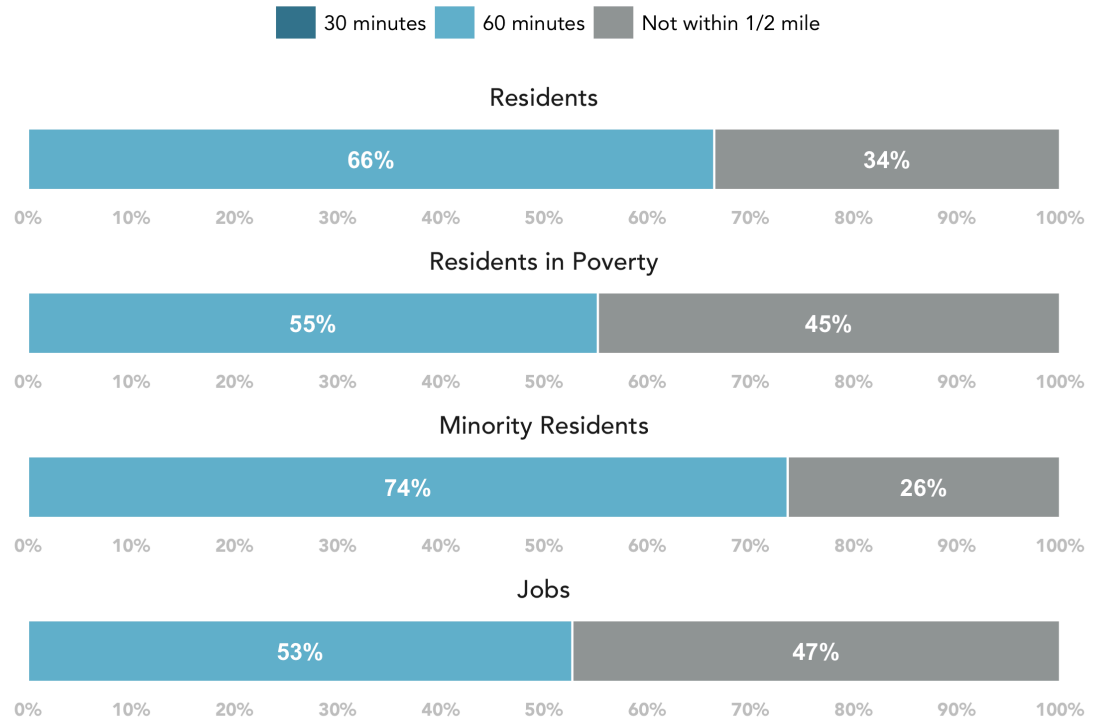
every 60 minutes.

With this structure, the most productive local and regional services (based on recent and historical ridership) would be available every day of the week. That means that a person who wants to travel from a home along the east end of Wilsonville Rd to Fred Meyer could do that by transit every day. Similarly, a person who lives along Canyon Creek Rd and works at Bridgeport Village could easily make that trip by transit every day with Route B. A resident of Tigard who wants to work at a Wilsonville business could accept a weekend shift.

Figure 32 shows how many residents in Wilsonville would be near transit with the 2028 Network’s Sunday service. A majority (66%) of all residents would be within a 1/2 -mile walk of a route running all seven days of the week.

SMART 2028 - Sunday at noon

What percentage of the SMART service area is near transit that comes every



Note: Proximity is measured as being located within 1/2 mile of a bus stop.

Figure 32: Wilsonville residents and jobs near SMART service on Sundays in the 2028 Network

Recommended Routes

This section describes each route in the 2028 Network in detail. **Note that stop locations shown are approximate. Actual stop locations will be proposed during service change processes in the future.**

Route A - Salem

Route A is the 2028 Network’s new version of SMART’s existing Route 1X between Wilsonville and Salem. This would be maintained similar to today’s route, but with added trips during the midday.

The main change would be how the route circulates through Wilsonville. Today, coming from Salem, Route 1X gets off I-5 at the Wilsonville Rd exit and makes a one-way loop of Boones Ferry Rd and Kinsman to reach the Wilsonville Transit Center. This is an industrial area, so almost no Wilsonville residents actually live near the 1X. Most people wishing to use it will need to reach the west side Transit Center first, which adds to their journey time.

In the 2028 Network, the new Route A would instead travel east from the I-5 through the Town Center, and then along Canyon Creek, Boeckman and Boberg to end at the west side TC. This would offer a bus to Salem within a 10 minute walk of about 4,600 residents. Today’s Route 1X service to Salem is walking distance from only about 400 Wilsonville residents.

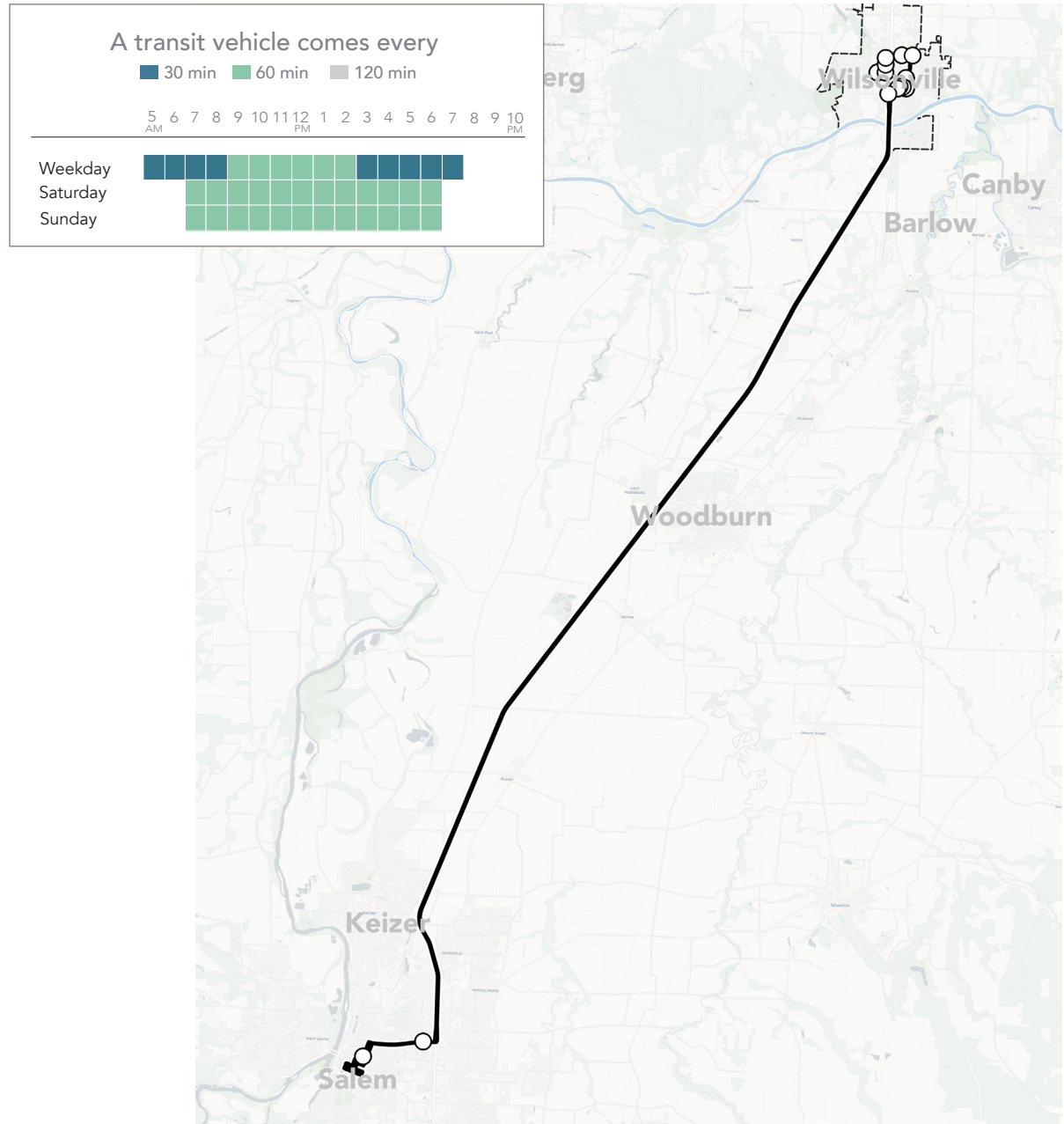


Figure 33: 2028 Network - Route A

Route B - Tigard/Tualatin

Route B replaces SMART’s current 2X service to Tualatin, with a route that continues north to Tigard.

Running every 30 minutes, Route B effectively plugs SMART into one of the most important connection points in the metro area’s west side network, the Tigard Transit Center. Today, Tigard can be reached using WES during weekday rush hours only, or with an additional transfer between SMART’s 2X and TriMet routes in Tualatin.

Tigard is already served by routes running every 15 minutes that continue to Downtown Portland and Beaverton, as well as other routes to most parts of the west side of the metro area and Yamhill County. TriMet plans for increases to service from these places to Tigard in future years.

By bringing people to (or from) Tigard, SMART can connect Wilsonville to numerous places that are also connected to Tigard - such as Beaverton, Washington Square Mall, Sherwood, Tualatin and Portland.

During public involvement, some people requested a direct route between Wilsonville and Sherwood. It is currently quite difficult to get between the two cities by transit.

However, as shown in the table on page 144, Sherwood is not a major source of work commute travel demand to or

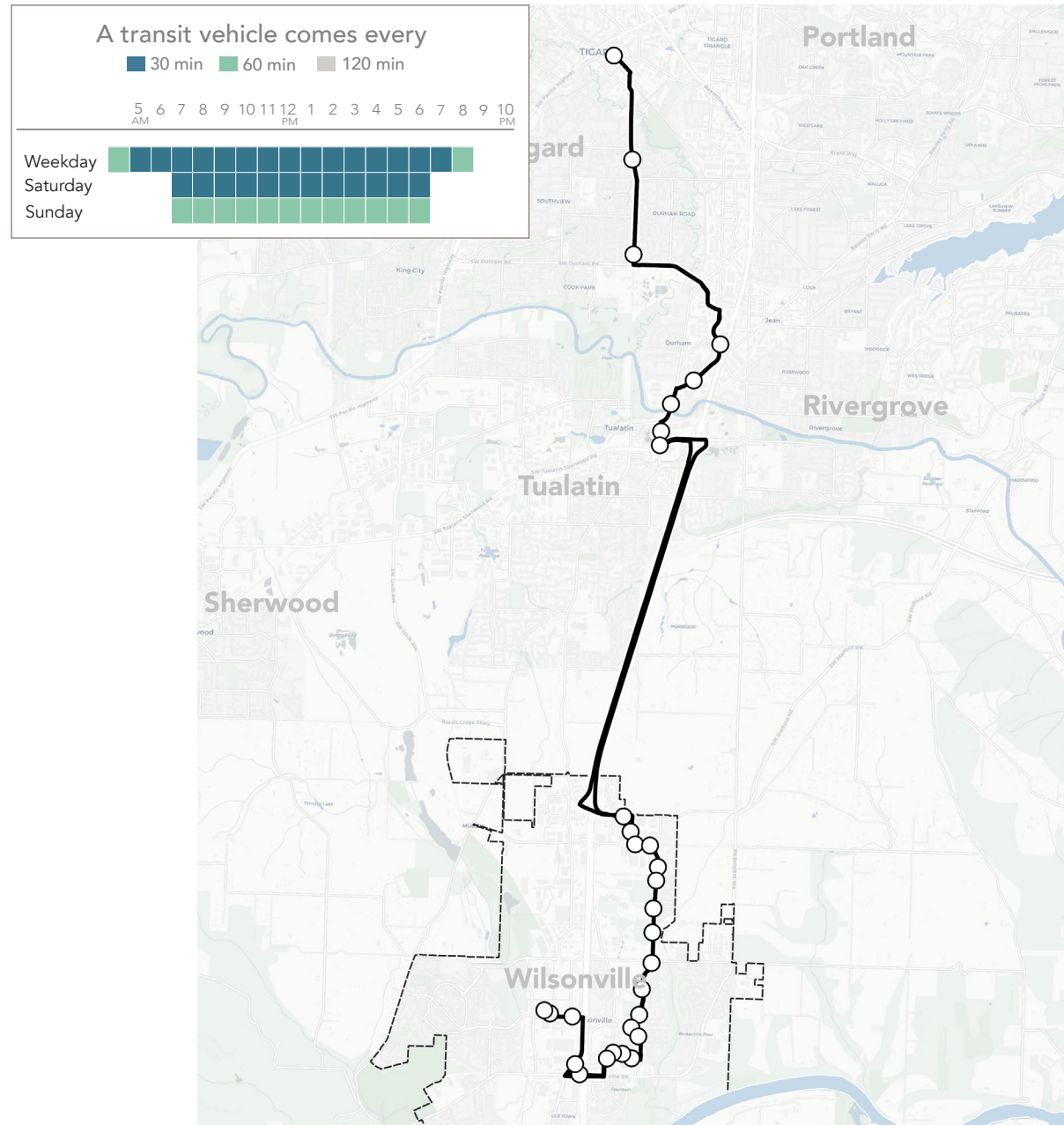


Figure 34: 2028 Network - Route B

from Wilsonville. The area between the two cities lacks urban development, so a bus route between them would not get much use except at its ends. Without much demand between the cities or along the route between them, the frequency SMART could justify offering on such a route would surely be low.

Rather than provide a very infrequent route for Sherwood-Wilsonville trips, this Plan offers a better frequency to Tigard where connections are available to Sherwood. This will give people more opportunities each day to make the trip (and on more days of the week), compared to what would be possible on a route connecting only the two cities and no other destinations.

In the future, as both cities grow and especially if urban development occurs on the roads between them, a direct route connecting them would become easier to justify at a decent frequency.

The existing SMART Route 2X ends at the Tualatin Park & Ride near Bridgeport Village, missing an important activity center near the Nyberg Road I-5 exit. There are two major grocery stores, retailers and apartments located in this development area, known as Nyberg Rivers. Route B would get off I-5 at Nyberg (rather than at the Lower Boones Ferry Rd exit as 2X does today), and then use Nyberg, Martinazzi, Boones Ferry and Lower Boones Ferry to reach Bridgeport Village.

Instead of ending at Tualatin Park & Ride, Route B would then continue north to Tigard via 72nd, Durham Rd and Hall Blvd.

Route B would not make all local (TriMet) stops in Tualatin and Tigard, instead making widely-spaced stops in order to avoid competing with TriMet services for any trips that are not leaving the TriMet service area. Since this is TriMet's service territory, the details of this arrangement will need to be worked out with TriMet.

The bus stop locations shown on the map of Route B on the previous page are not to be taken as precise, intended to demonstrate approximate stop spacing rather than proposals for specific stop locations.

In addition, procedures or improvements to make at-grade railroad crossings in Tualatin safe would need to be in place for this service to operate.

Route C - Canby

The 2028 Network’s Route C is the new version of the existing Route 3X between Wilsonville and Canby. This route would change very little from the existing design. The only change to routing compared to the existing 3X is that Route C would use Airport Rd rather than Highway 551 between Charbonneau and the Aurora State Airport.

The most meaningful improvement to Route C compared to the existing 3X is that it would operate more frequently throughout the day. Route C would run every 60 minutes all day long; today’s 3X runs about this often during the morning and afternoon, but with long gaps in the middle of the day that make waiting times longer and connections to CAT’s 99X service difficult. Hourly service would also be offered on Saturdays.

Connections would be available in downtown Canby to CAT’s 99X route going south and north on Highway 99E, to Salem in the south and Oregon City in the north.

Route 3X buses are affected by unpredictable delays and regular congestion on I-5 across the Willamette River. ODOT and Wilsonville have studied improvements to the I-5 bridge, and rulemaking for bus use on shoulders is underway. In the future, SMART could consider using the Canby Ferry or applying to use the shoulders of I-5 in order to improve reliability and shorten transit travel times on this route.

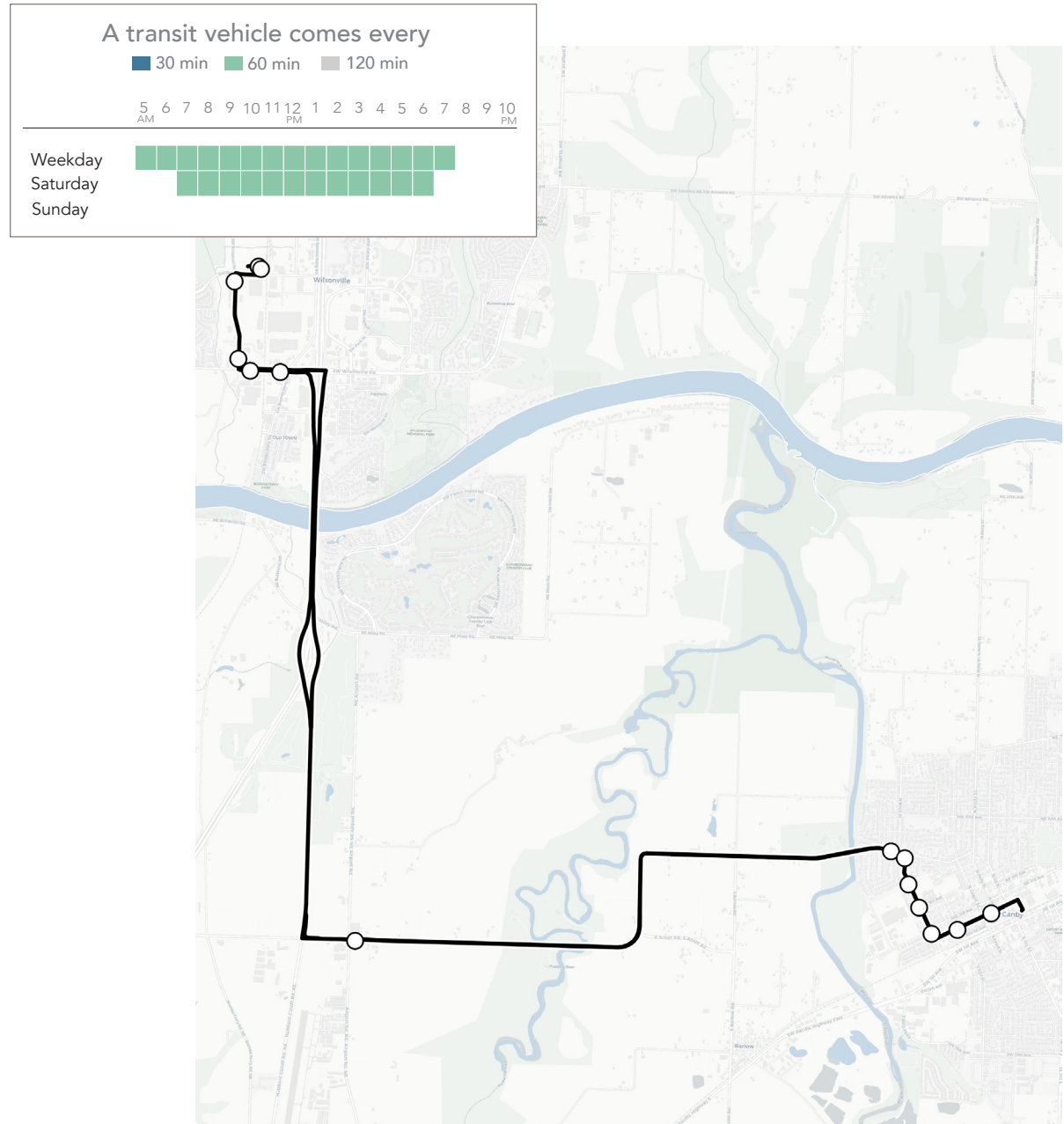


Figure 35: 2028 Network - Route C

Route D - Legacy Meridian/ Oregon City/Clackamas

Route D is an important new regional connection for SMART that fills a gap in connectivity in the south metro area. Today, trips across the Willamette River are not possible without either going through Downtown Portland or Canby. Traveling through Downtown Portland involves copious out-of-direction miles, and while traveling through Canby is more direct the route frequencies mean a fairly long wait is required to transfer in Canby.

Route D would establish a new service from Wilsonville to Clackamas Town Center (TC) using I-205, stopping along the way in West Linn and Oregon City. It would operate at least once per hour, all day long, weekdays and Saturdays, with some additional frequency during rush hours. It would take advantage of SMART’s ability to run buses on the shoulders of I-205 to get around congestion.

Connections to TriMet services would be available at Legacy Meridian, Oregon City Transit Center, and Clackamas TC. Connections to shuttles operated by RideConnection would be available at Legacy Meridian as well. Sandy Area Metro plans to serve Clackamas TC in the future.

Route D would enter Wilsonville via Stafford Rd in the east, and use Wilsonville Rd to reach its western terminus at Graham Oaks. (Example trips involving Route D are shown starting on page 47.)

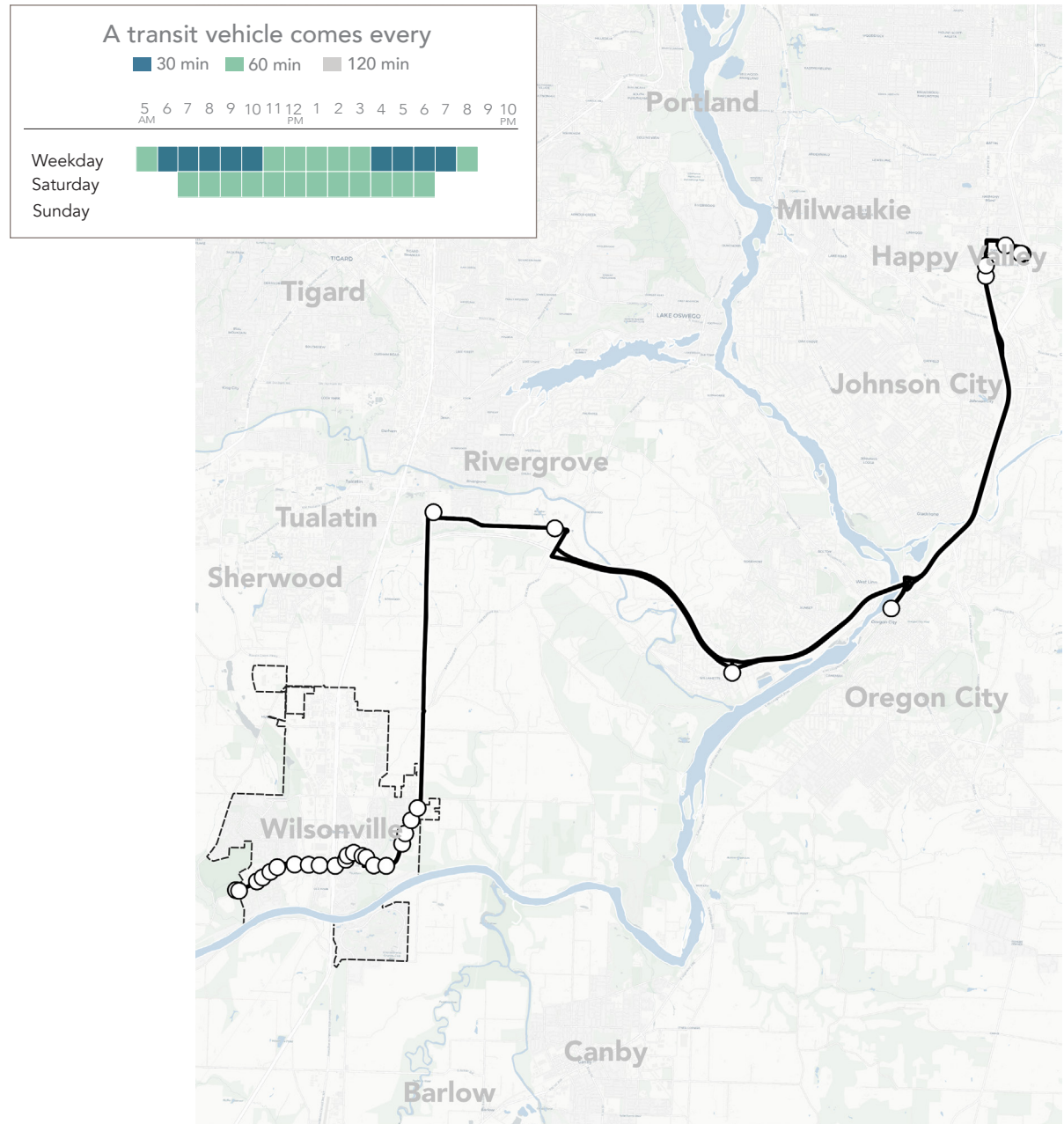


Figure 36: 2028 Network - Route D

Route E - Woodburn/Keizer

As of 2018, Woodburn was comparable to Canby in terms of the number of people commuting between Woodburn and Wilsonville (per the table on page 28). And yet, as of 2023 reaching Woodburn by transit is quite difficult. While it is possible via a connection to CAT's 99E route, this route deposits riders on the east edge of the city, and misses both the downtown core and the outlet mall to the west of I-5.

The 2028 Network would establish a connection between Wilsonville and the eastern side of Woodburn with Route E. Route E would run from Wilsonville to Keizer (benefiting from any potential bus priority treatments on I-5, like Route C).

It would stop at the Memorial Transit Center in Woodburn just east of I-5. Connections to Woodburn's local bus route are available at the transit center, to help riders continue on to the developments west of I-5 (some are a 15-20 minute walk away, and some are farther) or to downtown Woodburn and other parts of the city to east of the transit center.

Route E would be operated as a shared service with Cherriots's Route 80x. However, at the frequency shown above (every two hours) the route would cycle efficiently with one bus, which means that SMART could operate it independently, or could skip some trips when the Cherriots vehicle is scheduled to make the trip.

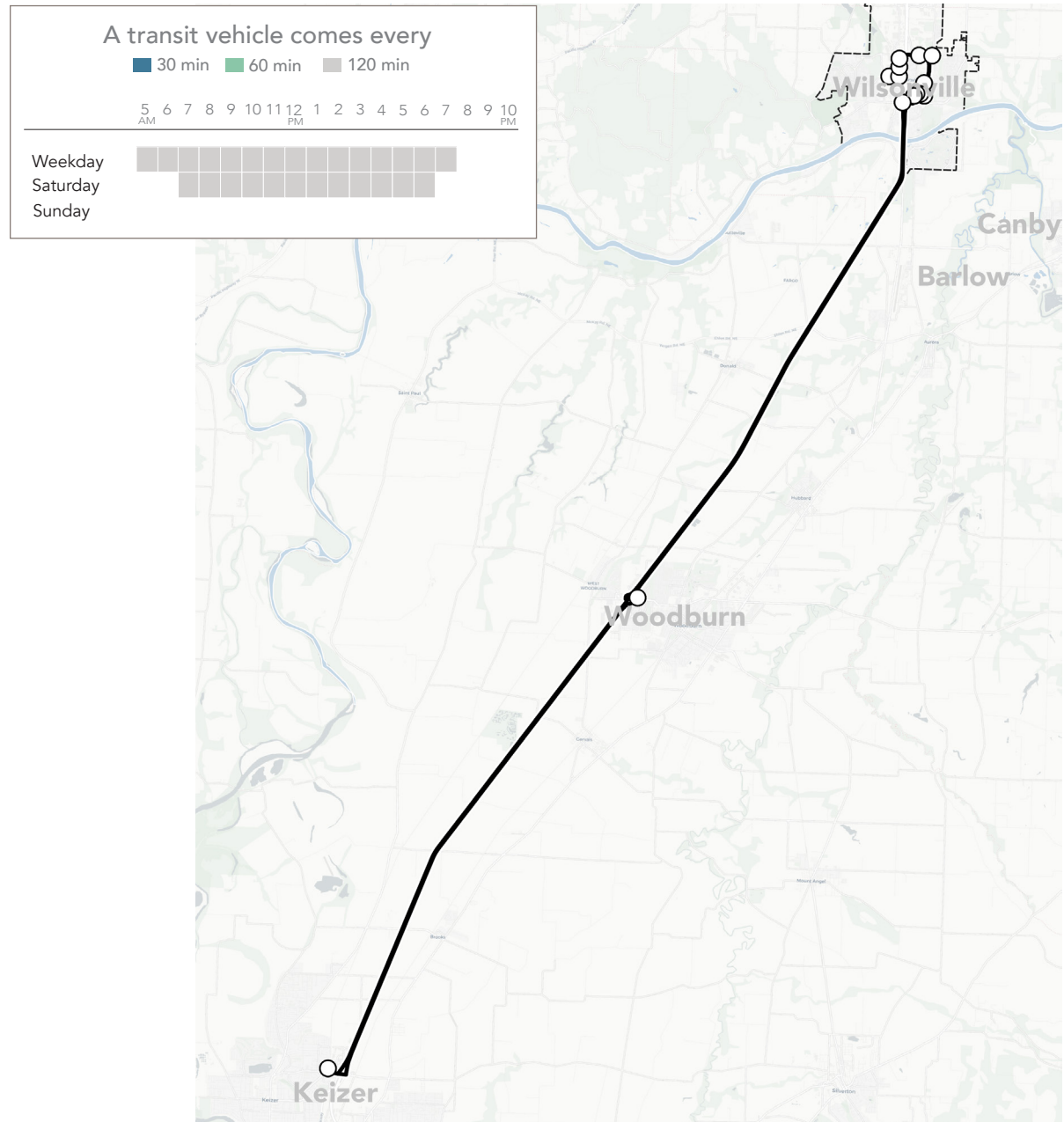


Figure 37: 2028 Network - Route E

Route F - Villebois/Wilsonville Rd/ Frog Pond

Route F has some similarities to the existing Route 4 and the existing Villebois Shuttle, also known as Route V.

Like Route 4, Route F would serve a long section of Wilsonville Road, which is SMART's busiest corridor due to its concentration of shopping, commercial buildings, apartment housing and multiple schools.

Route F would connect Villebois, Brown Road, the Fred Meyer, the eastern Town Center, and new residential development in Frog Pond. It would be more direct than the existing Route 4 due to the elimination of the deviation north to the west side Transit Center / WES station. (Most of the areas connected to the WES station by the existing Route 4 would, in the 2028 network, be connected by other routes, allowing Routes D and F to be more linear.) Route F would be longer, and much more frequent, than the existing Villebois Shuttle which offers quite minimal frequencies in the existing network.

Meanwhile, residents on Wilsonville Road west of Brown Road who are *not* on this new Route F would instead be on the new regional Route D, enjoying a more linear route along Wilsonville Road and a one-seat-ride to Legacy Meridian Medical Center, West Linn, Oregon City and Clackamas TC.

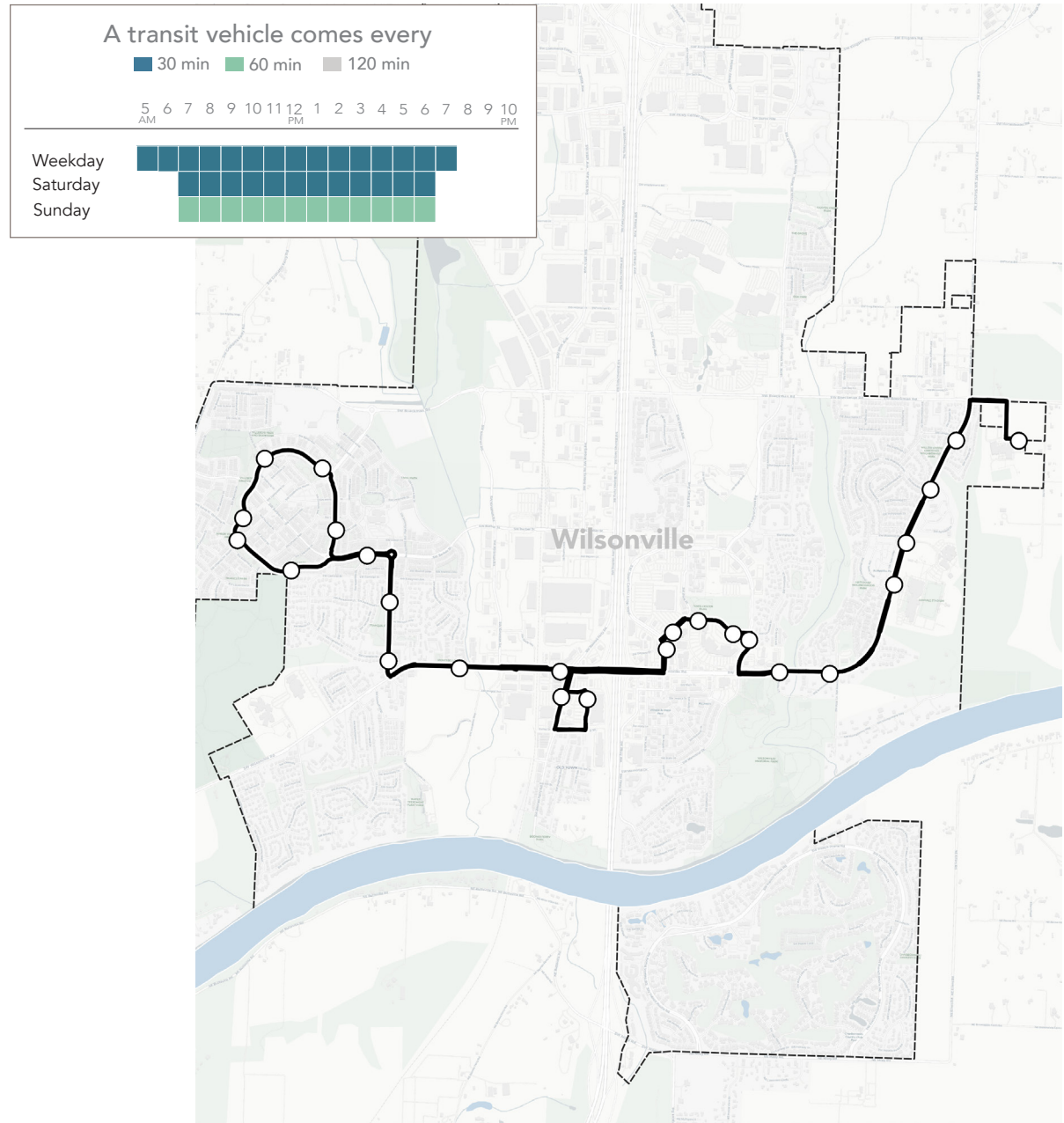


Figure 38: 2028 Network - Route F

Route G - Parkway/95th St./ Villebois

Route G is designed to serve employment areas east and west of I-5 in the northern portions of Wilsonville and connect them to the west side Transit Center / WES station and the east side Town Center.

Today, the areas Route G would serve are on Routes 5 and 6, both of which run only during rush hours (while WES is operating). Route G would maintain a similar schedule, operating only during the morning and afternoon rush hours on weekdays, but with a consistent 30-minute frequency.

Route G differs from SMART’s existing 6 and 5 in that it is designed to serve a wider variety of trip purposes, and make it easier to access jobs in the industrial areas of Wilsonville from more places. Unlike the existing routes, Route G’s east end is at the Town Center, where it would connect to many other regional routes besides WES, and be within walking distance to nearby residents.

In the west, Route G would end in Villebois, and act as the rush-hour service connecting Villebois to WES. However, because Villebois is fairly close to the WES station (about 1.1 miles from the center), and the biking and walking conditions are very good, an alternative plan could be to instead send this “tail” of Route G down Brown Road to the western end of Wilsonville Road instead, where residents are 1/2 mile farther and a more difficult

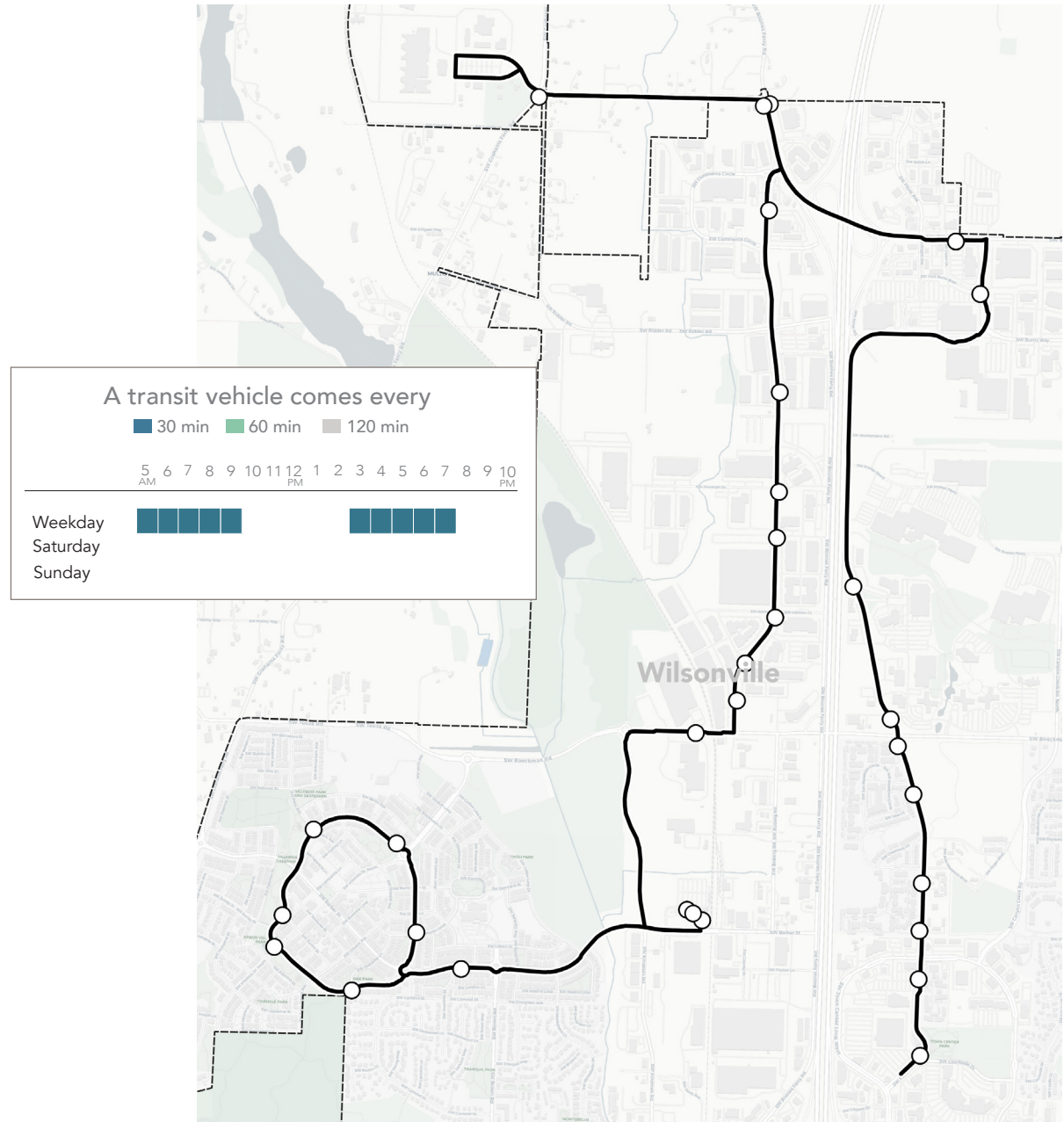


Figure 39: 2028 Network - Route G

bike ride away from the WES station.

To the north, Route G would serve Commerce Circle in both directions. Existing Route 5 serves Commerce Circle only southbound, so people coming from the south have to ride around in a big loop along Ridder, Grahams Ferry and Day Streets in order to reach their Commerce Circle destination. Offering direct service to Commerce Circle, without that loop, would make the service simpler and easier to understand.

Route G would stop at the Coffee Creek Correctional Facility when requested in advance, and consistently on the first trips of the morning when inmates are released and need transit to return home. By making that stop request-only for most of the day, SMART would avoid hauling passengers a long distance out of their way to pick up or drop off no one, while still providing an essential connection when it is needed.

But stop locations shown on the map of Route G on the previous page (and Route F on page 41) are approximate. Actual stop locations will be proposed during a future service change process.

Residents' Proximity to Service

The number of residents within 1/2 mile of transit would increase slightly with the 2028 Network. Where would coverage change?

The map on the left in **Figure 40** shows the existing SMART service extent in Wilsonville. Each dot represents 5 people. Blue dots are within a 1/2-mile walk of transit (transit that is operating at noon on weekdays), red dots are outside of that distance. The 1/2-mile walking buffer from each SMART stop is shown as a blue line.

In the existing network, a few places with lots of residents stand out as lacking access to transit. The most notable gap in the central area of Wilsonville is the cluster of dots along Canyon Creek Road south of Boeckman.

The entirety of Charbonneau, as well as some areas immediately north of the Willamette River, are also far from transit, but they are much less transit-oriented in their design than Canyon Creek Road, and much more costly for SMART to reach with transit service. There are no viable transit routes through the neighborhoods near Memorial Park or along the Willamette River (where a bus would have to wiggle down small streets and then turn around in cul de sacs), and these were not areas that public input suggested as high priorities

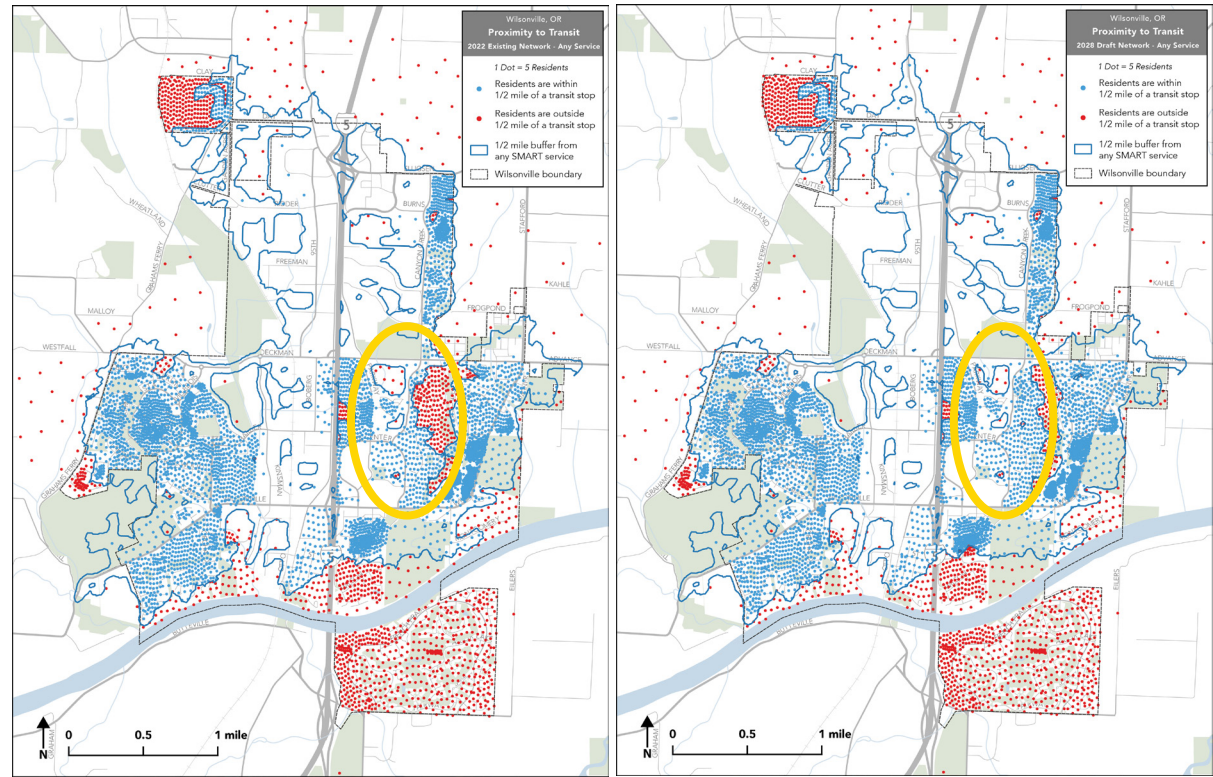


Figure 40: Residents within 1/2 mile walk of a bus stop in the 2022 network (at left) and in the 2028 Network (at right).

for network expansion. The 2028 Network does not reach any more people near the river.

Canyon Creek Road is on the way to other destinations, and can be served by SMART buses on their way north to Argyle Square without requiring them to deviate or discourage through-riding passengers. In the 2028 Network, it is served by Route B that continues on beyond Argyle Square to Tualatin and Tigard.

The area circled in yellow on these maps would be newly covered by Route B.¹

¹ In fact, the remaining red dots west of Canyon Creek Road are an artifact of the way the U.S. Census draws the Census blocks to in the Boeckman Creek area. Those red dots represent residents who actually live within 1/2 mile of Canyon Creek Road, not in the creek, and they would therefore be covered thanks to the new Route B.

Fixed Route Operating Increases

Using the frequencies, spans, lengths and assumed speeds of each of the proposed routes, we can estimate the number of vehicles and drivers required in-service, and the number of hours of each, required for each route. We can also estimate the miles of distance vehicles will have to travel to deliver each route. These are the basic components of operating cost: Revenue Hours in service, Revenue Miles in service, and Peak Vehicles required to deliver the service at its peak frequency.

(A “revenue hour” is one hour of a bus and driver on the road, providing service to passengers. A “revenue mile” is a mile driven on a route, in service. “Peak vehicles” are the greatest number of vehicles required at any one time to deliver service during the week, which is normally during rush hours. Revenue hours, revenue miles and peak vehicles define most of an agency’s costs to provide fixed-route transit.)

Figure 41 on the next page reports these cost elements along with the proposed frequency of each 2028 route.

These cost elements are used to generate dollar estimates of operating cost starting on page 87.

The 2028 Network represents a substantial expansion in service above the existing SMART network, befitting its role as the

endpoint of an ambitious 5-year improvement program. The 2028 Network would require about 252 revenue hours of service each weekday, approximately 71% more than SMART’s current weekday service.

However, the more substantial ongoing expenditure would come from the expansion of weekend service. The 2028 network would improve Saturday service on most routes, more than tripling Saturday service. It would also turn on three routes on Sunday for the first time.

As a result, the total annual cost of fixed-route service in the 2028 Network is about 75,000 revenue hours, an 89% increase compared to the existing service level. This does not account for the cost of adding demand-response service and other personnel on weekends as well. The nature of those costs are described in chapter 5, and estimated costs are presented starting on page 87.

Shared Operations with Cherriots

Today SMART and Cherriots (the transit provider for Salem, Keizer, and Marion and Polk Counties) share the cost of providing Route 1X. The cost share is simple: each agency runs some of the daily trips using its own vehicles.

In calculating the costs of future services on Route A, which would replace Route 1X, and on Route E, a new connection among Wilsonville, Woodburn and Keizer, we have assumed that this arrangement

would continue on weekdays. The Revenue Hours, Revenue Miles and Peak Vehicles given in the table on the next page only include one-half of those cost elements on weekdays.

However, we have not assumed that this cost sharing would apply on weekends (when Route 1X does not run today). All of the costs that arise from Saturday and Sunday service, for Routes A and E, have been included in the table on the next page.

Route E (Wilsonville-Woodburn-Keizer) would require only one bus to operate at the recommended frequency (120 mins). In practice, this means that the two agencies could not split costs by alternating trips with their own buses. A different method of cost sharing could be developed for this route alone, or perhaps for both of the routes (A and E) that the two agencies would be scheduling, marketing and operating together.

Any changes to the Route 1X (A), and introduction of the proposed Route E, would be done in consultation and coordination with Cherriots.

		Frequency		Two way length (miles)	Round-trip cycle time with layover		Layover time (including excess time)		Weekday Revenue Hours	Saturday Revenue Hours	Sunday & Holiday Revenue Hours	Revenue Hours per year	Revenue Miles per year	Peak vehicles required
		a.m. peak	mid-day		a.m. peak	mid-day	a.m. peak	mid-day						
A	Salem ¹	30	60	68	120	120	20	40	24 ¹	24 ¹	24 ¹	7,428	231,345	2
B	Tigard-Tualatin	30	30	25	120	120	29	28	64	36	24	19,556	233,823	4
C	Canby	60	60	17	60	60	22	22	15	12		4,446	77,271	1
D	Legacy Meridian-OC-Clackamas TC	30	60	50	210	240	30	57	91	36		24,006	334,109	7
E	Woodburn-Keizer ¹	120	120	56	120	120	29	34	8 ¹	12 ¹		2,223	56,687	1
F	Villebois-Frog Pond	30	30	11	60	60	13	12	30	24	12	9,588	99,236	2
G	95th/Parkway	30		14	60		19		20			5,080	70,409	2
Total - all proposed 2028 fixed routes									252	144	60	75,000	1,481,000	19
Total - 2021 ² fixed routes									147	44	0	39,600 ²	557,000 ³	15
Percentage increase in Fixed Route service to 2028 Recommendation									171%	327%		189%	266%	

1 For Routes A and E we assume that weekday service would be split equally between SMART and Cherriots (with RH divided equally), but that Saturday and Sunday service would be provided entirely by SMART.

2 2021 annual Revenue Hours is an annualized number calculated based on the typical weekly schedule of service in 2021. This is a slightly lower number than the Revenue Hours that were actually delivered in calendar year 2021.

3 2021 annual Revenue Miles is taken from the National Transit Database.

Figure 41: Recommended 2028 fixed route operating parameters and estimated Revenue Hours, Revenue Miles and Peak Vehicles.

Sample Trips

On this and the following pages, example trips are described as they would be made using the best combination of transit services in 2022 compared to the proposed 2028 Network.

In most cases, the 2028 Network results in shorter travel times. This is generally due to the shorter waits required to use routes (or, put another way, the more times that people can choose to start their trip). In some cases it is also due to a more linear and direct route which saves people in-vehicle riding time.

When SMART implements elements of the 2028 Network, comparisons like these can help communicate the value of service changes. Service changes are normally disruptive to at least a small number of existing riders, even when they are beneficial to a large number of potential future riders. Demonstrating travel time savings for trips that many people make can help overcome the bias against change and inertia that tend to discourage or prevent service changes.

On the 2022 Existing Network, what is the trip like from an apartment on Park Place to a medical appointment at Sunnyside Medical Center at noon on a weekday?

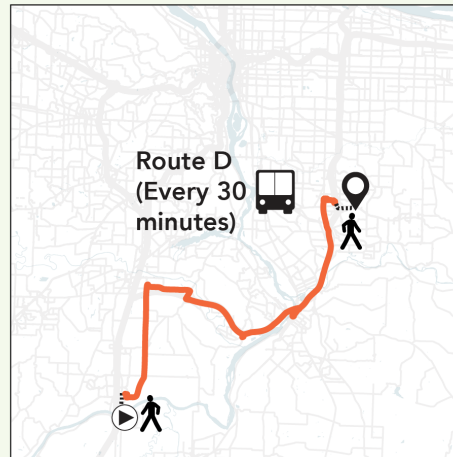


Total Travel Time: 2 hours 41 minutes

- 16 minutes walking
- 53 minutes average wait
- 1 hour 32 minutes riding

Depart at 9:00 am.
 Arrive at 11:41 am.
 Use Routes 2x, 96, and MAX
 2 Transfers.

On the 2028 Network, what is the trip like from an apartment on Park Place to a medical appointment at Sunnyside Medical Center at noon on a weekday?



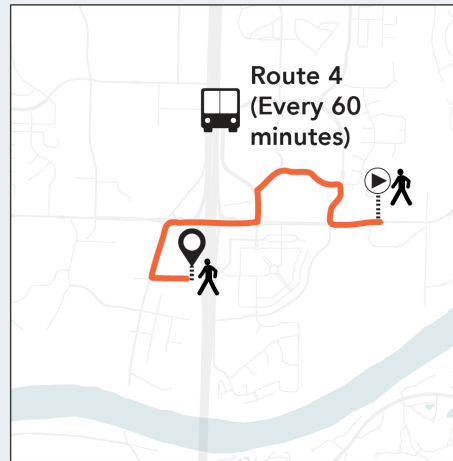
Total Travel Time: 1 hour 57 minutes

- 19 minutes walking
- 15 minutes average wait
- 1 hour 23 minutes riding




Depart at 10:00 am.
 Arrive at 11:57 am.
 Use Route D.
 No Transfers.

Figure 42: Comparing a trip between Wilsonville and Sunnyside Medical Center, on the 2022 network (at top) and the 2028 Network (at bottom).

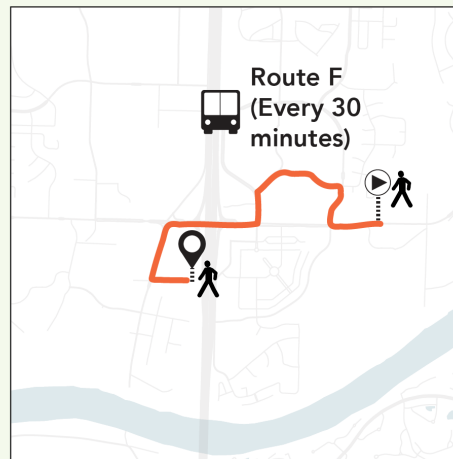
On the 2022 Existing Network, what is the trip like from an apartment near the Wilsonville Community Center to Fred Meyer on a Saturday afternoon?



Total Travel Time: 42 minutes

-  5 minutes walking
 -  30 minutes average wait
 -  7 minutes riding
- Depart at 12:34 pm.
 Arrive at 1:16 pm.
 Use Route 4.
 No Transfers.

On the 2028 Network, what is the trip like from an apartment near the Wilsonville Community Center to Fred Meyer on a Saturday afternoon?



Total Travel Time: 27 minutes




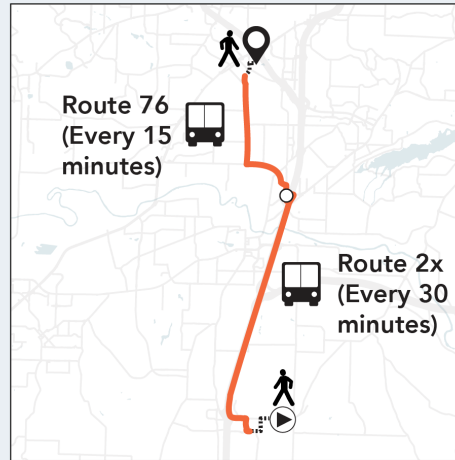



-  5 minutes walking
 -  15 minutes average wait
 -  7 minutes riding
- Depart at 12:30 pm.
 Arrive at 12:57 pm.
 Use Route F.
 No Transfers.

Figure 43: Comparing a trip between an east side residence and Fred Meyer on the 2022 network (at top) and the 2028 Network (at bottom).

On the 2022 Existing Network, what is the trip like from an industrial job on Burns Way to an apartment in Tigard on a weekday evening?



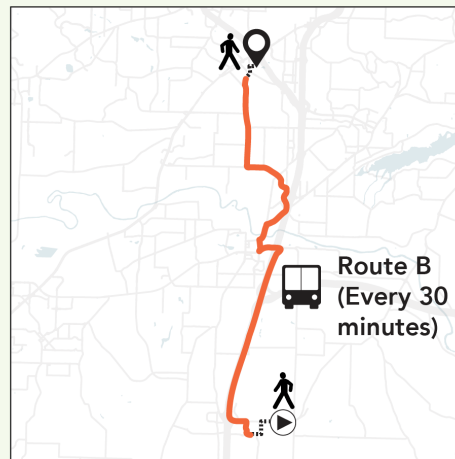
Total Travel Time: 58 minutes

-  8 minutes walking
-  23 minutes average wait
-  27 minutes riding




Depart at 4:45 pm.
 Arrive at 5:43 pm.
 Use Route 2x and Route 76.*
 1 Transfer.

* This trip is also possible using WES, but on average it would take 26 more minutes to complete, compared to this trip.

On the 2028 Network, what is the trip like from an industrial job on Burns Way to an apartment in Tigard on a weekday evening?



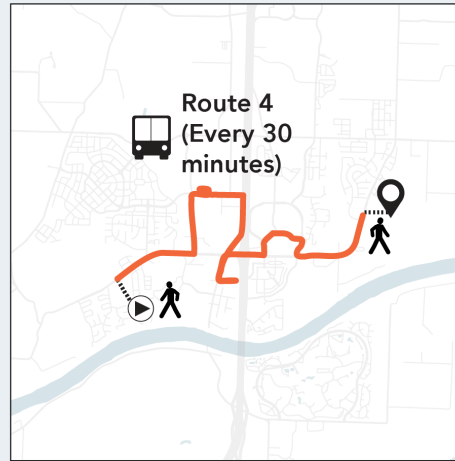
Total Travel Time: 55 minutes

-  8 minutes walking
-  15 minutes average wait
-  32 minutes riding




Depart at 4:45 pm.
 Arrive at 5:40 pm.
 Use Route B.
 No Transfers.

Figure 44: Comparing a trip between a Wilsonville job and a Tigard residence, on the 2022 network (at top) and the 2028 Network (at bottom).

On the 2022 Existing Network, what is the trip like from an apartment on Wilsonville Road to Wilsonville High School on a weekday morning?

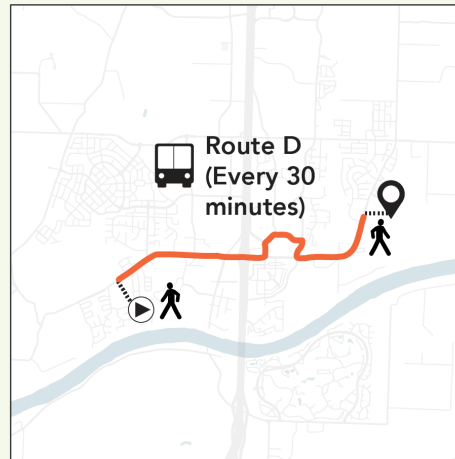


Total Travel Time: 41 minutes


-  3 minutes walking
-  15 minutes average wait
-  23 minutes riding

Depart at 7:40 am.
 Arrive at 8:21 pm.
 Use Route 4.
 No Transfers.

On the 2028 Network, what is the trip like from an apartment on Wilsonville Road to Wilsonville High School on a weekday morning?



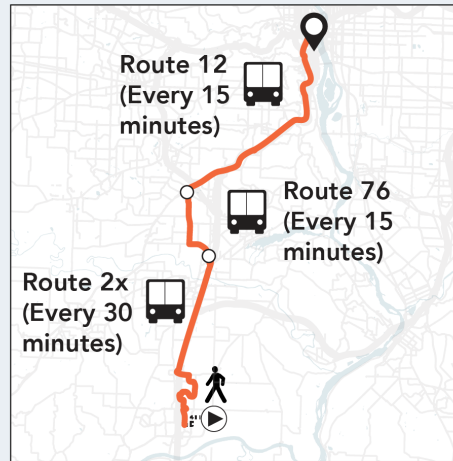
Total Travel Time: 28 minutes

-  3 minutes walking
-  15 minutes average wait
-  10 minutes riding




Depart at 8:00 am.
 Arrive at 8:28 am.
 Use Route D.
 No Transfers.

Figure 45: Comparing a trip between a west side residence and Wilsonville High School, on the 2022 network (at top) and the 2028 Network (at bottom).

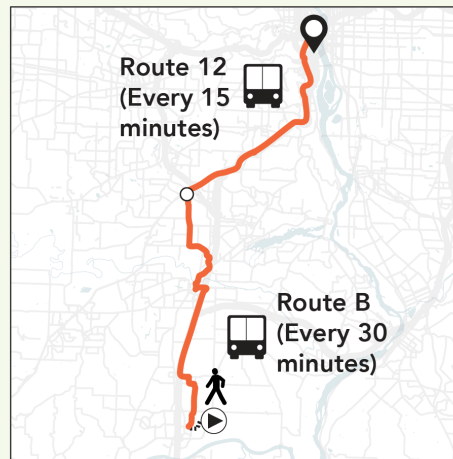
On the 2022 Existing Network, what is the trip like from an apartment near Canyon Creek to downtown Portland on a Saturday afternoon?



Total Travel Time: 1 hour 53 minutes

-  12 minutes walking
 -  30 minutes average wait
 -  1 hour 11 minutes riding
- Depart at 12:18 pm.
 Arrive at 2:11 pm.
 Use Routes 2x, 76, and 12.
 2 Transfers.

On the 2028 Network, what is the trip like from an apartment near Canyon Creek to downtown Portland on a Saturday afternoon?



Total Travel Time: 1 hour 42 minutes




-  7 minutes walking
 -  23 minutes average wait
 -  1 hour 12 minutes riding
- Depart at 12:00 pm.
 Arrive at 1:42 pm.
 Use Routes B and 12.
 1 Transfer.

Figure 46: Comparing a Saturday trip from Wilsonville to downtown Portland on the 2022 network (at top) and the 2028 Network (at bottom).

City Growth Areas

The map at right highlights the areas where the City of Wilsonville will eventually expand and grow at urban densities.

The 2028 Network was drawn with an awareness of the growth that will happen in the next five years, which is located in Frog Pond.

Routes F and D can be lengthened northwards along Stafford Road to new stops adjacent to Frog Pond developments. They could also branch away from one another, with one turning east to end at Meridian Creek Middle School while the other continues north on Stafford Road. Sidewalks must be added to both sides of Stafford Road to allow residents of new developments to walk out to and along Stafford Road to reach a bus stop.

Once Basalt Creek, in the northwest of the city, is developed, a reasonable transit route could run on either Grahams Ferry or Boones Ferry Roads. Detail of the street network in the area is shown on the next page.

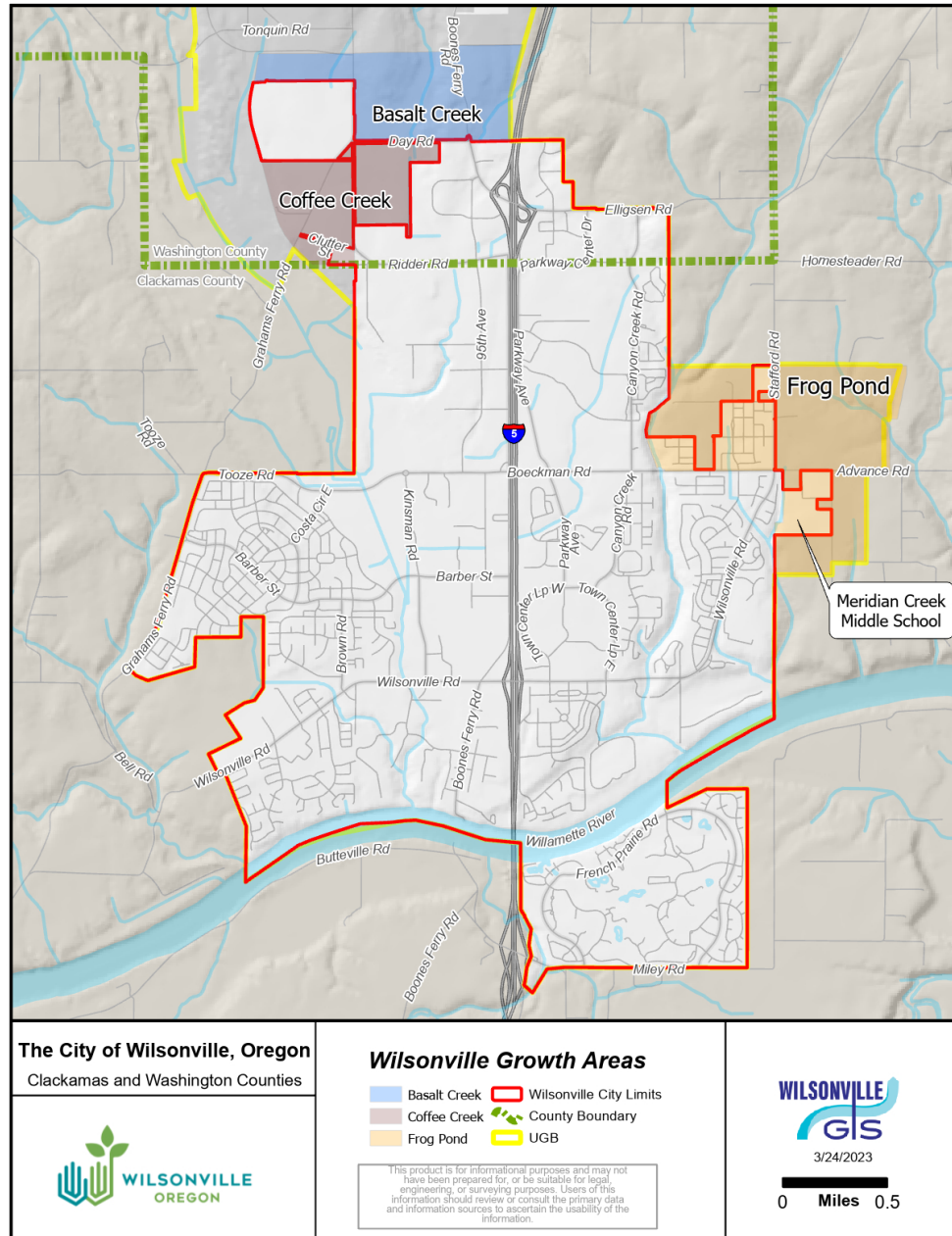


Figure 47: The next anticipated growth areas in the City of Wilsonville are Frog Pond, Coffee Creek and Basalt Creek.

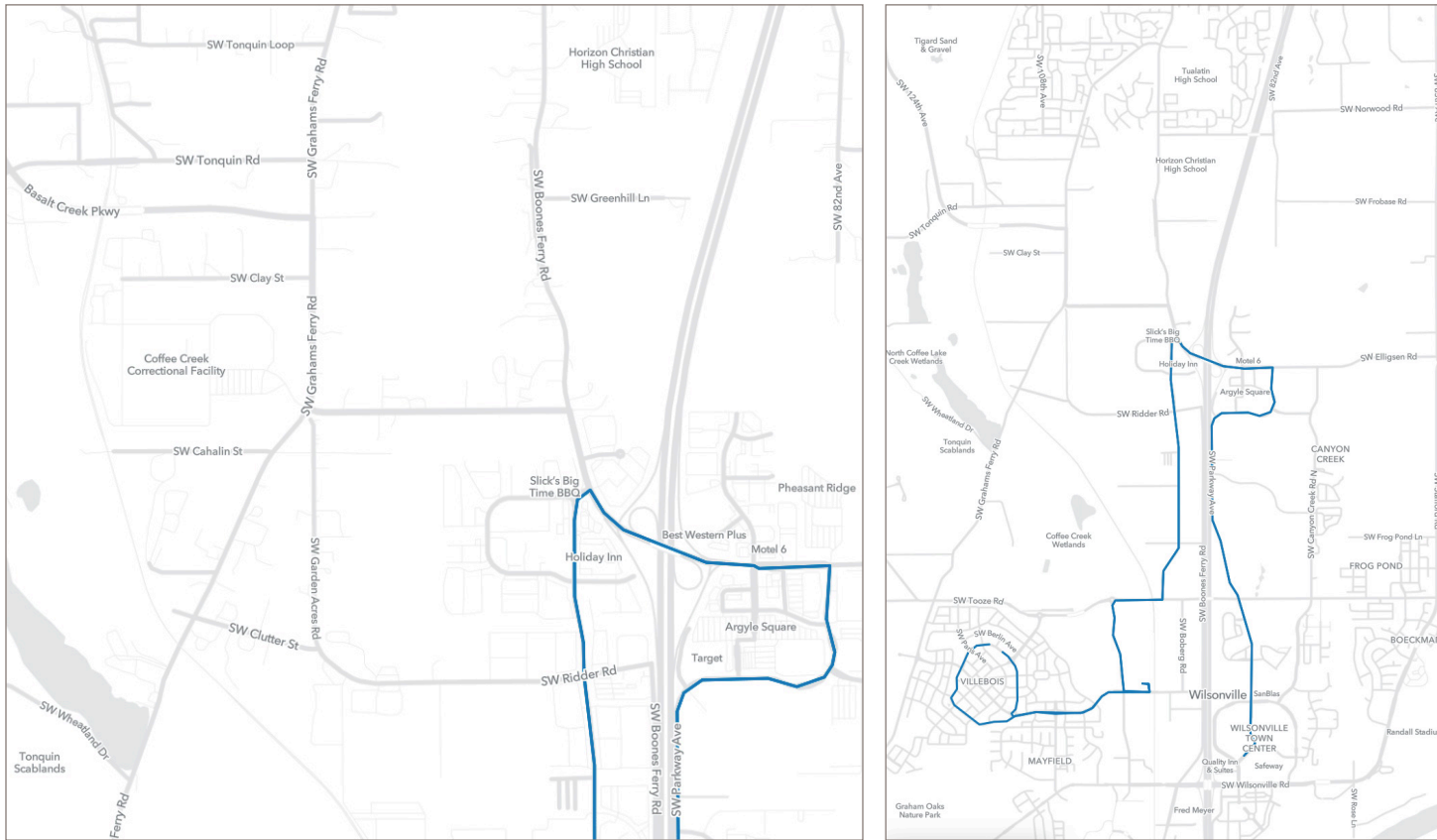


Figure 48: The City is expected to grow into the Basalt Creek area, along Grahams Ferry and Boones Ferry Roads, as shown in the street map at left. It will be important to concentrate transit-appropriate development along one, but not both, of these roads, as the Route G loop (shown in blue) could not be stretched any further north without making trips between the east and west sides of the city terribly circuitous.

Existing streets in the Basalt Creek area are shown above. The two main roads heading north from the existing developed area of Wilsonville into the new development areas are Grahams Ferry and Boones Ferry Roads.

We recommend that the City identify **one** of these roads as the priority for transit, and organize denser development around it, rather than expect that transit service can be provided on both roads in the near future. If development is planned with an

expectation of service on **both** roads, then the provided frequencies will be one-half as good as they could be if all of the transit-oriented and transit-needing developments were organized along one of the roads. It will also be essential to provide good pedestrian connections between the two roads, so that transit on one road is reachable from the other road.

Also, the simplest way to serve Basalt Creek – and to get service on both roads – would be to stretch northwards the loop

made by Route G. However, the further north that loop is stretched, the less useful Route G is for connecting people and destinations on the east and west sides of I-5, since most passengers would be taken very far out of direction. A different service design would need to be developed. One possibility is that Route G could be broken into two routes, one that stays on the west side of the city and continues north into Basalt Creek, and the other that connects the east side to a terminus at or near Commerce Circle.

4. Demand-Response Services

Dial-a-Ride is a door-to-door demand-response (DR) transportation service for passengers within the City of Wilsonville. People who are eligible based on the Americans with Disabilities Act (ADA) are given priority scheduling, but Wilsonville residents and workers of all ages are also welcome to utilize the Dial-a-Ride program. This Plan update does not recommend any substantial changes to the existing structure or delivery of SMART’s demand-response programs.

Background

SMART is required by the Americans with Disabilities Act (ADA) of 1990 to provide a paratransit service to persons who are unable to use fixed-route transit, as a complement to local (non-express) fixed-routes, in the places and at the times when local fixed-routes are operating.

SMART offers this complementary paratransit through its Dial-a-Ride program, which includes 4 separate service categories:

- ADA Complementary Paratransit.
- General Public. Provides in-town transportation for anyone under 60.
- Seniors. Provides in-town transportation for people ages 60 and older.
- Out-of-Town. Provides trips to destinations outside of the City of Wilsonville for ADA enrolled residents or people

	ADA	Senior	General Public	Out-of-Town
Eligibility	Limited to persons with disabilities, as determined by SMART’s Eligibility Committee.	Anyone age 60+.	Anyone.	Anyone enrolled in ADA, or anyone age 60+.
Cost	No fare.	No fare.	No fare.	\$3.00 per one-way trip.
Hours of Operation	All hours during which SMART fixed-route network operates.	M-F, 8:00 am - 5:00pm.	M-F, 8:00 am - 5:00pm.	M-F, 8:00 am - 5:00pm.
Trip purpose restrictions	None.	None.	None.	Medical appointments only.
Scheduling Principle	Priority.	Space-available basis.	Space-available basis.	Space-available basis.
% of SMART Demand-Response Ridership	54%	29%	<1%	16%

Figure 49: SMART Demand-Response Program Categories

age 60 or older, with a higher required fare payment and allowing a reservation be made further in advance.

Figure 49 summarizes the key attributes of each program category.

Minimum Required Paratransit Area

SMART is required by federal rules to provide paratransit service within 3/4-mile of all local fixed-route lines (not stops), during times when fixed-route service is operating. Any time an agency makes major changes to routes, it is changing the area in which it must offer paratransit.

Figure 50 compares the required minimum paratransit service for the 2022 network and the proposed 2028 Network. The area that is 3/4 mile from local bus routes in both networks is shown in dark green; the light blue area would be newly-required in the 2028 Network, while the light green area would drop out of the minimum required service area.

The blue area that would be newly included in the minimum required paratransit area is around the intersection of SW 14th and Tonkin Roads.

The green area that would no longer be within the minimum required area is outside of Wilsonville City limits, along Coffee Creek from Wheatland Drive and continuing about 1/3-mile south. It is mostly a natural area with only a few residents. In the review of April 2022 demand-response trips, no paratransit trips began or ended within this light green area.

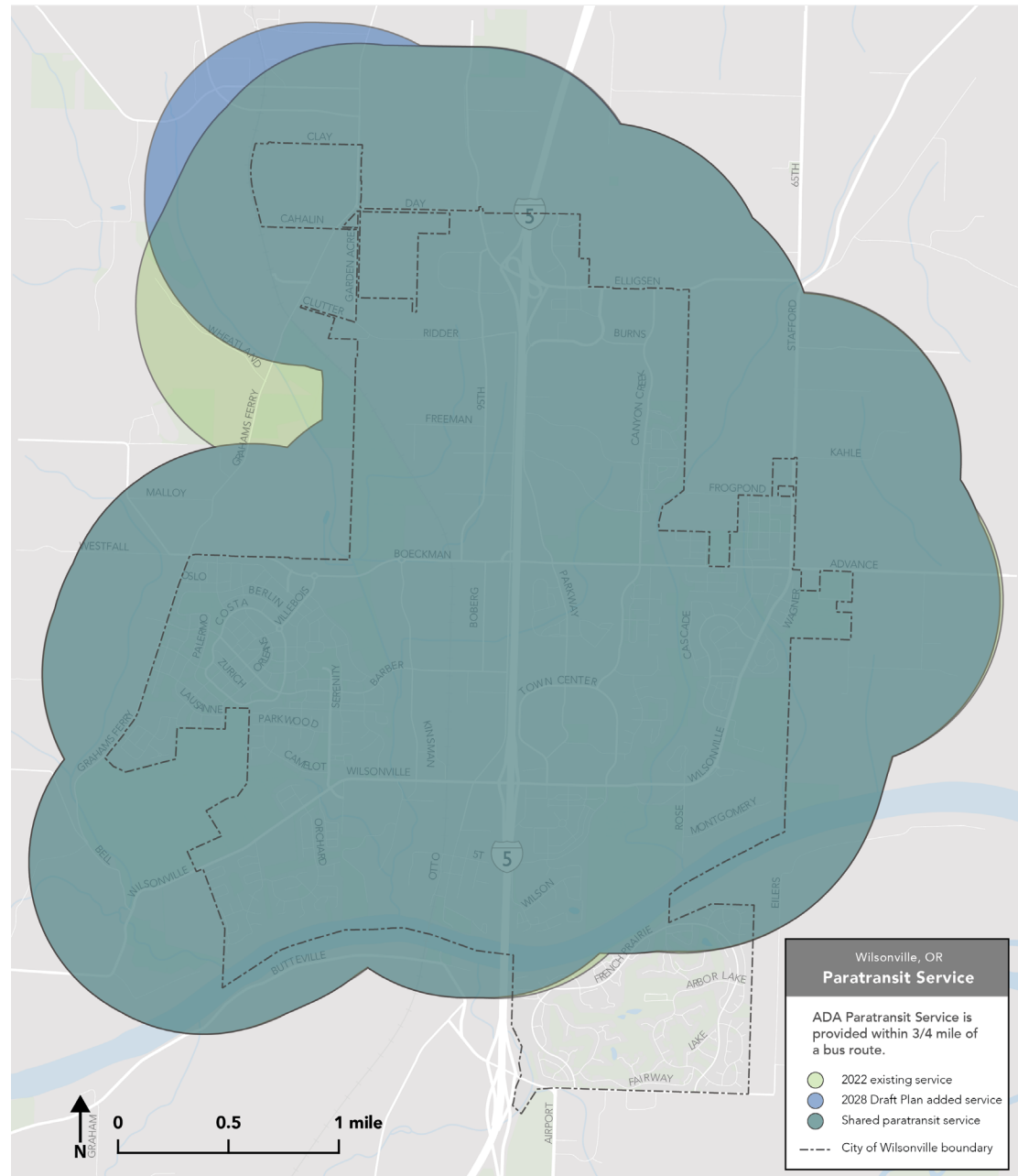


Figure 50: Required ADA Paratransit Areas for the 2022 and 2028 Networks

“Express” Routes and Segments

Express routes, which generally have long distances between stops and travel long distances, do not trigger a paratransit requirement. This is also true of express segments of routes that may also have a local segment.

Because the 2028 Network is explicitly designed to integrate local and regional service, many routes have local segments and express segments. For example, Route D would be a local route along Wilsonville Road but would run express along Stafford Road from the City boundary (at Frog Pond) to Legacy Meridian Medical Center). SMART would not be required to provide paratransit service to residents within 3/4 mile of this segment of Stafford Road. As another example, the existing Route 2X has a local segment within Wilsonville and an express segment between Wilsonville and Tualatin.

SMART has an established practice for helping ADA paratransit passengers transfer to TriMet’s paratransit service if they are traveling between the two service areas. Regardless of the “express” or “local” nature of the routes connecting the SMART and TriMet service areas, which may change over time, SMART intends to continue facilitating paratransit transfers between them.

Required Paratransit Days and Times

Because ADA paratransit must be offered on the days and at the times when local fixed-routes are operating, the schedules of fixed-routes govern the minimum size and operating cost of the ADA paratransit program.

The actual size and shape of the paratransit service area can grow and shrink throughout a day or week, as the obligation to complement a fixed-route with paratransit begins when that fixed-route begins service, and ends when that fixed-route ends service.

For the purposes of the map shown on the previous page, the paratransit service area was defined using the maximum network in service in 2028, which would be the network offered at rush hours. The minimum paratransit area at nights or on weekends could be smaller, when fewer local fixed-routes would be operating.

A transit provider can define the paratransit service area with this degree of precision by time of day and day of week. Because paratransit has a very high operating cost per ride, there is a reasonable motivation for adhering strictly to the minimum required service area. However, most agencies find that it is both too frustrating for their ADA passengers and too complex for their staff to administer a

dynamically-changing paratransit service area throughout each day. More often, agencies define a small set paratransit areas, such as one for weekdays, one for Saturdays and one for Sundays. The span (hours) of paratransit in those areas must match the span of time from the earliest to the latest local fixed-route bus service.

The required span of paratransit service would change greatly within Wilsonville with the implementation of the 2028 Network, compared to the minimum requirement in 2022:

- On weekdays, the span of paratransit service would be required to increase by one hour at night (until 9 p.m).
- On Saturdays, the span would be required to increase by one hour at night (until 7 p.m.).
 - The minimum required paratransit area would also increase slightly.
- On Sundays, no paratransit is required or offered today. In the 2028 Network, the span would be 12 hours.
 - The minimum required area would be similar to what is required today on Saturdays, chiefly the places within 3/4 mile of Wilsonville Road and Canyon Creek Road.

Adding fixed-route and demand-response services on Sundays would require “turning on” the entire SMART operation for an additional day per week.

Recommended Paratransit Service Increases

The service increases described on the previous page are the minimum required by law in order to match paratransit availability to local fixed route availability.

In addition, we recommend that SMART be prepared to fund more paratransit capacity during times when paratransit is offered today, as growth in Wilsonville's population, and particularly its senior population, are likely to increase demand for the service.

Improved frequencies on SMART intercity fixed routes may also increase demand for paratransit as the intercity routes become more appealing and useful to customers with disabilities. Some of these customers may be able to use the intercity routes but unable to use a local route due to their disability and they will be entitled to use paratransit for their local connection.

The cost estimates for service increases presented starting on page 87 include an assumed increase in SMART's paratransit (DR) capacity at these times:

- A DR vehicle and driver available two hours earlier and three hours later than DR is currently offered on weekdays.
- One additional DR vehicle and driver

in service during the 12 hours DR is offered today, on weekdays.

- A DR vehicle and driver available one hour earlier and one hour later than DR is currently offered on Saturdays.
- One to two additional DR vehicles and drivers in service during the times DR is offered today, on Saturdays.
- One to two DR vehicles and drivers available for 12 hours on Sundays (when no DR or fixed route service is offered today).

These additions would sum to 117 additional hours when DR vehicles and drivers are in service per week, over what is provided today, or about 6,100 more DR vehicle hours in service per year. The actual labor hours for DR drivers may be higher, depending on how efficiently work schedules can be created around the DR and fixed route transit schedule.

These increases in paratransit service come with costs not only for direct operation of the vehicles and for employing drivers to provide service for those 117 hours a week, but also for dispatchers who communicate with customers and drivers; staff who supervise the service; and staff who maintain the vehicles.

5. Capital Infrastructure, Programs and Operations

Overview

This chapter provides an outline of key capital investments necessary to deliver the Transit Master Plan. There are three types of major investments that would be required:

- Transit Vehicles
- Maintenance
- Town Center Terminal Facility

In addition to these capital investments, there are ongoing operational needs – especially increases in personnel – that

would be required to implement and support the larger system described in this Plan. These operating and personnel needs are also summarized in this chapter.

The end of this chapter describes some of the existing SMART programs that will continue in the future, which support the City’s transportation-related goals and complement the transit services described in this Plan.

Transit Vehicles

Existing Fleet

As of 2022 (before temporary service reductions due to an operator shortage) there were 18 peak vehicles in revenue service, for fixed route and demand response services combined. **Figure 51** shows that the morning rush-hour pullout (18) is larger than the afternoon rush-hour (15). In the midday, 12-13 vehicles are in service. More than a quarter of the vehicles in service each day (five of 18) are required only for one or the other rush hour periods.

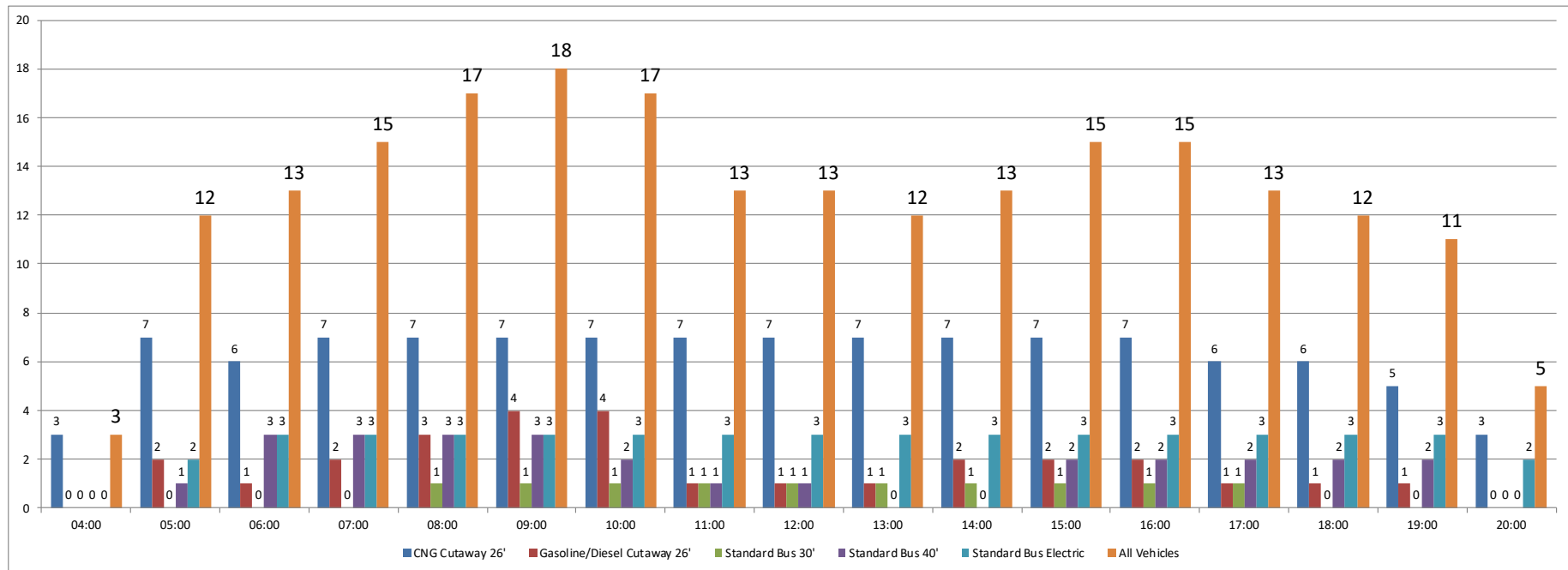


Figure 51: 2022 vehicle requirement by hour on weekdays. Orange bars represent all vehicle types, for both fixed route and Dial-a-Ride.

SMART uses five fuel types for revenue service: CNG, diesel, diesel/hybrid, gasoline, and electric. Most of the vehicles in service at most times of day are 26 foot long compressed natural gas (CNG) buses. They carry 21 seated passengers when the wheelchair positions are not in use, or 15 when both are deployed. Larger 30- and 40-foot buses are a mix of diesel, diesel hybrid, and electric.

Fixed-Route Vehicles

Growing the transit fleet is currently constrained by delayed delivery times for vehicles and parts from manufacturers. As a demonstration, at time of writing SMART is still waiting on delivery of three vehicles ordered before the pandemic.

Due to uncertainty in the transit vehicle supply chain over recent years, SMART has kept more spare vehicles than are required by regulation. However, even with those extra spare vehicles, growth in transit service would be constrained by fleet size (as well as a driver shortage).

The variety of bus types in the SMART fleet, and the fact that SMART has chosen to avoid relying on a single technology or fuel type, has allowed for flexibility while the supply chain is unreliable. For example, when a part needed to be replaced on an electric bus charging station in 2022, the charging station was out of service for 75 days. But transit service was not disrupted because SMART was able to deploy spare vehicles that did not require charging.

At time of writing, ridership has been and continues to be low since the Covid-19 pandemic. Crowding is not currently a recurring problem on any route, and so SMART has had the flexibility to assign buses with various seating capacity and fuel types to any route or type of service. Length of route or length of block (the amount of time a bus is out on the road, between visits to the garage) can inform the type of fuel or propulsion used by the vehicles – for example, if a bus can only run so many miles before needing a charge or a refueling, it may not be possible to use it on longer routes. This may be a limitation around which SMART needs to work in the future, especially with the longer routes included in the 2028 Network, but SMART has been able to manage this limitation without difficulty so far.

Prior to the Covid-19 pandemic, Routes 2X, 4, and 1X had the highest ridership and were therefore the most likely to become crowded and require or benefit from larger vehicles. Route 2X is currently using cut-aways, and Route 4 is using larger buses at rush hours and smaller vehicles outside of rush hours. Ridership on the 1X has not rebounded, for a variety of reasons: since the route was introduced, State workers in Salem offices have a hybrid-remote work schedule, car ownership and fuel costs are low, and parking cost and supply remain ample in Salem. Route 1X has therefore been operable with a 35-foot bus.

Thus with neither a requirement to put

larger buses on any routes due to crowding, nor a requirement to avoid putting certain buses on longer routes, SMART has had maximum flexibility in vehicle assignments in recent years. This could change between now and 2028 if ridership increases, and if SMART introduces longer (or slower) routes with more time between charging/fueling buses.

Demand-Response Vehicles

SMART's demand-response service uses four dedicated vehicles today and another four as spares. Eight additional vehicles used for regular fixed-route service are also used at times for demand-response. Ultimately, SMART staff intend to separate vehicle assignments to the fixed-route and demand-response modes for more transparency and easier reporting.

General Fleet Recommendations

The recommendations of this Plan, if implemented in full by 2028, would increase the peak vehicles in-service for both fixed routes and demand response to 23 (from 18 in 2022). In addition to the growth in the size of the fleet to accomplish the service increases shown in this Plan, SMART would need to add at least one spare vehicle, and continue to replace aging vehicles in the existing fleet.

Today, SMART operates compressed

natural gas (CNG), battery-electric buses (BEB), diesel-electric hybrid, gasoline, and diesel buses. SMART's goal is for its fleet to be free of diesel- or gasoline-powered vehicles by 2028. The diesel, gas and hybrid vehicles in the fleet will be used until the ends of their lives but they will not be replaced with the same types of vehicles.

The emergence of major economic, environmental, social, and other disruptive events outside of SMART's control will likely continue to create challenges to maintaining capital assets in the years to come. Although using multiple fuels (CNG, diesel, gasoline, electric) creates redundancy and flexibility for the agency, variety in a fleet typically also increases operational complexity. For example, if a route experiences crowding and only a subset of buses in the fleet are large enough to handle it, that subset of buses almost needs its own spare ratio to ensure that the route can reliably be assigned a large-enough bus. This has not been the case recently because there have not been pressures from either high ridership (crowding) or from route length (due to electrical charging), but as those constraints appear in the future the fleet variety may become a hindrance more than a help.

It may be worth exploring what has worked best over the past decade, consider what routes are likely to be changed or added in the next decade, and then narrow

down the variety of the SMART fleet to the fewest different types of vehicles that could reliably operate most of SMART's fixed-routes. This simplification of the fleet could be implemented slowly, as vehicles are replaced at the end of their useful lives. For example, if the decision is made to plan on delivering fixed-route services all with 30- to 35-foot buses in the future, SMART could continue to reduce its spare parts inventory, minimize the amount of training for staff to stay current, and reduce its spare ratio over time. Unfortunately, an additional limitation on this decision is what types of vehicles can be purchased, as manufacturing is highly limited and wait times for new vehicles extremely long.

Bus Procurement

As SMART has diversified its fleet over the past decade, it has gained experience working through the trade-offs of purchasing, operating and maintaining different types of vehicles. Technology continues to advance in vehicles of all fuel and propulsion types. Many transit agencies around the country are transitioning to cleaner fuel types to reduce emissions, and as part of that transition there are costs beyond vehicle price that must be clearly understood. Considering start up investments, maintenance, and how the operating environment might affect the stated lifespan of a vehicle are key to understanding the true cost.

SMART should focus on its own goals in order to prioritize the most important features of a bus. Environmental impact, fuel efficiency, operating and staffing resources needed, driver and customer comfort, space needs, and capital infrastructure needs are all important considerations.

Because bus propulsion technology has changed so rapidly in the past 20 years, many of the currently-available data about fuel efficiency, emissions reductions, and costs (operating, maintenance, capital, total) are conflicting. Published studies from the U.S. Department of Energy and transit agencies around the country over the past 15 years show a wide range of outcomes across a variety of metrics and vehicle fuel types. Some information about lifecycle costs and maintenance challenges is still evolving, as new vehicle technologies remain on the roads for enough years to be well-understood by transit agencies. SMART already has years of experience purchasing and maintaining alternative-fueled vehicles. The Wilsonville fleet manager, as well as fleet managers at peer agencies in Oregon, will be key people to rely on for knowledge about how emerging and improving technologies have worked in the recent past.

SMART aims to replace diesel, diesel hybrid, electric and CNG vehicles over the next five years. Here is some guidance to consider during future vehicle purchases.

Compressed Natural Gas (CNG)

CNG-powered buses can reduce emissions by up to 90 percent compared to diesel-powered buses. CNG buses may also provide lower operational costs per mile compared to diesel buses and fuel costs can be much lower. CNG requires significant initial investments in fueling infrastructure and upgrades to maintenance facilities, such as natural gas detectors and ventilation systems, but SMART already has what it needs and can accommodate growth in this equipment in its maintenance yard.

SMART has experience maintaining diesel-hybrid buses, which will not be replaced as they come to the ends of their useful lives. CNG vehicles have been found to have higher or lower maintenance costs than diesel-hybrids, depending on the study.

Range between refueling: Around 220 miles

Battery Electric Buses (BEB)

Electric buses operate solely on electric power from a lithium-ion battery pack. Charging can occur either at route termini or on-route. Currently, all SMART charging occurs at the maintenance yard. Electric buses can be zero-emissions (depending on the source of the electricity) and their fueling costs depend on electricity costs. Both carbon emissions and costs from electricity have been lower in the Pacific

Northwest than in other parts of the U.S. due to our abundant hydro power.

Despite recent improvements in battery capacity, electric buses have shorter ranges than diesel or gasoline vehicles. And despite improvements in charging speeds, electric buses generally still require more time to reach a full charge than diesel vehicles require to refuel. Vehicle ranges and vehicle charging/refueling time can affect the design and efficiency of routes, or constrain which vehicles can operate which routes. Deployment of electric buses therefore requires careful consideration of charging needs, route lengths and speeds, and operating conditions including weather. Air conditioning and heating can reduce an electric bus' battery span by as much as 30%.

SMART will soon have four charging stations at the maintenance yard. Technology continues to evolve with electric buses and charging capabilities, but many agencies have found that the limited range between charges has caused an increase in the number of buses and operators needed to provide the same level of service, compared to the number of vehicles previously required with other fuel types. Though we can imagine a role for electric buses in the SMART fleet, growing this type of fuel system at SMART will require a realistic look at the implied operating and capital cost increases over the life of the vehicle.

Electric cutaway vehicles are less tested

than full-sized electric transit buses. Though smaller vehicles have now been Altoona tested and FTA approved, there is far less peer experience and fewer long-term takeaways that SMART can use to make educated decisions for bus purchases. In addition, some important features such as easy and fast wheelchair boarding may be compromised in electric cutaway buses. In the coming years, it will be best to keep any electric bus purchases to more standard 35- and 40-foot buses that have more vendor support and that require SMART to stock fewer unique parts and supplies for maintenance.

Range between charges: 70 – 300 miles between depot charges

Hydrogen Fuel Cell

Hydrogen fuel cell electric buses (FCEBs) are hybrid vehicles powered by hydrogen fuel cells and an electric battery, providing flexibility to be deployed on longer routes. FCEBs can be zero-emission (depending on the energy source for the creation of the hydrogen fuel) and have a better fuel economy compared to conventional buses. However, fueling costs are high for hydrogen and it is not yet readily available as a vehicle fuel. Transitioning to FCEBs would therefore require investments in new fueling infrastructure and updates to SMART's maintenance yard.

SMART does not currently have any FCEBs and they are not currently recommended for SMART, based on the size of the

agency, the amount and type of service operated, and considering the other types of vehicles available in the fleet.

Range between refueling: Typically between 200 and 325 miles

Fleet to Support 2028 Service

As noted above, the number of vehicles required at peak times in-service would increase by five with implementation of this Plan. As SMART continues following its existing fleet replacement plan, these additional acquisitions will need to be accounted for.

SMART will need to decide what types of vehicles to add to its fleet in order to maintain flexibility (with regards to route assignment); maintain resilience in case of disruptions to fuels, supplies or parts; and meet SMART's goal of phasing-out all gas and diesel vehicles by 2028. Major delays in the manufacture of vehicles also need to be taken into account.

Vehicle Type Considerations

This Plan calls for services in 2028 that would require an increase of 5 peak in-service buses, going from the 18 buses that were required to operate maximum fixed route and DR (demand response or

Dial-a-Ride) service in 2021, to 23 buses required in 2028. During the peak in fixed route operations (6-9 a.m. and 4-8 p.m.) 19 vehicles would be needed to operate fixed routes. During the peak in DR operations (11 a.m. to 3 p.m.) 7 vehicles would be needed to operate DR.

Some vehicles could perform both functions, if they are suitable for both. However:

- A vehicle that provides DR may be too small to handle the passenger load on a fixed route (especially if it passes a school).
- A vehicle that is large enough to support a fixed route's passenger loads may be too small to drive down and turn around on every residential street in the city, in order to provide the door-to-door service required for some DR customers with disabilities.

Every size and type of vehicle are not available with every fuel type, and not with the same quality of design, comfort for passengers, reliability and availability for purchase.

Given the types of services the SMART fleet would need to operate in 2028 according to this Plan, we recommend that buses purchased primarily to operate fixed routes be battery-electric (BEBs), and that buses purchased primarily to operate Dial-a-Ride service or very low-ridership fixed routes be CNG.

Vehicle Fuel Type Recommendations

For fixed routes, we recommend that SMART purchase the largest vehicles that will be needed to accommodate potential passenger loads and wheelchair boardings per trip.

Understanding that today ridership is very low, it is possible and likely that it will increase by 2028.

The investments recommended on inter-city routes will increase their usefulness and therefore are likely to increase their ridership.

Fixed routes that pass by middle and high schools can experience high passenger loads twice a day, and if a too-small vehicle is assigned to the route it can cause passengers to be left behind at stops, or force SMART to deploy a second bus and driver during that period.

For long fixed routes, especially those traveling on I-5 and I-205, it is valuable for comfort and safety that all passengers have seats.

Wheelchair boardings are faster and more comfortable on some bus designs than on others. In general, larger and low-floor vehicles offer a better wheelchair loading and unloading experience than smaller and high-floor vehicles. However, the quality and reliability of designs for smaller

vehicles may improve in this regard in future years.

For all of these reasons, SMART should err on the side of procuring larger rather than smaller fixed route vehicles.

Battery Electric or Compressed Natural Gas Vehicles

Large fixed route vehicles, 35- or 40 feet long, are available with Battery Electric (BEB) or Compressed Natural Gas (CNG) propulsion. (SMART's 35' and 40' buses are currently a mix of BEB, diesel and diesel-hybrid.) BEBs are appealing given their potential for lower carbon impacts, depending on the source of the electricity that powers them (which in the Pacific Northwest consists partly of hydropower and is therefore relatively low in carbon emissions).

However, BEBs increase operational complexity. The increase in peak vehicle requirement for implementing the 2028 recommended services was calculated based on needed layover time for driver breaks and reliability, but no additional layover time for battery charging or for deadheading buses to a site where the battery can be charged. The current rule-of-thumb among transportation planners and schedulers working on fleet electrification is that a purely BEB fleet would need to be 20-50% larger than a fleet using diesel, gas or CNG, because of the added cycle time and deadhead (time spent

driving to and from the maintenance yard, without passengers) required for charging.

The 2028 fixed routes as described in this Plan include some schedule inefficiencies, meaning extra time that the vehicle is not on the road, in excess of the time needed for the driver's break and as padding to protect reliability. There are multiple ways this extra time can be used in scheduling:

- It can allow for the route to arrive a little earlier or later in order to make a timed connection with another route.
- It can be used for driver meal breaks or driver shift changes.
- It can be eliminated by interlining multiple routes which have extra time, so as to require one fewer buses over the set of interlined routes.
- It can be used to charge BEBs.

With an increase in BEBs in the SMART fleet, more of this extra time will be needed for charging. Overall, with a large enough increase in BEBs within the fleet, SMART should expect a related increase in its peak fleet requirement.

For routes on which BEBs would replace standard diesel or diesel-hybrid buses, an iterative planning-scheduling step should be taken before detailed scheduling is performed and a final vehicle requirement is calculated. In that process schedulers would identify inefficiencies caused by the need to charge vehicles between trips.

Planners would identify available charging locations as well as desirable charging locations in order to decrease deadhead time. Fast on-route charging might be considered as an alternative, representing an increased capital expense but a decreased operating expense if it can reduce deadhead time and simplify driver and vehicle scheduling.

Depending on the location and availability of chargers, the lengths of routes, and the speeds of routes, this planning-scheduling exercise might result in a higher vehicle requirement than we have estimated in this Plan. It could also contribute to longer-range planning to invest in on-route charging, rather than at the SMART maintenance yard, for example at the recommended Town Center terminal facility where some routes are recommended to terminate.

Additional factors can affect the time and distance that BEBs can be driven between charges. One of the biggest factors is hills, which are not a major issue in the Wilsonville or north valley topography. Weather, heating and air conditioning use, the age of the battery, and operating conditions could all affect the peak fleet requirement if the proportion of BEBs are increased in the fleet.

We also recommend that SMART not eliminate the possibility of purchasing large CNG vehicles for its fixed routes. While CNG vehicles have a higher carbon impact than BEBs, they are simpler to operate

and do not increase the overall required fleet size as BEBs do. There are also unanswered questions about the durability and environmental sustainability of the batteries that power BEBs, which may be better understood in the coming years as widespread global use of electric vehicles puts pressure on battery manufacturing and disposal. The lifecycle durability and environmental impacts of CNG buses, on the other hand, are well-understood as they have been in use for thirty years.

Compressed Natural Gas Vehicles

Local DR (demand response) vehicles can be smaller than most fixed route vehicles. This is because only a few passengers' trips can be delivered by one vehicle in an hour while still being reasonably direct for the passengers. Thus DR vehicles rarely need to fit more than a few passengers.

40' and 35' BEBs have a longer track-record and a more robust market in the United States compared to 30' and smaller BEBs, which are new to the market. Purchasing smaller BEB vehicles for its DR service would put SMART in the position of being a "guinea pig" for a relatively new and complex product.

Smaller CNG transit vehicles are available with better designs and a longer track record than small BEB vehicles. Therefore while we recommend BEBs for larger fixed route vehicles, we do not recommend them for the small vehicles that can be used (or are in some cases required) for

DR.

SMART has been using CNG propulsion as well as diesel and gasoline propulsion for smaller DR vehicles (mostly 26' "cutaways," which are high-floor buses built on a truck chassis). We recommend that SMART continue to use CNG for smaller vehicles rather than BEB. These new, small CNG vehicles are likely to be used mostly on DR but could also be used on low-ridership fixed routes or on certain fixed routes at times of day when ridership (and wheelchair boardings) are reliably low.

By 2028, the market for smaller BEBs may be more established, and the appropriateness of then-available small BEB transit vehicles, either on lower-ridership fixed routes or DR, can be reevaluated.

Current Vehicle Prices

The most recent vehicle cost estimates available in the Pacific Northwest are from the State of Washington price agreement which applied through March 2023. The table in **Figure 52** gives average prices for each size and fuel category, plus 10% for contract and delivery related costs.

These prices are only valid through the end of March 2023, and prices are likely to increase in the next State price agreement. (The State of Oregon offers similar guidance on prices, but it dates to 2020.) Actual purchase prices will depend on contract terms, timing of the purchase and the specifications of the vehicle.

For smaller buses (such as 26' long), appropriate to SMART's DR service and low-ridership fixed routes, the State of Oregon has negotiated a base price range \$107,990 to \$181,129 depending on the fuel type. The lowest-cost options in this size are diesel, and so SMART should expect to pay higher prices for CNG.

The state of Oregon offers a [Transit Vehicle Lifecycle Cost Analysis Tool](#), developed by the Oregon Department of Energy, the Department of Environmental Quality, and Zero Emission Vehicle Interagency Working Group, to help agencies predict the total life cost of a vehicle by fuel type and operating conditions. The tool is focused on 35- and 40-foot buses. SMART could use this tool to tailor inputs such as fully burdened labor costs, inflation rate, fuel costs, annual vehicle miles traveled per bus, infrastructure, and operations and maintenance inputs. However, SMART already has experience purchasing, operating and maintaining both BEB and

Length	CNG	BEB
30'	\$467,047	\$524,305
35'	\$547,904	\$680,397
40'	\$614,277	\$878,567

Average prices for heavy- and medium-duty buses in each length category, plus 10% for delivery and other small charges, taken from the Washington State vehicle price agreement, which is valid through March 2023.

Figure 52: Sample prices for CNG and BEB vehicles.

CNG vehicles, and may find its own local data and experience to be as good a basis for future planning as any statewide tool.

Vehicle Delivery Delays

Price is but one barrier to procuring new buses. Wait times are, at time of writing, a bigger barrier. Some types and sizes of buses are in very short supply due to the shuttering of some manufacturers, consolidation of others, and supply chain disruptions. Transit agencies are waiting years to take delivery of ordered vehicles.

This is one of the reasons that SMART has kept some of its older vehicles in operation longer, and kept a diverse fleet in terms of fuel and body types. With so much uncertainty about how long it will take to procure replacement vehicles, it is important that SMART keep in its fleet vehicles that can operate its longest routes reliably and efficiently, and that can handle its peak passenger loads comfortably. This may result in some older, diesel, or diesel-hybrid vehicles being kept in the fleet for longer than they otherwise would given SMART's goal of having a 100% alternative-fueled fleet by 2028.

Given that SMART is likely to maintain some diesel and diesel-hybrid vehicles in its fleet for additional years, it may be worth considering using renewable diesel to fuel those vehicles.

Charging Infrastructure

SMART needs one electrical charger per BEB vehicle, as all BEB vehicles are currently charged overnight. SMART also needs a spare charger, as the chargers occasionally go out of service or require maintenance.

SMART currently has three chargers installed in its maintenance yard and will install a fourth in 2023 at the cost of approximately \$80,000. This will meet the minimum requirement for charging the three BEBs currently in SMART's fleet.

The cost of installing chargers depends greatly on the state of the electrical system to which the charger is connected. If a new transformer is required then the cost for electrical upgrades can be many times the cost of the charger itself. For the 2023 installation, the electrical system is already up to standards. Future installations in the maintenance yard may require additional electrical work and therefore cost more than \$80,000.

In the future SMART can consider the addition of one or more fast chargers. Fast chargers are used on routes so that BEB buses running long routes do not necessarily have to return to the maintenance yard to be charged during the day. The recommended Town Center terminal facility is a place where a fast charger could be

installed to support electric operations of Routes D, E and F, which are not designed to serve the west side Transit Center adjacent to the maintenance yard.

Fast chargers themselves currently cost between \$65,000 and \$150,000, depending on the number of vehicles to be charged. However the electrical upgrades necessary to install any charger at a new facility would be considerable, likely far more than the cost of the fast charger itself. Fast chargers can also be installed at depots to allow for a higher ratio of buses-to-chargers and this may be worth considering in the design of SMART's expanded maintenance yard.

Administrative Investments

The improvements in the 2028 Network will require a set of accompanying changes to SMART's operation, maintenance and administration.

Longer Spans of Service

The increase in service proposed in this Plan would obviously trigger a need for more fixed-route and Dial-a-Ride bus drivers. This relates to the increase in the amount of fixed route and Dial-a-Ride service offered on all days, but it also specifically relates to early morning and later evening service:

- While the first and last fixed route bus in service would not be earlier or later than today, there would be many more buses on the road earlier.
- The Dial-a-Ride service day would be longer by 2 hours in the morning and 3 hours in the evening on weekdays (and one hour in the morning and one in the evening on Saturdays). This would be required because the fixed route service provided at that times would be “local” rather than “express” and would therefore require paratransit.
- The early morning and later evening service increases would trigger a need for additional supervisor hours at those times, on weekdays as well as Saturdays.
- A Dial-a-Ride dispatcher would be required for 4 additional hours of the day on weekdays, 13 additional hours on Saturdays.
- At least one supervisor and one dispatcher would be required on Sundays as well.

With the increases in span of service, the increases in quantity of service (and therefore drivers and vehicles on the road), and the additional of Sundays, the recommended 2028 service would trigger the need for:

- As many as 123 new supervisor hours per week.

- As many as 44 new Dial-a-Ride dispatcher hours per week.
- A full-time (40 hours per week) customer service staff person.
- A full-time (40 hour per week) maintenance staff person. (In fact, any increase in service at all, let alone an increase to the level of the 2028 recommendation, will trigger the need for an additional maintenance staff person.)

Operations Personnel

Adding more fixed route and Dial-a-Ride service on weekdays would not only require more drivers, it would increase the daytime work load for operations staff such as supervisors and dispatchers.

It would also lengthen the operating work day, adding hours to shifts in the mornings and evenings, as the fixed route and Dial-a-Ride spans of service would get longer.

A major increase in staffing would be required on weekends, when both fixed route and Dial-a-Ride increases would trigger additional weekend shifts for staff and a larger team of staff in total.

In addition, the work of administering, managing and communicating about SMART service will increase as the size and usefulness of the system increases.

Administrative Personnel & Facility

With a nearly three-fold increase in fixed route service (as shown in the table on page 46), and with further increases in DR service, SMART will need to grow its administrative team.

Administrative personnel support passengers, service and operations by providing planning, marketing, financial management, staff management, procurement, and more.

With growth of the administrative team, more space will be needed for their work, both office spaces and flexible space such as training rooms. The SMART administrative facility is currently at capacity so an expansion would be needed in order to provide space for this growth.

Maintenance Personnel

The planned increase in service hours, service miles and peak vehicles will require additional maintenance staff and supporting equipment, supplies and infrastructure.

The staff who maintain SMART vehicles work on all City of Wilsonville vehicles. There are four mechanics who work Monday through Friday in five 8-hour shifts.

These maintenance staff are at capacity today. Hiring and retaining mechanics has been a challenge, similar to the nationwide and local challenge of hiring and retaining transit operators. SMART currently has an

open position listed for a maintenance service worker. If filled, that will help provide currently-needed maintenance capacity.

The service increases described in this Plan would modestly increase the size of the fleet, which on its own would trigger a need for more maintenance staff, and may also trigger increases in required equipment, storage space, supplies and other infrastructure that supports maintenance. However, the service increases described in this Plan would greatly increase mileage and hours per vehicle, which would trigger more frequent preventative and reactionary maintenance per vehicle and would also increase needed maintenance capacity.

Additional maintenance staff would be needed to support the larger fleet and the greater wear-and-tear on the fleet. Those positions would be:

- Maintenance Hostler
- Equipment Mechanic
- Shop Foreperson

These positions cannot be added smoothly, one hour at a time, as service increases are implemented. The need for an additional full- or part-time position may be triggered by a small increase in service.

Regional Customer Service Center

SMART is currently in the planning stages of developing a regional customer service center that will handle customer service requests across multiple south metro transit providers. When the regional customer service center opens at the earliest in 2025, SMART will need to add more staff to operate the customer service center. The service increases recommended for 2028 would also trigger a need for additional customer service staff. The addition will relieve SMART's current dispatchers to focus solely on dial-a-ride scheduling and not general customer service as well.

An associated project, a trip planning tool at rideclackamas.org, will be connected to the regional customer service center and maintained by the same agency partners. It will provide a one-stop-shop for information about service, fares, rules and trip planning for all of the small Clackamas County transit providers.

Maintenance Yard

SMART’s fleet and administrative facility was built in 2012 to match the funding available at the time. It is near the Wilsonville Transit Center.

Planning is underway to improve the circulation for fueling, vehicle storage, and system growth in general. There is enough land to expand bus storage by about 40%, which is sufficient to accommodate the service increases and fixed-route peak fleet increase proposed by this Plan.

In the yard, there are currently three chargers for the electric buses. A fourth charger will be installed in FY 2023.

In addition, the administrative building will need to be evaluated for space and potential expansion as personnel and service expands.

Preliminary design and cost estimates for the maintenance yard expansion are currently in development and expected to be complete in 2023.

Technology and Public Information

SMART staff are satisfied with most of the software used on-board transit vehicles, as well as software for operations and planning. SMART uses the vendor GMV for automatic vehicle locators (AVL), automatic

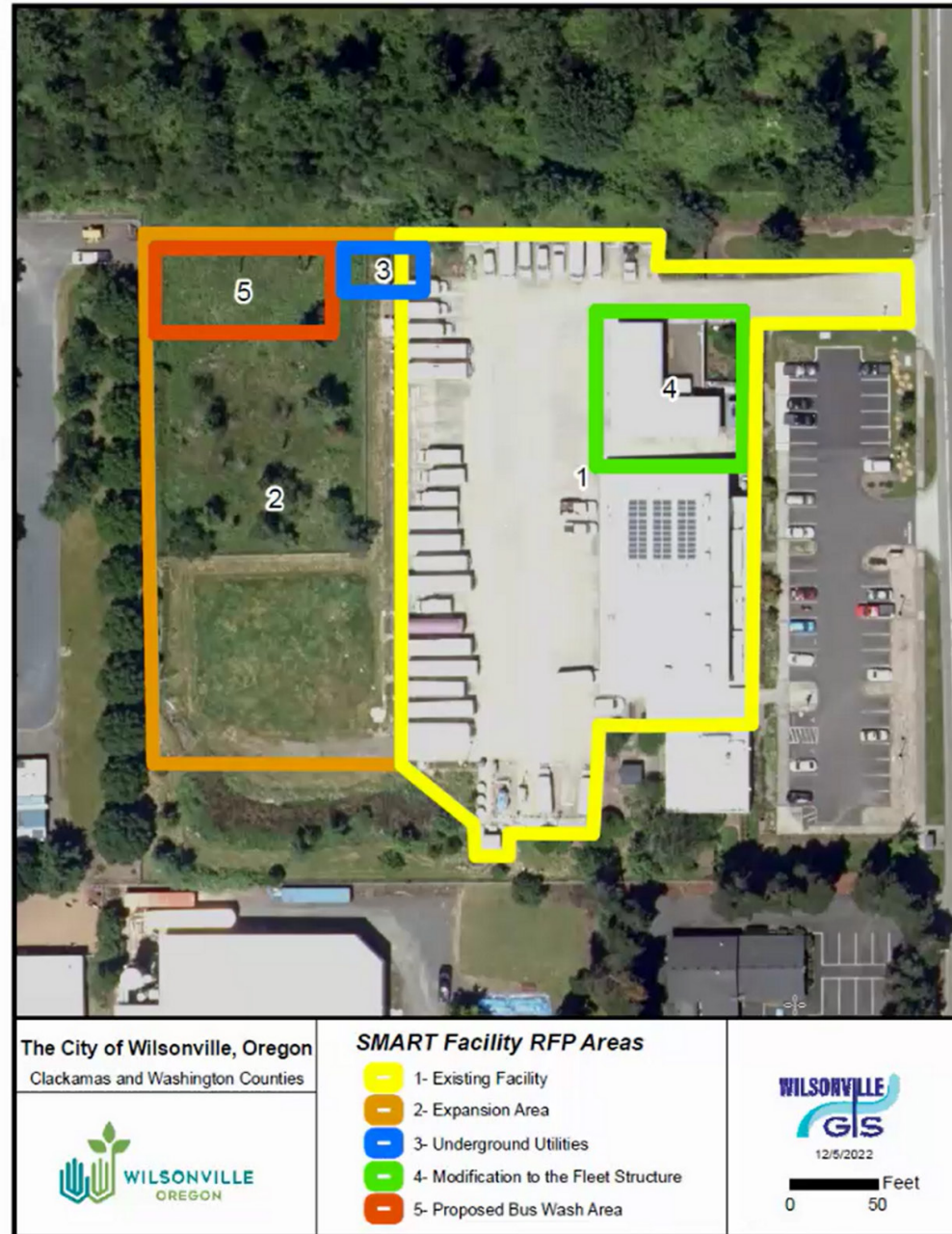


Figure 53: SMART Maintenance Yard Future Site Plan

passenger counters (APC) and mobile data terminals (MDT) on buses. GMV also provides real-time bus arrival information and can be used for booking subscription riders, paratransit dispatching, and driver logs. Staff use Optibus for fixed-route scheduling and mapping.

SMART is ordering digital displays to provide next bus information at the busiest bus stops. SMART also plans to replace its on-board surveillance system.

Real Time Bus Tracking

SMART currently has a bus tracking app, mySMARTbus, which is available to download for free from the Apple Store or Google Play. Real time bus information is also accessible on the mySMARTbus website.

Most smartphone users rely on navigation apps to provide them with information when they travel or move to a new city, such as Google Maps, Apple Maps, Transit App or Moovit. In the future, we recommend that SMART focus on providing reliable open data on its services via GTFS and GTFS-realtime feeds, so that people do not need to discover and download an additional app to find transit information.

Small Terminal Facility in Town Center

The 2028 network in this Plan includes two routes (E and G) that would have one terminus in the Town Center east of I-5 (Route E’s other end would be in Keizer, and Route G’s other end would be in Villebois). Routes A, B, D and F would pass through the Town Center. This area is shown in the excerpted map of the 2028 network in **Figure 54**.

The area marked on the map in **Figure 54** with a “T”, representing the place where Routes E and G would end and other routes would pass through, is approximately at the intersection of Park Place and Courtside Drive. It is a 1.5 mile walk from the existing Transit Center / WES station on the west side of I-5.

Plans for a pedestrian and bicycle bridge over I-5 would shorten the walk from the Town Center to the west side Transit Center to a little less than one mile. SMART also plans to offer a small autonomous shuttle vehicle over the pedestrian bridge, to help those who have difficulty walking make connections between the Town Center and the west side transit center. However, engineering and construction of the pedestrian bridge are unfunded and it may not be built for years to come.

Normally a transit agency would not want

two transit centers so close to one another. However, the severely divided nature of Wilsonville – with I-5 acting as a barrier between the two sides of the city – makes it an unusual case in which transit centers that allow routes to terminate, and passengers to transfer, on either side of the barrier could make the transit network simpler and more reliable.

The purpose of this small east side facility would be to:

- Eliminate the obligatory passage of all buses under I-5 on Wilsonville Road, regardless of whether that movement is useful to passengers, simply because they need to reach the Wilsonville Transit Center. Wilsonville Road at I-5 is extremely congested and causes delay.
- Make the Wilsonville Road route

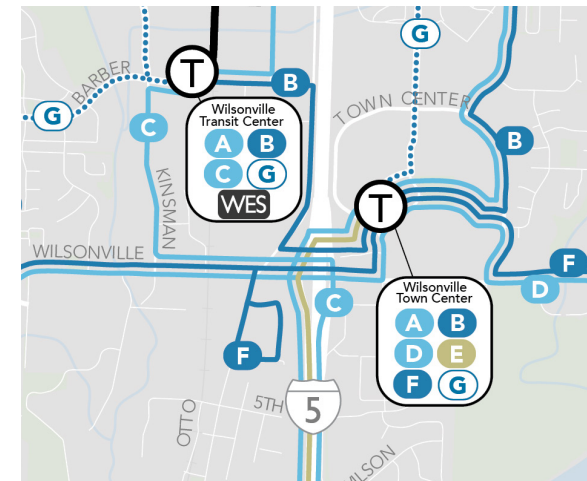


Figure 54: Central Wilsonville excerpt of the 2028 Network Map

(currently called Route 4, or proposed Routes D and F in this Plan) more direct by replacing the time-consuming deviation to the west side Transit Center with a smaller deviation onto Park Place. Wilsonville Road travelers bound for places in north Wilsonville, Tualatin or Tigard could transfer to Routes G or B at the Town Center.

- Provide shelters and seating where passengers can transfer from a local bus trip to a regional bus trip.
- Create a terminus for certain routes where bus drivers could take breaks, and passengers could make transfers.

Site Guidelines

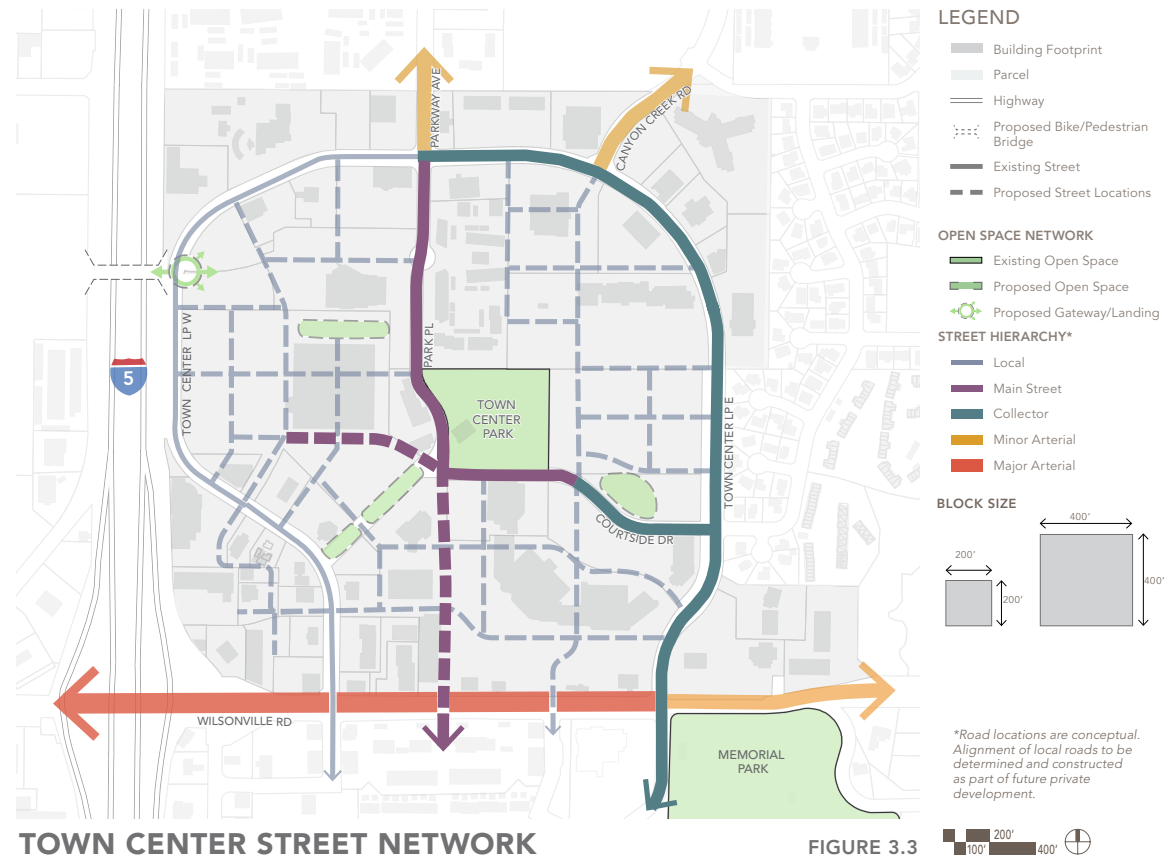
While the precise site can be determined in a later process, the appropriate site should be:

- On or very close to Wilsonville Road, to minimize out-of-direction travel for passengers using the Wilsonville Road bus route.
 - o The ideal, unconstrained location would in fact be on Wilsonville Road itself, between Memorial Drive and Town Center Loop W. This would allow all bus routes to be as linear as possible while still connecting. However, it seems unlikely that the City of Wilsonville would be able to dedicate the necessary amount of road width

to laying-over buses, sidewalk width for passenger shelters, and adjacent land for the operator facility. The second-best location, in terms of route directness, is along Park Place or Courtside Drive, where more land is currently used as surface parking and where curb lines are planned to change

anyway.

- In the middle of the Town Center, to minimize walking distances to people and destinations in every direction.
- Not directly adjacent to I-5 (such as on Town Center Loop W), for two reasons:
 - o To maximize the number of



24 \ CITY OF WILSONVILLE TOWN CENTER PLAN **FIGURE 3.3**
 Figure 55: Planned Street Network from the City of Wilsonville’s Town Center Plan 2021

destinations within walking distance (the freeway acting as both a barrier and an empty area in a bus stop's walkshed) and

- o To avoid duplicating service provided to the west side of I-5. (Once a pedestrian bridge is added over the freeway, the west side of the Town Center will be walking distance from SW Boones Ferry Road).

Many changes to the Town Center are contemplated by the City's Town Center Plan, last updated in 2021 (the planned street network is shown in **Figure 55**). The implementation of that plan should take into account the need for a small bus route terminus in the Center, and the guidelines given above for choosing its precise location.

Two Centers

The names of the existing (west side) and new (east side) transit centers should be carefully considered.

- "Wilsonville Transit Center" and "Wilsonville Town Center" are easy to misread at a glance, and have the same abbreviation.
- "SMART Central Station," is the old name for what is now called the Transit Center, but it is not very "Central."
- The "Station" refers to WES, but the future of WES is uncertain, so a long-lasting name should not depend

on it.

- If there are two places in a city that an ordinary person would describe as "transit centers" then neither should be given the name "Wilsonville Transit Center" as it fails to differentiate them.

For now, in planning work, we suggest distinguishing the two facilities by referring to their respective locations, on the west and east sides of the city.

Where in the Town Center?

The best location for this site would be either on Wilsonville Road, just south of the Town Center, or along the street currently known as Park Place. (The hypothetical site has been marked along Park Place on maps of the 2028 network.) The site would be small, just large enough for a few routes to terminate and for a modular break room.

If the site is off-street, the needed infrastructure and bus movements could be accommodated in a site as small as 10'x32'. If the site is on-street, then linear space in the right-of-way would be used to lay-over (park) buses, while a smaller space outside of the right-of-way would be needed for the modular break room only.

Consideration for how operators would access the locked facility, and whether and how any operator reliefs (with one operator replacing another on the same route/vehicle) would happen there, should

also be a part of the planning and costing process.

Off-Street Facility Near Park Place & Courtside Drive

If the site is off street, along Park Place or Courtside Drive (shown below) then the bus stops on those two streets could mostly remain in place.

The off-street site would need to be configured so that two buses could occupy it at the same time, and pass one another if necessary. The layover spaces for the two buses would be close to the operator break room. The buses would need to be able to turn around on the site, and exit in either direction (since Route G

heads north, and Route E heads south). A drawing of an example bus turn-around and layover area is shown in **Figure 57**, drawn for a site that is approximately 350 feet long (including the driveway at the top of the drawing) by 140 feet wide.

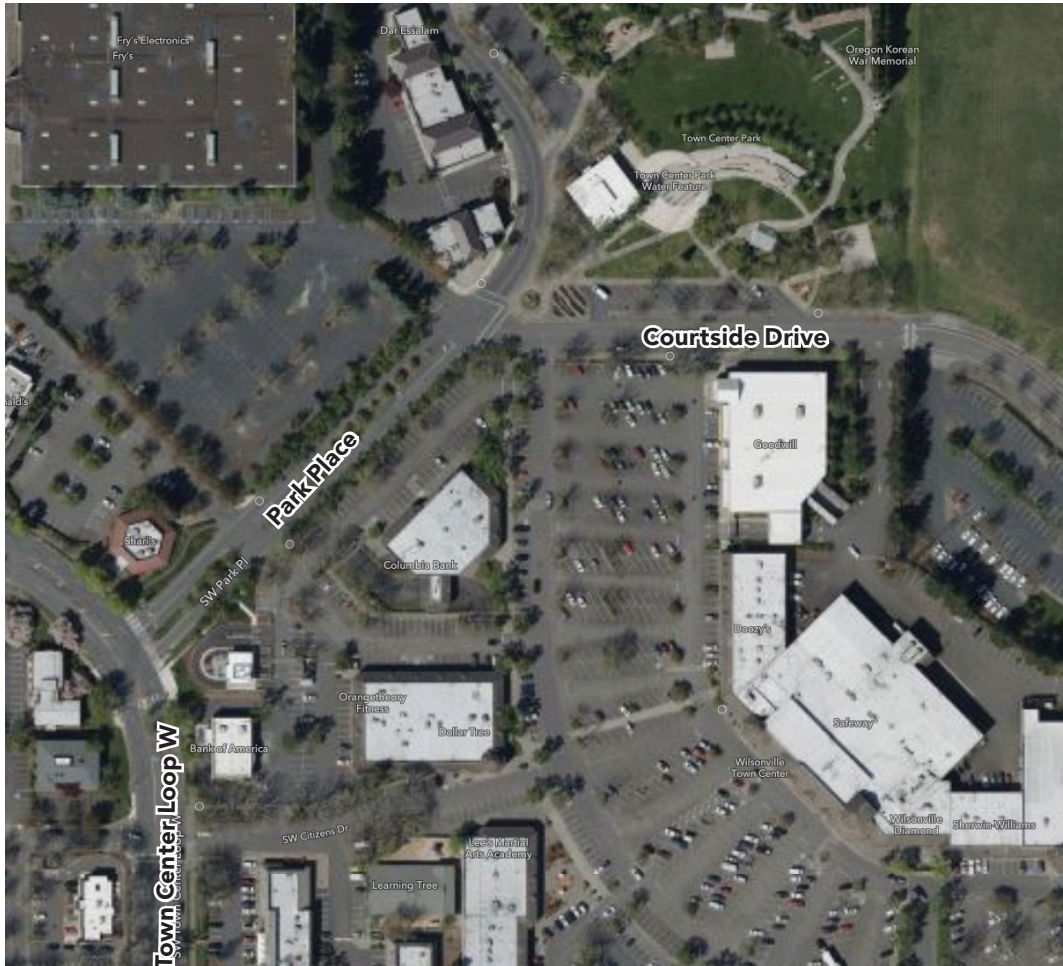


Figure 56: Potential Area for an East Side Terminal Facility in the Town Center

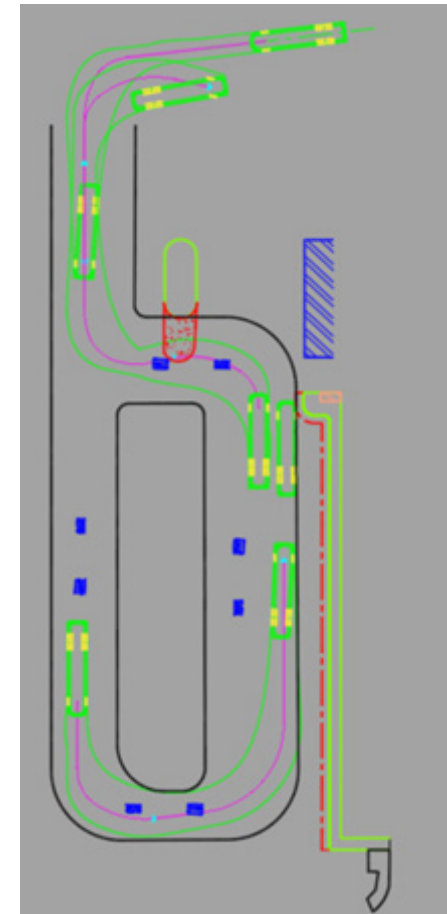


Figure 57: Bus circulation allowing for turn-around and layover in an example off-street terminal site.

For an off-street site in this area, the existing on-street bus stops could be maintained as the places where passengers would board and alight from buses, rather than in the terminal facility itself.

- Route A, B, D and F buses would run through and make stops on Park Place/Courtside Drive, and would not enter the facility at all.
- Route E buses would make stops on Park Place before turning into the facility to terminate and turn around.
- Route G buses could serve new stops on Park Place, close to the intersection with Courtside Drive, before pulling into the facility to terminate and turn around.

While the existing stop locations could be retained, the stops would need to be improved based on SMART’s usual standards for providing amenities at bus stops. We expect that shelters, benches and trash cans would be justified by ridership within a few years of introducing the 2028 network routes.

Ideally, the bus stops on these streets would also be closer to one another, to facilitate easy transfers. However, the current configuration of the area makes this difficult to change:

- The current design of the Park Place/Courtside Drive intersection seems to preclude placing bus stops close to the intersection on Courtside Drive, for

both directions.

- The wide driveway at that same intersection, into the Goodwill parking lot, eliminates a possible location for an eastbound stop.
- The angled parking at Town Center Park eliminates the possibility of stops on Courtside Drive that are closer to Park Place.

In consultation with City planners, SMART should evaluate the best potential sites for this terminal facility, and how bus stops served by buses in both directions (whether on Courtside Drive and Park Place, or other streets) could be moved close together to facilitate easy and intuitive transfers by passengers.

On-Street Facility on Wilsonville Road

If the goal is to make transit as useful as possible to the maximum number of people, then the ideal location for this terminal facility is not off of Park Place or Courtside Drive, but rather on Wilsonville Road itself (shown below in **Figure 58**) between Town Center Loop W and Memorial Drive.

This would make it possible for bus routes to be more linear and faster, especially routes that would *not* terminate in the Town Center.

Routes could stay on Wilsonville Road, rather than deviating to the north to serve Courtside Drive and Park Place. This would save passengers time, and also make the routes more efficient to operate for



Figure 58: Potential Area for an East Side Terminal Facility in the Town Center

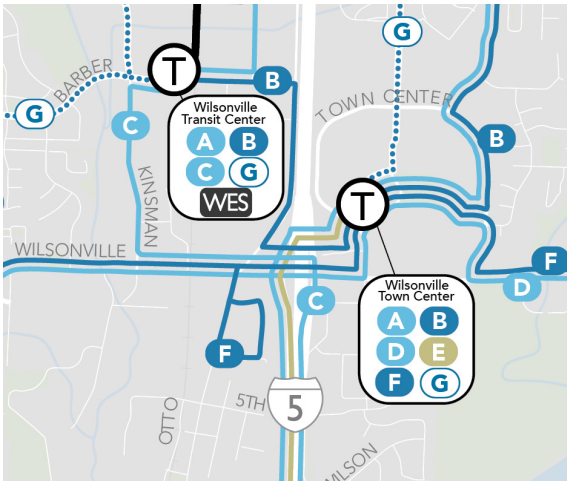


Figure 59: Central Wilsonville Excerpt of the 2028 Network Map

SMART, which in the long run supports higher frequencies.

Buses would still use the local streets of the town center in order to turn around, but the bus stops for terminating routes would be on Wilsonville Road.

In this case, spaces on both sides of Wilsonville Road would be needed for buses to layover (park) while drivers took a break. Improved bus stops for passengers would be needed on the sidewalks near these layover spaces. And, crucially, a nearby break room would be needed for bus operators so that they would have a short walk to and from their break. The break room may need to be on private property, or on City property, but regardless it would not fit in the right-of-way of Wilsonville Road itself.



Figure 60: Example of a Modular Break Room, 10' x 36'

Modular Building

Most of the costs of a terminal facility are likely to arise from changes to the streetscape or traffic controls, rather than from the facility itself. SMART will need to work with City planners and engineers to identify and evaluate possible locations, and estimate costs for both the terminus infrastructure and any needed street or engineering changes.

The facility would not necessarily require substantial construction and could be physically small, but it should be built with basic comforts that allow SMART to use it

for driver meal breaks rather than returning to the Wilsonville Transit Center break room. To that end, it should include:

- A restroom. If vehicles are scheduled with overlapping layover at the Town Center, then two small restrooms may be important for operator comfort and health.
- A small break space, with seating, a table, and access to potable water, electricity and a way to warm food.
- Electricity for air conditioning and heating and plumbing for the

bathroom and potable water for drinking would be needed.

- Wifi connectivity.
- Cleaning, first aid, and bathroom supplies.

Recognizing that the utility hookups have a one-time cost, the building itself could be a modular one to minimize construction costs. An example of the type of modular building that could be used as an operator break site is shown in **Figure 60**.

Modular buildings come in many configurations that can be plumbed with septic underneath. Electricity will require a tie in, and the best precise location for the facility may be influenced by where on the property is the closest junction, pedestal, or transformer box. Inside the modular building, a pre-fab wall for a separate quiet area or field supervisor office could be included.

Approximate costs for this facility would be \$124,000. This includes the modular building, minor sidewalk improvements, moving and re-installation of bus stops, a new bus shelter, minor asphalt striping, and other miscellaneous labors. This would include electrical and water hook-up but not sewer hook up. Additional costs would occur for operation and maintenance of the building.

The actual cost to create this facility will obviously vary greatly depending on where exactly the facility is located, whether

there are property leasing or acquisition costs, how suitable the streetscape is for bus stops and passenger transfers, and whether any traffic engineering changes are needed to allow for new bus movements at intersections.

Using a lower-cost modular building for this facility, rather than building a permanent structure, would be especially prudent if the best terminal site that can be developed by 2028 is not the same as the best site in the long-term Town Center Plan. Rather than wait to offer the service improvements described in this Plan until the Town Center Plan is built out, which could take decades, SMART could move forward with an interim, lower-cost but still comfortable facility.

Future Town Center Redevelopment

Much larger changes to this site example will need to be discussed once the Town Center Plan is implemented at the very least because “Park Place” will become a directly north-south street (shown in dashed purple on the map at right, which is repeated from an earlier page for easy reference).

The example location we have identified on the current, diagonal “Park Place” is planned to become a parkway for walking and cycling only (shown in green on this map).

Many European cities have incorporated

buses into such car-free parkways. The possibility of continuing to run bus service on the diagonal, old “Park Place” should not be dismissed out of hand.

However, the north-south “Park Place” would also be a suitable alignment for the proposed 2028 bus routes, especially if priority is given to buses turning on and off of Wilsonville Road. The new north-south “Park Place” would also be an appropriate site for passenger transfers and the terminal facility.

Finally, as mentioned above, if all of these improvements (layover spaces for buses, shelters and benches for passengers, and an operator break room) could be placed on Wilsonville Road and adjacent property, between Memorial Drive and Town Center Loop W, that would be ideal to support the 2028 Network and maximize potential ridership and access to transit. That idea may be worth considering in the context of the Town Center Plan as well, depending on the scale of change City staff expect will result from this Plan.

The recommendation for a small Town Center terminal facility, and more generally for improved transit service to and through the Town Center, is supportive of the Town Center Plan overall. The two Plans will need to be further harmonized and implemented together.

Transportation Options, Marketing & Information

SMART does more than just operate fixed-route and demand-response transit services. This section describes some of the other programs SMART administers that would continue through the period of this Plan.

SMART supports the statewide “Get There Challenge,” which incentivizes non-single-occupancy-vehicle use. People who use other modes, such as vanpooling, carpooling, cycling or transit, can qualify for rewards, during two weeks in October.

Vanpool

Vanpool options are available to commuters who begin or end their trips in Wilsonville.

SMART offers up to a \$500 per van/per month subsidy to help start more vanpools coming into and out of Wilsonville. Vanpools with at least five passengers in the group can lease a vehicle from Commute with Enterprise, with no long term commitment required.

Safe Routes to Schools (SRTS)

SMART delivers SRTS programming. SRTS is a nation-wide program that encourages and educates children and parents on the

benefits and safety knowledge of walking and rolling (skateboard, bike, scooter, carpool, and school or SMART bus) to and from school. SMART hosts Walk+Roll to School Day events and challenges to promote active transportation.

The SRTS program improves transportation for students, parents, and staff and also reduces the number of driving trips to and from schools to improve air quality and congestion. SMART is working to ensure safe, healthy, and equitable outcomes for all participants including historically marginalized groups.

Travel Training

SMART has partnered with Ride Connection’s RideWise Travel Training Program to provide information and training to support independent public transit use at no cost. The program is aimed at training older adults and people with disabilities to inform them about their transit options, and help participants feel comfortable with using SMART.

The RideWise Program offers personal, one-on-one travel training and group transit trips to help participants learn about fares, trip planning, accessibility, and how to use trip planning apps.

RideConnection also provides specialized shuttle services. One such shuttle serving Clackamas County near West Linn could connect with the proposed Route D at one of multiple places along the route, for

example Legacy Meridian Medical Center or downtown West Linn.

Transit Service Marketing

Marketing and public information are key elements in maintaining and increasing ridership. SMART can provide service that effectively meets passengers’ needs, but if people don’t know it’s there, they won’t use it. As Wilsonville continues to grow, there are also many new residents and employees who may not have previously heard about SMART. There is great opportunity to leverage outreach efforts through coordination with other providers and existing resources. The actions that need to be taken in order to get the information to the intended audience are often very inexpensive and represent a good value in terms of increased ridership.

SMART services are marketed through various efforts, including through printed informational materials, social media, attending community events, and providing information on the SMART website.

Safety and Enforcement

While SMART’s services and facilities are generally safe and without patterns of concerning incidents or behaviors, SMART should continue to pursue trainings, best practices, policies and procedures to maintain a high level of safety on buses, around

bus stops and at SMART facilities.

Special attention should be paid to providing a safe environment for women and young people. A [study](#) completed in 2019 for Metro, in Los Angeles, made the case that “women tend to bear outsized burdens and risks in the course of their daily travel. Being cognizant of how women travel can help ensure SMART provides a welcoming environment at all hours of operation. For example, women tend to take more trips than men, which means there is a greater chance of exposure to travel incidents. They are also more likely to be traveling with children. Service design that helps minimize time, cost, and physical burdens of travel will improve the travel experience for all, not just women and children.

Signage at major transit stops should instruct people in how to make transfers to other transit vehicles or how to walk to major destinations. Such signage reduces the vulnerability of occasional or first-time travelers, and improves their comfort and confidence in their trip. The real-time arrival boards that SMART is planning to install at major bus stops can also help with this.

Additional signage at major transit facilities should instruct people how to seek help, and should be visible, current, and translated into Spanish, at a minimum.

The routes proposed in the 2028 Network extend far into other agencies’ service

areas, and far beyond the immediate reach of Wilsonville Police and other City staff who could help respond to emergencies or provide aid to passengers and operators. SMART, TriMet, Canby Area Transit, Woodburn Transit and Cherriots should have recent agreements in place at shared stop locations indicating the protocol for a safety incident or threat.

SMART has been fortunate not to have experienced an increase in challenging interactions since the pandemic, as have many other urban transit agencies. The 2028 Network is expected to be more useful to a greater number of people, and would naturally therefore bring SMART staff in contact with safety and social challenges that have been uncommon on more specialized, lower-ridership routes in the past. Additional training and support for SMART staff would be appropriate as part of implementing the 2028 Network.

We recommend that SMART review studies published by the Federal Transit Administration and other transit agencies to continue staying informed on current safety strategies. SMART and TriMet staff should routinely discuss and collaborate on safety approaches, especially in the “border” areas where the two agencies’ routes overlap and where they share facilities.

Additional resources for SMART staff are the [Transit Cooperative Research Program Synthesis 121: Transit Agency Practices in Interacting with People Who Are](#)

[Homeless](#), and ongoing training and discussions organizing by the American Public Transit Association (APTA) and Oregon Transit Association.

Human trafficking is a crime in which someone is coerced or forced to work, and this criminal activity is known to be concentrated along the I-5 corridor in Oregon, Washington and California.

SMART signed onto the USDOT’s Initiative against Human Trafficking in 2021 and conducted all-staff training in 2022. Ongoing training and awareness campaigns should be supported. SMART could develop materials for riders on how to identify and report potential risks, and promote an awareness campaign during National Human Trafficking Prevention Month in January.

Other Oregon transit agencies also located along I-5 (such as TriMet, Cherriots, Lane Transit District and Rogue Valley Transit District) may have information to share as well.

6. Financial Context and Project Costs

There are a number of funding sources available for the various types of improvements recommended in this plan. Since many people throughout Oregon enjoy the amenities of the greater Wilsonville region, the City has taken a financial approach that spreads the costs of public transit among property owners, businesses, overnight and day visitors, transportation systems users, and local, state, and federal governments.

The five major available funding categories are federal funding (formula and discretionary grant programs), state funding, regional/local funding, and private funding sources/partnerships. The most relevant and promising sources to fund improvements proposed in this Plan Update for 2023-2028 are described below.

Capital rolling stock, such as vehicles and equipment replacement, can be purchased with a match of up to 85% of the cost by Federal and state sources.

Federal, State, Private/Partnership and Local sources of transit funding are described in turn by the tables on the following pages.

Federal Funding (Discretionary Grant Programs)

The Infrastructure, Investment, and Jobs Act (IIJA), also known as the Bipartisan Infrastructure Law (BIL), was signed in November of 2021 and is the current federal transportation funding bill. The law replaced Fixing America's Surface Transportation Act (FAST) and will add an additional \$550 billion to transportation, broadband, and utility investments across the United States. This funding will be distributed from FY 2022 through FY 2026 via a competitive grant application process. Several of the most relevant funding sources are described in the following sections.

Funding Source	Amount	Match Required	Eligible Projects	Notes
5339(b) Federal Transit Administration Discretionary Buses and Bus Facilities Infrastructure Investment Program	Varies based on year. No current update for 2023.	15% for vehicles; 10% for bus-related equipment and facilities.	<ul style="list-style-type: none"> Capital projects to replace, rehabilitate, purchase, or lease buses, vans, and related equipment. Capital projects to rehabilitate, purchase, construct, or lease bus-related facilities. 	Recipients of 5307 funding may apply directly to the Federal Transit Administration.
5339(c) Federal Transit Administration Discretionary Low or No Emission Program	Varies based on year. No current update for 2023.	15% for vehicles; 10% for bus-related equipment and facilities.	<ul style="list-style-type: none"> Purchasing or leasing low- or no-emission buses. Acquiring low- or no-emission buses with a leased power source. Constructing or leasing facilities and related equipment (including intelligent technology and software) for low- or no-emission buses. Constructing new public transportation facilities to accommodate low- or no-emission buses. Rehabilitating or improving existing public transportation facilities to accommodate low- or no-emission buses. 	Recipients of 5307 funding may apply directly to the Federal Transit Administration.
Rebuilding American Infrastructure with Sustainability and Equity (RAISE)	Minimum award is \$5 million in urban areas. No more than \$345 million per state.	20% excluding local areas.	<ul style="list-style-type: none"> Highway, bridge, or other road projects eligible under title 23, United States Code. Public transportation projects eligible under chapter 53 of title 49, United States Code. Passenger and freight rail transportation projects. Planning, preparation, or design of eligible transportation capital projects. 	Funding is obtained via an application to USDOT.
Safe Streets and Roads for All (SS4A)	FY 2023 Notice of Funding Opportunity to open in spring 2023.	20%.	<ul style="list-style-type: none"> Creating action plan to prevent roadway fatalities and serious injuries. Funding and implementing specific projects previously identified in the action plan. 	Funding is obtained via an application to USDOT.

Figure 61: Federal Discretionary Grant Funding Programs

Funding Source	Amount	Match Required	Eligible Projects	Notes	
STBG Discretionary Bus Replacement Program	Funding varies based on solicitation year. No current update for 2025 – 2027 solicitation.	10.27% for STBG.	<ul style="list-style-type: none"> Vehicle replacements that were purchased through ODOT Public Transportation Division and have ODOT on the title as first security interest holder. 	ODOT receives funds from the FHWA's STBG program, then allocates those funds to agencies via a competitive application process. The funds are transferred into FTA Sections 5310, 5311, or 5307.	
Statewide Transportation Improvement Fund Discretionary	Varies based on Oregon payroll tax revenue. Revenues stream from 5% of Statewide Transportation Improvement Fund.	20% of project's total costs. Eligible for 10% match if project meets certain characteristics.	<ul style="list-style-type: none"> Vehicle purchase. Equipment purchase. Facility purchase. Signs/shelters purchase. Planning. 	<ul style="list-style-type: none"> Project administration. Operating. Preventive maintenance. Mobility management. 	Funding is obtained via an application to a Qualified Entity (TriMet), then to ODOT.
Statewide Transit Network Program	Varies based on Oregon payroll tax revenue. Revenues stream from 4% of Statewide Transportation Improvement Fund and FTA 5311(f).	20% of project's total costs. Eligible for 10% match if project meets certain characteristics. If receiving 5311(f) funds, must provide 50% match for operations projects and 20% match for capital projects and project administration.	<ul style="list-style-type: none"> Vehicle purchase. Equipment purchase. Facility purchase. Signs/shelters purchase. Planning. Project administration. Operating. Preventive maintenance. Mobility management. 		Funding is obtained via an application to ODOT.

Figure 62: State Discretionary Grant Funding Programs (continued on next page)

Funding Source	Amount	Match Required	Eligible Projects	Notes
Transportation and Growth Management (TGM) Program	Varies based on formula that considers number of cities and the population within a region. Common award amounts are \$100,000 to \$250,000.	12%.	<ul style="list-style-type: none"> Planning work leading to local policy decisions. Projects should result in the development of an adoption-ready plan or land use regulation or amendments to an existing plan or land use regulation. 	Funding is obtained via an application to ODOT / Oregon Department of Land Conservation and Development (DLCD).

Partners	Eligible Projects	Notes
Developers / Transportation System Development Charges	<ul style="list-style-type: none"> Infrastructure within or related to new developments which improves transit usefulness and accessibility. 	<p>Opportunity to incorporate desired transit facilities into new developments to improve transit amenities on existing or planned routes.</p> <p>For example, sidewalks and bus pads on Stafford Road would allow SMART to place bus stops to serve residents of new Frog Pond developments.</p>
Local school district	<ul style="list-style-type: none"> Safe Routes to School (SRTS) plans. 	Opportunity to meld transit with SRTS planning and collaborate with the West Linn-Wilsonville school district to expand transit access to students, for example by deviating proposed Route D to serve a new district high school at times that suit the school schedule.

Figure 63: Potential Partnerships or Other Sources of Support

Local Wilsonville Funding

The City of Wilsonville funds transit service chiefly through a local payroll tax and self-employment tax, also called the “transit tax.” It is applied at a rate determined by the City Council and the rate has been set at 0.5% of wages.

The amount of money available is directly linked to the total wages earned each year. According to the Wilsonville 2022-23 Adopted Budget, the wage base growth has grown an average of 4.3% each year since FY 2008-09. The budget for future years has payroll tax receipts set to increase at 2%, a conservative assumption.

Transit Fund Forecast 2023-2028

The table on the following page summarizes the Wilsonville Transit Fund recent Actuals and Forecasts. It shows Revenues (“Resources”) and Requirements (“Expenditures” and “Transfers to other funds”) for the Transit Fund over the past three and coming five fiscal years, through FY 2026-27. This forecast was prepared in the first half of 2022 and is part of the adopted FY 2022-23 budget.

The Transit Fund in Wilsonville is made up of three main revenue sources: the local payroll tax, intergovernmental revenue (which includes grants from Federal and State sources described on previous pages), and charges for services. The local payroll tax and the intergovernmental revenue together represented 99% of the

Funding Source	Amount	Eligible Projects	Notes
Transit payroll and self-employment tax	\$0.005 rate on gross payroll earnings.	<ul style="list-style-type: none"> • Transit capital projects. • Transit operations. 	Funds are raised through payroll taxes paid by businesses in the City.

Figure 64: Wilsonville’s Local Payroll Tax

total funding, approximately 55%, and 44%, respectively.

Statewide Funding

Intergovernmental revenue includes state and federal grants and contracts, especially the Statewide Transportation Improvement Fund (STIF). Enacted by the State Legislature as HB2017 “Keep Oregon Moving,” STIF provides a dedicated source of funding to expand public transportation through a 0.1% statewide payroll tax on employees. The Oregon Department of Transportation disperses STIF funds through formula and competitive grants. Thanks to this funding source, the SMART Transit Fund is keeping up with expenditures and offers potential to expand service in coming years.

In FY 2022-23, SMART forecasted \$1,428,000 from formula funds and an award of \$300,000 in competitive STIF funds. SMART has forecasted \$300,000 annual revenue from competitive grants each year beginning in FY 2023-24, which is lower than actual competitive grant receipts from STIF from 2020-2022. Forecast grants from Federal and other

sources start at \$750,000 in 2022-2023 and grow gradually in future years, but are forecast to be considerably lower than actual received grant amounts in prior years.

TABLE 5 - Transit Fund Forecast

	Actual 2018-19	Actual 2019-20	Budget 2020-21	Proposed 2021-22	Forecast 2022-23	Forecast 2023-24	Forecast 2024-25	Forecast 2025-26	Forecast 2026-27
Beginning fund balance	3,592,929	4,595,626	5,084,730	7,505,702	\$ 7,536,271	\$ 7,263,781	\$ 6,973,383	\$ 6,707,951	\$ 6,422,500
RESOURCES									
Revenues:									
Transit tax	\$ 5,026,869	\$ 4,902,080	\$ 5,050,000	\$ 5,000,000	\$ 5,100,000	\$ 5,202,000	\$ 5,306,040	\$ 5,412,161	\$ 5,520,404
Intergovernmental:									
<i>STIF Formula</i>	-	-	1,800,000	1,400,000	1,428,000	1,456,560	1,485,690	1,515,400	1,545,710
<i>STIF (competitive)</i>	-	-	1,300,000	530,000	300,000	300,000	300,000	300,000	300,000
<i>Grants (#5307, TDM, Ot)</i>	3,381,180	3,463,450	2,196,588	2,034,104	750,000	757,500	765,075	772,726	780,453
Intergovernmental Total	3,381,180	3,463,450	5,296,588	3,964,104	2,478,000	2,514,060	2,550,765	2,588,126	2,626,163
Charges for services	206,399	140,935	170,000	-	-	-	-	-	-
Investment income	106,952	134,123	31,100	75,000	37,681	36,319	34,867	33,540	32,113
Miscellaneous	47,061	177,415	21,000	21,000	15,000	15,000	15,000	15,000	15,000
Revenue Total	\$ 8,768,461	\$ 8,818,003	\$ 10,568,688	\$ 9,060,104	\$ 7,630,681	\$ 7,767,379	\$ 7,906,672	\$ 8,048,826	\$ 8,193,680
REQUIREMENTS									
Expenditures:									
Personnel services	\$ 3,384,655	\$ 3,736,261	\$ 4,106,110	\$ 4,251,900	\$ 4,336,938	\$ 4,467,046	\$ 4,556,387	\$ 4,693,079	\$ 4,786,940
Materials & services	1,732,360	2,416,826	2,268,268	2,118,188	2,120,306	2,122,426	2,124,549	2,126,673	2,128,800
Capital outlay	2,071,020	69,667	2,629,941	1,990,000	787,500	793,125	798,806	804,544	810,340
Expenditures Subtotal	7,188,035	6,222,754	9,004,319	8,360,088	7,244,744	7,382,598	7,479,742	7,624,296	7,726,080
Transfers to other funds:									
General Fund	543,250	567,310	594,370	585,240	599,871	614,868	630,239	645,995	662,145
Building Capital Fund	34,479	58,608	214,493	84,207	58,556	60,312	62,122	63,985	64,625
Transfers Subtotal	577,729	625,918	808,863	669,447	658,427	675,180	692,361	709,980	726,770
Expenditures Total	\$ 7,765,764	\$ 6,848,672	\$ 9,813,182	\$ 9,029,535	\$ 7,903,171	\$ 8,057,777	\$ 8,172,104	\$ 8,334,277	\$ 8,452,850
<i>NET (Revenues less Expenditures)</i>	<i>1,002,697</i>	<i>1,969,331</i>	<i>755,506</i>	<i>30,569</i>	<i>(272,490)</i>	<i>(290,399)</i>	<i>(265,432)</i>	<i>(285,451)</i>	<i>(259,171)</i>
Ending fund balance	\$ 4,595,626	\$ 6,564,957	\$ 5,840,236	\$ 7,536,271	\$ 7,263,781	\$ 6,973,383	\$ 6,707,951	\$ 6,422,500	\$ 6,163,329
Financial Policy Minimum	1,023,403	1,230,617	1,274,876	1,274,100	1,291,500	1,317,900	1,336,200	1,364,000	1,383,200

Figure 65: City of Wilsonville Transit Fund Actuals and Forecasts, FY 2018-19 through FY 2026-27

Service and Capital Projects

This section provides cost estimates for investments that could be made towards implementation of the 2028 recommendation.

This cost estimates are approximate. Actual cost estimates will be developed at the time, based on resolved details related to scheduling of transit services, vehicles and staff, and then-current costs for labor, materials and/or construction.

“Table 1: Service Increases” on page 88 describes potential marginal increases to service frequency, span or capacity as SMART works to implement the full 2028 service vision. This table covers both fixed route (FR) improvements and Dial-a-Ride (Demand Response, DR) improvements. Some DR improvements would be required to complement fixed route improvements, per the American’s with Disabilities Act.

The costs in Table 1 are estimated based on the hours that buses and drivers would be in service, Revenue Hours (RH). Actual labor hours will be longer, and the number of full-time drivers hired to provide this service would not be so simple as the total RH divided by 40 hours per week. Operating costs are calculated based on estimated Revenue Hours of service and the average operating costs for 2022,

which differ for fixed route and demand response. Costs per RH will change over future years.

Table 1 indicates when one or more additional vehicles may be needed, and when overhead positions may need to be added due to a change or increase in service.

“Table 2: Assumed Costs per Service Revenue Hour” on page 90 shows the average costs per Revenue Hour of service which were used to estimate operating costs in Table 1.

“Table 3: Costs for New Overhead Personnel” on page 91 shows the fully-loaded annual 2023 salaries of full-time overhead personnel. These personnel cannot be added incrementally as service is increased incrementally. Service increases may trigger the need for one or more additional personnel, at part- or full-time.

“Table 4: Capital Projects and Investments” on page 92 provides rough estimated 2023 costs for the major capital projects recommended by this Plan.

Table 1: Service Increases	Estimated Change in Annual Operating Costs					Likely Additions of Operations Personnel Hours?				
	2021 RH ¹	2028 RH	Approx. Increase in Annual RH	Direct Operating Cost Estimate ²	Fully-Loaded Operating Cost Estimate	Additional vehicles likely required?	Maintenance? (H=Hostler, M=Mechanic, F=Foreman)	Supervisor?	Dispatcher?	Customer Service?
Changes and improvements to fixed routes, or additions to demand response (DR), to 2028 recommended levels:										
Upgrade 1X to recommended A ³	8200	8800	600	\$64,000	\$111,000					
Upgrade 2X to recommended B	8600	19600	11000	\$1,175,000	\$2,030,000	X	H, M, F	X		X
Upgrade 3X to recommended C	3000	4400	1400	\$150,000	\$258,000		H			X
Upgrade 4 and M to recommended D	12500	25000	12500	\$1,335,000	\$2,306,000	X	H,M,F	X		X
Launch E ³		2500	2500	\$267,000	\$461,000	X	H			X
Upgrade V to recommended F	1800	9600	7800	\$833,000	\$1,439,000	X	H,M,F	X		X
Change 5, 6 & 7 to recommended G	5500	5100	-400	\$(43,000)	\$(74,000)					
Add DR capacity and span on weekdays			4320	\$542,000	\$1,056,000	X	H,M,F	X	X	X
Add DR capacity and span on Saturdays			3300	\$414,000	\$806,000	X	H,M,F	X	X	X

1 RH stands for Revenue Hour. One Revenue Hour represents one hour of a driver and vehicle on the road providing service (or, in the case of Dial-a-Ride, available to respond to requests for service).

2 For information about sources of operating cost estimates, see the table following.

3 For Routes A and E we assume that weekday service would be split equally between SMART and Cherriots (with RH divided equally), but that Saturday and Sunday service would be provided entirely by SMART.

Table 1: Service Increases		Estimated Change in Annual Operating Costs					Likely Additions of Operations Personnel Hours?			
		2021 RH ¹	2028 RH	Approx. Increase in Annual RH	Direct Operating Cost Estimate ²	Fully-Loaded Operating Cost Estimate	Additional vehicles likely required?	Maintenance? (H=Hostler, M=Mechanic, F=Foreman)	Supervisor?	Dispatcher?
Lengthening of spans to 2028 recommended levels:										
Weekdays										
Earlier morning spans by one hour, for FR and DR ⁴			1800	\$248,000	\$436,000		H	X	X	X
Earlier morning spans by two hours, for FR and DR			2800	\$417,000	\$734,000		H,M,F	X	X	X
Later evening spans by one hour, for FR and DR			1800	\$248,000	\$436,000		H	X	X	X
Later evening spans by two hours, for FR and DR			3800	\$525,000	\$921,000		H,M,F	X	X	X
Later evening spans by three hours, for FR and DR			4100	\$611,000	\$1,076,000		H,M,F	X	X	X
Saturdays										
Upgrade Saturday FR service level to recommended	2300	7600	5300	\$566,000	\$978,000		H,M,F	X		X
Upgrade Saturday DR service level to recommended			690	\$87,000	\$169,000		H,M,F	X	X	X

⁴ FR = Fixed Route. DR = Demand Response = SMART Dial-a-Ride

Table 1: Service Increases		Estimated Change in Annual Operating Costs				Likely Additions of Operations Personnel Hours?				
2021 RH ¹	2028 RH	Approx. Increase in Annual RH	Direct Operating Cost Estimate ²	Fully-Loaded Operating Cost Estimate	Additional vehicles likely required?	Maintenance? (H=Hostler, M=Mechanic, F=Foreman)	Supervisor?	Dispatcher?	Customer Service?	
Sundays										
Launch Sunday & Holiday FR service as recommended	3500	3500	\$374,000	\$646,000		H,M,F	X			
Launch Sunday & Holiday DR service as recommended		1100	\$138,000	\$269,000		H,M,F	X	X		
All Recommended Fixed Route Service Increases		35400		\$6,531,800	X	Additions of revenue hours, drivers and operations personnel would also trigger a need for additional administrative staff and space.				
All Recommended Demand Response Service Increases		6100		\$1,492,600	X					
All Recommended Service Increases		41,500		\$8,024,400	X					

Table 2: Assumed Costs per Service Revenue Hour	Direct Operating Cost Per Vehicle Revenue Hour	Fully-Loaded Operating Cost Per Vehicle Revenue Hour
Fixed Route (FR)	\$106.81	\$184.51
Demand Response (DR/Dial-a-Ride)	\$125.51	\$244.32

Estimated operating costs in Table 1 are calculated based on the estimated number of Revenue Hours required to provide the service, and SMART’s estimated operating cost per Revenue Hour which is taken from SMART’s submission of 2022 service data to the National Transit Database. “Direct costs” are only those that relate to the driving and operation of vehicles. “Fully-loaded” costs include vehicle maintenance, facility maintenance and administration.

Table 3: Costs for New Overhead Personnel	Annual Fully-Loaded Salary for a Full-Time Position
Transit Supervisor	\$152,000
Transit Dispatcher	\$112,000
Transit Customer Service	\$95,000
Maintenance Worker/Hostler	\$84,000
Maintenance Equipment Mechanic	\$99,000
Maintenance Shop Foreperson	\$134,000
<p>While the “fully loaded” operating costs in the previous two tables do include the per-hour average cost of supervision, dispatching, customer service and maintenance, those functions cannot in fact be added incrementally. The per-hour average cost of these overhead functions over a year of operations is not the same as the marginal cost of adding these functions each time an hour of service is added. Personnel costs are somewhat “lumpy” and a small increase in service can trigger the need for a new position. The 2023 annual, fully-loaded salaries for new full time positions that may be triggered by service increases as the 2028 network is implemented are therefore given in this table.</p>	

Table 4: Capital Projects and Investments	Approximate 2023 Capital Cost (if known)	Notes
Each additional BEB vehicle (40')	~\$879,000	A 40' heavy-duty Battery Electric Bus (BEB) would be appropriate for SMART's high-ridership routes and any routes that pass by a middle or high school and are subjected to crowding. The State of Oregon provided \$838,000 as an estimated cost for a 40' BEB vehicle in 2020. A more recent estimate is available from the State of Washington negotiated price agreement, which is the price given at left for a 40' BEB vehicle plus 10% for miscellaneous contract and delivery-related costs.
Each additional CNG vehicle (30' - 40')	\$467,000 – \$614,000	CNG vehicles would be appropriate for SMART's high-ridership, long distance routes, as well as for in-town routes, lower ridership routes and Dial-a-Ride. For Dial-a-Ride, CNG vehicles of 26' or less would be needed, but they are not available for reference as part of the Oregon or Washington State negotiated vehicle price agreements. Larger 30' and 40' CNG vehicles are covered by these price agreements. The range of average costs for CNG vehicles under the Washington State price agreement, as of March 2023, is given at left.
Each additional electrical charger	\$80,000	Additional chargers will be needed for each BEB vehicle added to the fleet to deliver the planned 2028 services, plus a spare charger.
Maintenance yard expansion	TBD	Preliminary design and a cost estimate for the yard expansion are underway.
Administrative building	TBD	Growth in service levels, span, and operations and maintenance staff would trigger a need for additional administrative staff. The current administrative facility would need to be expanded to add offices, training rooms, and other shared areas.
Town Center terminal facility (off-street)	\$124,000	The capital costs of starting service to a new Town Center facility would include the purchase price of the break room and rest room (a modular building), a bus shelter and bench, small sidewalk modifications, minor changes to street striping and signage, and electrical/water hook-up of the modular building.
Town Center bus stop improvements	\$120,000	Bus stop, amenity and sidewalk investments to improve bus stops around the new Town Center terminal facility, in particular to make transfers between routes there easier and more accessible.
Stafford Road sidewalks	TBD	Sidewalks will make it possible for SMART to install bus stops on Stafford Road adjacent to new Frog Pond developments. Sidewalks could be constructed by developers or funded for city construction through System Development Charges (SDCs).
Autonomous shuttle and pilot service	TBD	When the pedestrian bridge over I-5, foreseen as part of the Town Center Plan, is funded and constructed, SMART is interested in piloting a small autonomous shuttle over the bridge. This shuttle could be used to connect the existing west side Transit Center and the recommended east side facility, especially for those passengers who have difficulty walking.

Appendix A: Existing Conditions



Prepared by JARRETT WALKER + ASSOCIATES

JULY 2022

1. Executive Summary

The Plan Update Process

This existing conditions report is the first deliverable in SMART's Transit Master Plan (TMP) Update process. The TMP Update will identify transit improvement projects that could be implemented over the next 3-5 years.

Timeline

The TMP project will take place over the next year, with a final TMP document completed in early Summer 2023. **Figure 66** provides a summary of the major stages in this process.

This report represents the end of the first stage. In the next step, SMART will begin an engagement process in late Summer

2022 focused on identifying the priorities of the public and stakeholders for future improvements to its network.

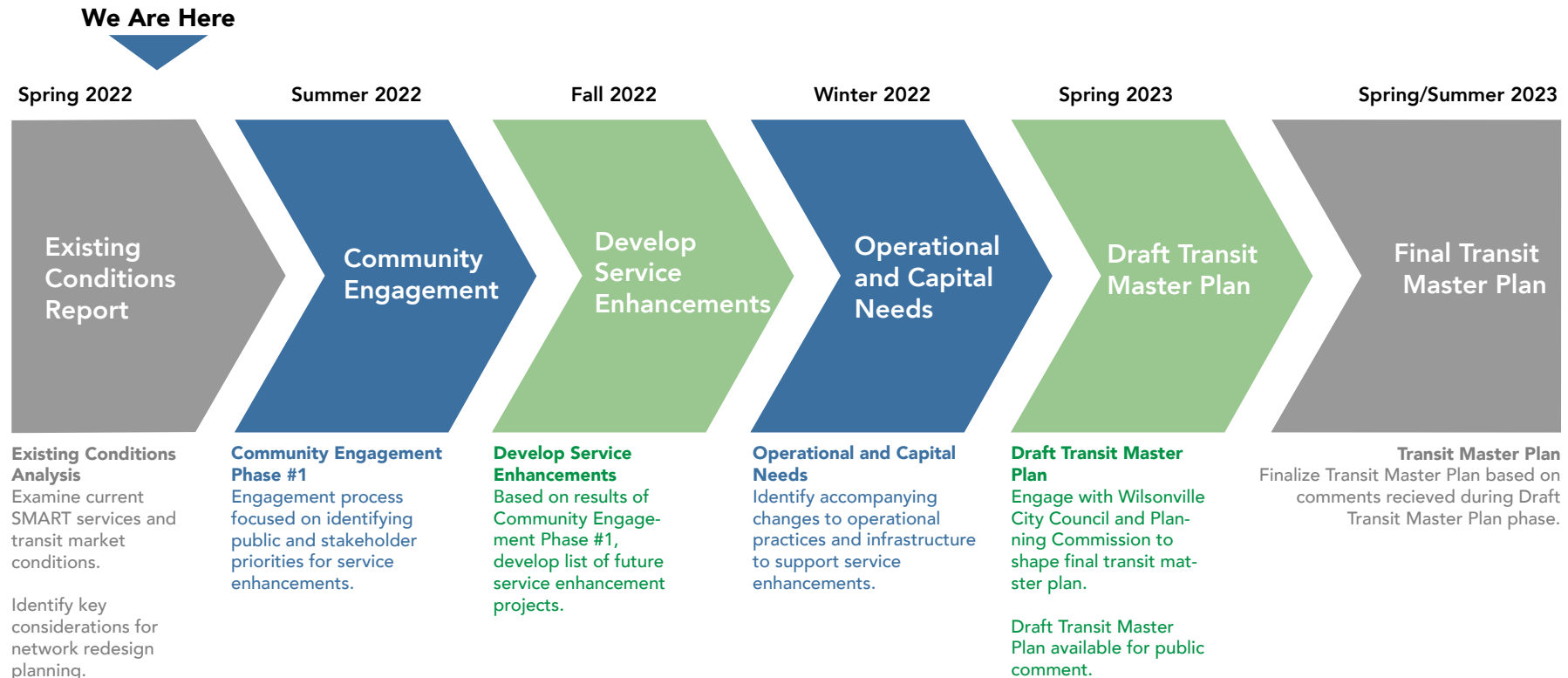


Figure 66: SMART TMP Update Project Timeline

Emerging from Covid-19

The past two years have presented major challenges for all transit agencies. Ridership declined substantially at virtually all US operators, and many were forced to make major service cuts as a result of either financial instability or driver shortage.

SMART has weathered this period better than most. As **Figure 67** shows, while ridership on SMART is lower today than in 2019, the fixed-route network service level has remained steady. This means that SMART’s post-Covid service planning can focus on network improvements, rather than on restoring service cut over the past two years.

While major disruptions in daily life due to public health guidance are now a thing of the past, some of the changes introduced over the last two years are likely to persist, creating new demands and expectations of transit providers. Part of the task of this study is to determine what the community SMART serves wants it to be doing today.

SMART Ridership and Service 2019-2022
Demand-Response and Fixed-Route Service

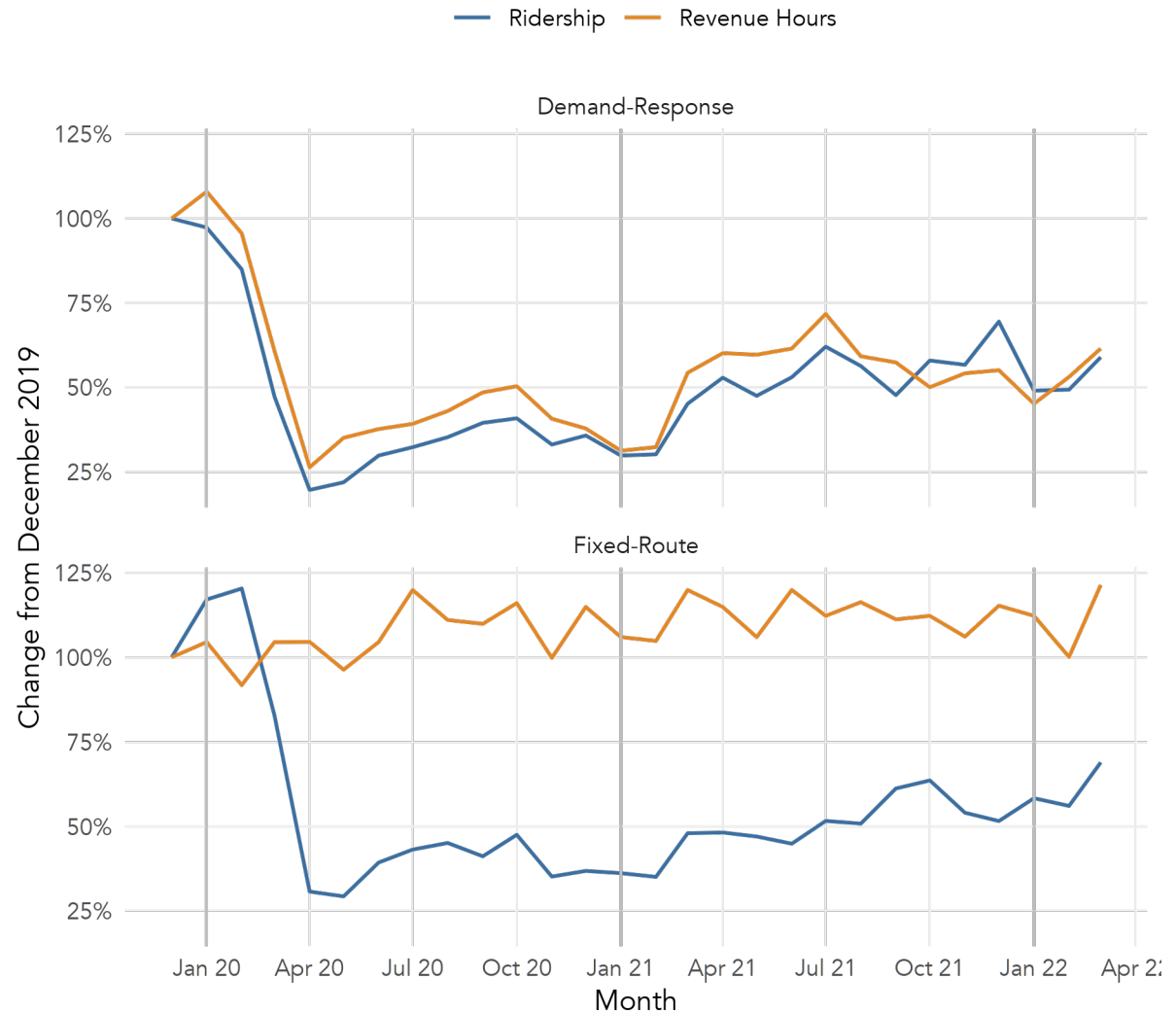


Figure 67: SMART Ridership and Service Level 2019-2022

Ridership or Coverage?

All transit planning processes must contend with the fundamental trade-off between transit services focused on different types of goals.

Transit is asked to serve many different goals by different members of the public, stakeholders or elected officials.

- **A Social Safety Net.** Transit can help meet the needs of people in situations of disadvantage, providing access to essential services and jobs, or alleviating social isolation by offering a basic affordable transportation option.
- **Economic Opportunity.** Transit can give workers access to more jobs; businesses access to more workers; and students more access to education and training.
- **Climate & Environmental Benefits.** By reducing car trips, transit use can reduce air pollution and greenhouse gas emissions. Frequent transit can also support compact development and help conserve land.
- **Congestion Mitigation.** Because buses carry more people than cars, transit use can mitigate traffic congestion by reducing Vehicle Miles Traveled (VMT). This is especially important in communities with significant jobs-housing imbalances and preponderance of long

commutes.

- **Personal Liberty.** By providing people the ability to reach more places than they otherwise would, a transit system can be a tool for personal liberty, empowering people to make choices.
- **Transportation Equity.** Transit can be designed to enhance the mobility minority and lower-income communities who have been denied access to highly useful transit service in the past.
- **Support New Development.** Transit can be an important asset for new residential or employment areas.

Some of these goals are only served if many people use transit. For example, transit can only mitigate congestion and reduce greenhouse gas emissions if many people ride the bus rather than drive. We call such goals “ridership goals” because they are achieved through high ridership.

Goals related to economic opportunity and equitable mobility are also related to the ridership goal, because for the positive outcomes that affordable, useful public transportation can provide to be widespread in the community, many members of the community must actively use the service.

Other goals are served by the simple presence of transit. A bus route through

a neighborhood provides residents insurance against isolation, regardless of whether or not they are able to drive, walk or cycle a long distance. A route may also fulfill political or social goals, for example by getting service close to new development areas. We call these types of goals “coverage goals” because they are achieved in large part by covering geographic areas with service and ensuring that transit is widely available, rather than by high ridership.

Higher Frequency or More Coverage?

Ridership and coverage goals are both justifiable, but they lead to opposing approaches to network design.

When transit is designed to achieve ridership, it tends to focus on providing high-frequency service to busy places. Transit designed to be widely available and achieve high coverage must spread those resources out to serve a wider area, so less service is available for high frequency in busy places.

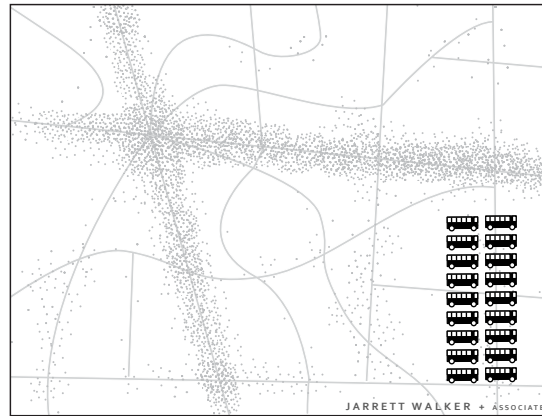
Figure 68 is an illustration of how ridership and coverage goals conflict with one another, due to geometry and geography. In the fictional town at the top of the image, the little dots indicate the presence of people and jobs. The lines indicate roads. Most of the activity is concentrated around a few roads.

A transit agency pursuing only a ridership goal would focus service on the streets where there are large numbers of people. Because service is concentrated onto fewer routes, frequency is high and a bus is always coming soon.

If the city were pursuing only a coverage goal, on the other hand, it would spread out services so that every street had a bus route. In this example, only one or two buses serve each of the green routes, so waiting times for each route would be longer.

While an agency can pursue ridership and provide coverage within the same budget, it cannot do both with the same dollar. The more it does of one, the less it does of the other.

This question is relevant for all kinds of service planning decisions. Should SMART focus its local service resources on its busiest corridors, or spread them out across all of Wilsonville to facilitate access to WES as it does today? When SMART looks to create better regional

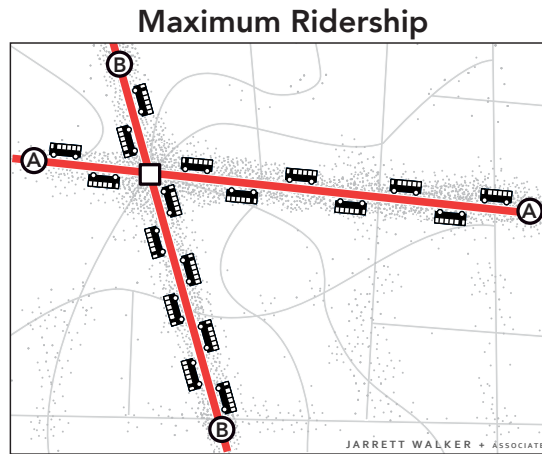


Imagine you are the transit planner for this fictional town.

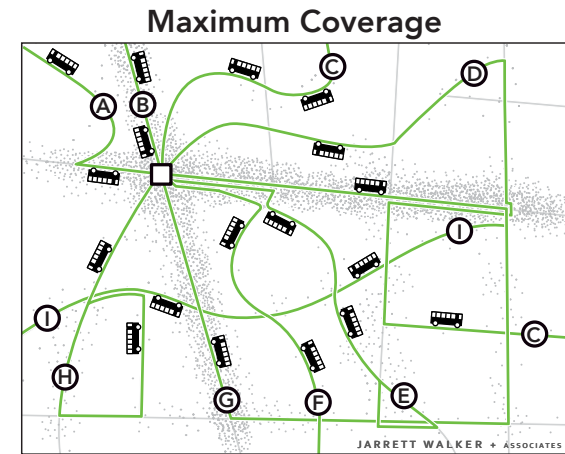
The dots scattered around the map are people and jobs.

The 18 buses are the resources the town has to run transit.

Before you can plan transit routes, you must first decide: What is the purpose of your transit system?



All 18 buses are focused on the busiest area. Waits for service are short but walks to service are longer for people in less populated areas. Frequency and ridership are high, but some places have no service.



The 18 buses are spread around so that there is a route on every street. Everyone lives near a stop, but every route is infrequent, so waits for service are long. Only a few people can bear to wait so long, so ridership is low.

Figure 68: An Illustration of Networks Designed for Ridership or Coverage

connections, should it prioritize creating one or two highly useful routes that run all day, or create a larger number of routes that might only run a few times each day?

About this Document

This document provides an overview of SMART's current state. It covers 5 main topic areas:

- **SMART's Existing Network.** This chapter covers SMART's current network design and performance of its existing services.
- **SMART's Demand-Response Programs.** This chapter describes SMART's demand-response programs, including key performance and ridership data.
- **SMART's Local Market.** This chapter describes the most important demographic and land use factors relevant to future service planning. It also describes some of the future development in Wilsonville that may have the potential to shape transit planning in the future.
- **SMART's Regional Markets.** This chapter describes existing or possible connections SMART could help serve between Wilsonville and neighboring communities.
- **Key Questions for Future Service Planning.** This chapter lays out the most important questions SMART, the public, stakeholders and elected officials will need to consider as the agency seeks to identify service improvement projects.

2. SMART's Existing Network

Existing Network

SMART's provides local bus service within Wilsonville, with nearly all parts of the city within a short walk to a bus stop. SMART also offers several routes that extend outside of Wilsonville to Tualatin, Canby, and Salem. This chapter describes SMART's current network design, ridership and performance, and how the system is more or less useful for different types of trips.

Local Network Structure

SMART's network structure is oriented around the need to serve three important places: Wilsonville Transit Center and the WES station, Wilsonville Town Center east of I-5, and the commercial area along Wilsonville Rd. west of I-5. All routes serve at least one of these places, and some key routes like the 4-Wilsonville Rd and 2X-Tualatin actually serve all three. This offers a high degree of connectivity (most places are connected to one another, and to at least one of these major destinations), but also a degree of complexity due to duplication as multiple routes serve the same places.

Figure 69 shows SMART's existing network in Wilsonville, color-coded by the approximate frequency of each route

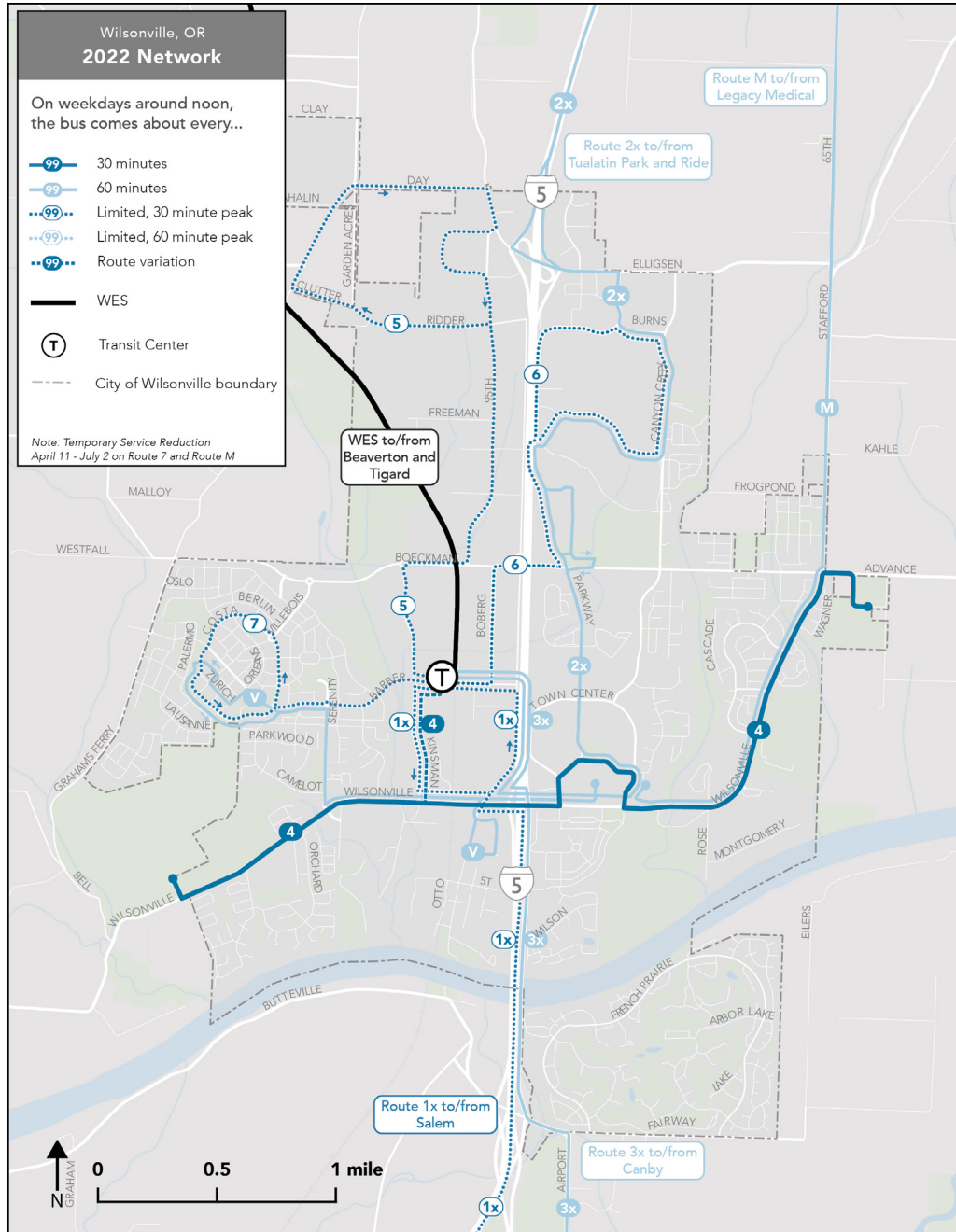


Figure 69: SMART 2022 Transit Network

in the middle of the day. This provides a general sense of the service level available throughout the city.

Frequency and Span of Service

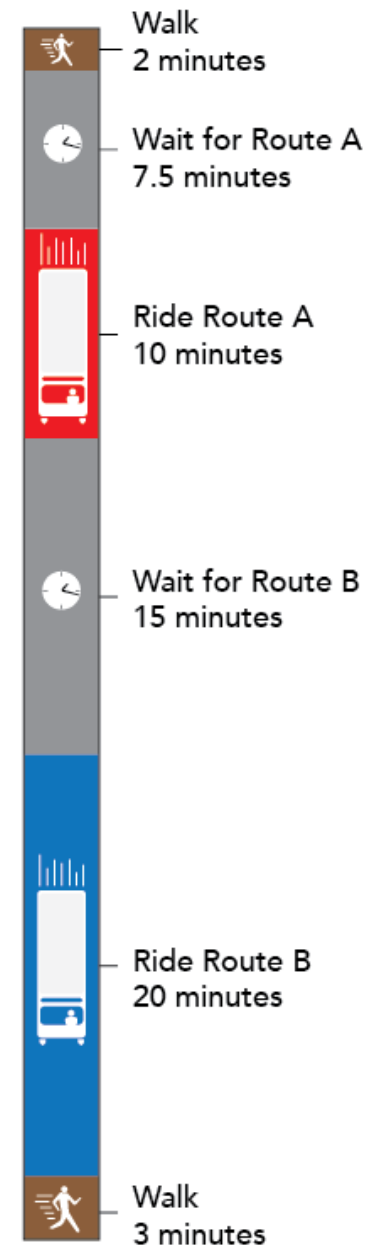
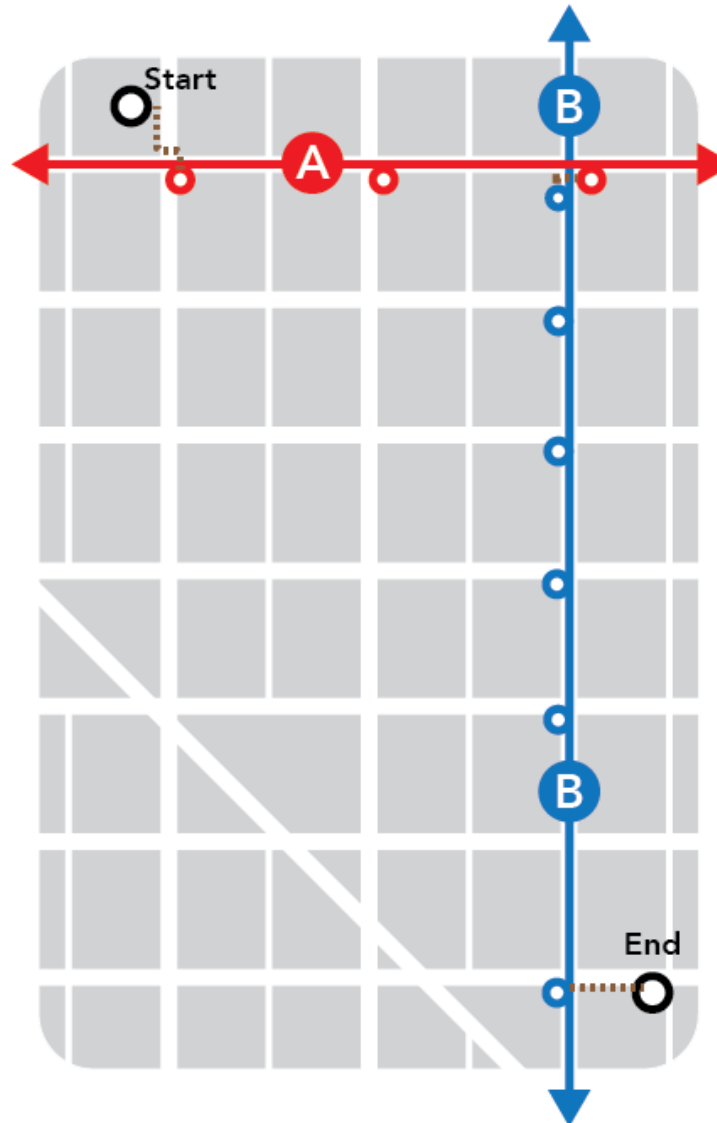
The maps on the following pages introduce a style used throughout this report, in which **route colors represent frequency**.

Red lines are frequent service, with a bus coming every 15 minutes or better, in the midday on weekdays. Purple lines run about every 20 minutes. Dark blue lines run about every 21-30 minutes and light blue lines are the least frequent, with more than 30 minutes between buses. Some bus routes offer better frequency than indicated on this map during weekday rush hours, and some offer poorer frequency at night and on weekends.

Frequency is important, because it determines how long you are likely to wait for service, and thus how long your overall trip will be. The diagram on this page illustrates how frequency and waiting time are two of the largest elements of travel time, especially for short trips like those made on SMART's local routes.

Today, SMART's most frequent service is Line 4 along Wilsonville Rd. This route serves some of the most important retail destinations in the city, as well as high-density housing along Wilsonville Rd

What's taking so long? *Elements of Transit Travel Time*



Frequency by Time of Day

east of Wilsonville Town Center. At times when WES is running, Line 4 deviates off of Wilsonville Rd to serve the transit center.

All other routes in the network run either less consistent schedules oriented towards peak commuting, or lower frequencies that are relatively consistent all day. For example, the Villebois Shuttle runs only in the middle of the day around once per hour, while the 1X service to Salem runs about every 30 minutes during rush hours, but with longer 90-120 minute gaps between trips at midday.

The maps shown in **Figure 70** compare the frequency available throughout SMART's network at 12 p.m. and 5 p.m. SMART's network operates at low frequency, with most routes coming every 30 or 60 minutes during the middle of the day. SMART's most frequent service is Route 4-Wilsonville Rd, which runs every 30 minutes all day long. The western half of the route between Wilsonville Transit Center and Graham Oaks runs more frequently (every 15 minutes) after 4 p.m. on weekdays, with added service making connections with every WES train.

The rest of the network operates at low frequency during the middle of the day. Routes 1X, 2X, 3X and the Villebois Shuttle all run hourly throughout the midday, with some longer gaps between trips on the regional routes.

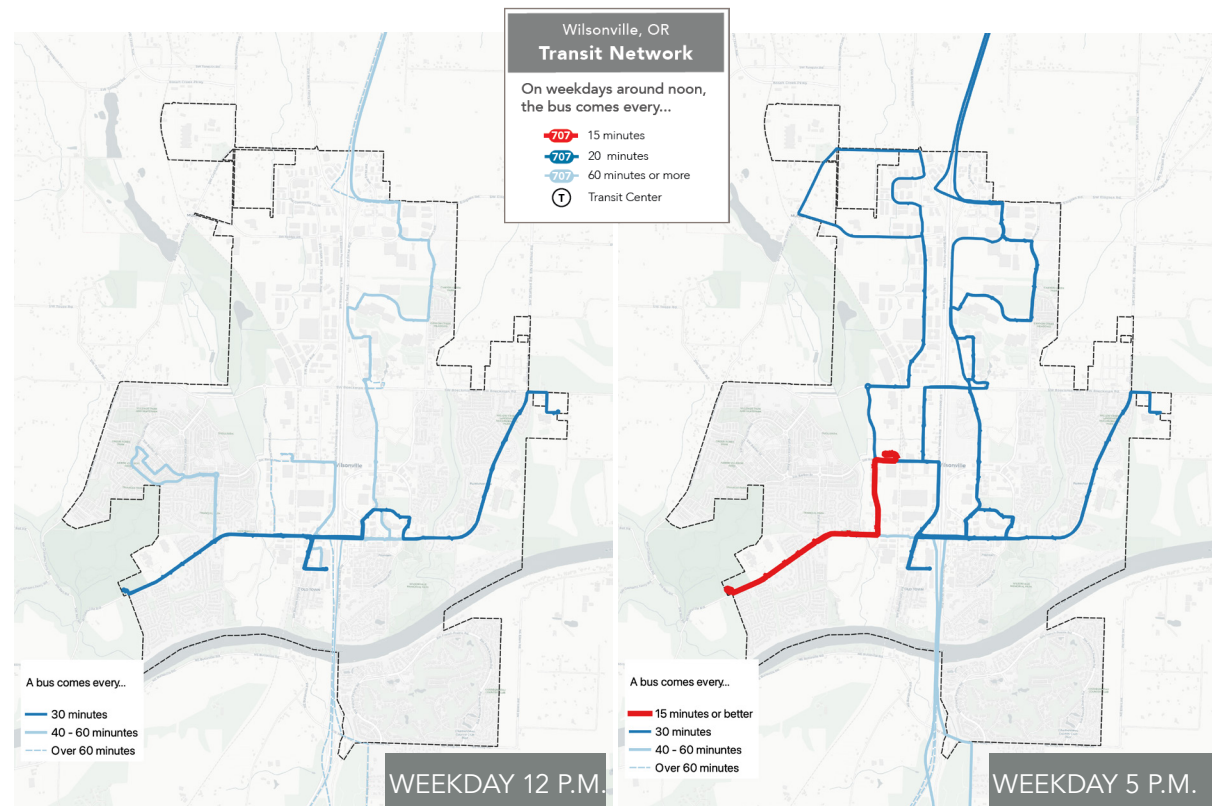


Figure 70: SMART frequency by time of day, weekdays

During the rush hours, most routes run more frequently, often connecting with every WES train at Wilsonville Transit Center. Two routes, 5-95th Ave and 6-Canyon Creek, run every 30 minutes during rush hour only.

Timed Connections During Rush Hours

To offset the lack of frequency in the network, the system relies on a timed transfer at the west side Wilsonville Transit Center (near the TriMet WES station). A timed transfer describes a schedule design where multiple routes are scheduled to arrive and depart a single point at the same time, providing for an easy transfer that reduces waiting time.

At Wilsonville Transit Center, passengers can connect between each of SMART's bus routes, as well as WES commuter rail. This makes a WES trip with an origin or destination in Wilsonville away from the transit center much faster. For example, if a person arrives in Wilsonville on the 4:47 WES trip, they can continue a trip via Route 5-95th Ave with just a 6 minute wait. Since Route 5 runs every 30 minutes, if this connection were not timed, the average wait would be 15 minutes.

WES, as well as SMART Routes 5 and 6, run only during rush hours. This means that Wilsonville Transit Center is much less useful as a connection point during other periods, because fewer places are reachable with a trip involving a transfer there.

During the midday, Routes 1X, 2X and 3X are all running, terminating at Wilsonville Transit Center. Route 4 does not serve the transit center at midday, so connections

between regional and local routes are more limited. Route 2X and 3X stop near Wilsonville Rd and Boones Ferry Rd, so a connection to Route 4 is at least possible, although connection times are not coordinated, so waiting times are unreliable.

Mismatched Frequencies

WES runs every 45 minutes, while SMART routes run every 30 to every 60 minutes.

The WES also operates with a 45 minute frequency, while SMART frequencies vary between 30 and 60 minutes. This makes it harder to create a reliable schedule for bus routes timed with WES because the frequency doesn't match, so there are cases where a passenger arrives just on time to catch the WES, and other cases where the passenger has to wait as long as 30 minutes until the next train arrives or departures.

Since SMART routes are meeting with the WES at Wilsonville Transit Center, this also creates an opportunity for other potential connections to offset the low frequencies. However since this is built around rush hours and the WES 45 min frequency, it's not a reliable connection, specially during the midday.

The time cycle of a few routes gives them enough time to connect to other regional routes outside Wilsonville Transit Center:

- Route 1X connects to several Cherriots lines at Salem Transit Center.
- Route 2X connects with TriMet line 76 and 96 at Tualatin Park and Ride.
- Route 3X connects to route CAT 99 at Canby Transit Center.

The following tables describe SMART bus frequencies for 2022. They show route frequency during each hour of the day (using color), across a weekday and Saturday,

In general the better frequencies happen at rush hours, that are visible in the two rough bands of dark blue running vertically through the chart. The most frequent routes offer a 30 minute service (with the exception of Route 4 that runs an additional bus from Wilsonville Transit Center to Meridian Creek Middle School direction to meet with WES) until about 8 p.m. on weeknights, and 6 p.m. on Saturdays.

Span and Frequency

Figure 71 below shows the frequency of each of SMART's routes during each hour of the day. In general, SMART routes run more frequently during the peak periods than during the middle of the day; only Route 4-Wilsonville Rd runs at the same frequency (30 minutes) all day long.

SMART's network operates from approximately 4 a.m. until about 8 pm on weekdays.

Weekends

Offering long spans of service throughout the day and the whole week, in places where large numbers of people can use transit, is key to attracting high ridership

over time. This allows many people to choose to rely on transit, forgoing an owned or hired car and choosing to live or work in places where they can take advantage of transit. If the transit network is only there during certain hours or certain days, few people will make the choices and build the habits that turn them into consistent transit riders.

Just three SMART routes run on weekends, and only on Saturdays: Route 2X, 4 and the V Villebois Shuttle. 2X and 4 run approximately every 30 minutes on Saturdays, a service level comparable to that of the midday pattern. However, their span of service is shorter: Route 4 runs approximately 5 a.m. to 8 p.m. on weekdays,

compared to just 7 a.m. to 6 p.m. on Saturdays.

Route V operates a much more limited Saturday schedule - just a few trips spread throughout the day to facilitate a shopping trip.

SMART 2022 Route Frequencies

The bus comes about every:

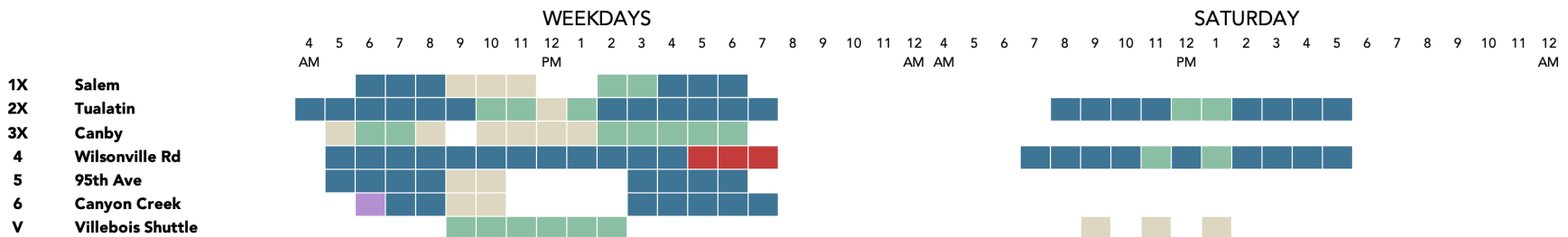


Figure 71: SMART Route Frequency by Time of Day

Weekend Service

As **Figure 72** at right shows, on weekends Routes 2X and 4 provide minimal service close to most of the high-density residential areas of Wilsonville and key retail centers. No service is available in the northwest part of the city, but this area is predominantly occupied by industrial and commercial land uses that are less active during weekends. Still, any trips by transit to these destinations are not possible on weekends.

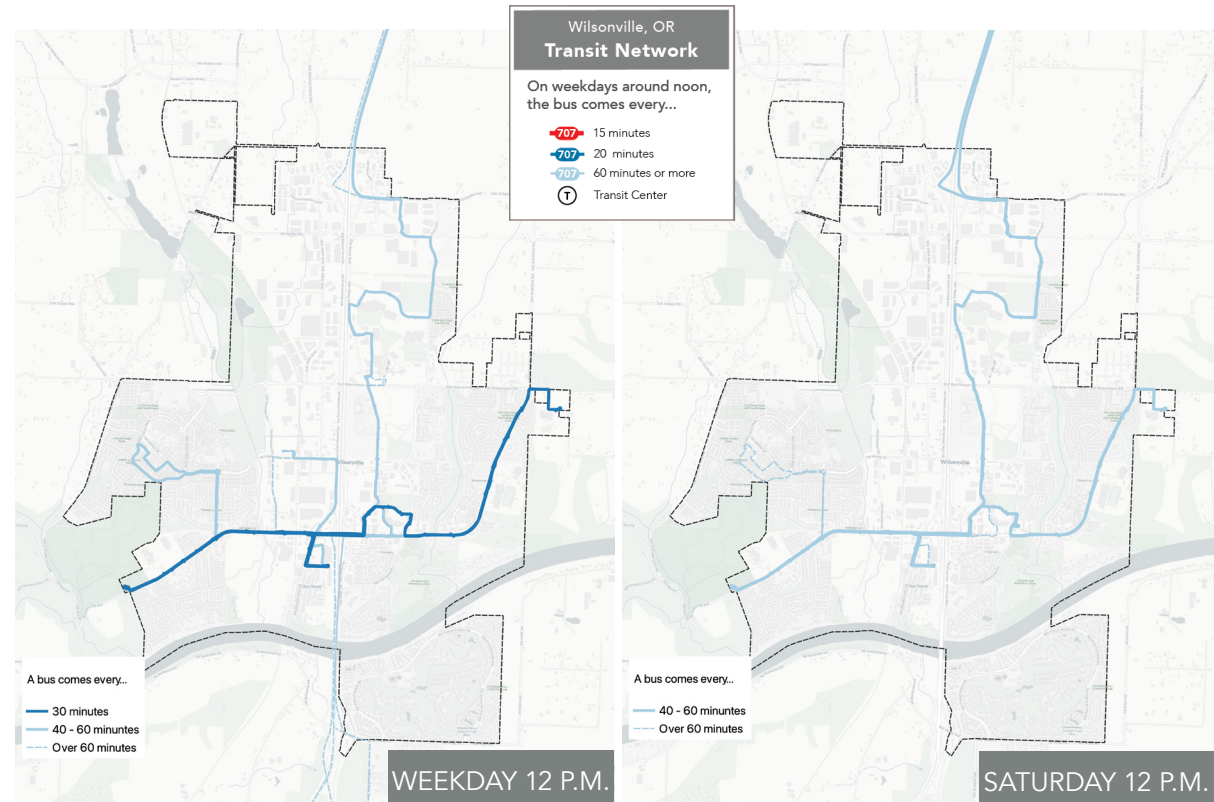


Figure 72: SMART frequency, weekdays and Saturdays

Route	Weekdays	Saturdays
1X		No service.
2X		
3X		No service.
4		
5		No service.
6		No service.
V		

SMART's Regional Connections

SMART's services connect with a range of other routes operated by nearby transit agencies. **Figure 73** provides an overview of the available connections to nearby communities. Each line is colored by frequency: red lines run every 15 minutes or better, blue lines run about every 30 minutes, and light blue lines run approximately every 60 minutes.

We can think about regional connections as serving three main directional groups of destinations:

- To the north, Route 2X and WES to Tualatin plug into a network serving Tigard, Sherwood, Beaverton, Hillsboro, Yamhill County, and Downtown Portland.
- To the east, Route 3X service to Canby connects through to other routes that reach Molalla, Oregon City, Milwaukie, Portland's east side, and other communities in east Multnomah County.
- To the south, Route 1X connects south to Salem and the various destinations served by Cherriots' local and regional services.

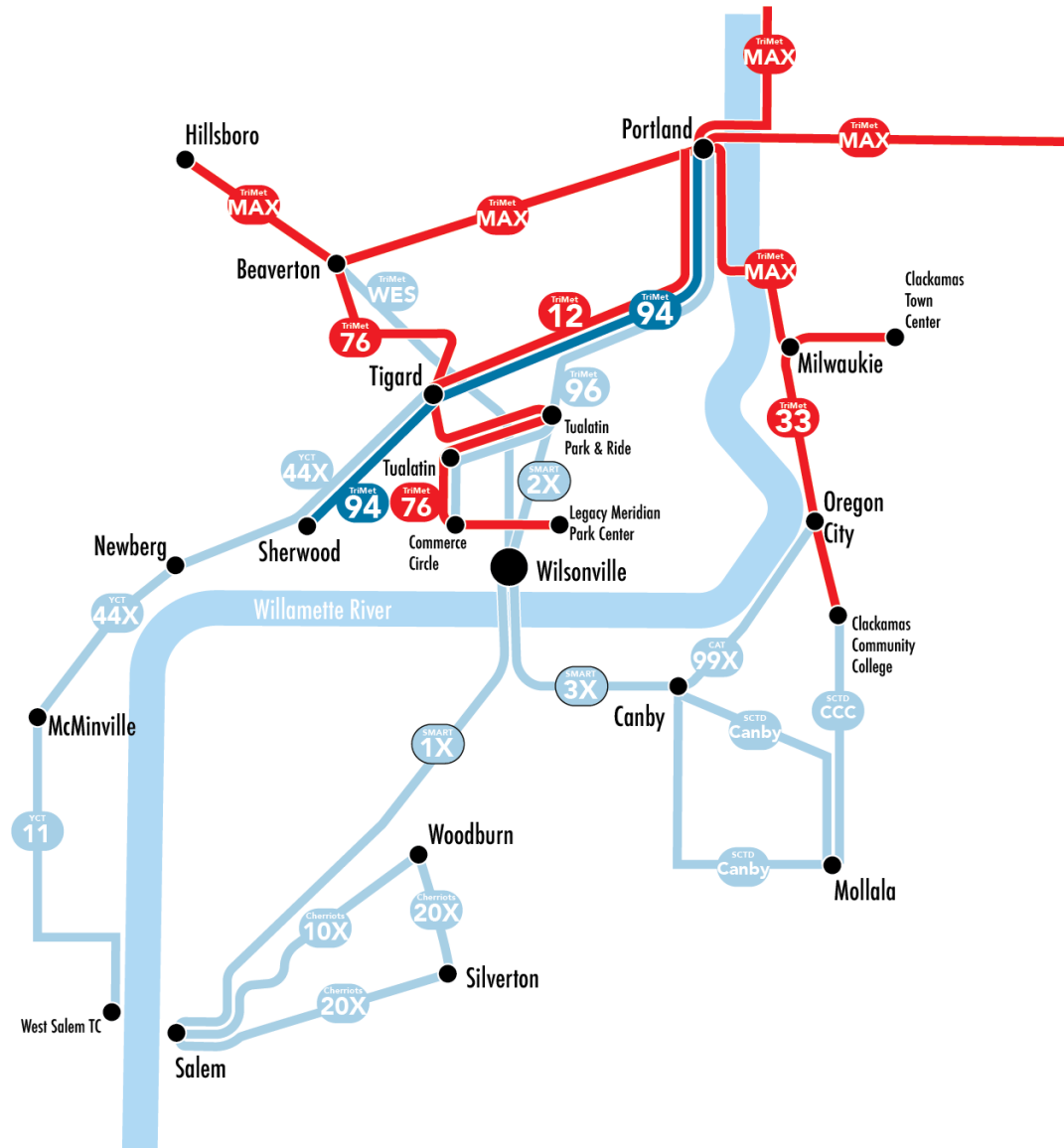


Figure 73: Regional Network (Multiple Transit Agencies)

Who is near service?

Most main streets in Wilsonville have fixed route bus service on them (while all of Wilsonville is served by Dial-a-Ride).

Figure 74 shows what percentage of people and jobs are within a 1/2-mile walk of fixed route service at noon on a weekday, and how frequently that service runs. 69% of residents and jobs are within half mile of a bus stop. About 36% of residents in Wilsonville are near Route 4

(the only route running every 30 minutes at midday). About 33% are near other routes running at worse frequencies.

Figure 75 shows the same data for the morning rush hour. During this period, most of the network runs every 30 minutes, so the majority of people who are within 1/2-mile of service are near a route that comes every half hour. The total number of people near service is a little higher during

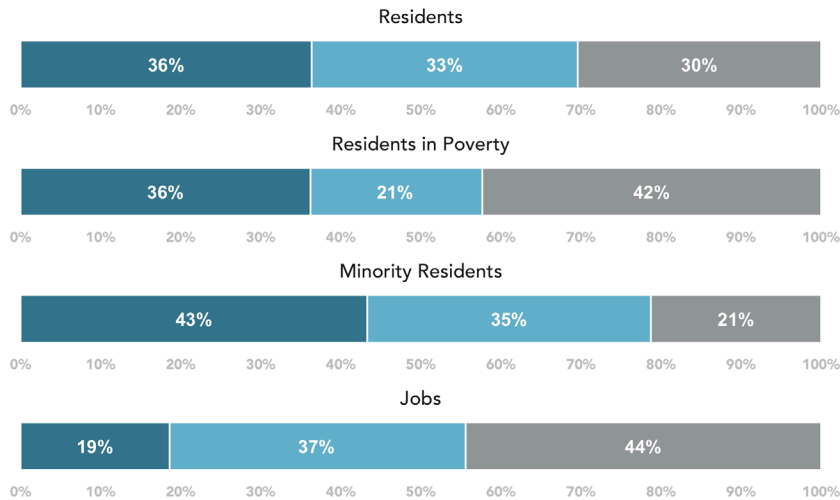
rush hour than at midday due to rush-hour-only services. 73% of residents are near service at 7:00 a.m., compared to 69% at 12:00 p.m.

Wilsonville's current standard for proximity to service is that 85% of residents should be within 1/3 mile of a fixed route bus stop. This standard is set in the Title VI policy, which was last updated in 2020. This is an unrealistic standard, especially

SMART 2022 - Weekday at noon

What percentage of the SMART service area is near transit that comes every

30 minutes 60 minutes Not within 1/2 mile



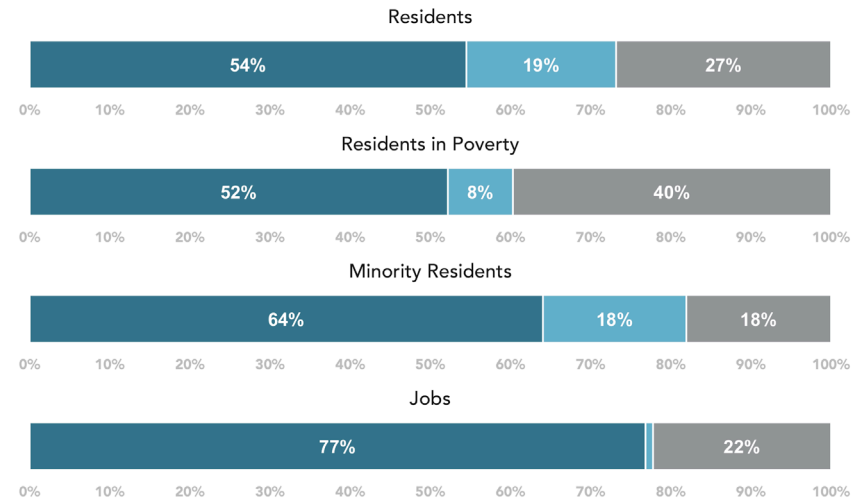
Note: Proximity is measured as being located within 1/2 mile of a bus stop.

Figure 74: Proximity to Transit Service at 12 p.m. on weekdays

SMART 2022 - Weekday at 7:00 am

What percentage of the SMART service area is near transit that comes every

30 minutes 60 minutes Not within 1/2 mile



Note: Proximity is measured as being located within 1/2 mile of a bus stop.

Figure 75: Proximity to Transit Service at 5 p.m. on weekdays

given Wilsonville's low street connectivity, which means that many residents live far down minor streets that don't go through. Without running fixed route buses deep into neighborhoods and turning them around in cul-de-sacs, 85% within 1/3 mile is not be achievable. However, this standard can be reset in 2023 when the SMART Title VI policy is updated.

The map at right shows where people are close to fixed route transit. Each dot represents 10 residents; blue dots are residents within a 1/2 mile walk of service, while red dots are residents further than 1/2 mile from transit. The location of the dots is based on Census population estimates at the block level.

- **A** Industrial and food supplier (Sysco) facilities too far from a bus stop due to the lack of street connectivity. Located South of SW Burns Way east of I5.
- **B** Apartments and houses along Canyon Creek.
- **C** High income 1 and 2 bedroom residential apartment buildings, with additional senior living buildings. This is one of the biggest clusters of Dial a Ride trip origins in the city.
- **D** Low density housing surrounding the Charbonneau Golf Club.
- Some people are not close to transit in the south east part of Wilsonville, where developments are far from a main street.

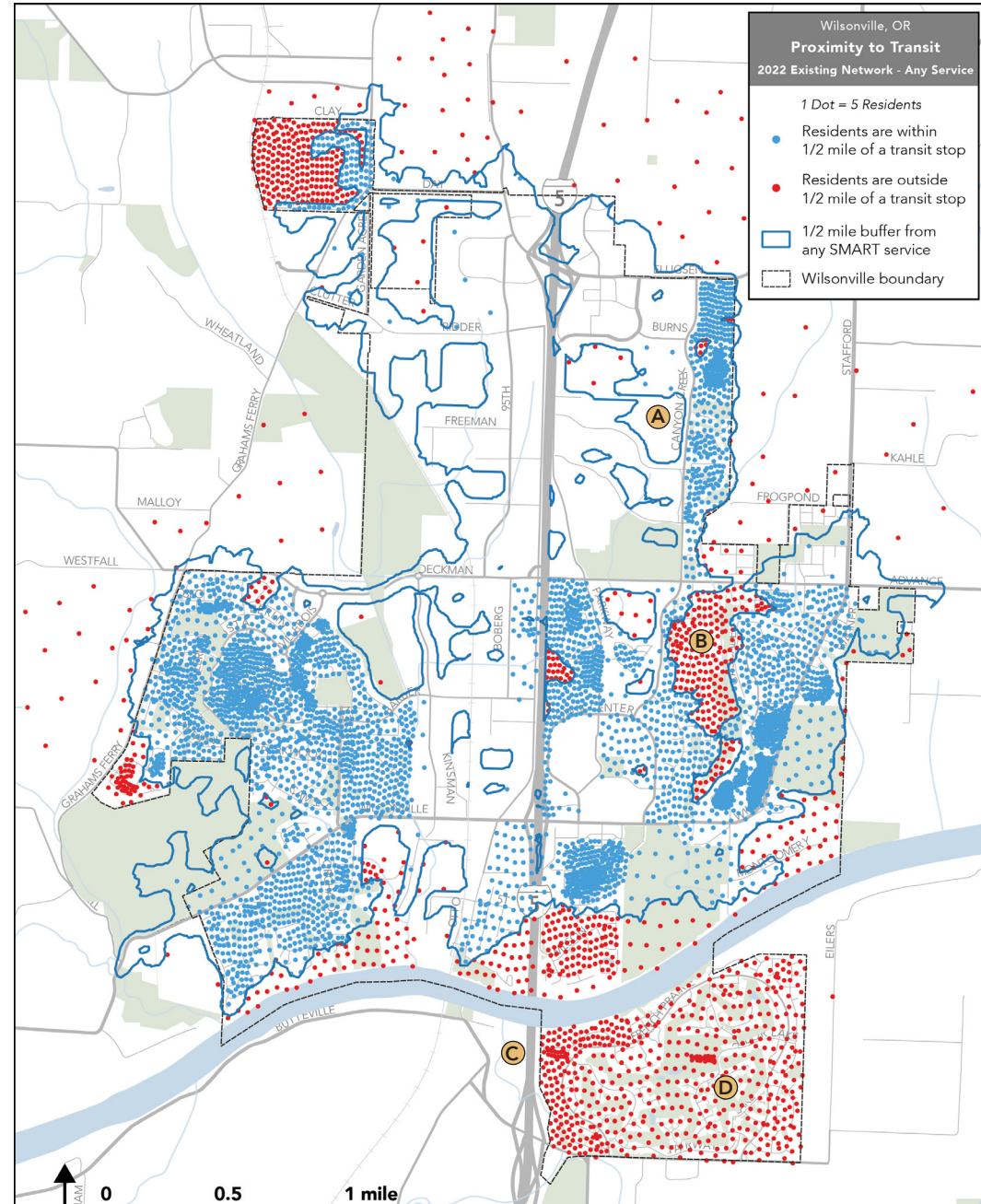


Figure 76: Residential Proximity to Transit

Existing Ridership

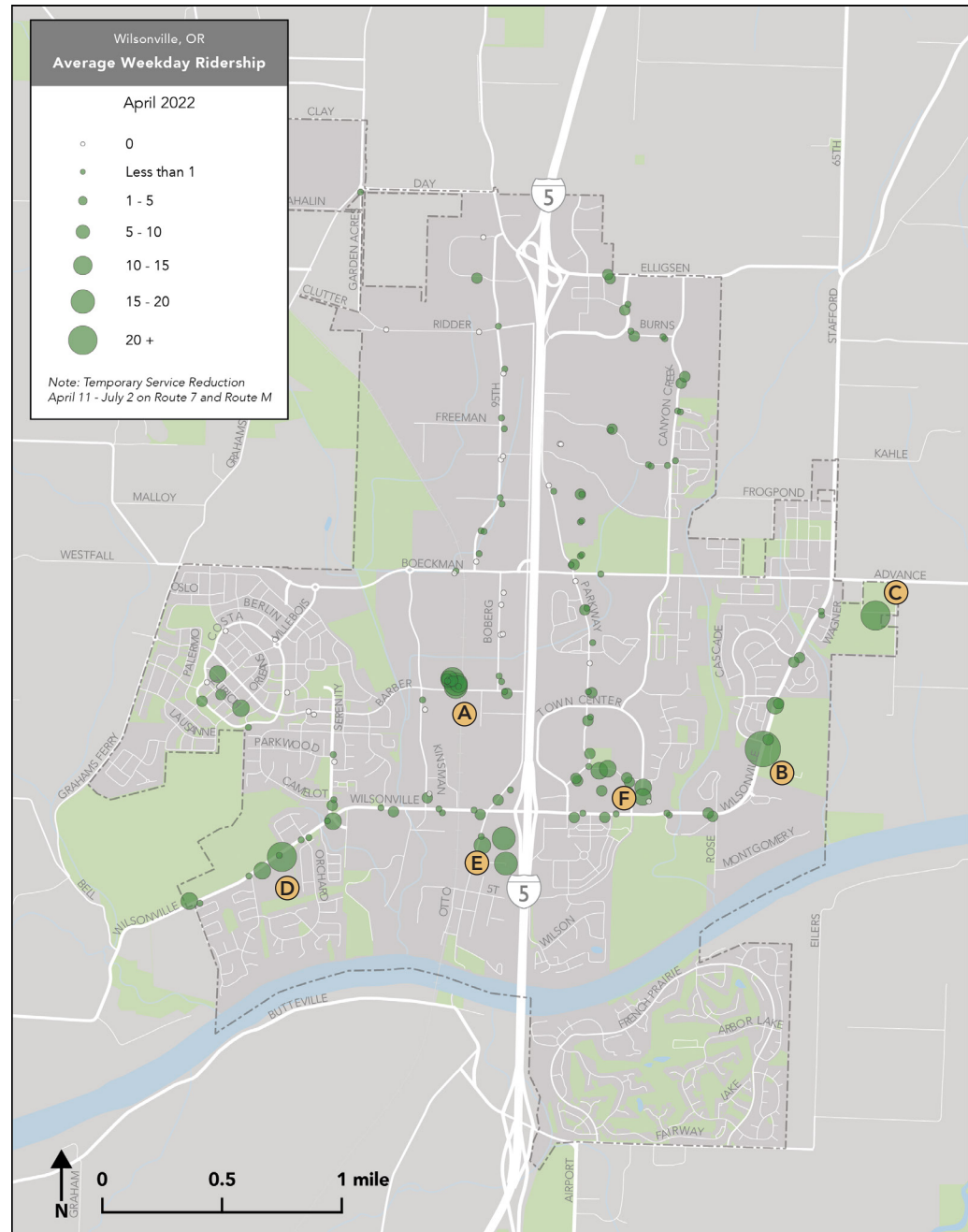


Figure 77: SMART Ridership by Stop, April 2022

Ridership by Time of Day

Ridership is one of the most important measures of transit performance. It can be visualized by mapping boardings at transit stops, as shown at right. When a stop is served by multiple routes, the boardings for all routes are summed for that stop.

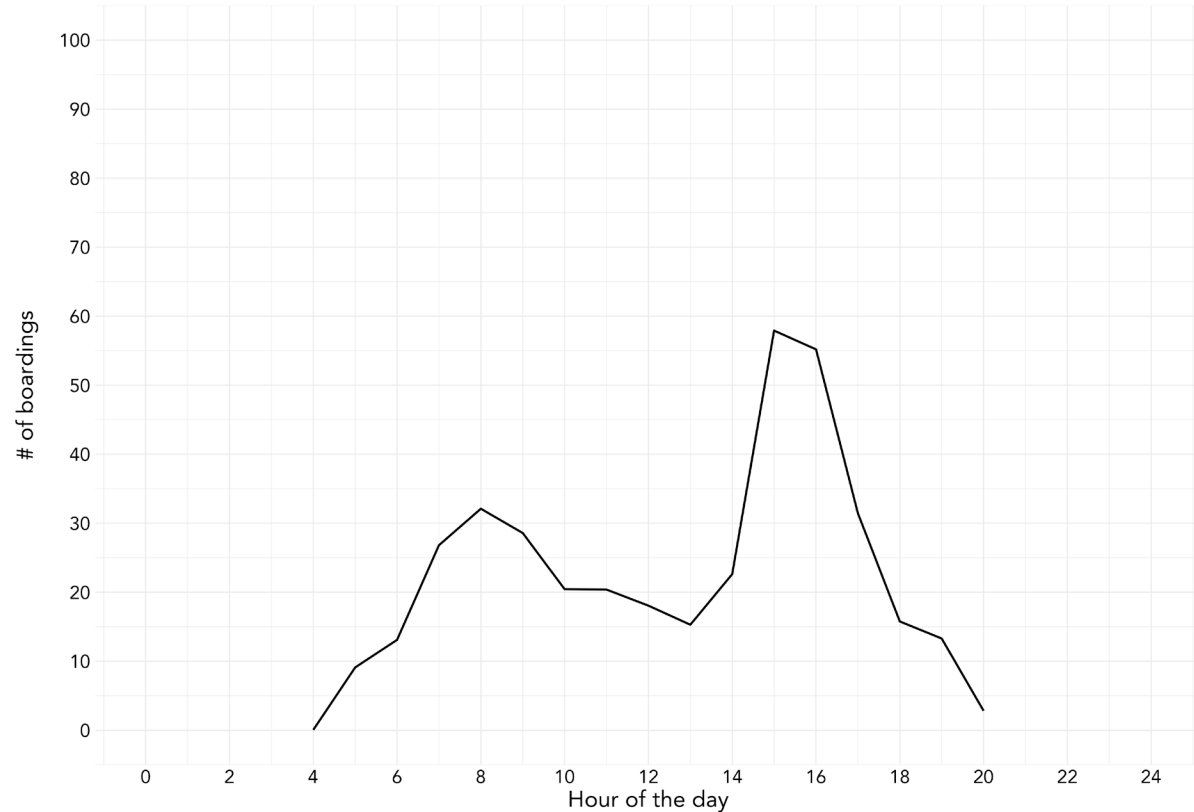
In April 2022, SMART's network carried approximately 385 people on an average weekday, for a weekly total of about 2,100 rides. The busiest route by far was Route 4-Wilsonville Rd, with nearly double.

Figure 77 shows how many boardings occurred at each stop in the network during this period on an average weekday.

The busiest stops range from serving locations with regional connections to local major destinations like education facilities and groceries. Each of these stops are at locations served by Route 4.

- **A** WES station.
- **B** Wilsonville High school and low income neighborhood.
- **C** Meridian Creek Middle school.
- **D** Inza R. Wood Middle School / Boones Ferry Primary school.
- **E** Fred Meyer.
- **F** Wilsonville Town Center.

SMART Average Weekday Ridership - 2022



Source: SMART boardings data and GTFS from April 2022

Figure 78: SMART Ridership by Hour

Transit Productivity

Historically, transit network ridership in many US cities has displayed a characteristically “peaked” pattern, with the busiest ridership periods corresponding to the AM and PM rush hours. Since the onset of the Covid-19 pandemic, many transit agencies have experienced even greater drops in peak ridership than across the entire day.

As shown in **Figure 78**, SMART’s ridership pattern today runs counter to this trend, displaying a clear AM and PM peak. The busiest hours of the day are 8 a.m. to 9 a.m. and 3 p.m. - 4 p.m. (the after school peak).

The rush hours are also the period of the day when the network is most useful. During the AM and PM peak, WES is running, which makes a range of connections to other important destinations possible. Other routes like 1X and 2X operate more frequently and more consistently, and overall, the network is more likely to present a convenient option for taking someone to their desired destination.

SMART Route Frequency and Productivity (Spring 2022)

Average Weekday Ridership and Service Level

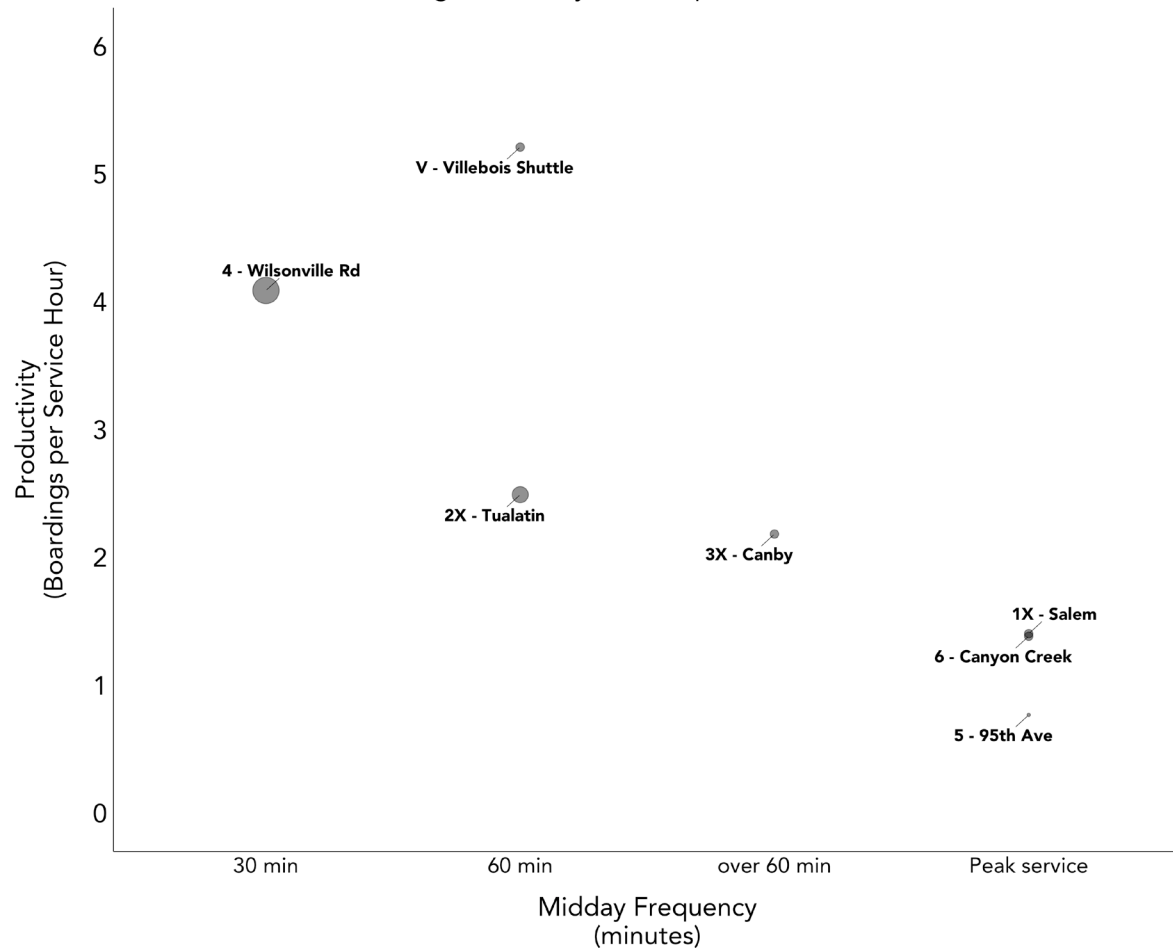


Figure 79: SMART Route Ridership and Productivity

Transit Demand Throughout the Day

Route 4 is SMART's most frequent, most expensive, and busiest route. It is also the route that generates the greatest level of ridership relative to the amount of service required to operate it. **Figure 79** shows the productivity (boardings per revenue hour) of each route on the y-axis, with the midday frequency shown on the x-axis. Each dot is scaled by its average daily ridership.

Route V is the most productive route, with over 5 boardings per revenue hour, but this comes with a very small level of ridership and a minimal service level. Route 4 is the second most productive at over 4 boardings per revenue hour.

Across SMART's current network, more frequent routes like Route 4 and Route 2X tend to carry more passengers more efficiently. These routes achieve high ridership and high productivity by providing useful service to destinations many people need to travel. On the other hand, SMART's least productive services are Route 5-95th Ave and Route 6-Canyon Creek, which are both more specialized routes that operate only during the peak period.

SMART Service and Ridership - 2022

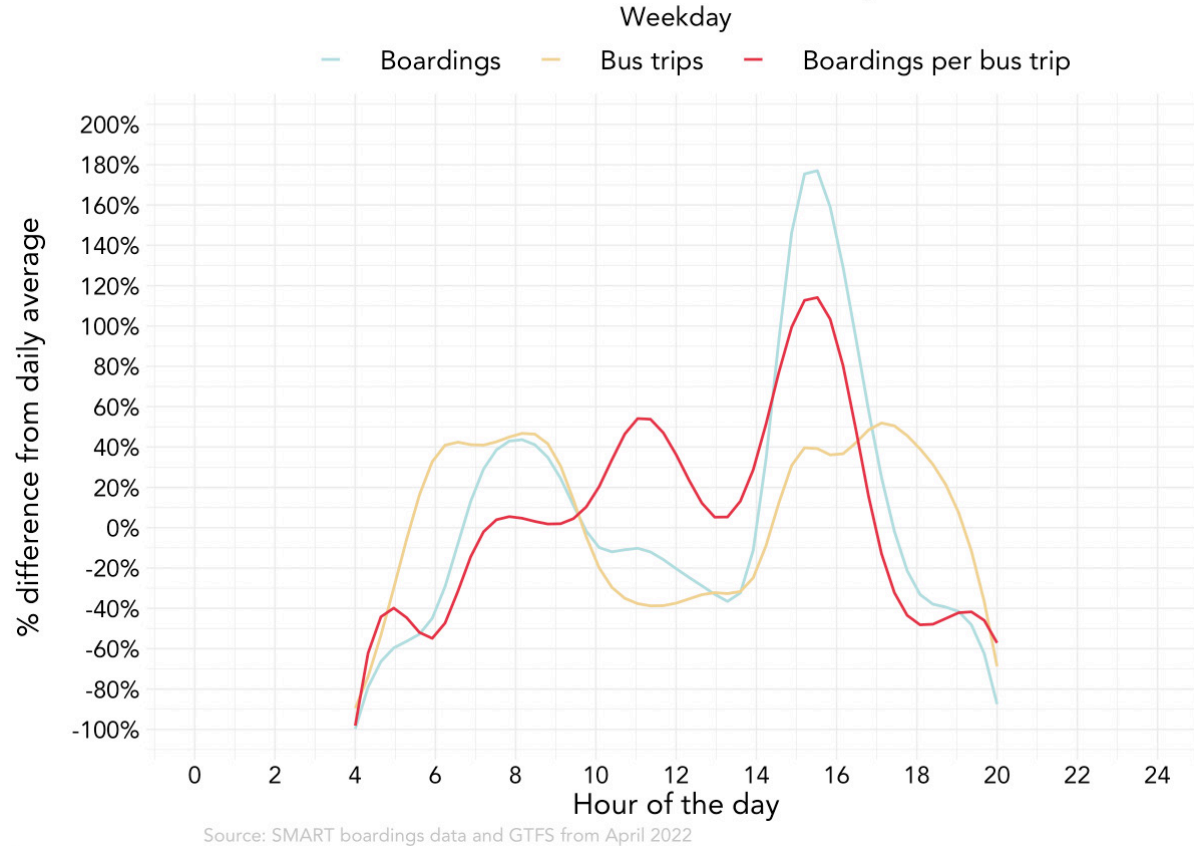


Figure 80: The red line in this graph shows how many bus boardings take place, relative to the amount of bus service provided, within each hour of the week.

Cost Per Ride

Like many transit agencies, SMART concentrates its service on weekday rush hour. Rush hours are the time when the most people are traveling to work or school. Rush hours are also when the most people travel all at the same time, and so congestion is at its worst.

The graph on this page shows boardings and service levels by hour of the day on weekdays, as a percent of the daily average level. Boardings are shown in blue, and peak sharply during rush hour, especially in the PM peak. Service levels are shown in yellow, and also peak during rush hours, as most routes operate at a higher service level.

There is a third line in red, which shows productivity by hour. This line reflects not just how many boardings take place, but how much SMART service is on the road.

We can make a few key observations from the shape of these lines. Productivity is highest at p.m. rush hour, starting at 2 and ending around 5 p.m. The number of people riding in the afternoon is high relative to other times of day. Midday productivity is also very high, even higher than the morning rush hour.

SMART Fixed-Route Cost per Passenger Trip

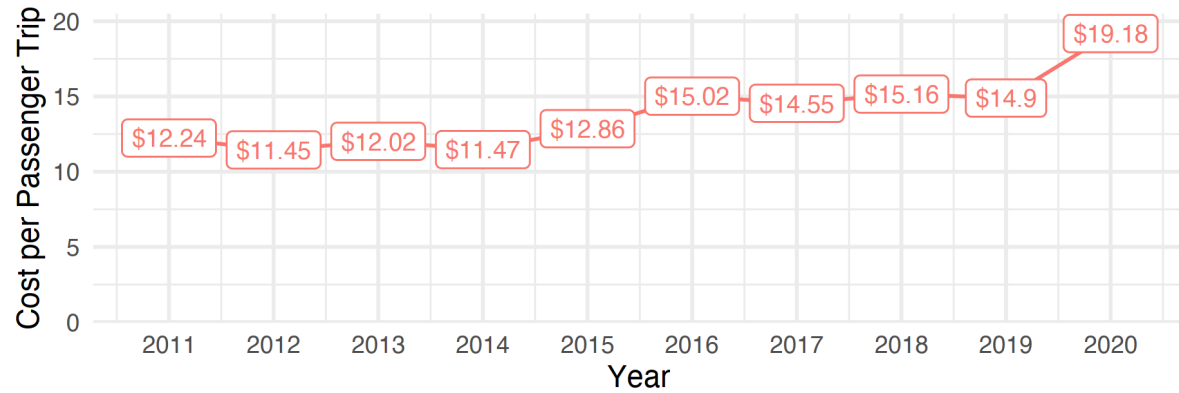


Figure 81: SMART Fixed Route Operating Cost per Boarding, 2011-2020

Covid-19 Impacts

The graph at right shows the total operating costs per one-way ride on fixed routes buses, in each year from 2011 through 2020.

Costs per ride increased sharply in 2020 because the number of rides on SMART fixed route buses decreased sharply due to the pandemic.

This chart is comparable to the one provided for demand response (Dial-a-Ride) services, which is shown on page 125.

The cost per fixed route ride ranged from approximately 1/4 to 1/2 the cost per Dial-a-Ride trip between 2011 and 2019.

Figure 82 shows SMART's monthly ridership since 2019. SMART's ridership has been substantially impacted by the Covid-19 pandemic. Like all US transit agencies, ridership dropped steeply in March 2020 as public health interventions began, and has been trending upwards since. However, total ridership is still just over half what it was during a typical month in 2019.

Unlike many other US transit agencies, SMART has not drastically reduced service levels during this period (Some of the

changes included cutting service on route 7 and C, and, reducing Saturday service on routes 2X and 4).

Figure 83 shows the quantity of service (vehicle revenue hours) SMART has provided during each month since 2016. Fixed-route service levels have continued in the same range as before the pandemic, at about 2,500 vehicle revenue hours per month. A consistent service level has ensured that as public health guidelines loosened through 2021 and 2022, the

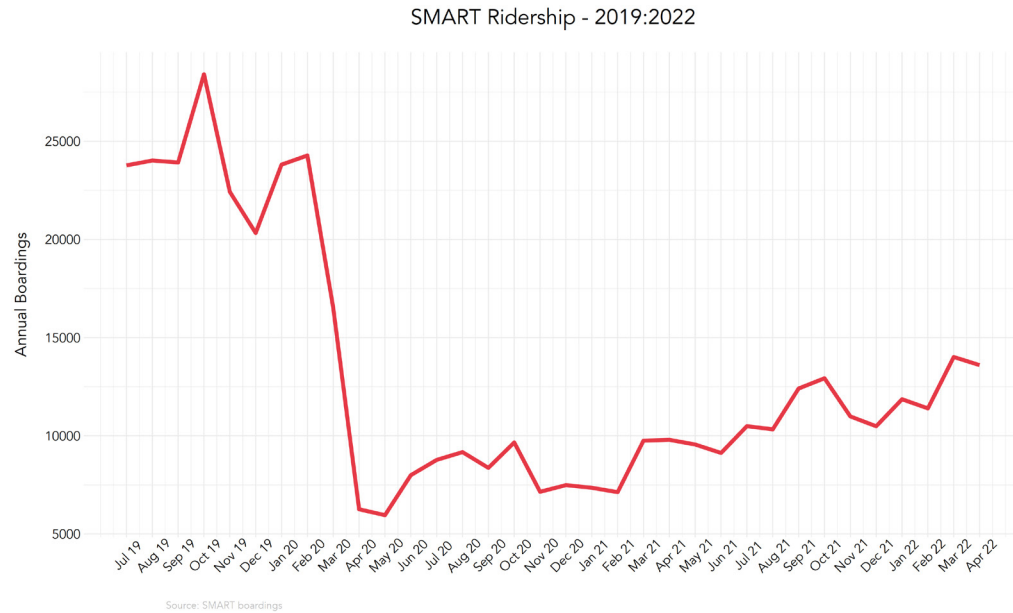


Figure 82: SMART Ridership 2019-2022

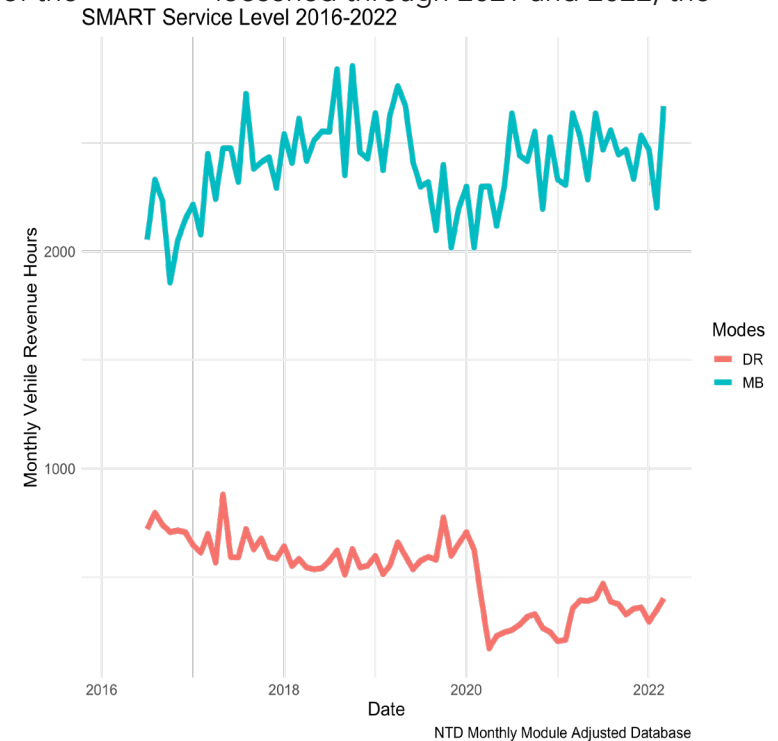


Figure 83: SMART Service Level 2016-2022

Where can SMART's service take you?

SMART network that people relied on before the pandemic was there waiting for them as travel demand picked back up.

SMART provides a network of bus routes that serve most areas of Wilsonville and connect to neighboring communities. But what sorts of trips is it most useful for? Where can a person travel in a reasonable amount of time?

To evaluate this, we use a tool called an "isochrone". An isochrone is a map that shows you everywhere you can reach from a particular starting point in a fixed amount of time. Using isochrones, we can see how almost all of Wilsonville is reachable on transit within 45,60 and 90 minutes from Wilsonville Transit Center, as in the example in **Figure 84**.

In this map, the area shaded in red shows everywhere a person could reach in that time, including:

- The initial waiting time, calculated as half of the route's frequency.
- Travel time in vehicles to each stop.
- Transfer times to connecting routes (half the frequency of the connecting route).
- Walking time from each reachable stop, up to the 30 minute travel time limit or 1.5 miles.

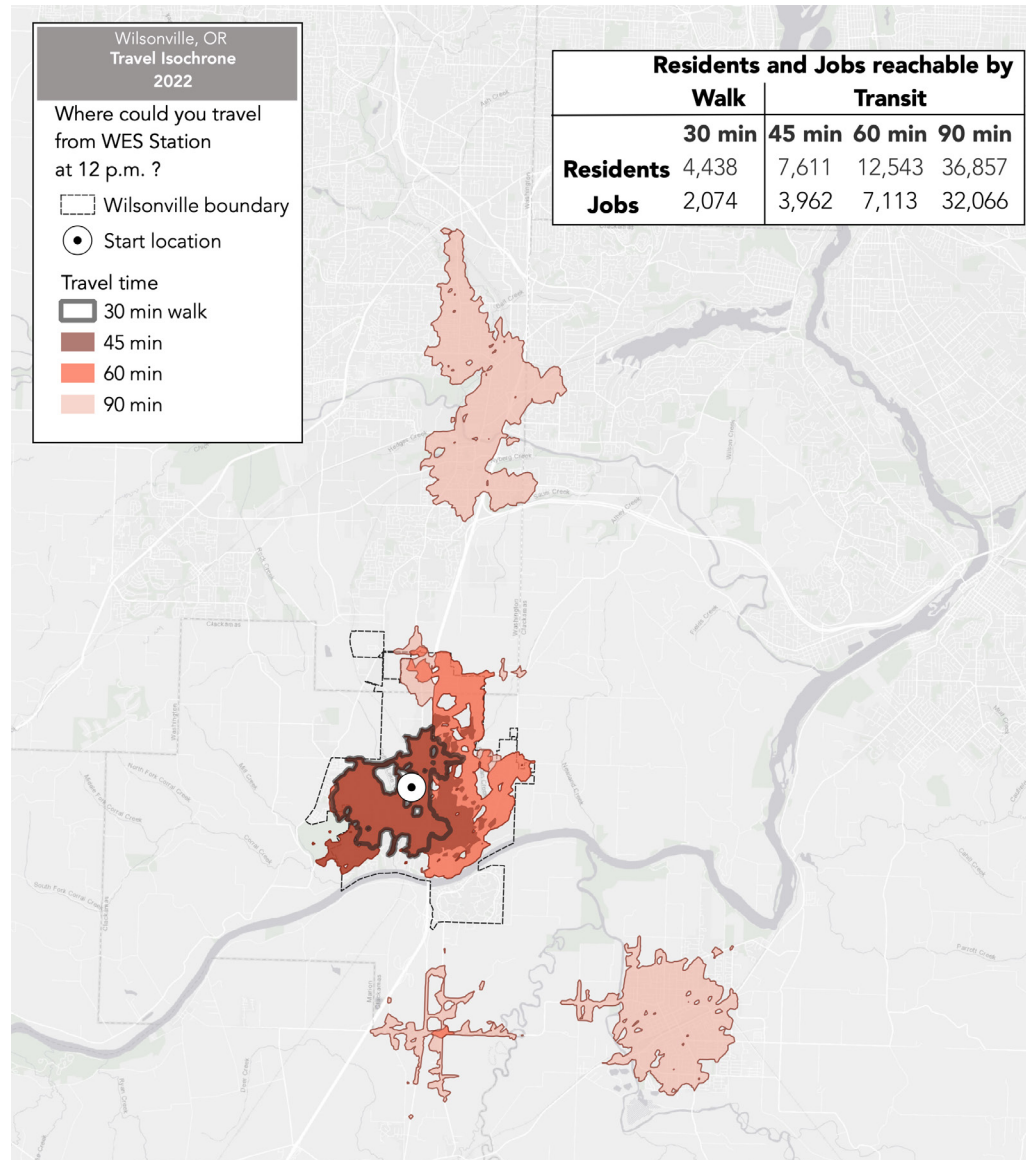


Figure 84: Travel Time Isochrone from Wilsonville WES

Travel to and from Wilsonville Transit Center

Wilsonville Transit Center is where all SMART routes converge, so it is the point in the network from which a person could reach the largest area and range of destinations. The table shown in **Figure 85** shows the number of jobs and residents that are inside this isochrone; all those jobs and people are potentially within reach of a person starting a trip here in 30 minutes if they were just walking, or 45, 60 and 90 minutes if they were using transit.

Due to the very low frequencies in the middle of the day and the difficult walking conditions, for a person to reach most of Wilsonville on transit they would have to spend over an hour walking, waiting and riding in the system.

From Wilsonville Transit Center we can see that the isochrone includes how route 2X connects to TriMet routes 96 and 76 in the north (A). However due to the lower frequencies during the middle of the day, it cannot take them deep into Portland or Beaverton within an hour and a half of travel time. This level of access is possible on WES during the rush hours. Route 3X operates with a very low frequency at midday, but it can take passengers all the way to Canby within 90 minutes (B).

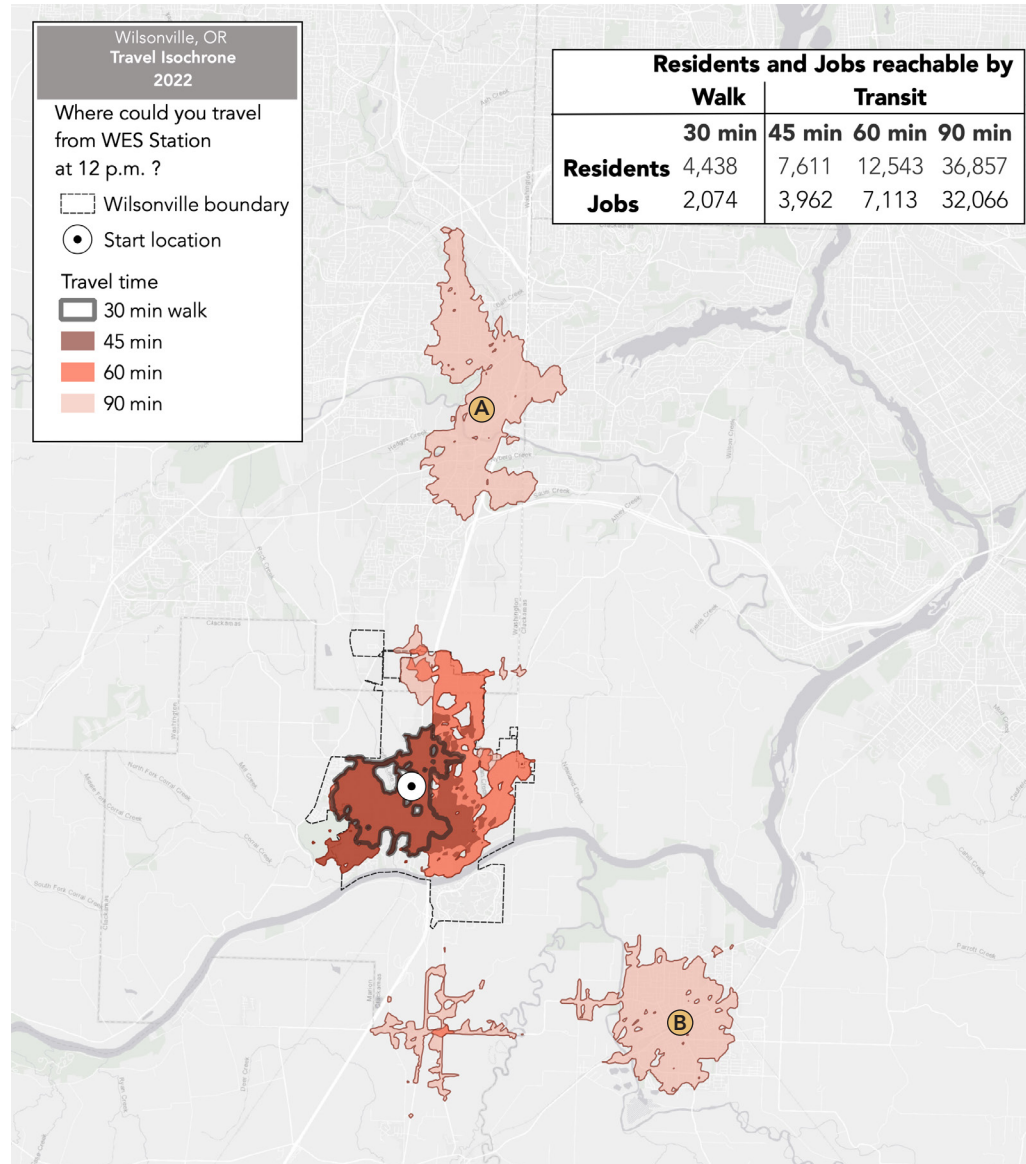


Figure 85: Travel Time Isochrone from Wilsonville WES

Travel to and from the Town Center

Figure 86 shows another isochrone example starting from Safeway in Wilsonville Town Center. The reachable areas are similar to the previous example, but now walking plays a bigger role to make connections at the Wilsonville Transit Center since the 4 that comes every 30 minutes doesn't take passengers to the Transit Center at midday. For this reason, the area covered by the connections in Tualatin **A** and in Canby **B** are smaller than if the trip started at the Transit Center.

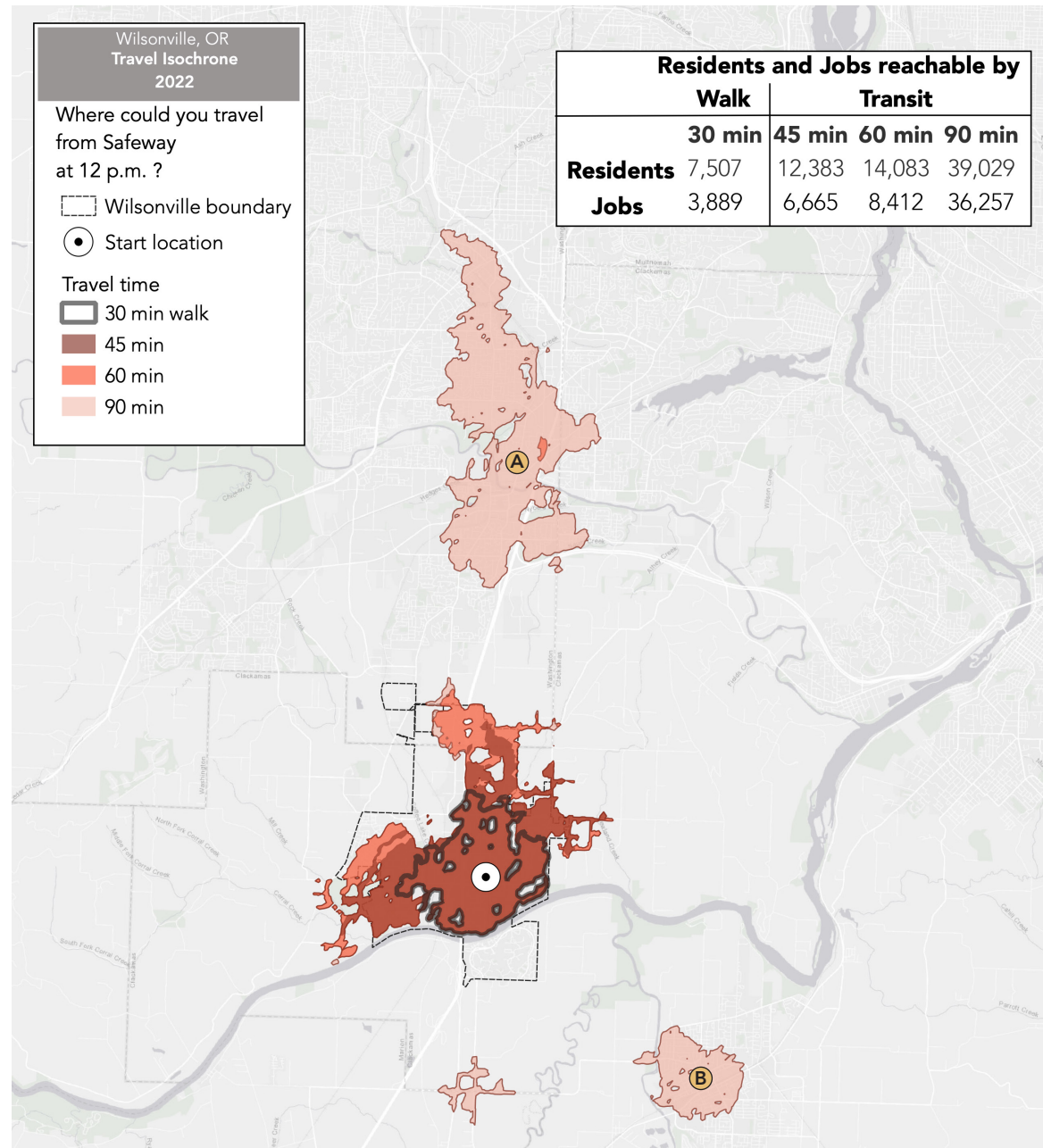


Figure 86: Travel Time Isochrone from Safeway

Travel to and from Villebois

Figure 87 shows a trip starting from Villebois Market on the west side of Wilsonville. This location is far from Route 4 but is served by Route V, which takes riders to Wilsonville Rd and not the transit center. Very little of the area of Tualatin or Canby reachable from other places is within reach from Villebois. Only about 9,500 residents and 4,100 jobs are reachable in 90 minutes from this point, compared to over 35,000 residents and jobs that are in reach from areas closer to the transit center.

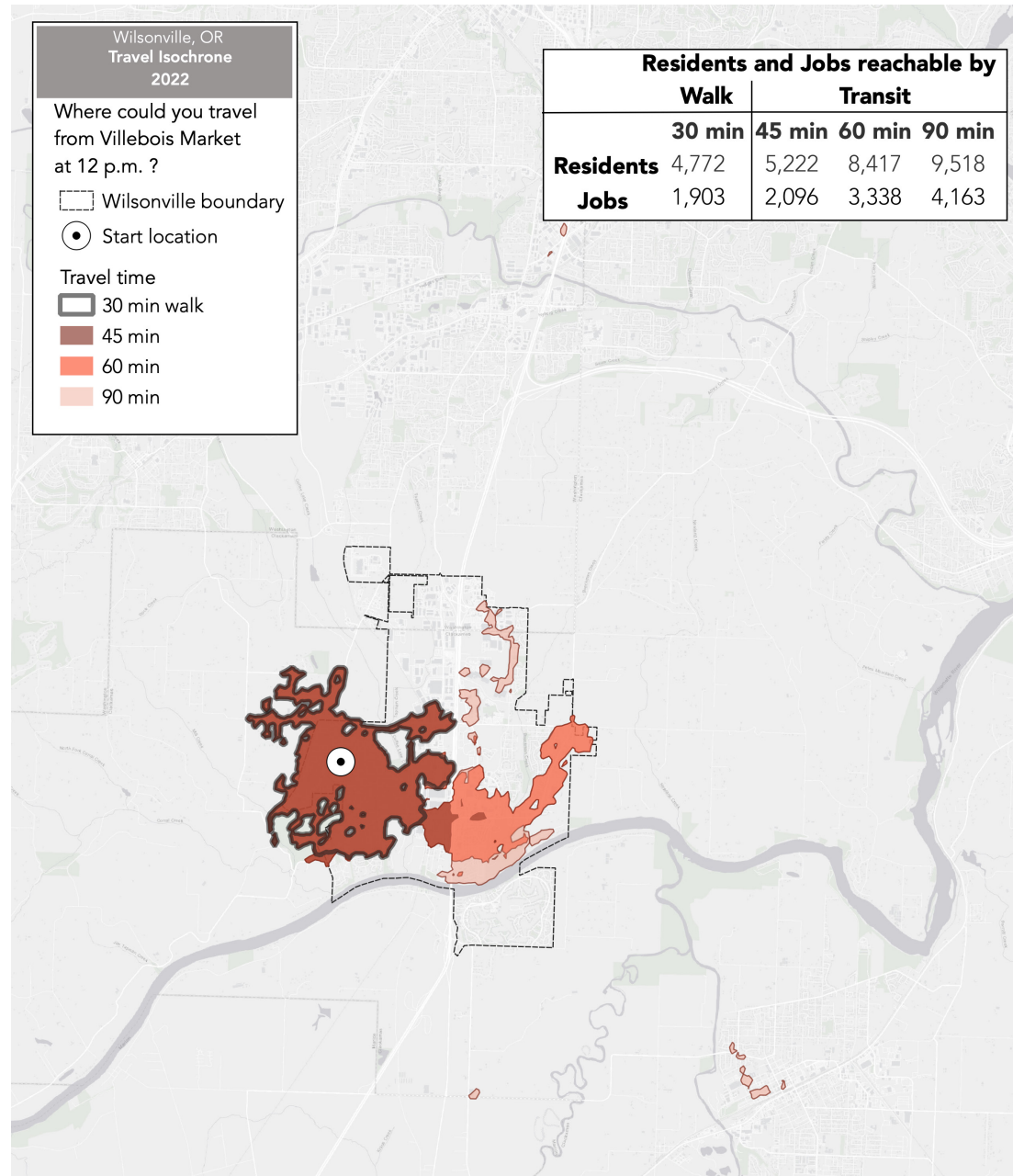


Figure 87: Travel Time Isochrone from Villebois Market

Key Takeaways

SMART's network offers fairly comprehensive service around Wilsonville, but its current service design implies certain trade-offs that are important to acknowledge when considering future changes.

SMART's network is optimized around the peak-only WES connection. This is an incredibly useful service for traveling north into Washington County, but it is available only during rush hour. Scheduling around WES impacts SMART's ability to maintain a consistent connection with CAT in Canby.

Figure 88 illustrates the other network design challenge produced by the focus on WES- complexity and duplication. This image shows a part of the network map focused on central Wilsonville. In order to facilitate the WES connection, Route 4 operates two very different patterns at different times of day, and the need to bring all routes to the transit center during WES' operating hours creates a lot of duplication on Boones Ferry Rd between Barber and Wilsonville Rd. Duplication is an outcome of a network design focused on one connection point, but it is important to acknowledge that it does have a cost- SMART is currently spending operating resources serving Boones Ferry with three different routes in order to make that connection possible.

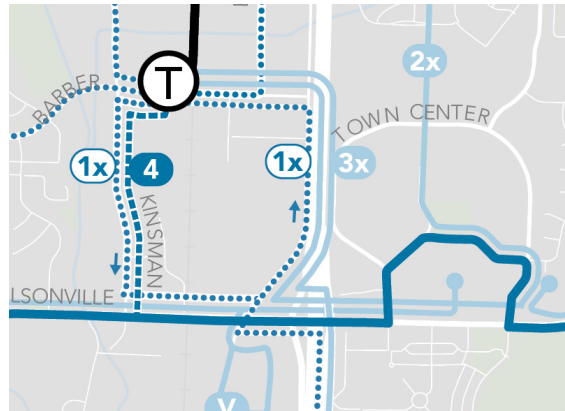


Figure 88: Subset of network map showing central Wilsonville

Most of SMART's ridership in Wilsonville happens along Wilsonville Rd, or at the transit center. On the average weekday in April 2022, just under half of all ridership on SMART happened on Route 4. Route 4 connects many of Wilsonville's highest-density residential and employment areas and major destinations, and offers SMART's most useful service. Wilsonville Rd is a powerful generator of transit demand, and likely to continue to be SMART's busiest corridor in the future.

While most areas are near transit, local trips are time-consuming due to low frequency. In the examination of travel time isochrones, it was evident that many parts of Wilsonville require transit trips of at least 45 minutes to reach from other areas. 45 minutes is a reasonable travel time at some distances, but is unlikely to be competitive

with driving, cycling or even walking where it is practical for people in a hurry.

SMART's peak-only routes are generating very little ridership. In April 2022, Route 5-95th Ave and Route 6-Canyon Creek were each carrying fewer than 15 passengers per day. While there are dense areas and important destinations on both routes, the peak-oriented service design may not be providing mobility during all the periods riders in these markets may need to travel.

In particular, Canyon Creek Rd is surrounded by dense residential development similar to the east end of Wilsonville Rd. This market may present stronger ridership potential were SMART able to offer a higher and more consistent level of service on the corridor.

3. SMART's Demand Response Programs

Overview of Demand-Response Services

SMART is required by the Americans with Disabilities Act (ADA) of 1990 to provide a complementary paratransit service to persons who are unable to use public transit fixed route services. SMART offers this service through its Dial-a-Ride program, which includes 4 separate service categories:

- ADA Complementary Paratransit.
- General Public. Provides in-town trips available to anyone under 60.
- Seniors. Provides in-town trips for people ages 60 and older.
- Out-of-Town. Provides trips to destinations outside of the City of Wilsonville for residents and people age 60 or older, at a higher cost and with a longer reservation lead time.

Figure 89 summarizes the key facts about each program.

One of the most important distinctions is that ADA trips are prioritized, while all other trip types are offered on a space-available basis. ADA trips are available during all hours the fixed-route network is operating including on Saturdays, as required by law, and offer more flexibility in scheduling and booking.

	ADA	Senior	General Public	Out-of-Town
Eligibility	Limited to persons with disabilities, as determined by SMART's Eligibility Committee.	Anyone age 60+.	Anyone.	Anyone enrolled in ADA, Senior or General Public.
Cost	No fare.	No fare.	No fare.	\$3.00 per one-way trip.
Hours of Operation	All hours during which SMART fixed-route network operates.	M-F, 8:00 am - 5:00pm.	M-F, 8:00 am - 5:00pm.	M-F, 8:00 am - 5:00pm.
Trip purpose restrictions	None.	None.	None.	Medical appointment only.
Scheduling Principle	Priority.	Space-available basis.	Space-available basis.	Space-available basis.
% of SMART Demand-Response Ridership	54%	29%	<1%	16%

Figure 89: SMART Demand Response Program Summary

Eligibility and Enrollment

Each of SMART's demand-response programs requires users to complete an application in order to enroll and use demand-response service. The General Public and Senior programs require only a simple one-page application.

Eligibility for ADA services is determined based on a collection of individual factors, so it requires a more complex enrollment process. The three categories for ADA eligibility for complementary paratransit, as detailed in Circular 4710.1, Chapter 9, 9.1.2 Eligible Individuals, are:

1. Inability to navigate the fixed-route system independently due to physical or mental impairment.
2. Lack of accessible vehicles, stations or bus stops.
3. Inability to reach a boarding point or final destination.

The ADA enrollment process includes a detailed application addressing these factors, and may also require a functional, in-person assessment. This process ensures that SMART is able to accurately verify which potential customers are eligible for the most useful demand-response services, but the more complex application process for ADA services may also introduce a barrier to access for some

users compared to the simpler application processes for the other programs.

Travel Training

SMART also partners with Ride Connection to offer a sophisticated free travel training program (RideWise) designed to help older adults and people with disabilities navigate the transit system. Travel training programs help people who might otherwise rely solely on demand-response services to gain access to information and training the enable them to use the fixed-route network independently.

Travel training programs like RideWise help expand users range of travel options, and are also an important complement to demand-response service because they have the potential to help shift a portion of demand-response users' trips to the fixed-route network, which can provide them at a much lower cost to SMART.

Performance

Cost

In the years leading up to the start of the Covid-19 pandemic, the cost of SMART's demand response program was relatively stable, with total operating expenditure in 2016-2019 of between \$880,000 and \$1.04 million, shown in **Figure 90**. The greatest cost increase occurred in 2020, when SMART was forced to adapt to the variety of unique circumstances associated with the onset of the Covid-19 pandemic. In the years prior, the agency's demand-response operation appeared to be managed on a sustainable financial basis.

Ridership

Figure 91 shows the long-term ridership trend on SMART's demand-response programs. Over the past decade, ridership was relatively stable, before increasing substantially in 2016. Ridership then began falling, with the lowest point in 2020.

The cause or attribution of the large jump in demand-response ridership reported to NTD is unclear. In 2016, SMART implemented the Villebois shuttle service as a deviated-fixed route, with ridership reported to NTD as part of its demand-response services. The Villebois shuttle was transitioned to full fixed-route service, moving this ridership out of the

SMART Demand-Response Operating Expenses
2016-2020 (last five years available)

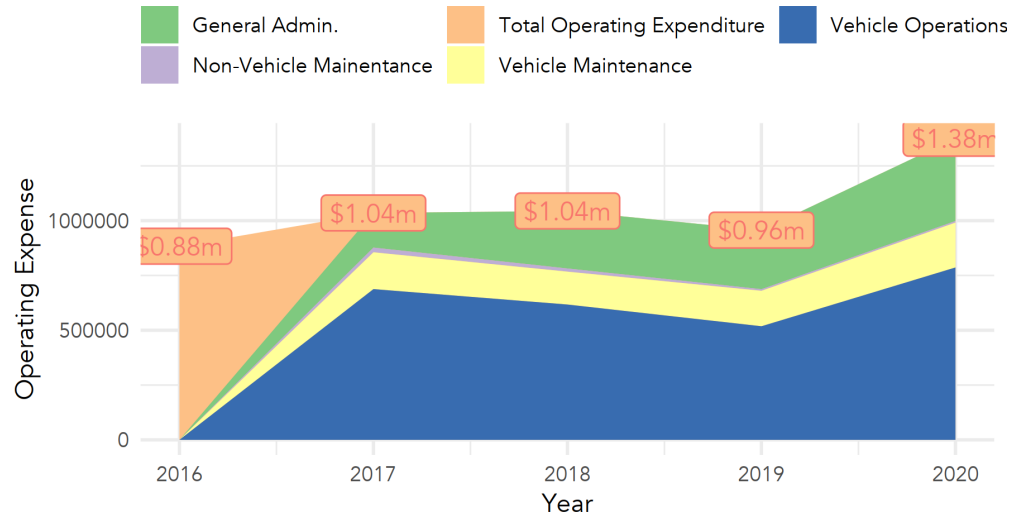


Figure 90: SMART Demand Response Operating Expenses, 2016-2020

SMART Demand-Response Ridership

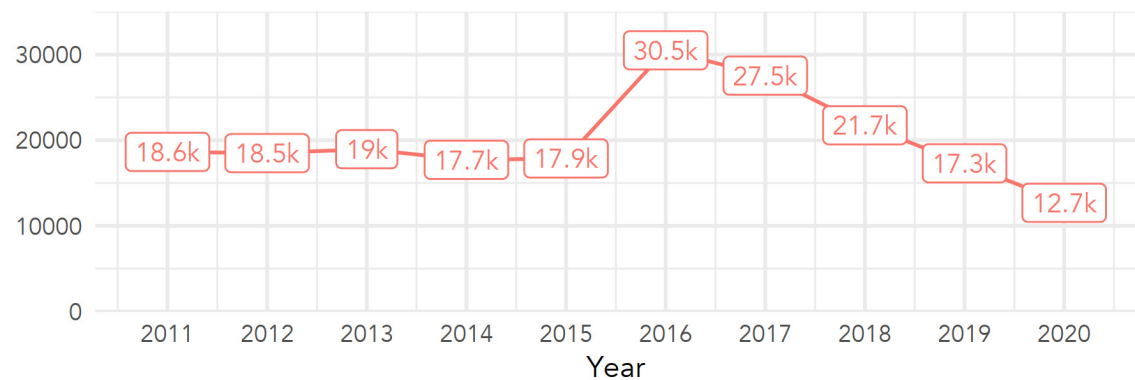


Figure 91: SMART Demand Response Ridership, 2011 - 2020

demand-response category.

Cost per Ride

Over the long term, cost per passenger trip has been relatively stable in the past decade. Cost per passenger dropped sharply in 2016 (the year the ridership spike likely related to the introduction of the Villebois shuttle occurred), but by 2018 and 2019 was in the range it had been in 2013-2015. In 2020, cost per passenger increased dramatically (nearly doubling), the combination of cost increases and ridership declines attributable to the unique circumstances of the first year of the Covid-19 pandemic.

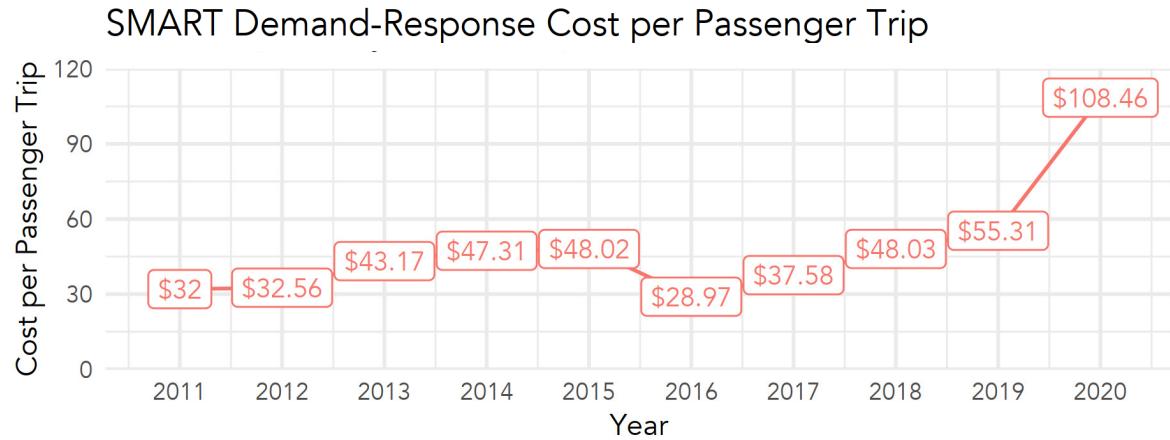


Figure 92: SMART Demand Response Cost per Boarding 2011-2020

Ridership by Program

Figure 93 shows the number of trips in April 2022 made using each program. In April 2022, there were 623 total trips made on SMART demand-response services. ADA trips made up the largest share of overall ridership, with about 54% of April trips on that program. The senior program was second, with about 30% of trips. Most of the remainder were out of town trips, with just 3 general public trips during this time.

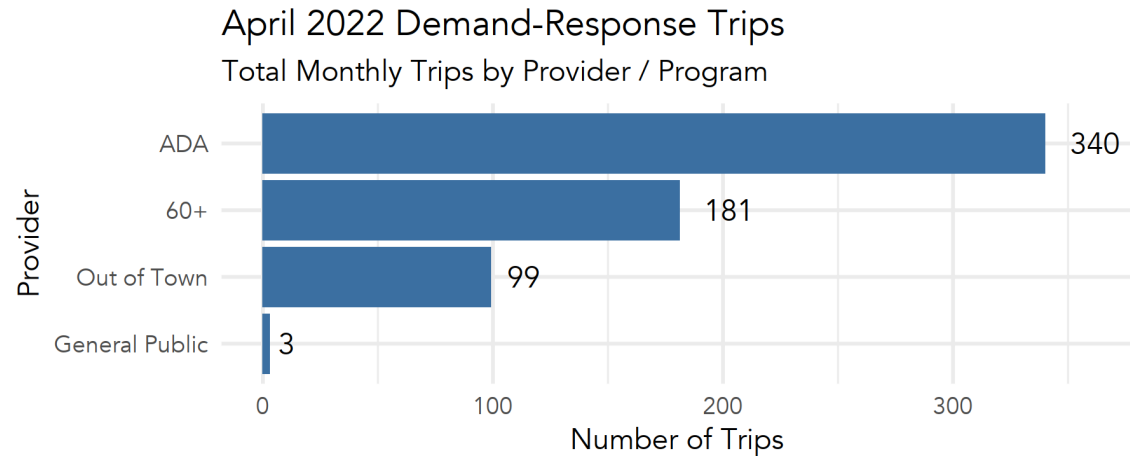


Figure 93: SMART Demand-Response Trips by Program, April 2022

Trip Duration

In-town trips are short, with the majority of trips on the ADA and Senior programs requiring fewer than 20 minutes to complete. **Figure 94** shows the distribution of the duration of trips on the Senior, ADA and Out-of-Town programs during April 2022. Because of the small number of trips, General Public trips are excluded from this graph.

SMART's decision to offer Out-of-Town trips to enrollees of the ADA, Senior and General Public programs provides an extremely useful means of accessing medical destinations outside of Wilsonville. However, Out-of-Town trips naturally tend to take longer, because they involve moving people to destinations outside of Wilsonville. The average Out-of-Town trip lasts 27 minutes, compared to 13 minutes for ADA and 14 minutes for Seniors. In April, the total duration of Out-of-Town trips (44.8 hours) was actually slightly larger than that of Senior trips (43.6 hours).

Duration of April 2022 Demand-Response Trips
Duration of Trip by Provider / Program

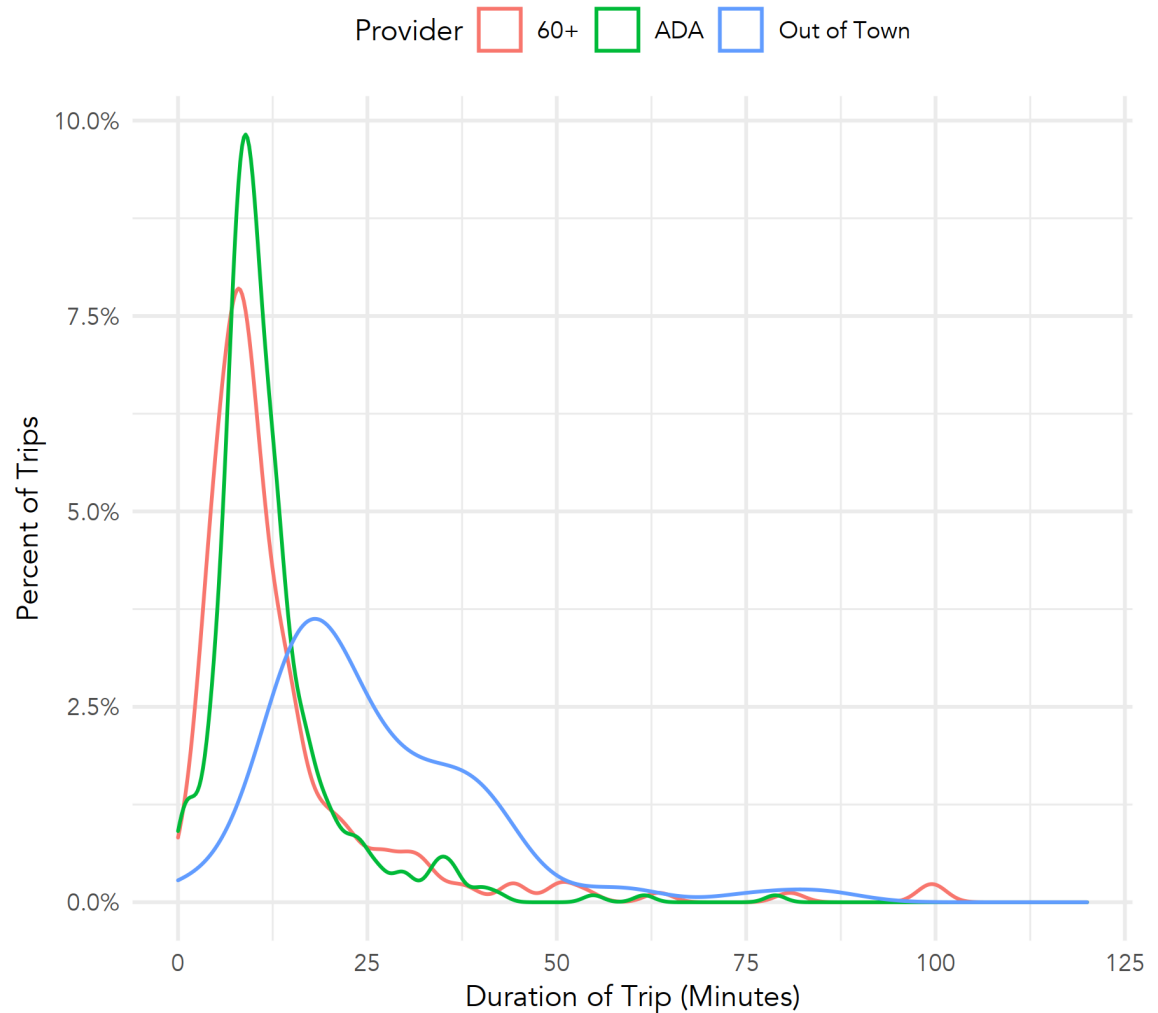


Figure 94: SMART Demand-Response Trip Duration by Program, April 2022

Destinations

Where do people use SMART's demand-response services to travel to? **Figure 95** shows each demand response trip destination served during April 2022. While the focus of activity was on Wilsonville, as mentioned previously, about 16% of trips are made outside of the city boundaries.

In Wilsonville, some of the notable concentrations of destinations included:

- Fred Meyer **A**.
- Seniors' housing at the **B** Village at Main, **C** Brookdale Wilsonville, **D** Portera at the Grove, and Wiedemann Park **E**.
- Wilsonville Community Center, Safeway, and nearby seniors' apartments **F**.
- In Charbonneau, serving seniors' apartments on the west side **G**.

While SMART delivers trips to destinations in Portland, Oregon City and other communities, the largest single demand-response destination outside of the city is the Legacy Meridian Park Medical Center in Tualatin **H**. There were 23 trips to this hospital or surrounding specialist offices in April 2022. The second busiest out-of-town destination was OHSU **I**, with a total of 6 trips combined between the Marquam Hill and South Waterfront campuses.

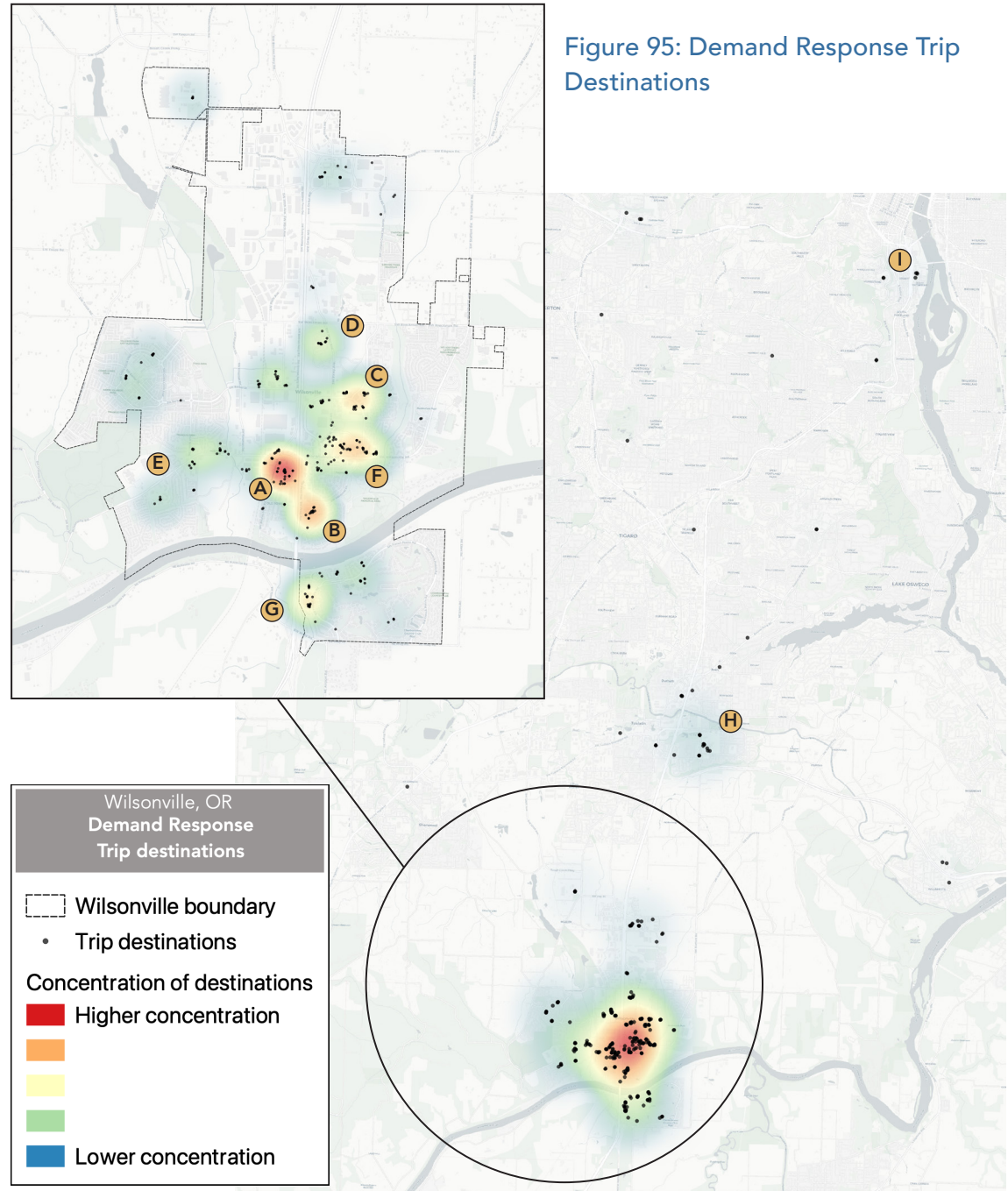


Figure 95: Demand Response Trip Destinations

Key Takeaways

This Transit Master Plan update will not focus on identifying changes or improvements to SMART's demand-response programs. However, there are some important things we can learn from these programs to inform thinking about future changes to the fixed-route network.

SMART's demand-response programs are designed to prioritize ADA trips.

ADA trips make up a majority of SMART demand-response trips, and there are clear benefits to utilization of the ADA program that would not discourage eligible customers from using it in favor of the Senior program.

SMART's customers can gain expertise in using both demand-response and fixed-route services, thanks to the partnership with Ride Connection.

A sophisticated travel training program is a key element in ensuring that demand-response riders are not siloed into reliance on only one service. While not all demand-response customers will find the fixed-route network a viable alternative, the infrastructure is there to help people gain the information needed to make trips in the best way for them. As a result, future improvements to the fixed-route network also have the potential to benefit demand-response customers.

In most of Wilsonville, demand-response trip patterns are similar to

fixed-route ridership. Some of the busiest destinations for demand-response service are the same places that see a lot of boardings on fixed-route, especially major retail like Safeway and Fred Meyer, and the stops serving apartment buildings around Town Center Loop.

Demand-response trip patterns indicate some important places SMART could consider serving in the future.

Some of the busiest places on the demand-response system are in places that SMART currently doesn't serve, particularly the higher-density senior housing developments on the west side of Charbonneau. Additionally, the Legacy Meridian Park Medical Center is the busiest destination for demand-response trips outside of Wilsonville. SMART's Route M-Medical Shuttle (currently suspended) makes this connection, but there may be other ways of serving this destination with the fixed-route network that make reaching it more convenient.

4. SMART's Local Market

The Market & Need for Transit

SMART's primary service area is the City of Wilsonville, although several of its routes extend outside of those boundaries. This section reviews the key demographic and land use factors relevant to transit network planning, and describes the role each play in assessing transit demand or need.

In this chapter, we present and discuss data that informs two different types of considerations in transit planning:

- Where are the strongest markets for transit, with potential for high ridership and low operating costs?
- Where is there elevated need for transit, where coverage services may be important even if they do not attract high ridership?

A "strong transit market" is mostly defined by where people are, and how many of them are there, rather than by who people are. We learn about transit needs mostly by examining who people are and what life situation they are in.

Measuring Demand and Need

On the following pages, these maps and diagrams help us visualize potential transit markets and needs:

- Residential density
- Job density
- Activity density (combined residential and jobs)
- Density of young and older residents.
- Density of people of color.
- Maps of walkability.

These visualizations are based on information from the US Census American Community Survey (2019), 2020 US Census, and OpenStreetMap (walkability).

New Service Areas

This chapter also briefly describes some of the approved future development that could change land use in Wilsonville, and thus the areas SMART could potentially serve.

The Ridership Recipe

Creating a useful transit network isn't just about faster or more frequent service. Many factors outside the direct control of SMART—such as land use, development, urban design, and street networks—affect transit's usefulness.

The built environment factors shown in

Figure 96 on the next page are critical to a broadly-useful, high ridership transit network:

- **Density.** Where there are many residents, jobs and activities in an area, there are many places people might want to go, and many people nearby who might choose to ride transit.
- **Walkability.** An area only becomes accessible by transit if most people can safely and comfortably walk to and from the nearest transit stops.
- **Linearity.** Short, direct paths between destinations are faster and cheaper for SMART to operate. Linear routes are also easier to understand and more appealing to most potential riders.
- **Proximity.** The longer the distance between two places that SMART wants to serve, the more expensive it is to connect them. Areas with continuous development are more cost-effective to serve than areas where there are large, undeveloped gaps between destinations.

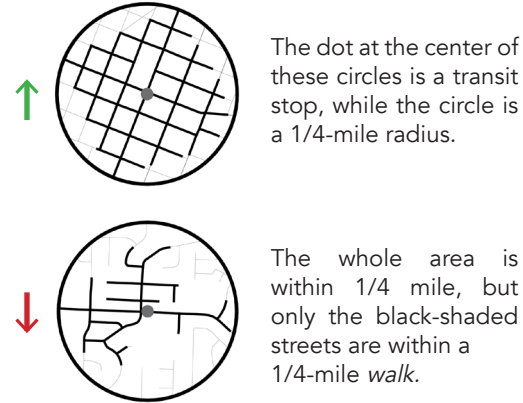
These elements are important preconditions for where transit can be useful for many people, at a relatively low cost.

The Ridership Recipe: Higher Ridership, Lower Costs

DENSITY How many people, jobs, and activities are near each transit stop?

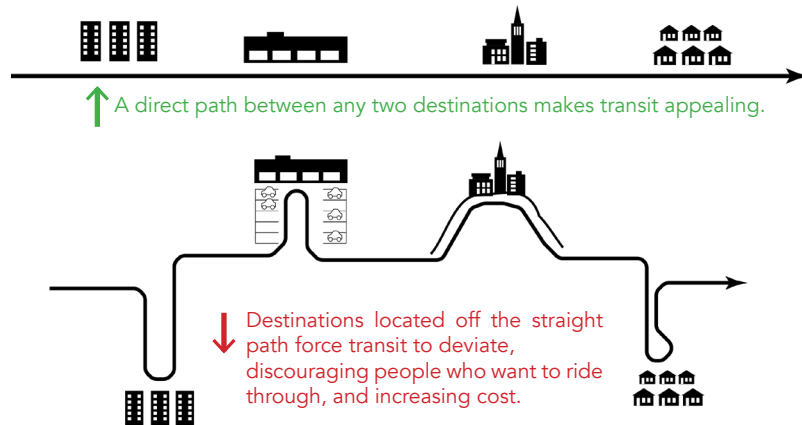


WALKABILITY Can people walk to and from the stop?



↑ It must also be safe to cross the street at a stop. You usually need the stops on both sides for two-way travel!

LINEARITY Can transit run in reasonably straight lines?



PROXIMITY Does transit have to traverse long gaps?

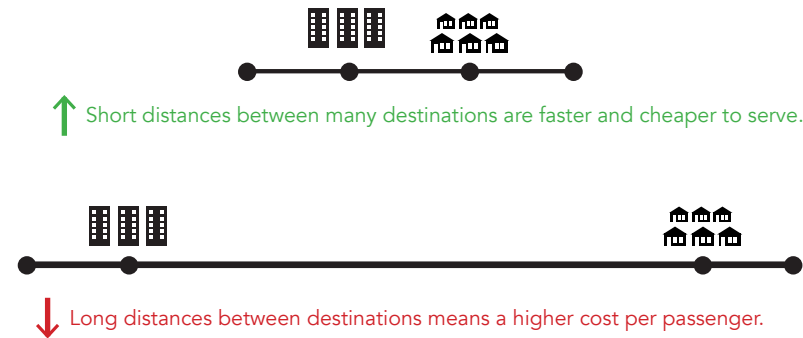


Figure 96: The Ridership Recipe describes how the built environment affects potential for high ridership and transit efficiency.

Population Density

The first and simplest land use factor for transit ridership is density: how many people are nearby who could potentially choose to ride transit? When more people are closer together, the potential market transit can address is larger. **Figure 97** shows the population density in each census block near Wilsonville as determined in the 2020 Census.

In Wilsonville, most residential development is located away from I-5 and the core commercial areas of the city. On the west side, the master-planned Villebois **A** area is developed at a range of densities, with a core of apartments and townhomes surrounded by single family neighborhoods. Most other residential areas on the west side are predominantly single-family, although there are some pockets of higher density **B**.

Density is higher east of I-5, with major apartment complexes located along both sides of Wilsonville Rd from I-5 to Advance Rd **C**, as well as along the Town Center Loop, Canyon Creek Rd, and Parkway Ave. Multifamily residential land uses continue north along Canyon Creek **D** with more gaps between individual developments, until the road ends at the city limit.

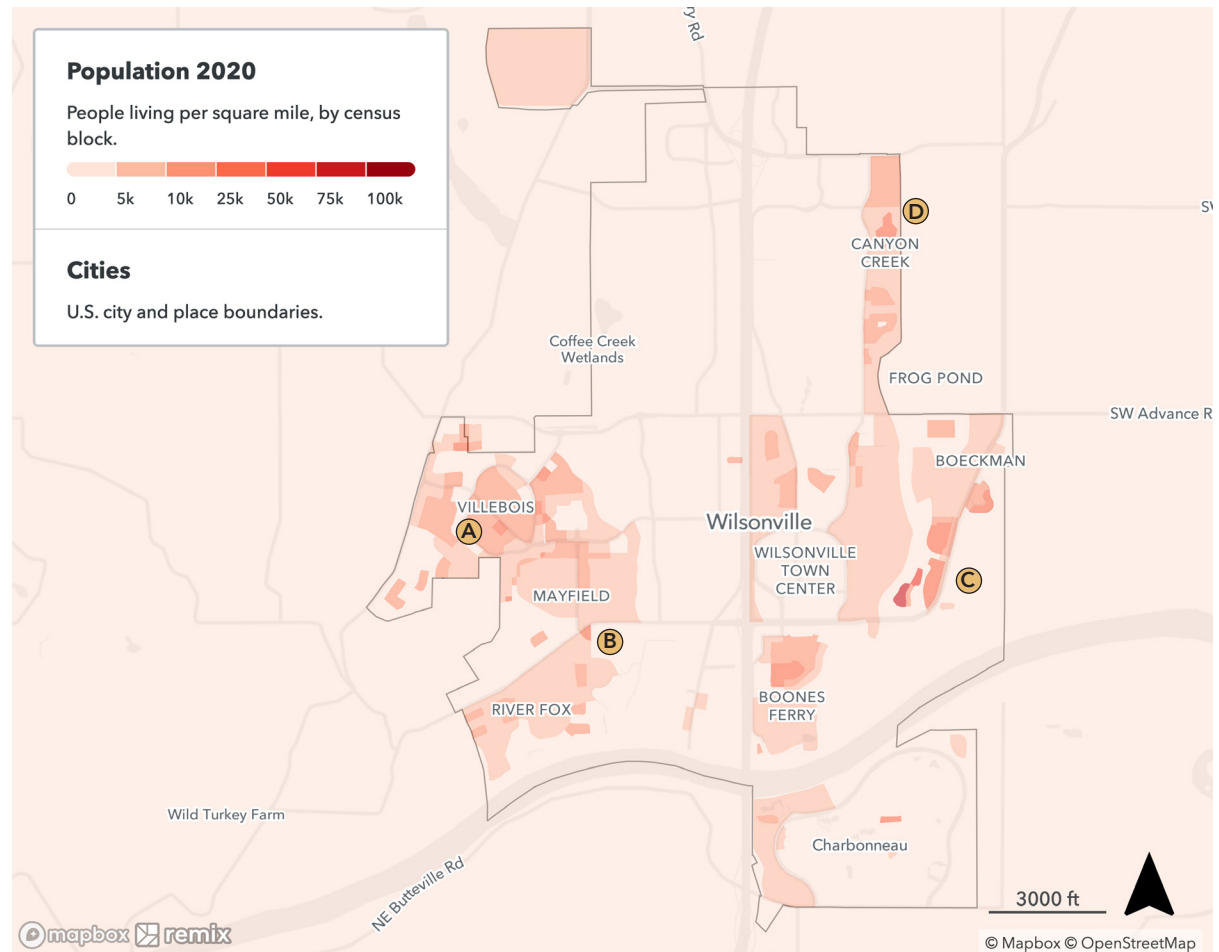


Figure 97: Population Density

Employment Density

Figure 98 shows the density of employment by census block in Wilsonville. Employment is another important indication of the size of the market for transit; employment locations generate travel demand not just from their employees, but from customers, clients and visitors.

In Wilsonville, employment density is highest in four main areas:

- Along Boones Ferry Rd and Boberg west of I-5, a mix of commercial, logistics and industrial employers. Density is greatest between Wilsonville Rd and Barber St. **A**
- Along Parkway Ave **B**, where a variety of office and technology campus buildings are located, as well as the OIT Portland Metro campus.
- Near Wilsonville Town Center **C** west of I-5 along Wilsonville Rd. Employment in this area mainly consists of retail and service establishments. One of the largest retailers in this area, Fry's Electronics, closed permanently in 2021.
- In the northwest area **D**, a mixture of industrial and distribution businesses and office parks are located along 95th Ave, extending to the industrial park surrounding Commerce Circle in the north.

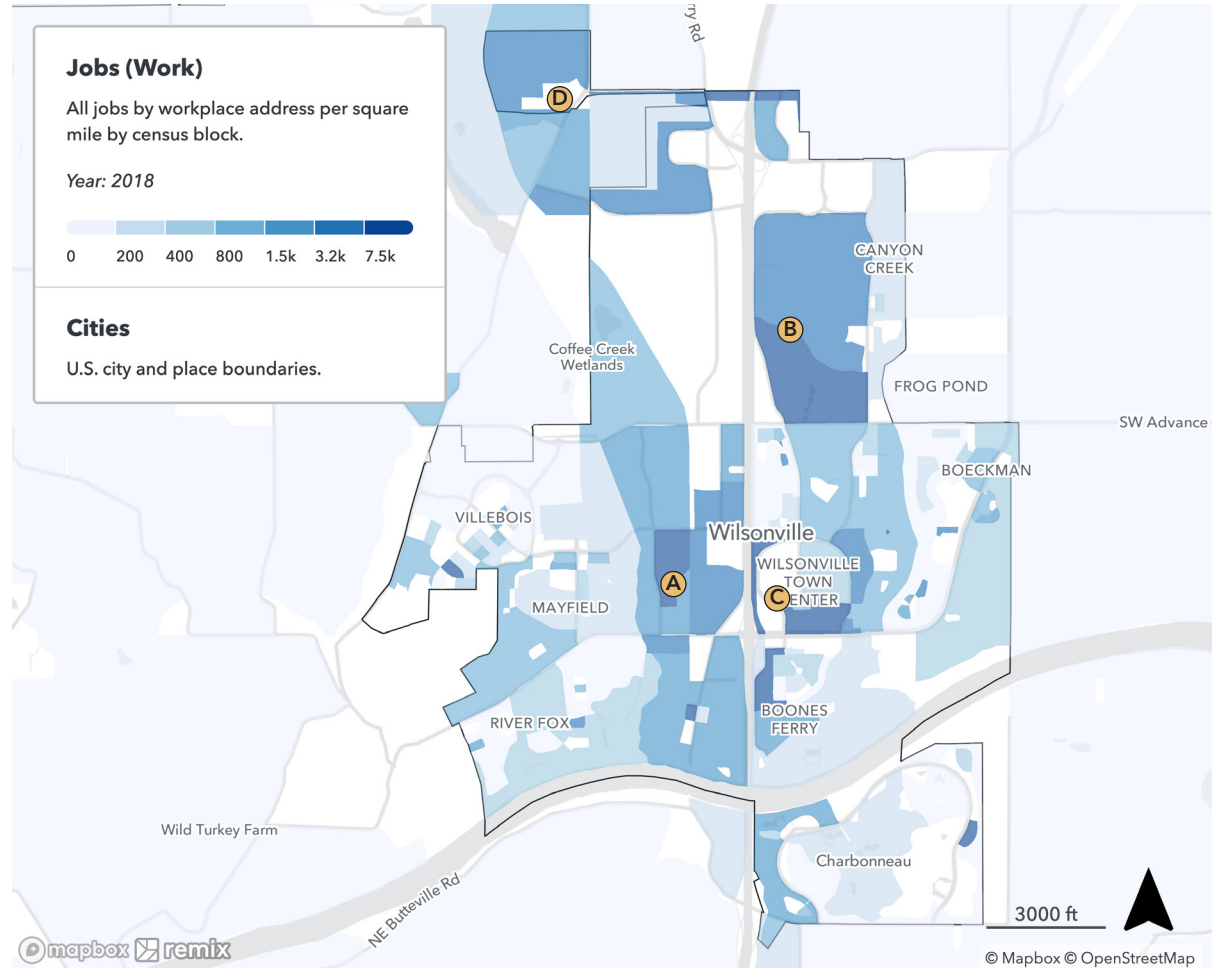


Figure 98: Employment Density

Activity Density

Together, population and employment density provide a good indication of the relative level of activity in different areas throughout the day. **Figure 99** maps the combination of employment and population density in Wilsonville and nearby areas.

The map uses a three-color scale: residential density is shown in shades of red, job density is shown in shades of blue, and places where residents and jobs are both present are shown in shades of purple. The darker the color, the greater the number of jobs or residents in the area.

The main area of Wilsonville where residential and employment density converge is along Town Center Loop **A**. The Town Center has important retailers like Goodwill and Safeway, the CCC Wilsonville campus, and a variety of smaller businesses. There are also a number of large apartment buildings near the north and east side of the loop, as well as one residential property (Town Center Park Apartments) along Park Pl. inside Town Center Loop itself.

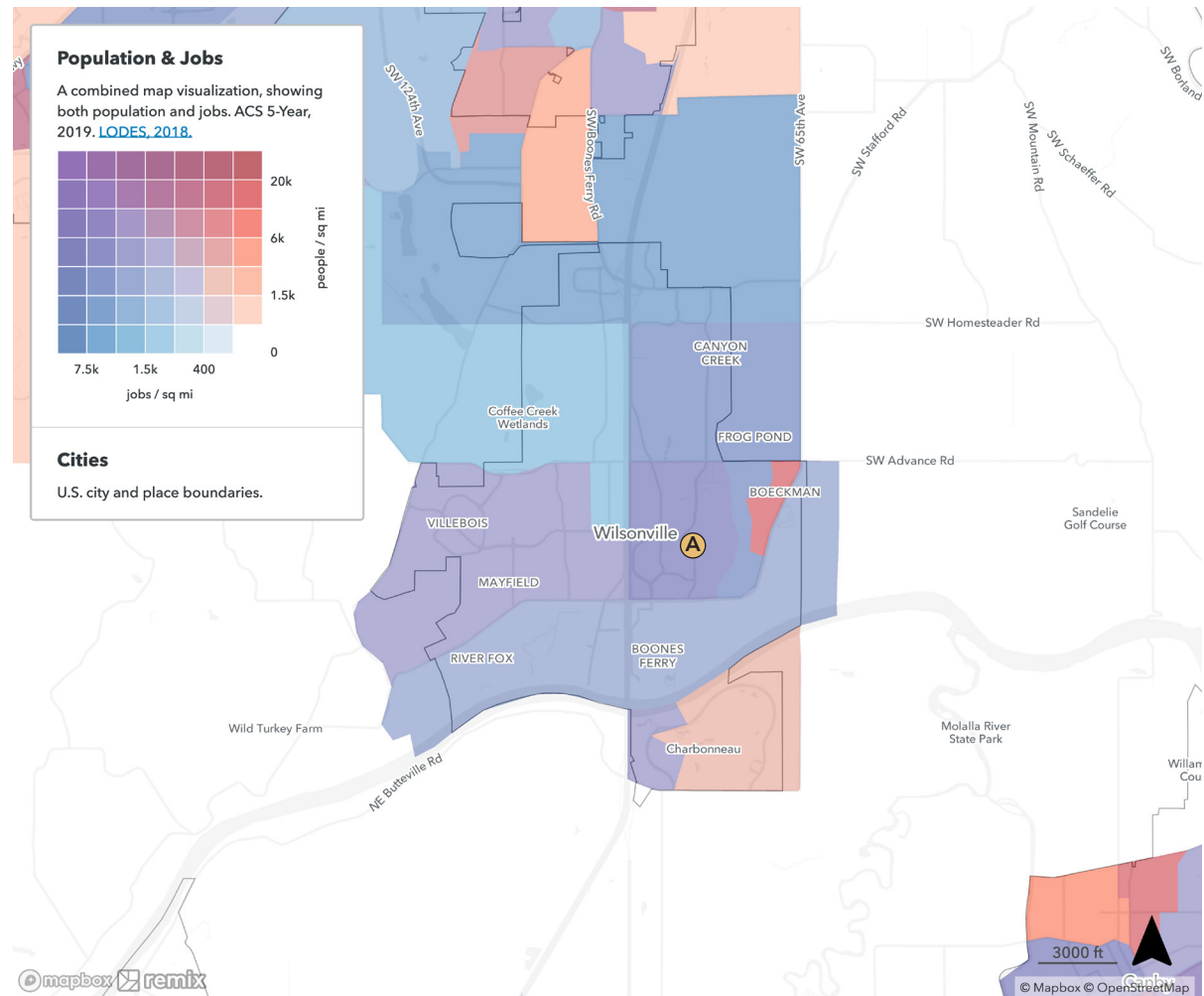


Figure 99: Activity Density

Race and Ethnicity

Figure 100 shows the density of people of color by census block, as reported in the 2020 Census. In Wilsonville, people of color make up almost 20% of residents. Hispanic or Latino residents make up 13%, while the second most numerous group are Asian residents, who make up about 4% of the population.

The distribution of people of color in Wilsonville is generally quite similar to that of the population as a whole. Higher-density areas tend to have a greater number of nonwhite residents, particularly in the apartment areas around the east side of Wilsonville Rd (A), Canyon Creek, and residential neighborhoods on the west side (B). Notably, despite the higher-density residential areas of western Charbonneau, density of minority residents is low throughout Charbonneau (C).

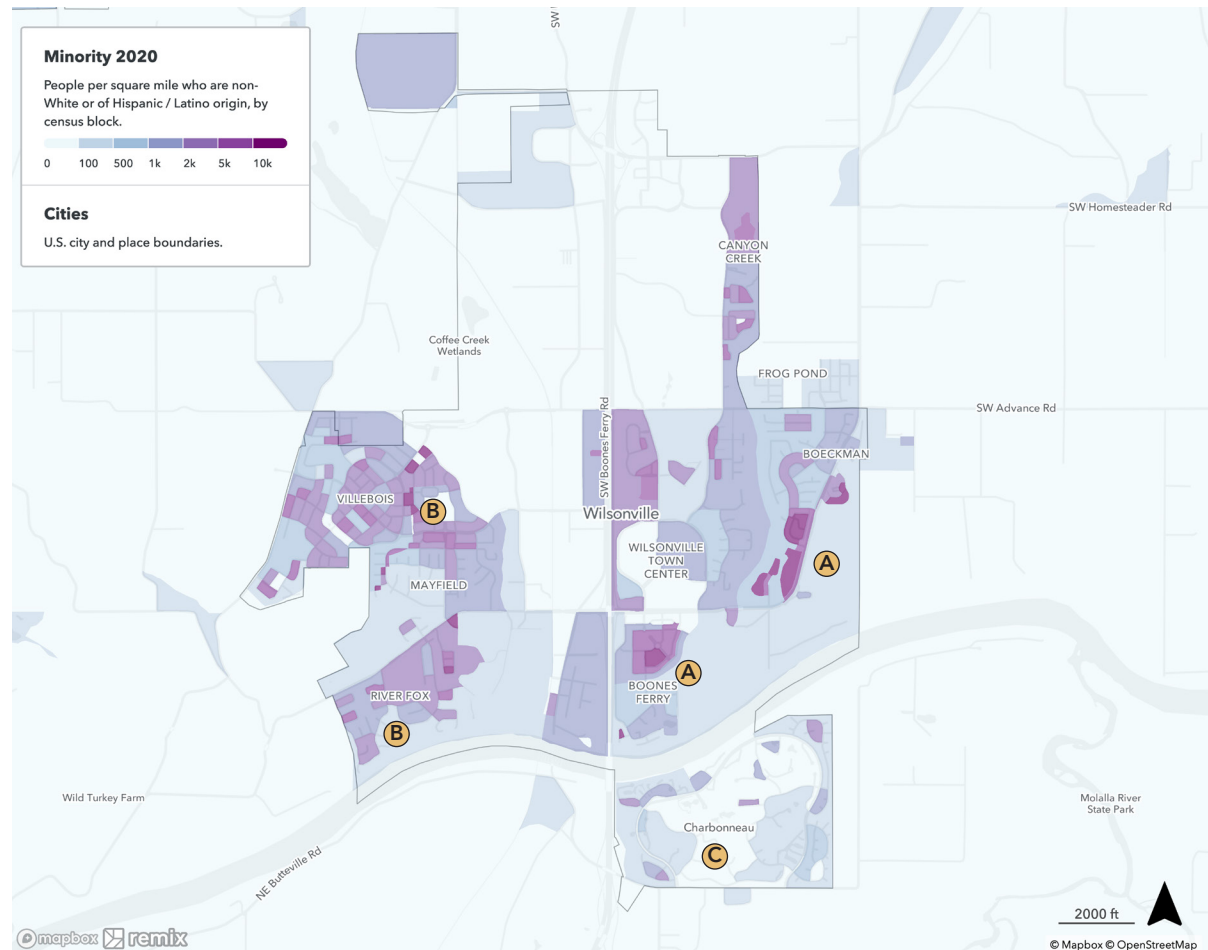


Figure 100: Density of Minority Residents

Residents in Poverty

A common goal for transit service is to provide affordable transportation for lower-income people, who are less likely to own cars. Understanding where lower-income populations are located is also a key civil rights requirement.

Transit can be an attractive travel option for low-income people due to its low price. SMART fixed route service is free, except for Route 1X - Salem. In dense areas with walkable street networks, this can produce high ridership. However, if transit doesn't actually allow people to make the trips they need in a reasonable amount of time, even people with fewer financial resources will have a strong incentive to finding other ways to get where they need to go.

In Wilsonville, the density of people in poverty tracks closely with overall density. The highest concentrations are found in the block group enclosing Town Center Loop and nearby apartments **A**, as well as the dense areas further east along Wilsonville Rd **B**.

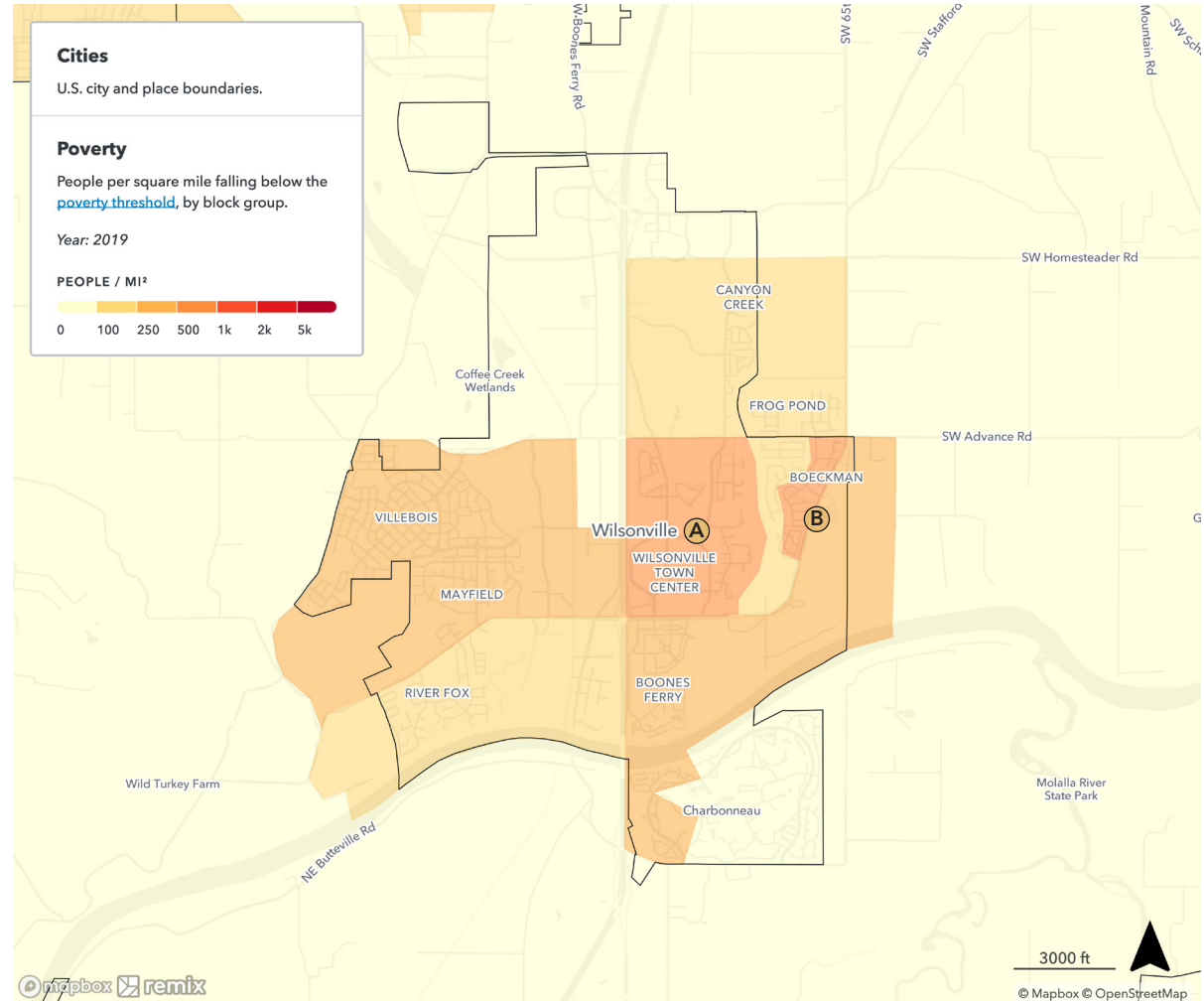


Figure 101: Density of People of in Poverty

Senior Residents

Figure 102 shows the density of senior residents in Wilsonville. Seniors constitute around 15% of the total population in Wilsonville, and some of Wilsonville’s highest-density housing is found in apartment developments oriented towards older adults.

While older adults are present in all residential areas, there are some notable concentrations in areas that are home to higher-density senior housing developments, as on the west side of Charbonneau **A**, in the residential areas northwest of Wilsonville Town Center **B**, and on the western edge **C** of Villebois .

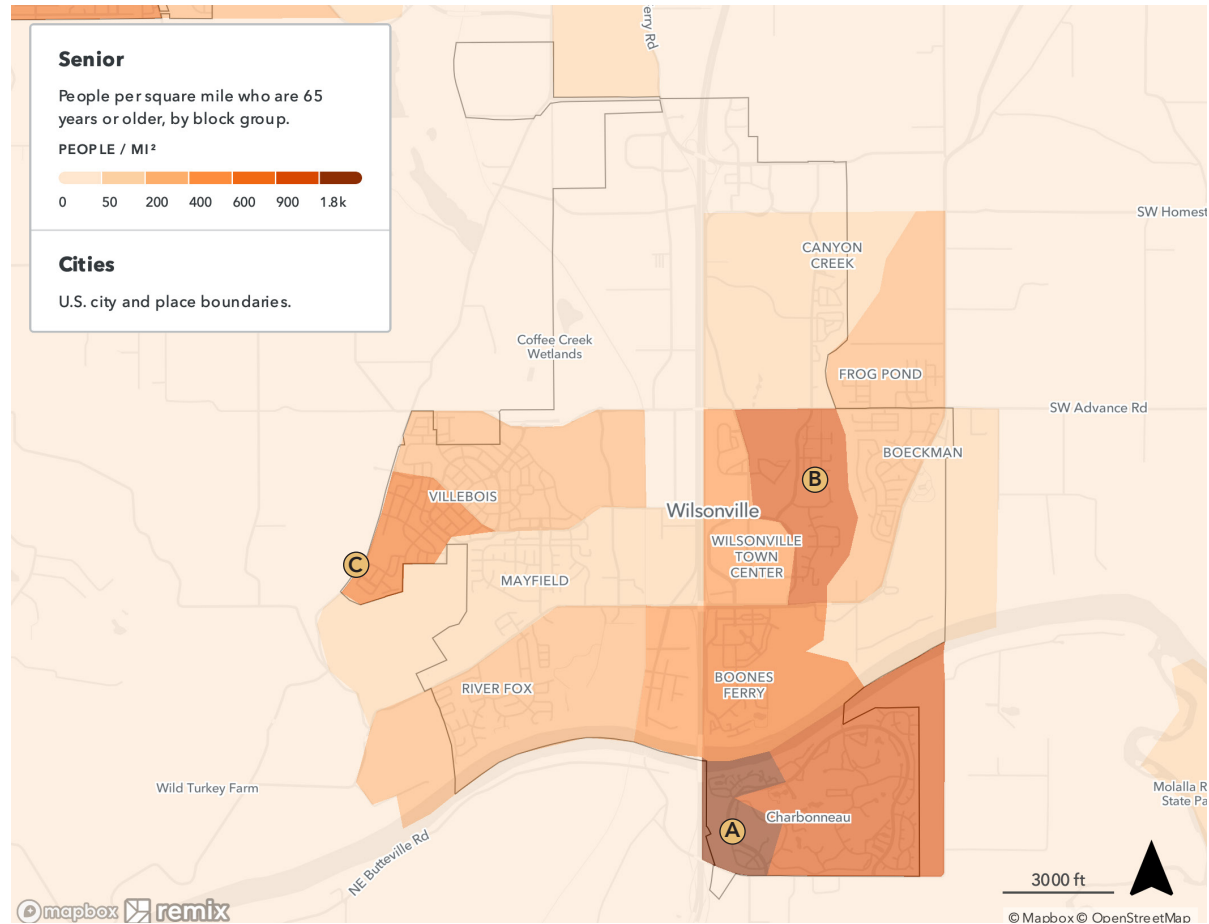


Figure 102: Senior Density

Younger Residents

Just as transit coverage can meet the needs of seniors who cannot or choose not to drive, transit service can also be a useful option for the travel needs of children and teenagers who are too young to drive.

Figure 103 shows the density of residents under the age of 18 in each Census block group in Wilsonville. Children under the age of 18 constitute around 20% of the total population in Wilsonville. The highest densities of younger people are found in the dense housing areas along Canyon Creek **A** and Wilsonville Town Center **B**, as well as in Villebois **C**.

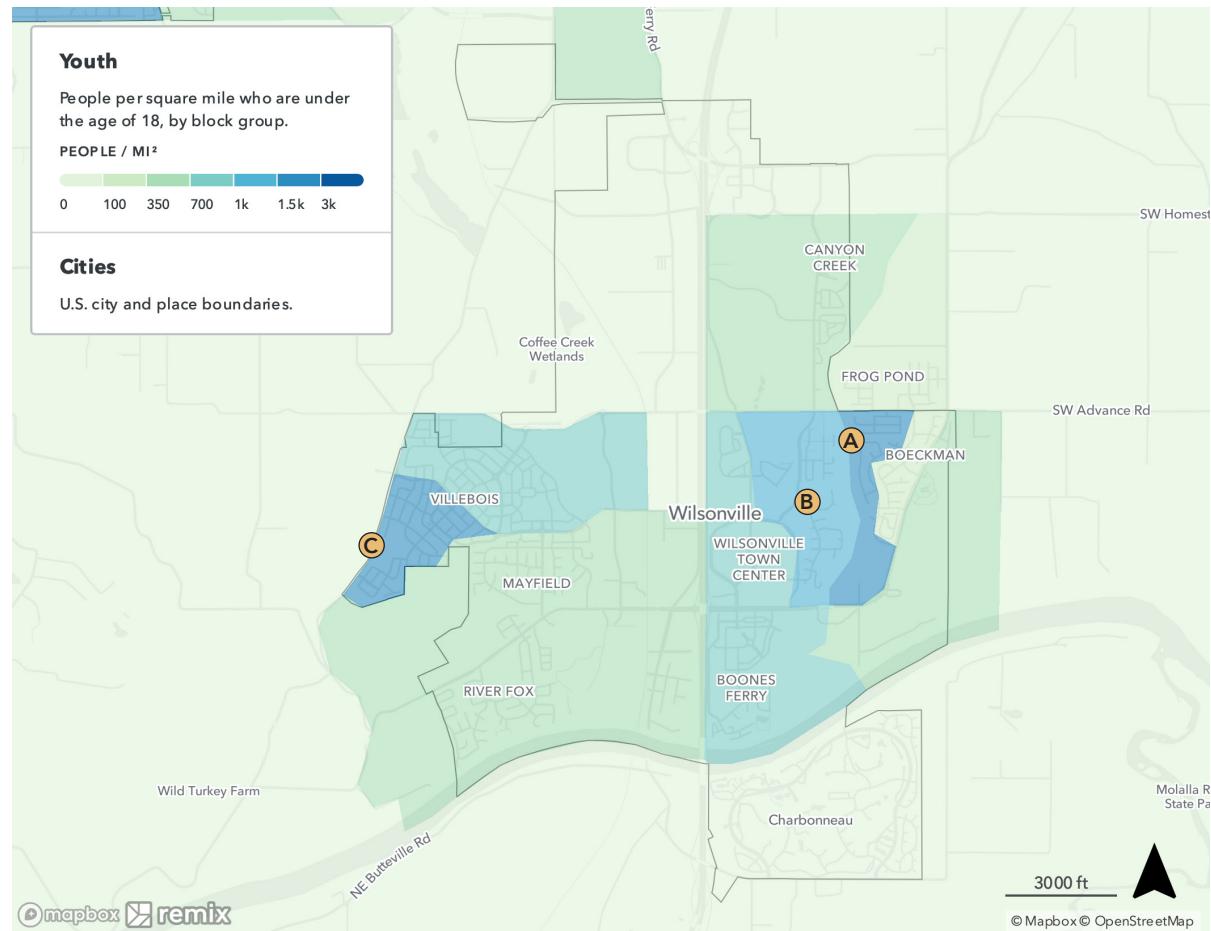


Figure 103: Youth Density

Walkability

Walkability is one of the most important factors determining whether transit is likely to generate higher ridership. If it is not safe or convenient to walk to a stop, few people are likely to choose to do so unless they have few other travel options.

Figure 104 shows an estimate of how walkable different parts of Wilsonville are based on street connectivity.

This measure compares the area reachable “as the crow flies” to the area actually accessible using the existing street network. While this measure is not sensitive to the quality of infrastructure, it does show where walking trips are likely to be shorter or longer.

Wilsonville’s street layout is generally circuitous, with a low degree of connectivity between individual neighborhoods or developments. Connectivity is highest around the commercial areas east and west of I-5 **(A)**, as well as in Villebois **(B)** which was designed with a grid street pattern. Connectivity is lower in most other parts of the city, even in areas of high density along the eastern half of Wilsonville Rd **(C)**.

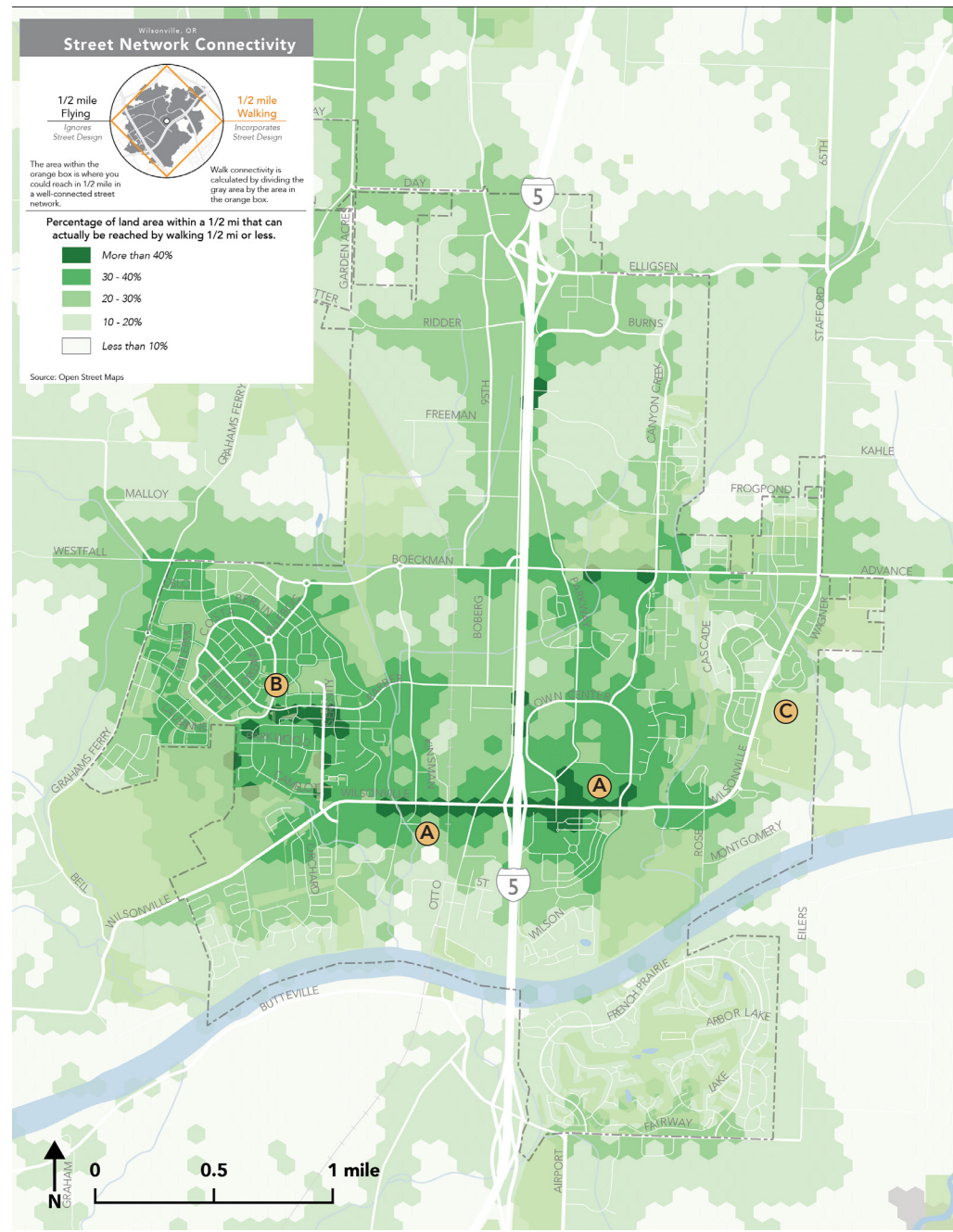


Figure 104: Street Network Connectivity

New Service Areas

There are changes to the urban form of Wilsonville happening right now or coming in the near term that future planning for the transit network must consider.

Wilsonville Town Center & I-5 Pedestrian Bridge

The Wilsonville Town Center Plan was developed in 2019 and created new conceptual land use concepts and recommendations for the future of the Town Center area. The Plan proposed to update the Town Center into a mixed-use, walkable, and transit accessible space that is a central hub of the community. The future Town Center could potentially have an additional 800 residential units over the next 20 years. **Figure 105** shows the proposed pedestrian bridge and planned multimodal network from the Town Center Plan.

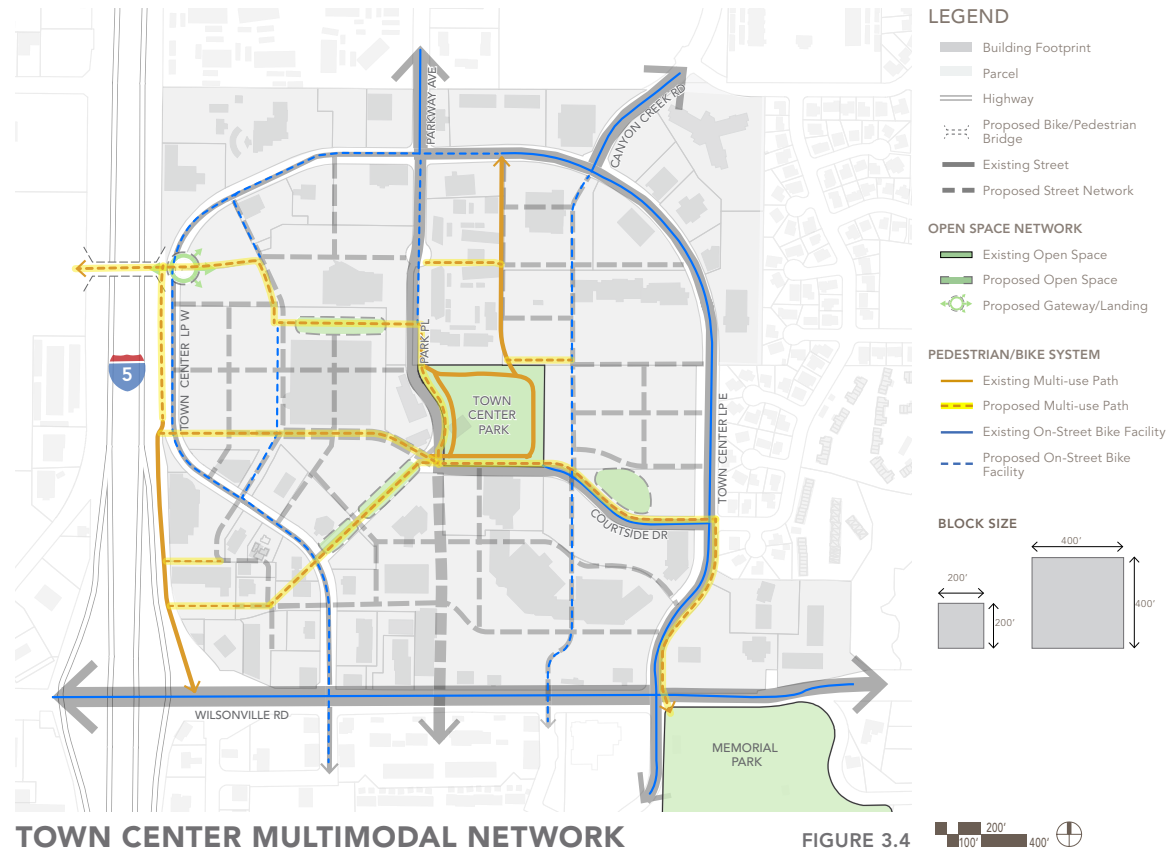


Figure 105: Planned Town Center Multimodal Network

I-5 Pedestrian Bridge

The Wilsonville Town Center Plan included a recommendation of a Bike/Pedestrian system in the area, and included a proposed Bike/Pedestrian Bridge that connected the Town Center to the Wilsonville Transit Center. This will provide

connections to nearby employment areas, multi-family housing, and Wilsonville's Town Center commercial center.

Frog Pond

A new residential area is currently under construction near the intersection of Stafford Rd and Boeckman Rd. The master plan for this area was completed in 2015, and identifies three new neighborhood areas at the edge of the urban growth boundary that will incorporate development at low and moderate densities - single-family homes, and attached townhouses. **Figure 106** reproduces the neighborhood framework map from the 2015 Frog Pond Area Plan.

If fully built-out, the entire Frog Pond development would add nearly 2000 units to Wilsonville's housing stock. However, only portions of the western neighborhood are under construction or built so far, and only these areas are within the UGB at present. If completed as described in the original master plan, the western Frog Pond development would consist of approximately 600 single-family units located northwest of the Stafford/Boeckman intersection.

While not complete, the Frog Pond development has already produced one important change relevant to the transit network: the signalization of the Stafford / Boeckman intersection. Previously an uncontrolled four-way stop, the intersection now has dedicated left turn lanes for all four approaches, as well as improved sidewalks and bike lanes.

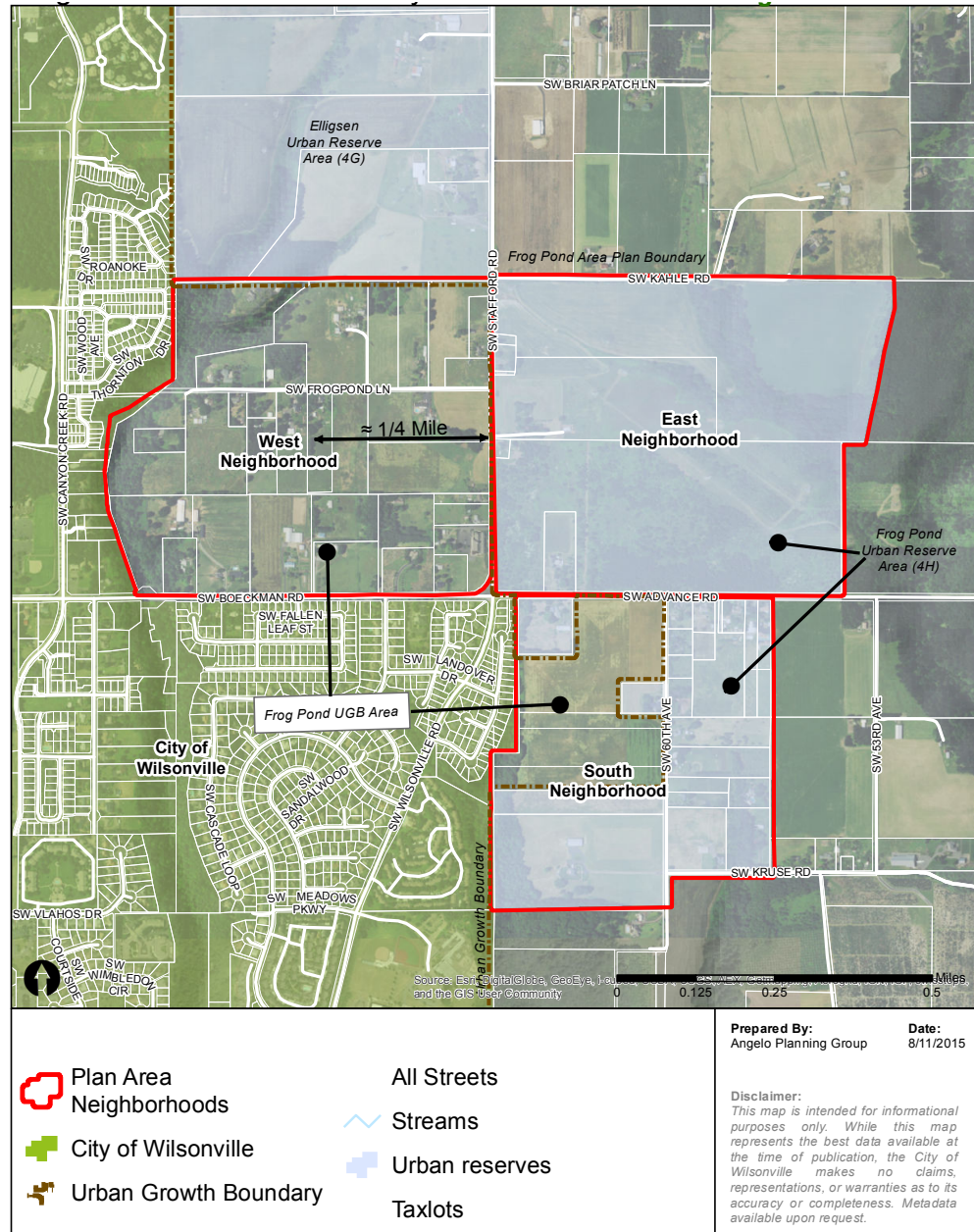


Figure 106: Frog Plan Neighborhood Framework

5. SMART's Regional Markets

SMART is Wilsonville’s transit agency, but its role is not just to move people within the city. SMART also provides connections to neighboring communities like Salem, Tualatin and Canby, facilitating the movement of people back and forth around the southern portion of the Portland region and Mid-Willamette Valley.

A majority of jobs in Wilsonville are held by people arriving from other parts of the region to work, and many of the city’s residents work in jobs located outside of Wilsonville. **Figure 107** shows the number and percent of workers living or employed in Wilsonville who commute to or from somewhere else, based on US Census LEHD data for 2019 (the most recent time period available). In both cases, only a small minority live and work in Wilsonville: about 9% of people employed in Wilsonville live in the city, while about 16% of workers living in Wilsonville work in the city.

These statistics speak to the importance of regional connections for SMART. As SMART seeks to improve its network in the future, one important question is which regional connections should it focus on? Are there connections that exist today that should be the target of more investment, to make them more useful and reliable for travel all

day? Or, are there regional markets that aren’t served at all, and where a new transit connection could make new trips possible?

This chapter provides a description of SMART’s potential regional markets, organized into three broad directional axes:

- East & Northeast, including Oregon City, Milwaukie, the Harmony area, the east side of Portland, Gresham and Sandy.
- West & Northwest, including Tualatin, Tigard, Yamhill County, Beaverton, Hillsboro, and downtown Portland.
- South, including Canby, Salem, Woodburn, Donald, and Molalla.

Today, SMART services extend from Wilsonville in all three directions, but these services are not useful for every type of trip. As

Segment	Count	%
Workers Employed in Wilsonville	18,220	100.00%
<i>Living Outside Wilsonville</i>	16,643	91.30%
<i>Living Inside Wilsonville</i>	1,577	8.70%
Workers Living in Wilsonville	9,722	100.00%
<i>Employed Outside Wilsonville</i>	8,145	83.80%
<i>Employed Inside Wilsonville</i>	1,577	16.20%

Figure 107: Wilsonville Commuting Inflow/Outflow

SMART considers future regional service improvements, it is important to begin with a solid sense of what those markets look like: their key destinations, the volume of people moving through them, and the existing transit connections.

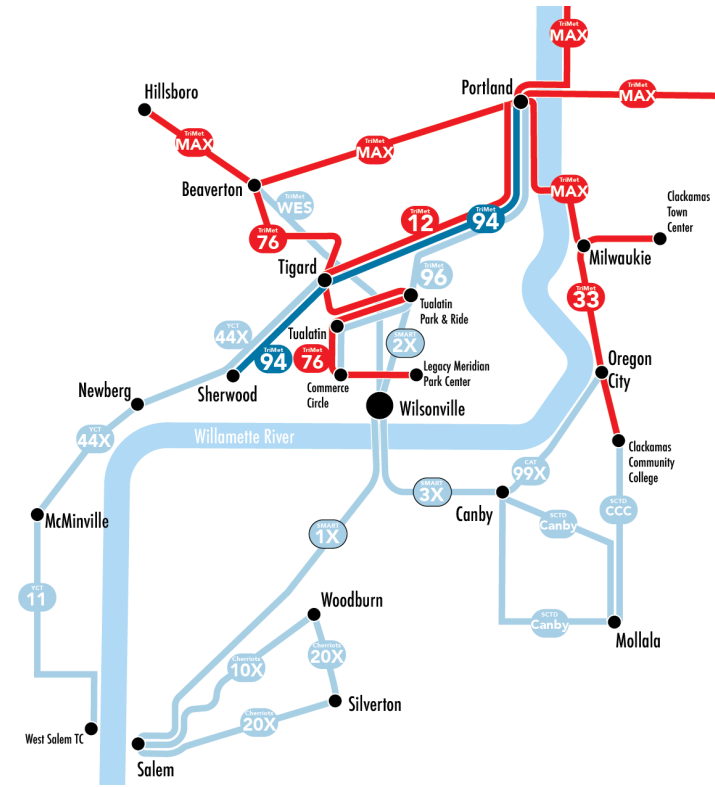


Figure 108: SMART Regional Connections

Wilsonville Trips

Figure 109 uses the same data source to show the 25 communities with the greatest number of commute trips to or from Wilsonville. This table represents the total volume of work-based travel, based on the same US Census information on where workers home and employment locations. The general direction of travel from Wilsonville is noted, with **west/northwest destinations shown in blue**, **south destinations shown in green**, and **east/northeast destinations shown in orange**.

Portland is the largest single connection: over 4,600 people either live in Wilsonville and work at employers in Portland, or the reverse. Of these trips to or from Portland, 1,456 involve a home or work location east of the Willamette River.

Wilsonville local trips are the second most common, followed by a range of Washington County cities - Tualatin, Beaverton and Tigard. These are the connections served by WES during rush hours (but not at other times).

Of trips between Wilsonville and the top 25 connections, over 60% are towards the west / northwest or to Portland. About 11% head south, and about 11% head east / northeast. About 19% of home/work pairs involve a location outside of Wilsonville representing less than 1% of the total number of workers; these included 2019 telecommuters.

City	Direction	Total Trips	Pct of Total
Portland	W/NW, E/NE	4644	15%
Wilsonville	Local	1802	11%
Tualatin	W/NW	1416	4%
Beaverton	W/NW	1399	4%
Tigard	W/NW	1394	4%
Salem	S	1137	4%
Hillsboro	W/NW	1025	3%
Lake Oswego	W/NW	934	3%
Woodburn	S	725	2%
Canby	E/NE	718	2%
Oregon City	E/NE	612	2%
Sherwood	W/NW	575	2%
West Linn	W/NW	517	2%
Newberg	W/NW	495	2%
Gresham	E/NE	444	1%
Aloha	W/NW	406	1%
Vancouver	W/NW	258	1%
Milwaukie	E/NE	256	1%
Keizer	S	246	1%
Happy Valley	E/NE	211	1%
Eugene	S	206	1%
Albany	S	176	1%
McMinnville	W/NW	175	1%
Hubbard	S	161	1%
Oak Grove	E/NE	158	<1%

Figure 109: Commute trips to and from Wilsonville (top 25)

South Metro Regional Trips

While SMART is the City of Wilsonville's transit agency, its full name ("South Metro Area Regional Transit") speaks to a broader challenge in regional mobility. Unlike in TriMet's service area to the north, no single entity is responsible for coordinating and designing regional connections. However, transit works as a network; when SMART establishes routes between Wilsonville and Tualatin and Wilsonville and Canby, it is also creating at least the potential for a service that could be useful for someone traveling from Canby to Tualatin, even if they have no business in Wilsonville at all.

Figure 110 uses LEHD data from 2019 to show the number of workers moving between each of the cities south of the TriMet district and north of Cherriots' service area. Not every connection shown here could potentially involve SMART; for example, Tigard - Tualatin or Tualatin - Sherwood transit trips will always happen via TriMet routes.

Other trips are more relevant to SMART's service area. For example, about 396 people move between Canby and Tigard; on transit. The most logical way to make this trip is through Wilsonville (via Route 3X and WES, or potentially via 2X and TriMet Line 76), although today's network is not optimized to facilitate this movement.

Some of the most numerous connections

South Metro Area Job Flows
Number of workers moving between cities

	Aurora	Barlow	Beavercreek	Butteville	Canby	Dayton	Donald	Dundee	Hubbard	McMinnville	Molalla	Mulino	Newberg	Sherwood	St. Paul	Tigard	Tualatin	Wilsonville	Woodburn
Aurora	7				39		7	1	28	6	12	2	12	9	2	22	21	46	51
Barlow		0			4									4		4	4	10	2
Beavercreek	0	0	67		54		4		4	7	48	19	14	10		80	67	48	18
Butteville	0	1		2	15		4		2	3	5		5	3	1	6	7	15	7
Canby	39	4	54	15	1378		29	12	127	68	260	54	118	131	4	396	455	722	383
Dayton			1	1	3	61	3	10	1	267		2	96	13	5	34	37	17	16
Donald	7	0		4	29		12		18	22	13	2	40	16	4	22	28	45	41
Dundee			1		12	10	2	31	1	335	3		270	48	1	74	92	57	27
Hubbard	28	0	4	2	127		18	1	67	31	39	7	33	21	7	80	103	161	265
McMinnville	6		7	3	68	267	22	335	31	5894	28	3	1132	140	6	358	333	176	195
Molalla	12	1	48	5	260		13		39	28	572	82	51	32	2	152	138	158	162
Mulino	2		19	1	54		2		7	3	82	31	8	10	1	42	22	37	14
Newberg	12	2	14	5	118	96	40	270	33	1132	51	8	2226	537	24	822	887	509	181
Sherwood	9	4	10	3	131	13	16	48	21	140	32	10	537	834	10	1022	1115	575	155
St. Paul				1	4		4		7	6			24	10	9	5	9	6	24
Tigard	22	4	80		396	34	22	74	80	358	152	42	822	1022	5	3587	2911	1364	432
Tualatin	21	4	67		455	37	28	92	103	333	138	22	887	1115	9	2911	2081	1560	736
Wilsonville	46	10	48	15	722	17	45	57	161	176	158	37	509	575	6	1364	1560	1803	718
Woodburn	51	2	18	7	383	16	41	27	265	195	162	14	181	155	24	432	736	718	1866

LEHD 2019

Figure 110: South Metro Regional Jobs Flows

that involve crossing through Wilsonville include Tualatin - Woodburn (736 trips), Tigard - Woodburn (432 trips), Tigard - Canby (396 trips), and Molalla-Tigard (152 trips).

Just because a trip passes through

Wilsonville doesn't mean that SMART could or should serve that destination pair. However, these commuting data do illustrate the potential need and opportunity for future improvements in connections between south metro area cities.

East / Northeast Connections

Many important destinations are located along the 99E corridor to the northeast of Wilsonville, including a variety of services in Oregon City, the Clackamas County seat. **Figure 111** and **Figure 112** show the density of population and jobs in this area.

North of Oregon City, residential and commercial development becomes more intense in inner Portland suburbs like Milwaukie. One of the region's largest retail and industrial job centers is located in the Harmony area near the Clackamas Town Center mall, north of the I-205 / 224 interchange. Service between Wilsonville and Canby and Canby and Oregon City exists today at approximately hourly frequency, and multiple TriMet routes serve Oregon City and points north.

Canby

Today, regional connections between Wilsonville and the 99E corridor begin in the town of Canby. SMART's 3X connects with Canby Area Transit's 99X serving Oregon City and Woodburn. While Canby has few major destinations of its own, over 700 workers either live or work between Wilsonville and Canby.

Oregon City

Oregon City is about 15 miles northeast of Wilsonville. With a population of over 35,000 residents, 15,000 jobs, a major

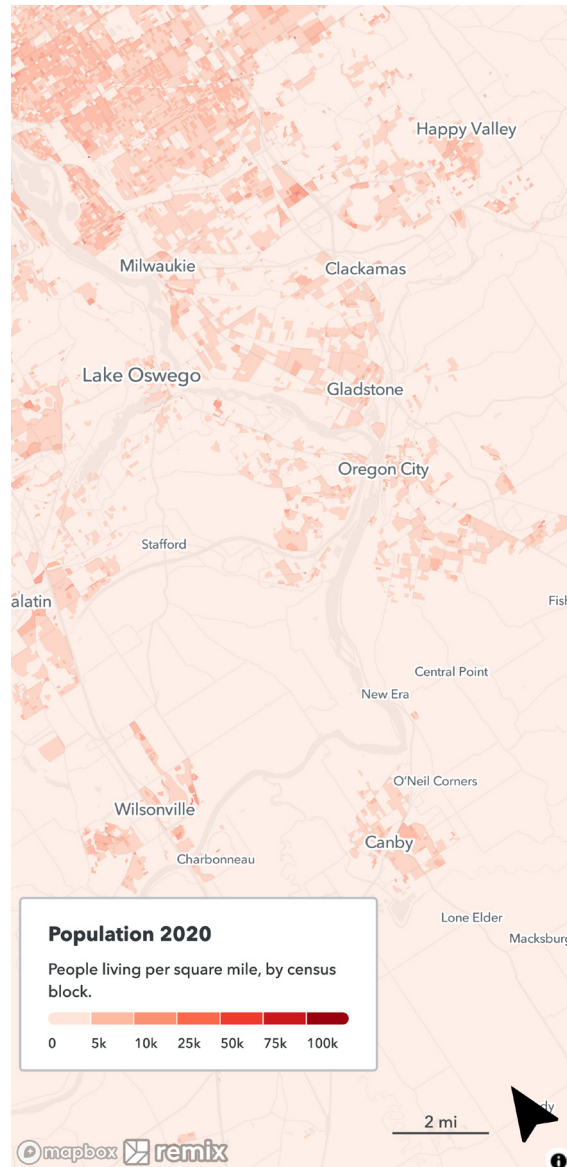


Figure 111: 99E Area Population Density

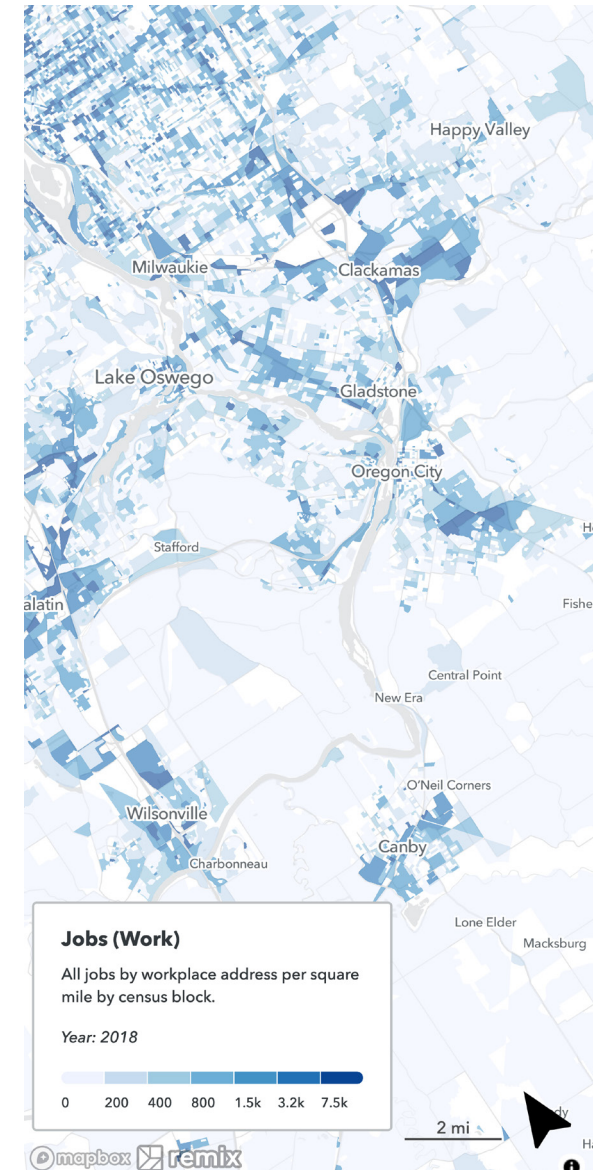


Figure 112: 99E Area Job Density

Clackamas Community College campus, and multiple shopping and recreation areas, Oregon City is a key destination for Wilsonville residents. The Beavercreek Employment area located near Clackamas Community College is a large industrial site that is currently being developed and is planned to create over 1,500 jobs. TriMet and Canby Area Transit (CAT) currently provide service in the city, along with a new county shuttle that provides additional service within the city. Approximately 612 workers commuted between Wilsonville and Oregon City in 2019.

A transit trip to Oregon City involves a straightforward transfer between Route 3X and CAT's 99X in Canby. Depending upon when a rider is traveling, this can take under an hour during rush hours, or about 80 minutes during midday when the 3X and 99X schedules don't align well.

Milwaukie

Milwaukie is located about 19 miles north from Wilsonville. An inner suburb of Portland, Milwaukie is home of the southern terminus of TriMet's Orange Line, and is served by multiple frequent bus routes. There are over 1,500 companies located in the city, and the North Milwaukie Industrial Area is a major jobs center with over 80 businesses and 2,000 employees. About 256 people commuted between Milwaukie and Wilsonville in 2019. Today, Milwaukie is a 3-transfer trip from Wilsonville; the simplest way to reach downtown Milwaukie

City	Direction	Total Trips
Portland	W / NW, E / NE	4644
Wilsonville (home and work)	Local	1802
Canby	E / NE	718
Oregon City	E / NE	612
Gresham	E / NE	444
Milwaukie	E / NE	256
Happy Valley	E / NE	211
Oak Grove	E / NE	158

Figure 113: East / Northeast Commute Trips to/from Wilsonville

uses SMART Route 3X, CAT's 99X, and TriMet's Line 33. Due to the low frequency of 3X and 99X and inconsistently scheduled connection, this trip generally takes over 80 minutes.

Harmony

The Harmony area east of Milwaukie is another major destination. Harmony is home to Clackamas Town Center and a variety of other nearby retail businesses, as well as the Kaiser Sunnyside Medical Center. The Clackamas Industrial Area located east of I-205 is a major employment site with warehousing and distribution centers. The Harmony area has a mix of activities that draws people from all over the region.

Harmony is also an important transit connection point for trips between Clackamas County and Portland. TriMet's Green Line and Line 72-82nd / Killingsworth services

end here.

While Clackamas Town Center is a major transit node, reaching it from Wilsonville is very challenging, involving a three-transfer trip on Route 3X, CAT's 99X, and one of the several TriMet routes that travel between Oregon City and Clackamas. This takes over an hour and twenty minutes, even during the AM rush hour. SMART is currently preparing for a grant-funded pilot project to test express service between Wilsonville, Oregon City and Clackamas Town Center using bus-on-shoulder operations along I-205.

Portland (east of Willamette River)

While Downtown Portland is the traditional focus of the "peak commute", the section of the city east of the Willamette River is also full of places people might need to travel. About 1400 people commute to or from the east side of Portland and

workers and patrons from all over the region.

Gresham

Gresham is located about 33 miles north-east of Wilsonville. Gresham is the region's second largest city, and is home to a wide array of major employers. Gresham is also well-served by TriMet, but completing a trip between Gresham and Wilsonville is very challenging. At rush hour, it may be possible using WES and the Blue Line, with a likely total travel time of over 90 minutes. At midday, itineraries using a combination of 2X and TriMet bus services require well over 2 hours.

Sandy

Sandy is about 34 miles northeast of Wilsonville. Sandy Area Metro (SAM) provides connections to Gresham and Estacada, and the Mt. Hood Express provides a connection from Sandy to Mt. Hood. Sandy has a strong recreational industry because of its proximity to Mt. Hood.

Connecting Routes

Transit connections east and northeast of Wilsonville depend on SMART's Route 3X and Canby Area Transit's 99X. While the trip between Wilsonville and Canby is quick (just over 20 minutes), the travel time of the second leg is highly variable because 3X and 99X are not scheduled

Destination	Peak Travel Time	Midday Travel Time
Canby Transit Center	21 minutes	21 minutes
Oregon City Transit Center	50 minutes (7:30 am), 45 minutes (5:35 pm)	80 minutes
Milwaukie Transit Center	83 minutes	82 minutes
East side Portland (Gateway Transit Center)	82 minutes	137 minutes
Gresham Transit Center	108 minutes	159 minutes
Downtown Sandy	146 minutes	205 minutes

Figure 114: Travel times to selected E/NE destinations from Wilsonville

to facilitate a fast connection during the middle of the day. Because Oregon City is the gateway to connections to all other important places on the east side of the region, this produces a similar expansion of travel times for all eastside destinations during the midday.

West / Northwest Connections

Washington County begins within Wilsonville's boundary, and includes some of Oregon's largest employers and fastest growing cities. Tualatin, Beaverton and Tigard are the three largest origin/destination pairs for Wilsonville workers, and while a longer trip, Hillsboro is also in the top 10. TriMet's WES commuter rail was developed in order to serve the intense demand for north-south travel through Washington County, and while it currently does not carry a substantial portion of the corridor's trips, the needs that it addresses continue to be major topics in transportation planning in the region.

To the west, the Yamhill County cities of Newberg and McMinnville have a smaller share of Wilsonville worker home or employment locations, but there is substantial travel demand along the 99W corridor. YCAT services connect to the TriMet network at Tigard Transit Center.

Tualatin

Tualatin is located 6 miles north of Wilsonville. The city provides a significant number of advanced manufacturing, information technology, and health services jobs. Nyberg Woods is a key retail destination in the city. Over 750 commuters travel from Wilsonville to Tualatin, and over 600 commuters travel from Tualatin to Wilsonville.

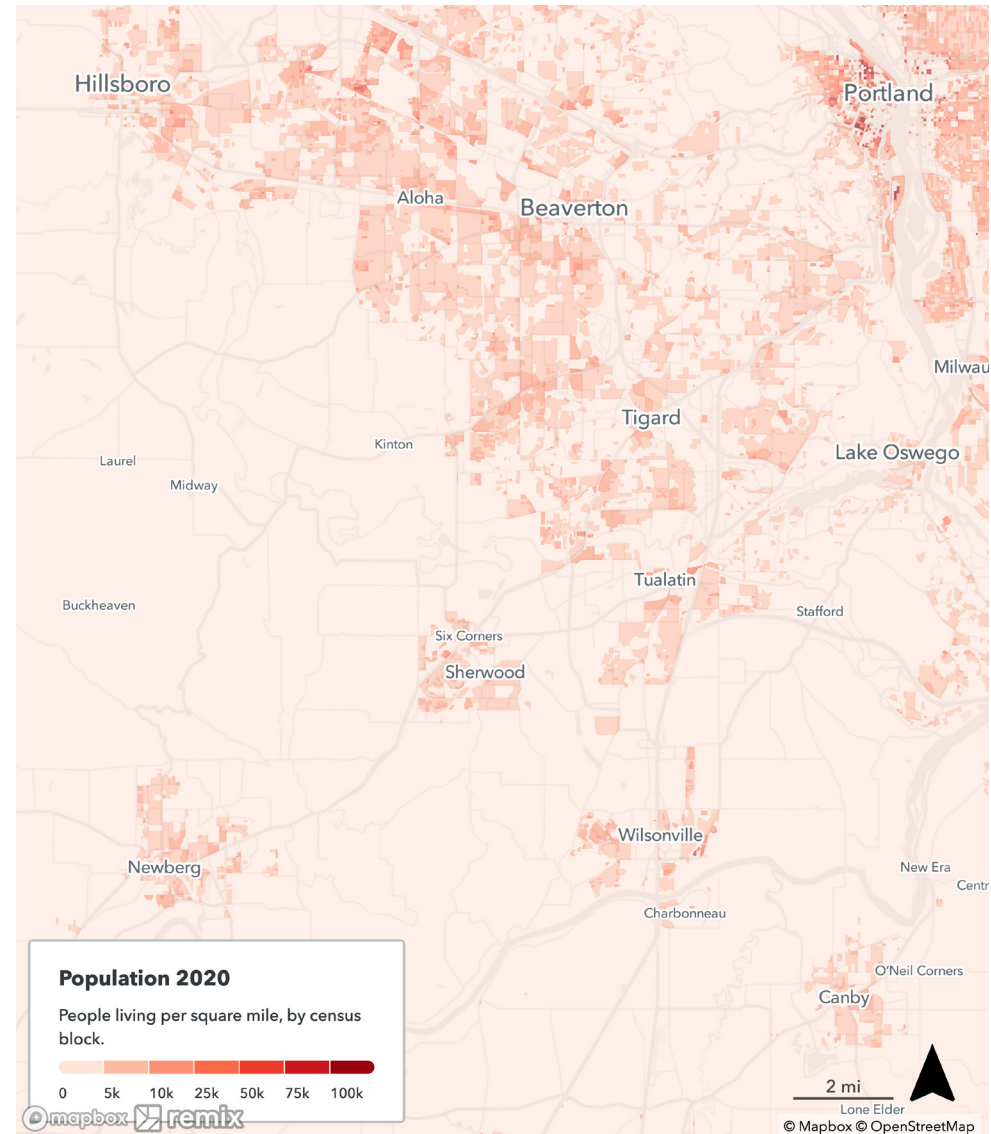


Figure 115: West / Northwest Population Density

SMART's Route 2x goes to Tualatin Park & Ride, and the Medical Shuttle goes directly to the Legacy Meridian Park Medical Center. The WES is also available as a peak service option to reach Tualatin. The Tualatin Shuttle offers connections from WES to various job sites, such as Lam Research, the Tualatin Business Center, and Tualatin Distribution Center. TriMet's Line 36, 37, 38, 76, 96, and 97 connect Tualatin to many regions including Portland, Lake Oswego, Tigard, Beaverton, Wilsonville, and Sherwood.

Tigard

Continuing further north of Tualatin is the city of Tigard, which is located 11 miles north of Wilsonville. Bridgeport Village and Washington Square Mall are major commercial centers. Over 700 commuters travel from Wilsonville to Tigard, and over 650 commuters travel from Tigard to Wilsonville. In addition to having a WES station, TriMet's Line 12, 45, 64, 76, 78, and 94 all serve Tigard Transit Center and provide connections to Beaverton and SW/ Downtown Portland. Yamhill County Transit (YCAT) also provides a connection to McMinnville from Tigard's Transit Center.

Beaverton

Beaverton is about 15 miles north of Wilsonville. The WES provides limited service from Wilsonville to Beaverton Transit Center. From there, travelers can take the Blue or Red MAX line, or several

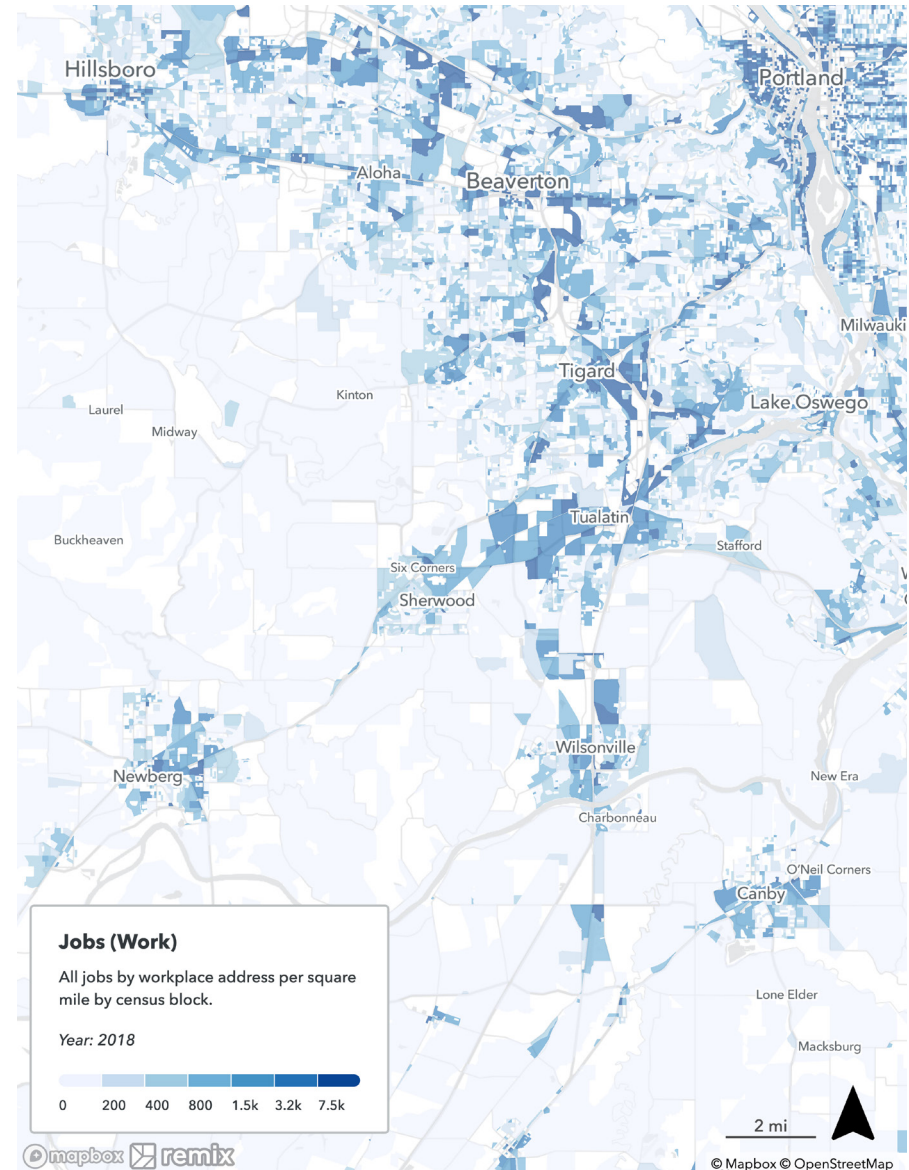


Figure 116: West / Northwest Employment Density

TriMet bus lines to travel throughout Beaverton and to Downtown Portland.

Hillsboro

Hillsboro is a key employment center in the region, with many computer, electronics, and software companies located in the city. Intel is a major employer, with over 20,000 employees. About 500 workers travel from Wilsonville to Hillsboro, and vice versa. Currently, transit service between Wilsonville and Hillsboro is extremely limited and requires multiple transfers. Hillsboro is about 30 miles away from Wilsonville, and it can take about 2 hours to travel between the two cities via public transit.

Yamhill County

Yamhill, McMinnville, Newberg, and other smaller cities are located in Yamhill County, about 30 miles west of Wilsonville. Yamhill County Transit provides service between the cities in the county, and to other cities in the region, including Hillsboro, Salem, and Tigard. There is no direct service from Yamhill County to Wilsonville. For example, to travel from Wilsonville to McMinnville, it takes over 3 hours. Transfers must be made at Tualatin and Tigard, or at Beaverton and Hillsboro. Over 200 commuters travel from Wilsonville to Yamhill County, and over 900 commuters travel from Wilsonville to Yamhill County. Chemeketa Community College, Linfield College, and George Fox University are

Destination	Peak Travel Time	Midday Travel Time
Downtown Portland	55 minutes	106 minutes
Tualatin Park and Ride	36 minutes	36 minutes
Tigard Transit Center	20 minutes	63 minutes
Hillsboro TC	68 minutes	128 minutes
Beaverton TC	29 minutes	93 minutes
Downtown Newberg	66 minutes	142 minutes

Figure 117: Travel times to selected W/NW destinations from Wilsonville

key educational destinations in the county.

Southwest and Downtown Portland

Southwest/Downtown Portland is about 17 miles north of Wilsonville. There are several industries in Portland, including tech, healthcare, and manufacturing. There are also several educational institutions in Southwest/Downtown Portland, including PCC, PSU, and OHSU. As described earlier, connections to Portland from Tualatin, Tigard, and Beaverton. It takes at least two transfers to travel between Wilsonville and Portland. Approximately 1,200 commuters travel from Wilsonville to Southwest/Downtown Portland, and almost 700 commuters from Wilsonville travel to the area.

County. When WES is not running, transit travel times to nearly all of these places are much longer. This is not just because WES is fast and runs in its own right-of-way; it is also because WES serves Tigard Transit Center, the major connection point for TriMet and YCAT services in southern Washington County. At midday, when only SMART's Route 2X is running, the variety of useful services that stop here (including Line 12 and 94 to Sherwood and Downtown Portland) are much more difficult to reach from Wilsonville, requiring an additional transfer.

Connecting Routes

When WES is running, it is the fastest way to travel north into Washington County, and to access connections into Yamhill

Southern Connections

SMART has long collaborated with Cherriots, the transit provider in Salem, to offer a consistent and useful service between Wilsonville and Salem via I-5. However, Route 1X focuses only on the Salem - Wilsonville connection; other important places between the two cities are more challenging to reach on transit, including even major employment and commercial destinations like Woodburn Premium Outlets. Similar to the connection to Oregon City, destinations along the Highway 99E corridor are reachable from Wilsonville via a transfer to CAT's 99X.

South of Woodburn, service is provided along 99E by Cherriots; Cherriots also serves Silverton and Mt. Angel.

Canby

Canby is located about 7 miles south of Wilsonville. SMART's Route 3x provides service to Canby. We included Canby in our discussion of regional connections to the east and northeast, but it is also important to consider in thinking about southern connections. Canby Area Transit's 99X serves all of Highway 99E from Woodburn to Oregon City, which in turn connects with Cherriots regional service (Route 10X) in Woodburn.

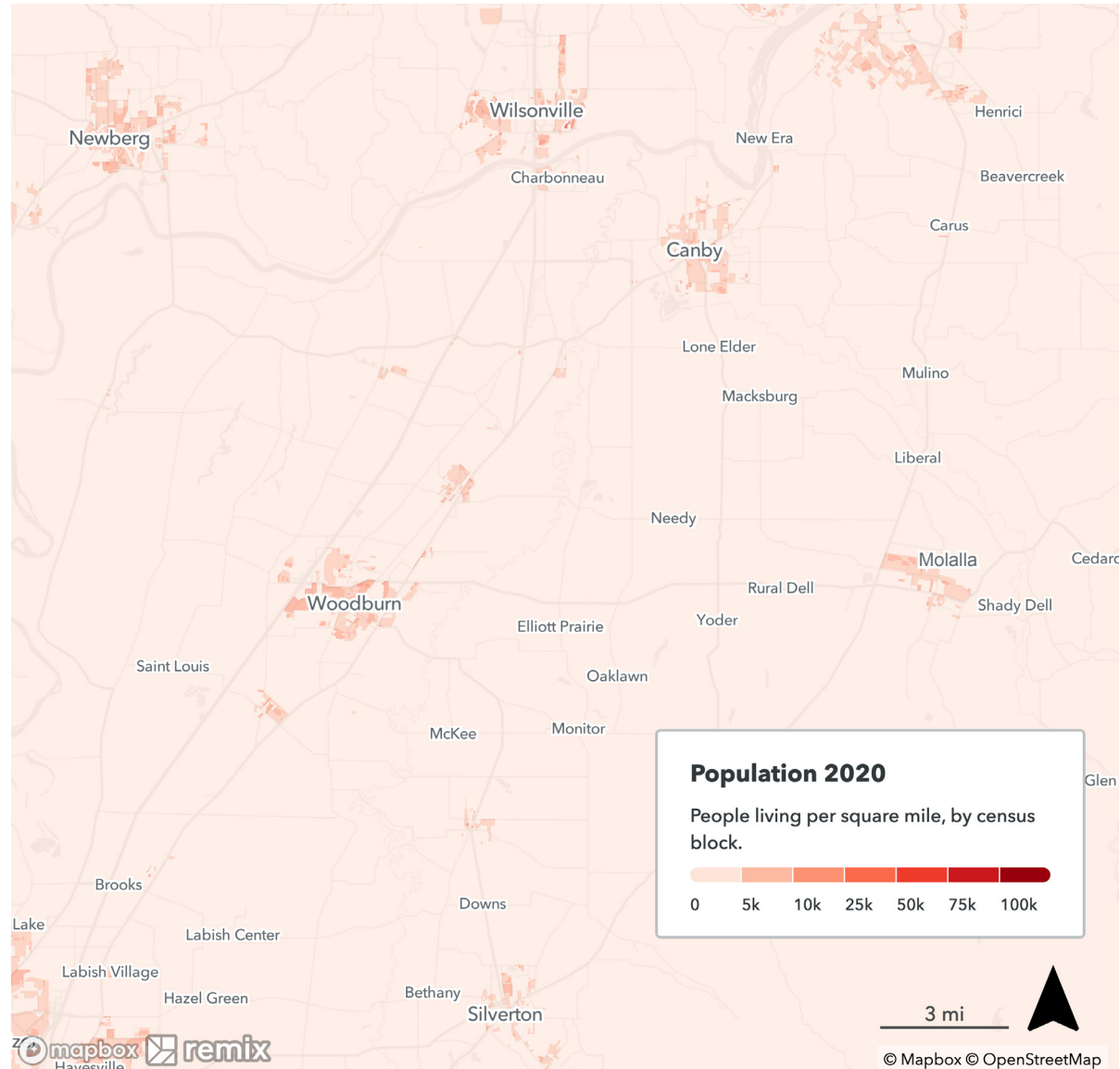


Figure 118: South Employment Density

Woodburn

Wilsonville and Woodburn are almost exactly the same size, and Woodburn is home of to a very large employment retail cluster in its outlet mall. Despite this, Woodburn is poorly connected by transit to neighboring communities, with the only regional services arriving in the east side of the city via 99E.

Canby Area Transit provides a connection to the northern edge of Woodburn with their 99X route. From there, travelers can take Cherriot's 10X route to Salem, or Woodburn Transit Service's Express bus loop to travel within Woodburn. Woodburn Premium Outlets is a large shopping center that provides many retail service jobs and draws in many travelers from across the region. About 150 commuters travel from Wilsonville to Woodburn, and over 550 commuters travel from Woodburn to Wilsonville.

Molalla

South Clackamas Transportation District (SCTD) also provides a connection from Canby to Molalla each hour, which is about 20 miles southeast of Wilsonville. While Molalla is a small community, about 160 people commute between Molalla and Wilsonville, with more than 80% of those coming to a job in Wilsonville. The SCTD service to Canby is consistent, but because the 3X midday schedule is less regular, travel times between the two cities are highly variable. SCTD also operates direct

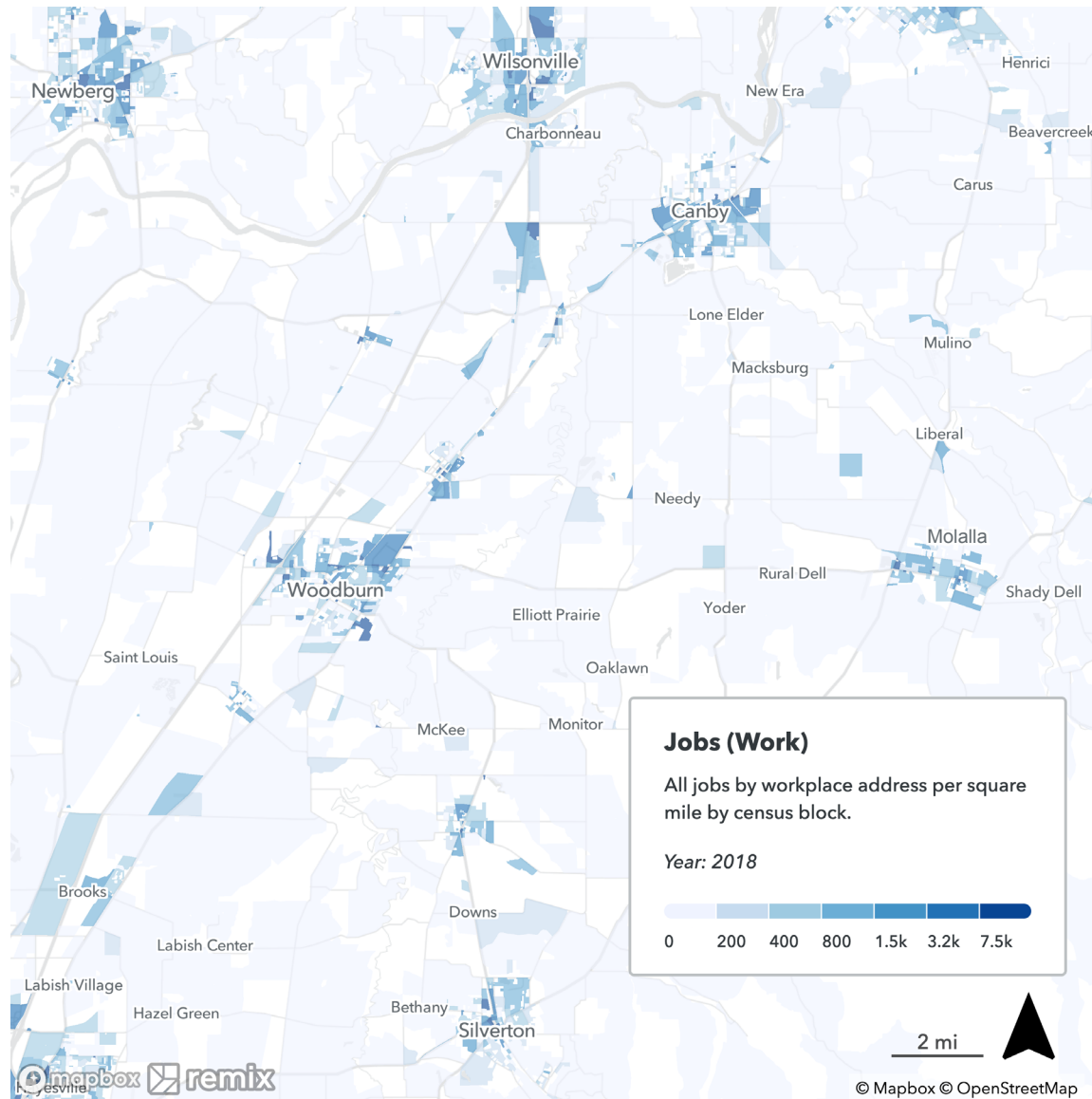


Figure 119: South Employment Density

service between Molalla and Clackamas Community College in Oregon City (also served by TriMet Frequent Service Line 33), so Canby is not a critical connection point for transit trips between Molalla and Oregon City.

Donald

Donald is approximately 7 miles south of Wilsonville. There is not a significant amount of commuters between Donald and Wilsonville, as about 5 commuters travel from Wilsonville to Donald, and 40 commuters travel from Donald to Wilsonville. Currently, no transit service exists between the two cities.

Salem

Salem is about 30 miles south of Wilsonville. A huge number of State of Oregon agencies and services are located in the city, making it an important employment destination for commuters from Eugene to Portland. Chemeketa Community College and Willamette University offer educational opportunities in the city. SMART and Cherriots' 1X provides service from Wilsonville to Downtown Salem.

Connecting Routes

Route 1X is a strong connection between Wilsonville and Salem, and ensures a consistent trip of under an hour between the two cities during both rush hours and the

Destination	Peak Travel Time	Midday Travel Time
Salem	48 minutes	45 minutes
Donald	No transit available	No transit available
Molalla	60 minutes (7:30 am), 100 minutes (4:35 pm)	92 minutes
Woodburn (Woodburn Prem. Outlets)	112 minutes	114 minutes
Woodburn (99E & 214)	56 minutes	86 minutes

Figure 120: Travel times to selected southbound destinations from Wilsonville

City	Direction	Total Trips	Pct of Total
Portland	W/NW, E/NE	4644	15%
Wilsonville	Local	1802	11%
Salem	S	1137	4%
Woodburn	S	725	2%
Keizer	S	246	1%
Hubbard	S	161	1%

Figure 121: Southbound Commute Trips to/from Wilsonville

midday. Connections to the other destinations are more variable.

Molalla and Woodburn are both reachable in about an hour during rush hour, but trips to Woodburn Premium Outlets take nearly two hours once the time to transfer to the local Express Loop is accounted for. Trips to Molalla also take substantially longer at midday because of the poor alignment of the schedules of the 3X and Molalla-Canby services.

Key Takeaways

The three directional travel markets described here are unique, and the service strategies that may work in one are not necessarily those that will work in other. Still, there are a few important observations worth making about the future potential for improving regional connectivity between Wilsonville and nearby communities.

Most of the key connections are already in place, but at low service levels that require long waits. Other than SMART's 1X, all of SMART's regional services run hourly. In Canby, they connect with another hourly service (Route 99X), and Route 99X in turn connects with hourly routes that reach Molalla and Salem. This structure offers a basic lifeline, but ensures that anyone who needs to use these routes is going to spend a long time waiting, lengthening overall travel time.

Some important existing connections are not consistently coordinated throughout the day. For example, SMART's 3X and 99X converge in Canby, making a trip to Oregon City or Woodburn possible. However, the schedules of these routes are not tightly integrated; at some times of day, they line up closely enough to provide a smooth connection in at least one direction; at other times, one route arrives soon after the other departs. The connection to 99E could be made much

more useful by designing a 3X schedule around the convergence with CAT's 99X, but this would likely require ending the practice of timing some of 3X's departures with WES.

When WES is not operating, north-bound service is much less useful.

WES is important not just because it is a high-capacity rail service, but because it connects Wilsonville to Tigard Transit Center, the major node of TriMet's south Washington County network. This connection doesn't exist at all during the midday - Route 2X serves Tualatin instead. Fewer routes meet at Tualatin, so fewer potential trips between Wilsonville and points north are effectively served during the middle of the day.

Woodburn is an important destination, but it is not integrated well with either I-5 or 99E services. SMART and Cherriots' 1X does not serve Woodburn, and CAT's 99X does not directly serve either the historic town center or Woodburn Premium Outlets. This means that trips between most of Woodburn and Wilsonville, Salem or Canby will require an added infrequent transfer, extending overall travel times. Of all of the sample trips evaluated in this chapter, trips between Wilsonville Transit Center and the outlet mall were among the longest.

6. Key Questions for Future Service Planning

The choices about what SMART should do in the future will be made based on input from the public, stakeholders and elected officials about what values, goals and priorities should shape the agency's service improvement efforts.

Based on our evaluation of existing conditions, we identify several key questions for the future.

How much should the SMART network be organized around WES?

WES connects stations in Wilsonville, Tualatin, Tigard and Beaverton. Because of its high operating cost, it only runs during weekday rush hours, every 45 minutes, with no service at midday, evenings or on weekends. As a result, ridership on WES has been very low, with the lowest levels occurring since the pandemic. Its operating cost per ride for TriMet is about 10 times the cost per bus ride and 12 times the cost per MAX ride.

TriMet owns and operates WES. Wilsonville's agreement to contribute operating funds expires in 2026, which makes this TMP update a timely opportunity to reevaluate the role of WES in the city's transit network and development plans, and affirm or change the degree of focus on WES.

Operating a single transit line (whether rail or bus) across both Wilsonville and TriMet's service territories requires a

special agreement. If WES were to be supplemented or replaced with a bus route that would require a new agreement with TriMet.

The existing transit network and schedules are fairly focused on WES. This focus has three general effects.

First, it is hard to talk about improving bus connections to Tigard and Beaverton, especially all-day connections, because WES already provides *something*. Yet an all-day connection is badly needed. Meanwhile, due to WES's high operating costs it is hard to justify running it at a better frequency or all-day.

Second, timed connections between WES and SMART buses are difficult to deliver. SMART's ability to set the right frequencies for local routes is limited by the choice to prioritize connections with WES.

Third, WES ends in a place in Wilsonville that is neither walking distance from the densest area of town (Town Center and Wilsonville Road) nor on the way to and from that dense area. As a result, any local route has to "choose" between taking residents and workers to WES, or taking them to the town center. This "dueling centers" problem means that local service is divided into more unique routes, with each route offering a poorer frequency than would be possible if the WES station were either on the way to the other town center, or walking distance from it.

As a result, there are two questions for this TMP update: Should non-WES connections to Tigard, Beaverton and points west be explored? And, how important are local route connections with WES?

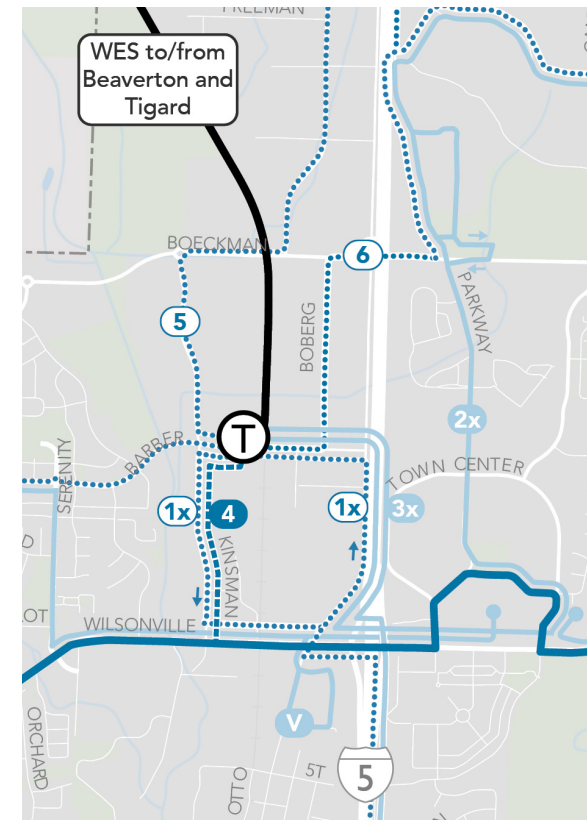


Figure 122: SMART's network has two "centers," separated by I-5.

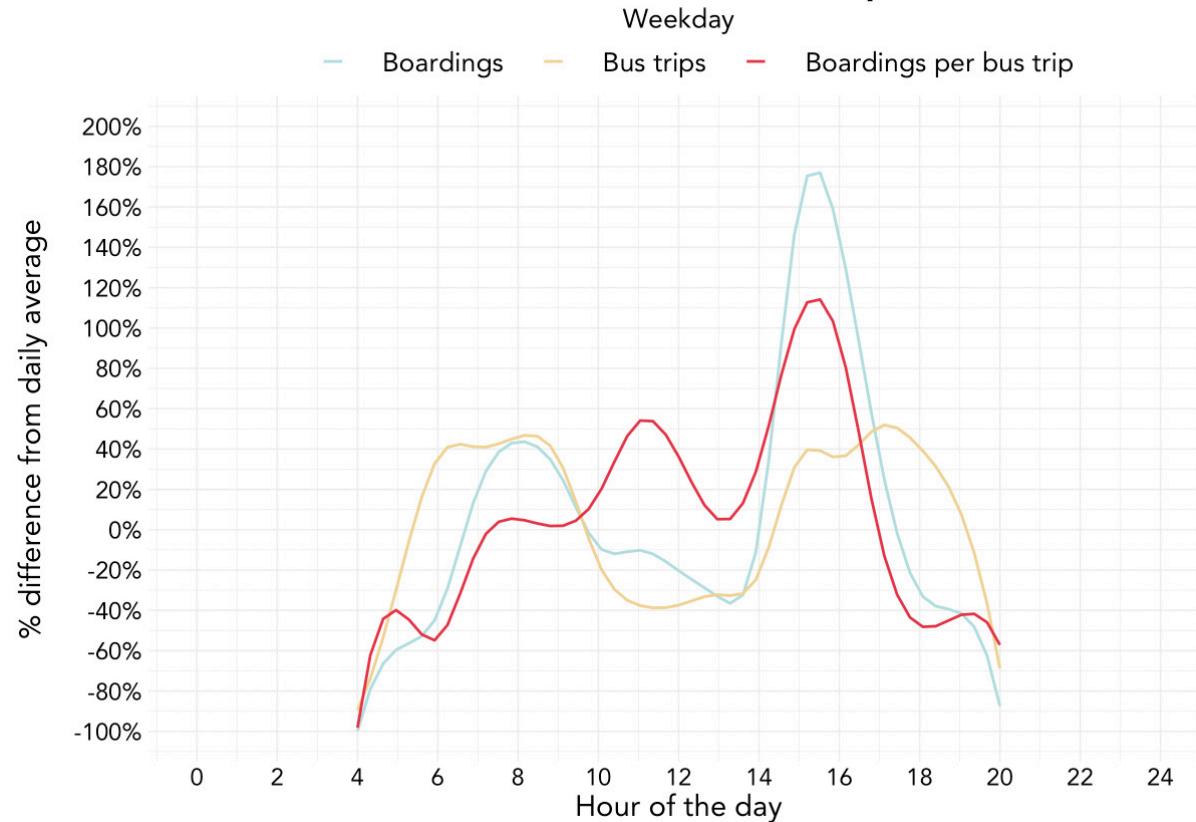
How should SMART balance services at rush hours vs. at other times?

Because SMART’s service is built around WES, many of its routes primarily serve the needs of people commuting during the rush hours. Routes 5 and 6 only operate when WES is running, and regional services like 2X and 3X run extra trips during this period, or have their schedules aligned with WES arrivals. This approach to network design maximizes the usefulness of the network during the rush hour periods when many people need to travel.

This rush hour focus comes at a cost. The areas served by Route 5 and 6 aren’t reachable at all during the middle of the day, or on Saturdays. The extra trips Route 2X makes during rush hour are trips it can’t make later in the evening, or earlier in the morning, or even conceivably on Sundays.

Since the onset of the pandemic, the commuting patterns of the workers whose schedules were previously most aligned with the traditional rush hour (office and professional workers) have changed dramatically. Most major cities’ downtown cores are still challenged by much higher vacancy rates than before the pandemic, and commute-oriented services operated by TriMet and other large transit agencies have lagged in ridership recovery compared to routes oriented toward the all-day demand generated by retail and service workers, and the customers that visit their

SMART Service and Ridership - 2022



Source: SMART boardings data and GTFS from April 2022

Figure 123: SMART Service and Ridership by Hour

places of employment.

Earlier in this report, we showed the chart shown above, which compares ridership and service level throughout the day. Ridership and service (number of trips) are both higher during the rush hours than during the midday or evening, but importantly, the number of people who board each trip doesn’t drop in the midday.

This is evidence that people are finding SMART’s service useful throughout the midday, even though there is less service offered.

These observations about the rush hour raise an important question for future service planning: is this focus on the rush hour the right service design, given current performance and changing travel patterns?

Ultimately, this is again a question about what people value - a service that is easier to use during rush hour, or a service that is available over a wider range of hours, perhaps even on weekends?

How should SMART balance improvements to regional or local services?

In the 2017 TMP process, one of the major questions for the public and stakeholders was about whether SMART's network should focus more or less on local or regional services. While some regional services can be funded through grants or interagency partnerships, it is also important to gain greater understanding from the public about whether SMART should focus on making it easier to get around Wilsonville, or making it easier to travel between Wilsonville and neighboring communities.

When we improve regional service, what are the most important destinations to serve?

This document has reviewed a range of data describing some of SMART's potential regional markets, like the table of commute trips between Wilsonville and other destinations shown on this page. There are good reasons to make investments in service improvements oriented north, northeast, and south toward Salem. So one of the most important questions for

City	Direction	Total Trips	Pct of Total
Portland	W/NW, E/NE	4644	15%
Wilsonville	Local	1802	11%
Tualatin	W/NW	1416	4%
Beaverton	W/NW	1399	4%
Tigard	W/NW	1394	4%
Salem	S	1137	4%
Hillsboro	W/NW	1025	3%
Lake Oswego	W/NW	934	3%
Woodburn	S	725	2%
Canby	E/NE	718	2%
Oregon City	E/NE	612	2%
Sherwood	W/NW	575	2%
West Linn	W/NW	517	2%
Newberg	W/NW	495	2%
Gresham	E/NE	444	1%
Aloha	W/NW	406	1%
Vancouver	W/NW	258	1%
Milwaukie	E/NE	256	1%
Keizer	S	246	1%
Happy Valley	E/NE	211	1%
Eugene	S	206	1%
Albany	S	176	1%
McMinnville	W/NW	175	1%
Hubbard	S	161	1%
Oak Grove	E/NE	158	<1%

Figure 124: Commute trips to and from Wilsonville (top 25)

the public to inform SMART’s future planning is which of these connections are the highest priority for Wilsonville’s residents?

When we improve local service, what are the most important priorities? Ridership or coverage?

SMART’s local routes serve all parts of Wilsonville, but their service level is highly variable. One important question for the public is what SMART should focus its local service resources on. For example, should it concentrate more service into making busy corridors like Route 4 more useful, even if this meant that it invests less in peak-only services like Route 5 or 6 that serve fewer riders? This is the substance of the ridership-coverage trade-off described earlier in this document.

However, this question is only particularly relevant if SMART were to change the basic principle of the network away from the current imperative to prioritize connections with WES. If WES remains the main route to Tigard and other places to the northwest, and if connections with WES are essential for local routes, there are not many ways to change the local SMART transit network to increase ridership potential.

Next Steps

This Existing Conditions report is only the first step in this project. It lays out the current conditions of the network and poses questions, but this report cannot determine what SMART should do to improve its network in the future. Those questions can only be answered through engagement with the community that SMART serves.

In late summer and fall 2022, SMART will conduct an engagement process focused on these very questions. Using online and in-person methods, the agency will ask the public to help it determine what it should be focusing on in the coming years as it seeks to improve service.



Figure 125: SMART TMP Update Project Timeline



Appendix B: Public Involvement Summary

Public input guided the major features of this Plan, as summarized above. In the Documents area of the [project website](#) a Public Engagement Summary Report describes public input received in greater detail.

Appendix C: SMART 2022 Fleet Inventory

Year	Make/Model	Fuel type	Capacity	ADA Positions	Also Used for Demand-response
2020	Ford/Eldorado Aerotech	CNG	21 15	2	Yes
2020	Ford/Eldorado Aerotech	CNG	21 15	2	Yes
2019	Ford/Eldorado Aerotech	CNG	21 15	2	Yes
2019	Ford/Eldorado Aerotech	CNG	21 15	2	Yes
2019	Ford/Eldorado Aerotech	CNG	21 15	2	Yes
2016	Gillig LF35	Diesel	31 27	2	
2013	Gillig LF40	Diesel	38 34	2	
2012	Gillig LF40	Diesel	38 34	2	
2014	Gillig LF40 Hybrid	Diesel/Hybrid	37 33	2	
2014	Gillig LF40 Hybrid	Diesel/Hybrid	37 33	2	
2021	Proterra Catalyst	Electric	29 23	2	
2019	Proterra Catalyst	Electric	29 23	2	
2019	Proterra Catalyst	Electric	29 23	2	
2018	Ford/Starcraft Allstar	Gasoline	17 11	2	Yes
2017	Ford/Starcraft Allstar	Gasoline	17 11	2	Yes
2016	Ford/Eldorado Aerotech	Gasoline	18 12	2	Yes

Figure 126: 2022 Fixed-Route Vehicles

Year	Make/Model	Fuel type	Capacity	ADA Positions	Also Used for Demand-response?	Category
2010	Ford/Eldorado Aerotech	Diesel	20 12	2	Yes	Emergency spare/contingency
2007	Blue Bird CSRE	Diesel	41 35	2		Emergency spare/contingency
2005	Ford/Champion Challenger	Diesel	21 15	2	Yes	Emergency spare/contingency
2000	Gillig Phantom	Diesel	29 25	2		Training bus/spare
2005	Eldorado EZ Rider	Diesel	29 23	2		Spare
2012	Ford/Eldorado Aerotech	Gasoline	18 12	2		Marginal spare

Figure 127: Fixed-Route Spares

Year	Make/Model	Fuel type	Capacity	ADA Positions	Also Used for Demand-response?
2015	Ford/Eldorado Aerolite	CNG	9 5	2	
2015	Ford/Eldorado Aerolite	CNG	9 5	2	
2011	Ford/Eldorado Aerotech	CNG	20 12	2	Yes
2011	Ford/Eldorado Aerotech	CNG	20 12	2	Yes

Figure 129: Demand-Response Vehicles

Year	Make/Model	Fuel type	Capacity	ADA Positions	Also Used for Demand-response?	Category
2013	Ford/Eldorado Aerotech	Gasoline	18 12	2	Yes	Marginal spare
2013	Ford/Eldorado Aerotech	Gasoline	18 12	2	Yes	Marginal spare
2013	Ford/Eldorado Aerotech	Gasoline	18 12	2	Yes	Marginal spare
2013	Ford/Eldorado Aerotech	Gasoline	18 12	2	Yes	Marginal spare

Figure 128: Demand-Response Spares

Year	Make/Model	Fuel type	Capacity	ADA Positions	Category
2010	Dodge Caravan	Gasoline	6 4	1	Supervisor vehicle
2010	Ford/Braun	Gasoline	7 3	1	Beyond useful life. Maintained as driver relief/spare DR
2010	Dodge Caravan	Gasoline	6 4	1	Driver relief/spare DR
2010	Dodge Caravan	Gasoline	6 4	1	Driver relief/spare DR

Figure 130: Non-Revenue Vehicles

Resources for Vehicle and Fuel Comparison

[New York City Transit Hybrid and CNG Transit Buses: Interim Evaluation Results.](#) National Renewable Energy Laboratory (NREL) Technical Report, 2006.

[Comparison of Modern CNG, Diesel and Diesel Hybrid-Electric Transit Buses: Efficiency & Environmental Performance.](#) MJB & A. November, 2005.

[Electric vs. Diesel vs. Natural Gas: Which Bus is Best for the Climate?](#) Jimmy O'Dea. July 19, 2015.

[U.S. DOE. New York City Transit Diesel Hybrid-Electric Buses: Final Results.](#) DOE/NREL Transit Bus Evaluation Project. July 2002.

[EESI Hybrid Buses Costs and Benefits.](#) March 2007.

[The Transit Bus Niche Market for Alternative Fuels. Module 6: Overview of Biodiesel as a Transit Bus Fuel.](#) Clean Cities Coordinator Toolkit. December 2003.

[Proterra vendor infographics comparing CNG, Diesel, Hybrid, and Proterra mile per gallon and cost per mile.](#)

[Zero-Emission Bus Evaluation Results: King County Metro Battery Electric Buses.](#) FTA Report 0118, February 2018.

[Fuel savings of STM's hybrid buses less than half what was promised, documents](#)

[show.](#) Madger, J. Montreal Gazette, June 2019.

[Reduced Engine Idle Load \(REIL\) System for Conventional Propulsion Diesel & CNG Buses: Development, Validation & Market Study Program.](#) FTA Research.

[Washington State Transit Buses Contract,](#) Washington State Department of Enterprise Services. 2020-2023

[Oregon Transit Fleet Electrification Guide and Lifecycle Cost Analysis Tool,](#) Oregon Department of Transportation. 2020.