



FUTURE SERVICE OPPORTUNITIES EVALUATION, PRIORITIZATION, AND MONITORING PROGRAM

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INTRODUCTION

This memorandum presents the evaluation and prioritization of service opportunities as well as a performance monitoring program for the service opportunities. This memorandum will help to inform South Clackamas Transportation District's (SCTD's) Transit Development and Master Plan (TDMP). The analyses documented in *Memo #6: Future Service Opportunities* provide the foundation for the service opportunities to address service gaps and needs. Service gaps and needs were based on several factors, including stakeholder input via survey responses and open houses; population, employment, and land use growth; and potential transit demand.

This memorandum serves to evaluate and prioritize service opportunities that may address potential service gaps and needs. This memorandum also develops a monitoring program to assess the implementation and operation of recommended service opportunities. These opportunities are evaluated using the criteria identified in *Memo #5: Evaluation Framework* and prioritized based on their evaluation.

EVALUATION CRITERIA

Memo #5: Evaluation Framework presented evaluation criteria to (1) measure progress on SCTD's goals, policies, and practices; and (2) prioritize future service opportunities. Table 1 provides the evaluation criteria, their related goal area, and a description of each criterion.

Table 1. Evaluation Criteria

Evaluation Criteria	Notes
Customer Experience	
Annual Rides	Total ridership potential from Transit Cooperative Research Program (TCRP) methodologies, existing ridership compared to population/employment near stops, etc.
Service Hours	Number of service hours
Rides per Hour	Cost-efficiency measure comparing potential ridership to service hours provided
Service Frequency	Can be further distinguished by frequency during peak periods vs. off-peak
Service Span	Number of hours per weekday and weekend day service is provided
Travel Time	Evaluates travel time impacts to existing service and travel time for new services
Stakeholder Support	Considers support and priorities of riders, community members, and other stakeholders
Accessibility and Connectivity	
Population within ¼ Mile of Transit Route or Service	Provides ridership proxy using population near stops or service
Employees within ¼ Mile of Transit Route or Service	Provides ridership proxy using employment near stops or service
Transportation-Disadvantaged Populations within ¼ Mile of Transit Route or Service	Measure of access to transit for transportation-disadvantaged populations
Coordination	
Connections to Other Routes/Providers	Evaluates how well an alternative is integrated with other routes and mobility services
Sustainability	
Access to Health-Supporting Destinations	Evaluates access to grocery stores, parks, community spaces, health care, and social services
Cost per Ride	Evaluates cost-efficiency of system
Total Capital Costs	Provides capital costs needed to start service alternative
Total Annual Operating Costs	Provides operating costs to maintain service alternative

FUTURE SERVICE OPPORTUNITIES

This section summarizes the identified service opportunities, which include existing services, new services, information and technology improvements, and bus stop and facilities improvements. These opportunities were developed based on stakeholder input; population, employment, and land use growth; and existing and future transit demand.

The evaluation criteria primarily focus on existing service enhancements and new routing services. While information and technology improvements and bus stop and facilities improvements enhance the customer experience and encourage ridership, their costs, funding sources, and impacts to users vary greatly from transit provider to transit provider. These opportunities are summarized, evaluated, and prioritized at a high-level in this memorandum. Further detail can be found in *Memo #6: Future Service Opportunities*.

Molalla to Canby Service Opportunities

The following 8 opportunities were considered for the Molalla to Canby Route.

- » **Canby1: Route Modification – 2-way service on West Side of the route instead of Loop:** Provide two-way service along Highway 211 and the Canby-Marquam Highway between Molalla and Canby.

Figure 5. Molalla to Canby Existing Route

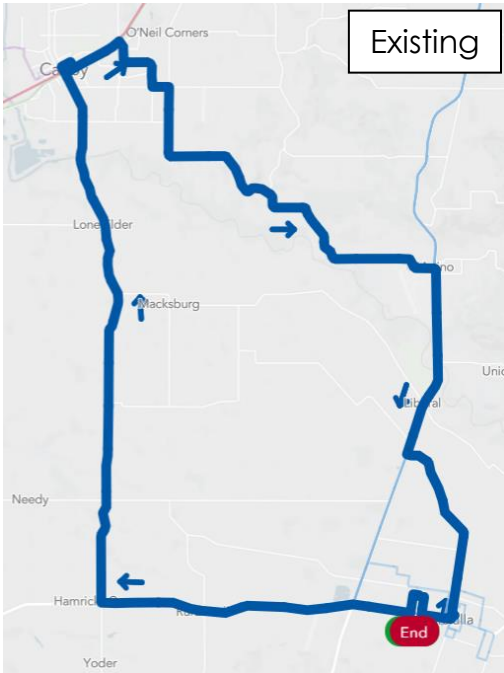
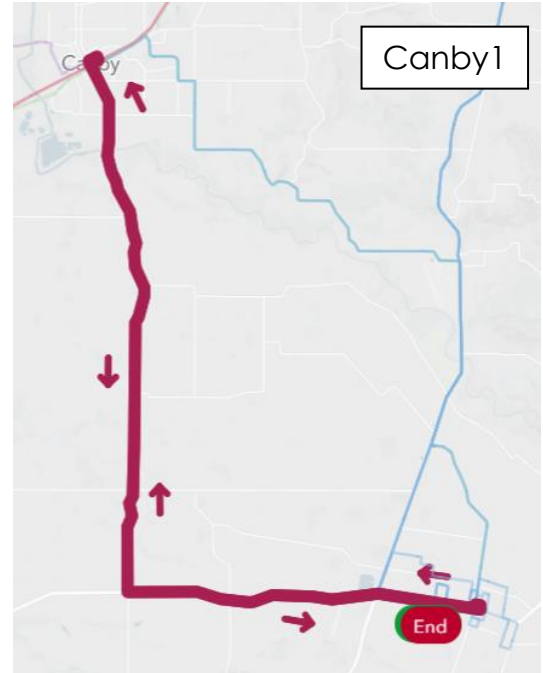
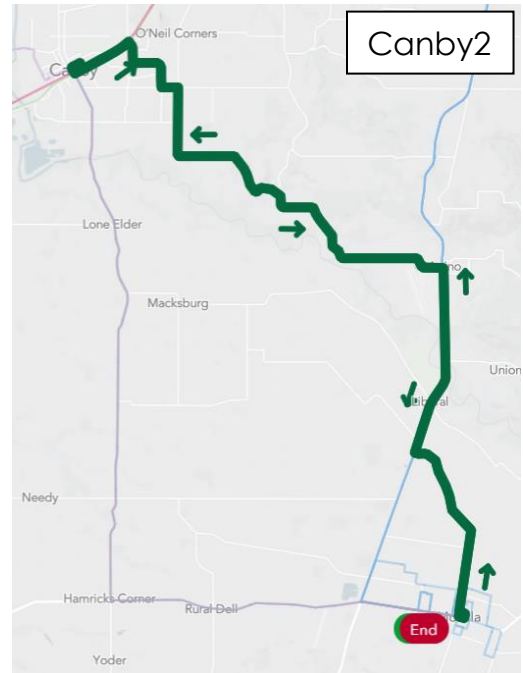


Figure 4. Molalla to Canby - Canby1 West Side



- » **Canby2: Route Modification – 2-way service on east side of the route instead of Loop:** Provide two-way service along Highway 213 and Mulino Road between Molalla and Canby.
- » **Canby3: Peak Hour Increased Frequency:** Increase frequency to half hour headways between the hours of 7:30 – 9:30 AM and 3:15 – 5:15 PM.
- » **Canby4: Increased Frequency Throughout the Day:** Increase frequency to half hour headways during all service hours (between 7:30 AM – 5:15 PM).
- » **Canby5: Earlier Morning Service:** Add two hours of service in the early morning (5:30 – 7:30 AM).
- » **Canby6: Later Evening Service:** Add two hours of service in the late evening (5:15 – 7:15 PM).
- » **Canby7: Saturday Service:** Add service on Saturdays 8 AM – 6 PM.
- » **Canby8: Weekend Service:** Add service on Saturdays and Sundays.

Figure 6. Molalla to Canby - Canby2 East Side



Molalla to CCC Service Opportunities

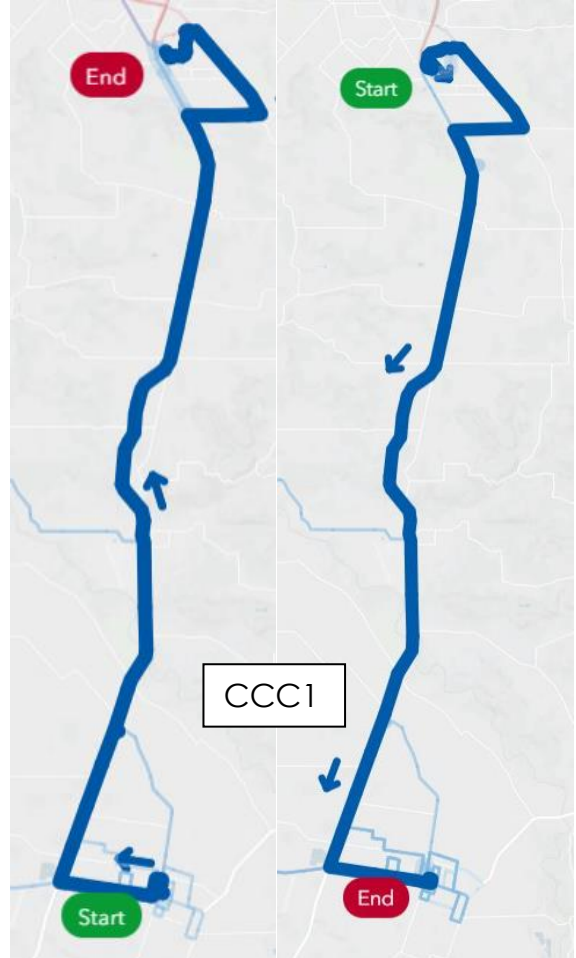
The following 7 opportunities were considered for the Molalla to CCC Route.

- » **CCC1: Henrici Route Modification:** Modify existing route to serve Henrici Road and Beavercreek Road.

Figure 8. Molalla to CCC Existing Route

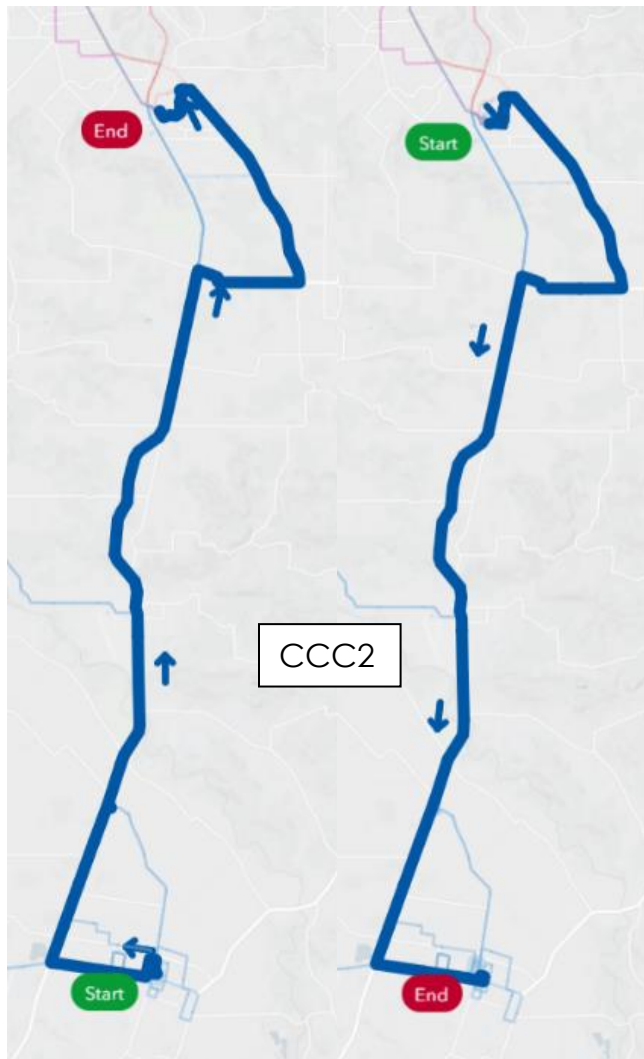


Figure 7. Molalla CCC Route Modification (CCC1)



- » **CCC2: Leland Route Modification:** Modify existing route to serve Leland Road and Beavercreek Road. See Figure 9 on next page.
- » **CCC3: Peak Hour Increased Frequency:** Increase frequency to 20-minute headways between the hours of 6:00 – 8:00 AM and 4:00 – 6:00 PM on weekdays.
- » **CCC4: Increased Frequency Throughout the Day:** Increase frequency to half hour headways during all service hours (between 5:00 AM – 8:30 PM) on weekdays.
- » **CCC5: Earlier Morning Service:** Add one hour of service in the early morning (4:00 – 5:00 AM) on weekdays. Increasing service hours would encourage ridership and increase access to job opportunities educational opportunities, healthcare, social service, and economic activity.
- » **CCC6: Later Evening Service:** Add two hours of service in the late evening (8:30 – 10:30 PM) on weekdays.
- » **CCC7: Sunday Service:** Add service on Sundays 8AM – 6PM.

Figure 9. Molalla CCC Route Modification (CCC2)

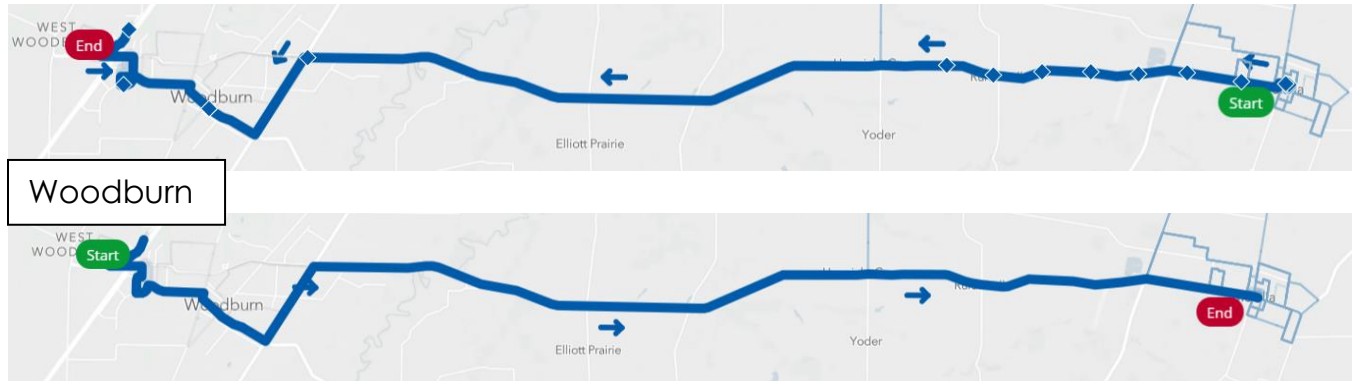


New Services

Five new services were identified and evaluated that would provide connections to other transit providers and access to transit users currently without transit service.

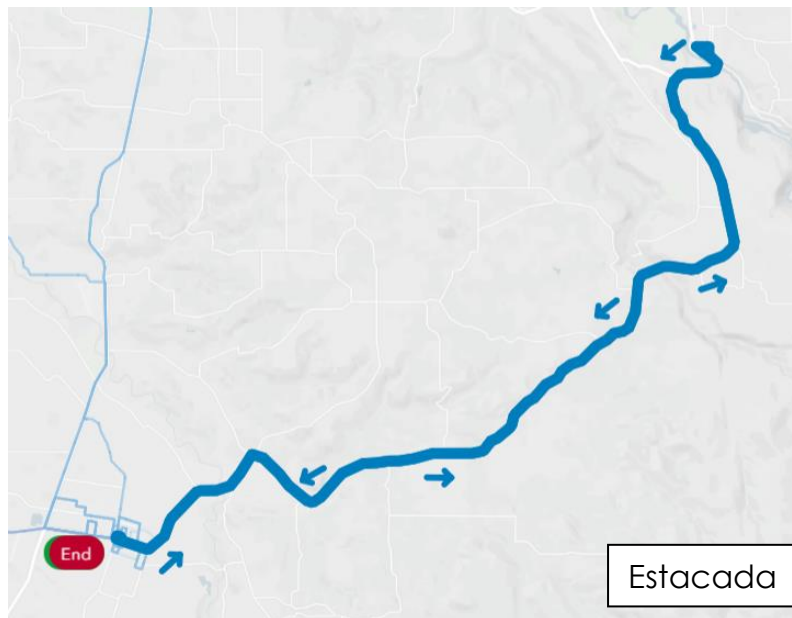
- » **Woodburn:** Provide direct service from Molalla to Woodburn.

Figure 10. Molalla to Woodburn Route



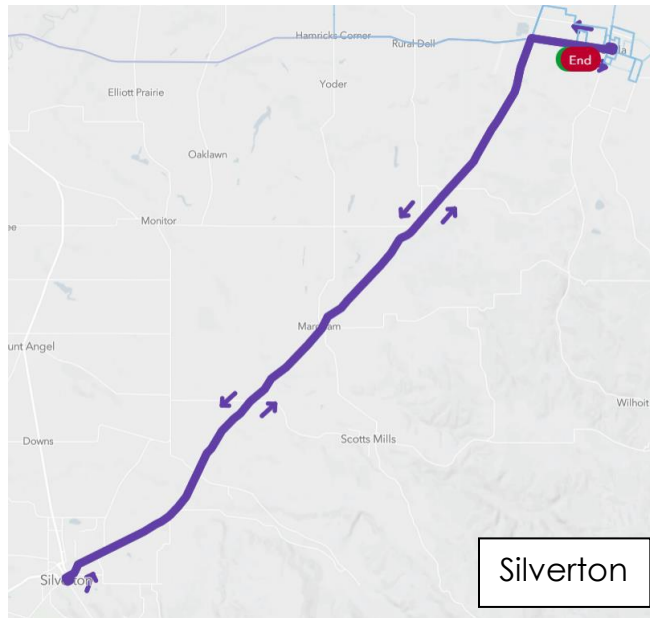
- » **Estacada:** Provide direct service from Molalla to Estacada.

Figure 11. Molalla to Estacada Route



- » **Silverton:** Provide direct service from Molalla to Silverton.

Figure 12. Molalla to Silverton Route



- » **Commuter Service to Employment Areas:** SCTD could explore organized buses and/or shuttles to major employment areas, such as the Clackamas Industrial Area and the Woodburn Outlets.
- » **On-Demand Shuttle Service:** Provide curb-to-curb shuttle service within the City of Molalla.

FUTURE ROUTING SERVICE OPPORTUNITY EVALUATION

Table 2 summarizes the evaluation results by goal area for each route. Table 3 shows the detailed evaluation results for each service opportunity for each evaluation criteria, with better/improved criteria results identified in green, no change/moderate in yellow, and worse/decreased identified in red. Information on the new costs, new annual rides, new cost per new ride as well as a detailed analysis of the transportation disadvantaged populations within ¼ mile of transit is included in Appendix A.

Table 2. Future Route Service Opportunity Evaluation Overview

Route	Customer Experience	Stakeholder Support	Accessibility and Connectivity	Coordination	Health and Sustainability
City Loop	» MC2 – Double Frequency throughout the Day is high priority for MC riders, increases travel opportunities, has ½ hour headways, but decreases the rides per hour.	» MC6 – Later Evening Service and MC7 – Add Saturday Service are high priorities for all survey respondents.	» While the MC4 – Serve More Streets alternative would increase the population and employment capture, it would decrease serve more non-disadvantaged population than it would disadvantaged populations.	» MC1 – Double Frequency during Peak Hour, MC2 – Double Frequency throughout the Day, MC5 – Earlier Morning Service, and MC6 – Later Evening Service all increase connectivity to other routes and providers.	» MC 4 – Serve More Streets could increase access to health-supporting locations without requiring the purchase of a new bus and has a decreased cost per ride than the existing conditions.
Canby	» Canby7 – Saturday Service and Canby 8 – Weekend Service both increase travel opportunities and rides per hour, and are a medium priority to Canby riders.	» Canby4 – Double Frequency throughout the Day, Canby5 – Earlier Morning Service, Canby6 – Later Evening Service, Canby7 – Saturday Service are all moderate or high priorities for Canby riders.	» Canby 2 – East Line increases service and connectivity to CCC route but decreases population and employment capture. Alternatives 3 – 8 do not increase access for target populations but increase transfer opportunities.	» Only Canby 1 – West Line decreases coordination among regional transit providers.	» Canby Alternatives 5 – 8 increase access to health-supporting locations without accruing additional capital costs (new buses).
CCC	» CCC4 – Increase Frequency throughout the Day improves service frequency and increases travel opportunities, while only decreasing the rides per hour by 0.14.	» CCC1 – Henrici Rd, CCC3 – Increase Frequency During Peak Hour, CCC6 – Later Evening, and CCC7 – Sunday Service are high priorities for CCC riders.	» CCC2 – Leland Rd increases population and employment capture,	» All CCC alternatives increase connectivity to other routes and adjacent providers.	» CCC Alternatives 4 – 7 increase access to health-supporting locations without accruing additional capital costs (new buses).
Woodburn	» Provides increased travel opportunities.	» Woodburn service is a high priority for SCTD riders.	» Increases connectivity for transportation-disadvantaged populations, with a population capture of 10,355 and an employment capture of 2,081.	» Provides direct connection to Woodburn Transit service.	» Increases access to health-supporting locations but will require additional capital costs (new buses).
Estacada	» Provides increased travel opportunities but with very few rides per hour.	» Estacada service is a low priority for SCTD riders.	» Increases connectivity for transportation-disadvantaged populations, with a population capture of 1,848 and an employment capture of 225.	» Provides increased connectivity to City, Canby and CCC Routes.	» Does not provide service change to health-supporting locations.
Silverton	» Provides increased travel opportunities.	» Silverton service is a medium priority for SCTD riders.	» Increases connectivity for transportation-disadvantaged populations, with a population capture of 3,401 and an employment capture of 450.	» Provides increased connectivity to City, Canby and CCC Routes.	» Does not provide service change to health-supporting locations.
Commuter	» Provides increased travel opportunities.	» Commuter Shuttles to employment areas are a low priority for SCTD riders.	» Increases connectivity.	» Provides connectivity.	» No change in service to health-supporting locations.
On-Demand	» Provides increased travel opportunities.	» An on-demand shuttle is a medium priority for SCTD riders.	» Increases connectivity.	» Provides connectivity.	» Increases connectivity to health-supporting locations.

Table 3. Future Route Service Opportunity Detailed Evaluation

Alternative		Customer Experience						Accessibility and Connectivity			Coordination	Health and Sustainability			
		New Annual Rides	Service Hours	Rides per Hour	Service Frequency	Travel Time	Stakeholder Support	Population within ¼ Mile	Employees within ¼ Mile	Transportation-Disadvantaged Populations within ¼ Mile	Connections to Other Routes/Providers	Access to Health-Supporting Destinations	Cost per Ride	Total Capital Costs	New Annual Operating Costs
MC0	Existing	No Change (24,051)	2,540	9.47	1 Hour Headway	No Change	No Change	2,997	456	No Change	No Change	No Change	\$6.79	No New Buses	No Change (\$163,387)
MC1	Double Frequency During Peak Hour	+5,500-6,500	3,560	8.48	1/2 Hour Headway Peak Hours	Provides Increased Travel Opportunity	Moderate; Priority for Molalla City Riders, lower priority for CCC Riders	No Change	No Change	No Change	Provides increased connectivity to Canby and CCC Routes	Increases Access; More frequency to reach grocery stores, first/last-mile from intercity services	\$7.58	+1 New Bus	+\$66,000
MC2	Double Frequency Throughout the Day	+13,000-16,000	5,080	7.66	1/2 Hour Headway All Day	Provides Increased Travel Opportunity	Moderate; Priority for Molalla City Riders, lower priority for CCC Riders	No Change	No Change	No Change	Provides increased connectivity to Canby and CCC Routes	Increases Access; More frequency to reach grocery stores, first/last-mile from intercity services	\$8.40	+1 New Bus	+\$163,000
MC3	Simplified Route	-	2,540	13.71	1/2 Hour Headway All Day	Shortened Transit Travel Time; Potential Increased First-Mile/ Last-Mile Time	Lower; Less respondents in favor. Many unsure respondents.	2,852	422	Decreases Service	No Change	Decreases Access; Fewer Origins within 1/4 mile	\$4.69	No New Buses	\$0
MC4	Serve More Streets	-	2,540	9.71	No Change	Longer Transit Travel Time; Potential Decreased First-Mile/ Last-Mile Time	Moderate; More respondents in favor. Many unsure respondents.	3,070	472	Decreases Service	No Change	Increases Access; More Origins within 1/4 mile	\$6.62	No New Buses	\$0
MC5	Earlier Morning Service	+2,500-3,500	3,050	8.92	No Change	Provides Increased Travel Opportunity	Moderate; Low priority for Molalla City Riders, higher priority among CCC and Canby Riders	No Change	No Change	No Change	Provides increased connectivity to Canby and CCC Routes	Increases Access; Expanded service span to reach grocery stores, first/last-mile from intercity services	\$7.21	No New Buses	+\$33,000
MC6	Later Evening Service	+2,500-3,500	3,050	8.92	No Change	Provides Increased Travel Opportunity	Higher; Priority for all Respondents	No Change	No Change	No Change	Provides increased connectivity to Canby and CCC Routes	Increases Access; Expanded service span to reach grocery stores, first/last-mile from intercity services	\$7.21	No New Buses	+\$33,000
MC7	Add Sunday Service	+1,500-2,500	2,925	8.97	1 Hour Headway on Sundays	Provides Increased Travel Opportunity	Higher; Priority for all Respondents	No Change	No Change	No Change	No Change	Increases Access; Expanded service span to reach grocery stores, first/last-mile from intercity services	\$7.17	No New Buses	+\$25,000

Alternative		Customer Experience						Accessibility and Connectivity			Coordination	Health and Sustainability			
		New Annual Rides	Service Hours	Rides per Hour	Service Frequency	Travel Time	Stakeholder Support	Population within ¼ Mile	Employees within ¼ Mile	Transportation-Disadvantaged Populations within ¼ Mile	Connections to Other Routes/Providers	Access to Health-Supporting Destinations	Cost per Ride	Total Capital Costs	New Annual Operating Costs
Canby0	Existing	No Change (14,075)	2,540	5.54	1 Hour Headway	No Change	No Change	9,589	2,058	No Change	No Change	No Change	\$12.88	No New Buses	No Change (\$181,297)
Canby1	West Line	-	2,540	4.88	No Change	Improves travel time for West side of Loop; reduces travel opportunity for East side of Loop	N/A	5,036	1,119	Decreases Service	Decreases connectivity to CCC Route	No Change	\$14.62	No New Buses	\$0
Canby2	East Line	-	2,540	5.96	No Change	Improves travel time for East side of Loop; reduces travel opportunity for West side of Loop	N/A	6,153	1,367	Increases Service	Increases connectivity to CCC Route	No Change	\$11.97	No New Buses	\$0
Canby3	Double Frequency During Peak Hour	+4,000-6,000	3,560	5.38	1/2 Hour Headway Peak Hours	Provides Increased Travel Opportunity	Lower; Low priority for Canby Riders	No Change	No Change	No Change	Provides increased connectivity to Canby transfer opportunities	Increases Access; Expanded service span to reach Fred Meyer, Providence Canby Medical, etc.	\$13.26	+1 New Bus	+\$73,000
Canby4	Double Frequency Throughout the Day	+12,000-14,000	5,080	5.27	1/2 Hour Headway All Day	Provides Increased Travel Opportunity	Moderate; Medium priority to Canby Riders	No Change	No Change	No Change	Provides increased connectivity to Canby transfer opportunities	Increases Access; Expanded service span to reach Fred Meyer, Providence Canby Medical, etc.	\$13.53	+1 New Bus	+\$181,000
Canby5	Earlier Morning Service	+5,000-6,000	3,050	6.45	No Change	Provides Increased Travel Opportunity	Moderate; Medium priority for all Respondents	No Change	No Change	No Change	Increases connectivity to CCC Route and other Providers in Canby	Increases Access; Expanded service span to reach Fred Meyer, Providence Canby Medical, etc.	\$10.88	No New Buses	+\$33,000
Canby6	Later Evening Service	+500-1,500	3,050	4.94	No Change	Provides Increased Travel Opportunity	Higher; Priority for all Respondents	No Change	No Change	No Change	Increases connectivity to CCC Route and other Providers in Canby	Increases Access; Expanded service span to reach Fred Meyer, Providence Canby Medical, etc.	\$14.20	No New Buses	+\$33,000
Canby7	Add Saturday Service	+3,500-4,500	3,090	5.82	1 Hour Headway on Saturdays	Provides Increased Travel Opportunity	Higher; Priority for all Respondents	No Change	No Change	No Change	Increases connectivity to CCC Route and other Providers in Canby	Increases Access; Expanded service span to reach Fred Meyer	\$12.27	No New Buses	+\$39,000
Canby8	Add Weekend Service	+7,000-9,000	3,640	6.01	1 Hour Headway on Weekends	Provides Increased Travel Opportunity	Moderate; Medium priority to Canby Riders	No Change	No Change	No Change	Increases connectivity to CCC Route and other Providers in Canby	Increases Access; Expanded service span to reach Fred Meyer	\$11.88	No New Buses	+\$79,000

Alternative		Customer Experience						Accessibility and Connectivity			Coordination	Health and Sustainability			
		New Annual Rides	Service Hours	Rides per Hour	Service Frequency	Travel Time	Stakeholder Support	Population within ¼ Mile	Employees within ¼ Mile	Transportation-Disadvantaged Populations within ¼ Mile	Connections to Other Routes/Providers	Access to Health-Supporting Destinations	Cost per Ride	Total Capital Costs	New Annual Operating Costs
CCC0	Existing	No Change (53,951)	6,518	8.28	1 Hour Off-Peak, 1/2 Hour Peak	No Change	No Change	5,590	1,631	No Change	No Change	No Change	\$8.97	No New Buses	No Change (\$483,936)
CCC1	Henrici Road	+17,000-20,000	6,518	11.12	No Change	Improves travel time for Henrici area	Moderate; More respondents in favor than not, but many unsure respondents	7,204	2,494	Decreases Service	Increases connectivity to Canby Route and other Providers in Oregon City	No Change	\$6.68	No New Buses	+\$0
CCC2	Leland Road	+3,500-5,000	6,518	8.95	No Change	Improves travel time for Leland area	Moderate; More respondents in favor than not, but many unsure respondents	6,035	1,770	Increases Service	Increases connectivity to Canby Route and other Providers in Oregon City	No Change	\$8.30	No New Buses	+\$0
CCC3	Increase Frequency During Peak Hour	+3,500-5,000	7,538	7.72	20 Minute Headway during Peak	Provides Increased Travel Opportunity	Higher; High priority to CCC Riders	No Change	No Change	No Change	Increases connectivity to Canby Route and other Providers in Oregon City	Increases Access; More frequency to reach grocery stores, transfers to cities with advanced medical	\$9.62	+1 New Bus	+\$76,000
CCC4	Increase Frequency Throughout the Day	+8,500-10,500	7,793	8.14	1/2 Hour Headway All Day	Provides Increased Travel Opportunity	Moderate; Medium priority to CCC Riders	No Change	No Change	No Change	Increases connectivity to Canby Route and other Providers in Oregon City	Increases Access; More frequency to reach grocery stores, transfers to cities with advanced medical	\$9.12	No New Buses	+\$95,000
CCC5	Earlier Morning Service	+Up to 1,000	6,773	8.01	No Change	Provides Increased Travel Opportunity	Lower; Low priority to CCC Riders	No Change	No Change	No Change	Increases connectivity to Canby Route and other Providers in Oregon City	Increases Access; Larger service span to reach grocery stores, transfers to cities with advanced medical	\$9.27	No New Buses	+\$19,000
CCC6	Later Evening Service	+Up to 1,000	7,028	7.69	No Change	Provides Increased Travel Opportunity	Higher; High priority to CCC Riders	No Change	No Change	No Change	Increases connectivity to Canby Route and other Providers in Oregon City	Increases Access; Larger service span to reach grocery stores, transfers to cities with advanced medical	\$9.65	No New Buses	+\$38,000
CCC7	Add Sunday Service	+4,000-6,000	7,068	8.34	1 Hour Headway on Sundays	Provides Increased Travel Opportunity	Higher; High priority to CCC Riders	No Change	No Change	No Change	Increases connectivity to Canby Route and other Providers in Oregon City	Increases Access; Larger service span to reach grocery stores	\$8.90	No New Buses	+\$41,000
Woodburn	Woodburn	+9,000-11,000	2,295	4.32	90 Minute Headway	Provides Increased Travel Opportunity	Higher; High priority to all respondents	10,355	2,081	Increases Service	Provides direct connection to Woodburn Transit service	Increases Access; New connection to reach grocery stores, transfers to cities with advanced medical	\$16.99	+1 New Bus	+\$168,600
Estacada	Estacada	+1,000-2,000	2,040	0.63	2 Hour Headway	Provides Increased Travel Opportunity	Lower; Low priority to SCTD Riders	1,848	225	Increases Service	Provides increased connectivity to City, Canby and CCC Routes	No Change	\$115.77	+1 New Bus	+\$149,800
Silverton	Silverton	+3,000-4,000	2,295	1.50	90 Minute Headway	Provides Increased Travel Opportunity	Moderate; Medium priority to SCTD Riders	3,401	450	Increases Service	Provides increased connectivity to City, Canby and CCC Routes	No Change	\$48.84	+1 New Bus	+\$168,600
Commuter	Commuter Shuttle	Varies	Varies	5-10	2 Runs/Day	Provides Increased Travel Opportunity	Lower; Low priority to SCTD Riders	Increases Service	Increases Service	Increases Service	Provides increased connectivity to Employment Destinations	No Change	\$7.43 - \$14.86	+1 New Bus	Varies
On-Demand	On-Demand Curb-to-Curb	+16,000-18,000	2,805	6.00	Dependent on Availability	Provides Increased Travel Opportunity	Moderate; Medium priority to SCTD Riders	Increases Service	Increases Service	Increases Service	Provides increased connectivity to Rider Destinations	Increases Access; New connection to reach grocery stores, transfers to cities with advanced medical	\$12.24	+1 New Bus	+\$206,000

INFORMATION, TECHNOLOGY, & FACILITIES SUMMARY

Information and technology services can significantly improve the ridership experience and increase ridership by improving ease of transit use and providing information to SCTD. Information & technology improvements and their key considerations are shown in Table 4. These improvements have costs, ridership impacts, and funding sources that differ between them.

INFORMATION & TECHNOLOGY

Information & technology improvements and their key impacts and costs are as follows:

» **Real-Time Vehicle Arrival Information and Passenger Counters:**

- ❖ *Improve the ridership experience by reducing passenger wait times, providing confidence that a bus has not been missed, and creating a more informed and comfortable rider. This can be a critical amenity for rural services that operate on an infrequent basis.*
- ❖ *GPS technology to provide vehicle arrival information is often paired with automatic passenger counters to provide better ridership data.*
- ❖ *However, these cost data were collected when the technology was newer; improved system efficiencies have led to decreased costs. These costs should be explored further with vendors. SCTD is in the process of investigating Automated Vehicle Location (AVL) technology.*

» **Fare Payment Options**

- ❖ *In addition to potential ridership increase and improved customer experience, transitioning to mobile systems would reduce the effort of collecting and processing paper tickets and \$1 bills.*
- ❖ *Costs can vary significantly based on the type of system.*
- ❖ *Additionally, there exists the potential for administration savings as well as an improved ability to make minor adjustments to fares over time, as the coinage barrier is lowered.*
- ❖ *SCTD is participating in a regional effort among smaller rural transit providers to study the feasibility of an integrated, regional fare collection system to provide seamless transfers across different transit providers.*

» **Online/Mobile Trip Planning Tool**

- ❖ *Trip planning tools can help the public get travel information at any day or time.*
- ❖ *While some providers create proprietary trip planning tools, free and readily available trip planning tools are available and more fitting to SCTD's size and needs. These tools include Google Maps, OneBusAway, Moovit, and Transit. All of these tools depend on the open data format for GTFS-Realtime. SCTD currently provides stops and schedule data in a format that allows Google Maps to include their services in a regional trip planner.*

» **Cameras**

- ❖ *CCTV can be used to enhance safety and security at transit centers.*
- ❖ *Currently, SCTD operates 2 security cameras on all buses.*

In addition to improving existing service, data gathered from technologies such as real-time vehicle arrival information and AVL can help to analyze the performance of existing and future service opportunities. For example, AVL data could be assessed to adjust schedules based on delay points and improve transfer connections.

Table 4. Information, Technology, and Facilities Summary

Alternative		Customer Experience			Health and Sustainability		Other Considerations
		Annual Rides	Travel Time	Stakeholder Support	Total Capital Costs	Total Annual Operating Costs	
Real-Time Vehicle Arrival Information and Passenger Counters		Increase	Improves; Decreases Waiting Time for Riders	High; Online and CCC respondents ranked this as top priority.	Varies		
Fare Payment Options		Increase	Improves; Reduces Dwell Time to Pay Fare	High; CCC respondents ranked this as top priority.	Varies		
Online/Mobile Trip Planning Tool		Increase	No Change	High; City respondents ranked this as top priority.	Schedule in-place, real-time information can be incorporated once available		
Cameras		No Change	No Change	Not Included in Survey	Already Equipped		
Bus Stops	Transit Centers & Major Transit Stops	Increase	No Change	High; Online and CCC respondents ranked bus stop improvements as a top priority	Varies		
	Signage	Increase	No Change		\$300 - \$1,000	Maintenance	
	Shelters	Increase	No Change		\$6,000 + Installation	Maintenance	
	Benches	Increase	No Change		\$500 - \$1,500	Maintenance	
Fleet	Fuel Types - Hybrid-Electric	No Change	No Change	Not Included in Survey	\$150k - \$200k more than regular bus; Charging Facilities	25%-30% Fuel Cost Decrease	Environmental Benefits
	Fuel Types - CNG	No Change	No Change	Not Included in Survey	\$25k - \$50k more than regular bus; Dual-fuel facilities	25%-45% Fuel Cost Decrease	Environmental Benefits
	Low-Floor	No Change	Improves; Reduces Dwell Time to Board Vehicle	High; 90% of the Low-Floor Bus Demo Riders ranked as "Very Good" or "Good"	No change from regular bus	No change from regular bus	
Bicycle & Pedestrian Amenities		Increase	Improves; Increases connections to transit	High; Canby and CCC respondents ranked this as top priority.	N/A; Not Owned by SCTD		Requires Partnerships with Cities, County, ODOT, etc.
Park-and-Ride Lots		No Change	No Change	Low; Ranked as low importance for all respondents	N/A; No recommended locations identified.		

FACILITIES IMPROVEMENTS

Facilities improvements include transit centers and major stops, bus stops, fleet improvements, bicycle and pedestrian amenities, park-and-ride lots, and other bus and administrative facilities. Similar to information and technology improvements, safe and comfortable facilities can improve the ridership experience and increase ridership by improving stop visibility, providing protection from poor weather, and improving access to transit. Facilities improvements and their key impacts and costs are as follows:

» **Transit Centers and Major Transit Stops**

- ❖ *Transit centers provide a transfer point for bus routes, while major transit stops are typically provided at major activity centers. In addition to providing greater passenger amenities that improve rider comfort, transit centers and major transit stops provide visibility for the transit service, reminding residents and visitors of the availability of the service within their community.*
- ❖ *Currently, transit centers are provided at Canby, CCC, and Ross Street within SCTD's system. Major bus stops within the system could include the Molalla Safeway. As service and ridership increase, SCTD could consider enhancing other bus stops to improve rider experience.*
- ❖ *Though the March 2019 onboard survey indicated the Molalla Safeway as the only major stop outside of transit centers, consistent stop-level ridership information may identify other stops, such as the Molalla Adult Center or Canby Fred Meyer, as major stops. Acquiring stop-level data would identify which stops should be considered major stops. Final decisions about transit center locations and other stop improvements depend on the final service network.*

» **Bus Stops**

- ❖ *Waiting at a bus stop is generally the first part of a rider's journey on SCTD's transit system, and a visible, safe and comfortable stop is critical. helps enhance the transit system.*
- ❖ **Signage:** *The cost for a new bus stop signage and pole, installed, can range from \$300 to \$1,000, depending on the material and the installation conditions.*
- ❖ **Shelters:** *Passenger shelters add to the comfort of using transit and are generally very popular with riders. An "off the shelf" passenger shelter costs approximately \$6,000 plus installation. In addition to initial capital costs, passenger shelters will incur maintenance costs for cleaning, repair and replacement.*
- ❖ **Benches:** *An alternative to a shelter for a stop that has less ridership is a bench. Benches should be considered for stops with at least three boardings per day, although other factors, such as the proximity to senior housing and nearby businesses willing to contribute to the costs, should be factored into the decision a well. Installed benches vary in price from \$500 to \$1,500*
- ❖ *Locations identified for improvements in the Molalla TSP Update include:*
 - » OR 213/ Meadow Drive (NB) » OR211/ Leroy Avenue (EB)
 - » OR 213/ Toliver Road » OR211/ Kennel Avenue (EB)
 - » OR 211/ OR213 (EB) » Meadow Drive / Meadowlawn Place/ Toliver Road

» **Fleet Improvements**

- ❖ *Clean and operational vehicles improve rider experience and properly-maintained and replaced vehicles reduce the likelihood of vehicle breakdowns and/or disruptions to service.*

- ❖ **Current Fleet:** SCTD currently owns six buses and regularly operates five of them, with one bus in reserve. The average age of the active fleet is 2.3 years of use. Of the active fleet, three vehicles are in excellent condition, one in adequate condition, and one in poor condition. Two vehicles are significantly above 200,000 miles, and one is nearing their expected useful life (EUL).
- ❖ **Fleet Size & Replacement:** SCTD operates approximately 250,000 vehicle revenue miles per year. With EUL's of 200,000 miles, SCTD is anticipated to need a replacement vehicle every 1.25 years on average. For fleet size, typically, a 20 percent spare ratio is recommended. The fleet size will be considered in developing a capital management plan.
- ❖ **Fuel Types:** SCTD has been purchasing diesel buses. A bus with hybrid-electric propulsion costs \$150,000 to \$200,000 more than a similar bus with diesel propulsion but will generally reduce fuel costs by approximately 25 to 30 percent. A bus with compressed natural gas (CNG) costs \$25,000 to \$50,000 more than a similar bus with diesel propulsion but will generally reduce fuel costs by approximately 25 to 45 percent. Challenges in using hybrid-electric and CNG is the additional cost of purchasing new vehicles (typically more than comparable diesel models) and need for charging/dual fueling facilities.
- ❖ **Low Floor:** Low-floor buses eliminate the steps in the vehicle, provide easier access for riders, speed boarding and alighting, and are much easier for drivers to operate than traditional lifts. Eventually, as part of the normal bus replacement schedule and as sidewalk infrastructure improves, SCTD can replace any remaining high-floor buses with low-floor models. SCTD has recently tested a low-floor demo bus on the Molalla City route for a day, with excellent reviews from both riders and drivers.

» **Bicycle and Pedestrian Amenities**

- ❖ Virtually every bus rider is also a pedestrian, and bicycles provide an important “last mile” option for transit, particularly for SCTD riders who may be fairly dispersed.
- ❖ SCTD can work with local cities and Clackamas County to prioritize **pedestrian** improvements that serve transit stops.¹ It is of particular importance and a legal requirement to provide for access by persons with disabilities. Transit centers, shelters, and new or relocated bus stops should be designed to meet the requirements of the Americans with Disabilities Act (ADA). It is recommended that cities, the County, and Oregon Department of Transportation (ODOT) prioritize street corners near transit centers and shelters for ADA ramps.
- ❖ Locations identified in the Molalla TSP Update for pedestrian improvements include:

» OR 213	» Leroy Avenue	» E Heintz Street
» OR 211	» E 5 th Street	» Industrial Way
» Molalla Avenue	» Cole Avenue	» Stowers Road
» Toliver Road	» Mathias Road	» E 7 th St
» Shirley Street	» Frances Street	
» Ridings Avenue	» Kennel Avenue	

¹ Memo #8: Transit Benchmarks discusses development requirements related to access to transit stops.

- ❖ *The bicycle/transit connection can be facilitated by providing for bike parking at transit centers and, space permitting, transit shelters.² All SCTD buses have the capability to carry bikes.*
- ❖ *Locations identified in the Molalla TSP Update for bicycle improvements include:*
 - » OR 213
 - » Shirley Street
 - » Ridings Avenue
 - » OR 211
 - » Mathias Road
 - » Cole Avenue
 - » Molalla Avenue
 - » Leroy Avenues
 - » Frances Street
 - » Toliver Road
 - » 5th Street

» **Park-and-Ride Lots:**

- ❖ *Park-and-ride lots are typically feasible in situations where there is either a parking charge or parking shortages at the rider's destination, or if there is a substantial savings in travel cost or time by using transit.*
- ❖ *The intercity park-and-ride demand is likely to be relatively small due to free parking at CCC and near the Canby Transit Center.³*

Many cost estimates above are based on *Transit in Small Cities: A Primer for Planning, Siting, and Designing Transit Facilities in Oregon*.⁴

SERVICE OPPORTUNITY & IMPROVEMENT PRIORITIZATION

Future routing service opportunities were prioritized by timeframe based on their evaluation results. Prioritization considers several factors, including evaluation results, funding availability, and other factors influencing decision-making including other services and capital purchases.

For Tier 1, the recommended service alternatives (MC6, Canby1 or Canby2, CCC6, and CCC7) were those that were high priorities for stakeholders, low-cost to implement, higher potential for ridership, and improved access to health-supporting destinations and connectivity to other providers. These include expanded morning or evening hours and Canby1 or Canby2, changing the Canby loop into an out-and-back line service. Stop activity is being collected to determine which side of the loop should be served as a line in replacement of the loop service. No new buses are needed for these alternatives.

In addition to these alternatives, real-time vehicle arrival information and passenger counters; additional rider tools and information via website and mobile app; bus stop improvements, including potentially major stop enhancements to Ross Street Transit Center; and low-floor buses were recommended for Tier 1 information, technology, and facilities improvements. Survey respondents ranked real-time vehicle arrival information and online/mobile trip planning tools highly; as apps such as Google Maps and Transit already provide trip planning, it is possible respondents were seeking the real-time arrival component be incorporated and marked both highly. SCTD can also improve their website information with real-time vehicle arrival information. SCTD currently has several bus

² Bicycle parking space requirements for transit stops and transit centers are addressed in *Memo #8: Transit Benchmarks*.

³ While park-and-ride lots are not identified as a short-term need in the SCTD service area, the Oregon Transportation Planning Rule (TPR) requires that park-and-rides be allowed to be developed in parking lots in jurisdictions with transit service. Given this TPR requirement and the potential need in the longer term, *Memo #8: Transit Benchmarks* addresses development requirements related to park-and-ride-and-ride lots.

⁴<http://www.oregon.gov/LCD/TGM/docs/fulltransitprimer4-4-13.pdf>

stops that lack signage and should be signed for better rider understanding and improved service visibility. Additional bus stop improvements include bike racks at major transit stops, such as the Ross Street Transit Center. Lastly, as SCTD replaces their fleet, new vehicles should be low-floor to improve customer experience and decrease dwell time at stops.

For Tier 2, the recommended service alternatives (MC4, MC5, Canby5, Canby6, and CCC4) were moderate to high priorities for stakeholders, low to medium cost, and improved travel time, connectivity, and access, especially for transportation-disadvantaged populations. These include expanded morning or evening hours and increased frequency. For MC4, modifications such as service to the northeast area of Molalla would be shorter-term, while routing modifications with new roadways/developments in the southwest area of Molalla may require further evaluation. SCTD leadership would also like to pursue programs to increase awareness of transit and its relationship to travel demand management (TDM) strategies, especially in partnership with other providers who have indicated TDM strategies as a need.

For Tier 3, the recommended service alternatives (MC2, Canby3, Canby7, CCC3, and Woodburn) were moderate to high priorities for stakeholders, medium to high cost to implement, moderate to higher potential for ridership, increased connectivity, and increased service availability and frequency. Four new buses are needed to increase frequency on all routes and add Woodburn service.

For all tiers, SCTD should continue to collaborate with other jurisdictions to improve bicycle and pedestrian amenities at and near stops, which was a high priority for survey respondents and improves access to transit.

The recommended alternatives capture many of the high priority alternatives identified according to stakeholder feedback. Services that need further evaluation include route modifications to existing services, where the implications of the alternatives need to be studied and external factors are present. For example, simplifying the Molalla City loop may lead to more route deviation requests and the Henrici/Leland areas may be served by modification to TriMet Route 32 and a new Oregon City Last-Mile Shuttle. While adding Sunday service on Molalla City is a high priority for riders, the newly implemented Saturday service should be evaluated before making a recommendation for Sunday service.

Information, technology, and facilities improvements that require further evaluation include fare payment options, bus stop improvements, fleet fuel types, and covered bus facilities (potentially at Ross Street Transit Center). SCTD and other nearby providers are currently studying fare payment options. Activity thresholds were identified that trigger bus stop improvements, such as benches for stops with at least three boardings a day. More information on bus stop activity is needed to identify which stops need improvements. Fleet fuel types such as hybrid-electric and CNG require capital costs for fueling and charging facilities and would need to be considered further prior to recommendation and implementation. Covered bus facilities may also be recommended as stop activity grows to provide more space and comfort for riders than a smaller bus shelter; information from passenger counters and real-time vehicle arrival can help to identify locations for covered facilities.

Service alternatives not recommended include service enhancements that are costly, had low potential ridership, and ranked low among stakeholders' priorities. For example, riders indicated increasing frequency throughout the day on the Canby was a moderate priority, but the costs were much higher and ridership improvements were low, resulting in poor cost per ride and rides per hour results. Park-and-ride lots are not recommended at this time as SCTD destinations do not meet the characteristics supporting additional park-and-ride space.

Table 5 shows the preliminary prioritization recommendations by route and tier. Operating costs do not include information, technology, and facilities impacts.

Table 5. Service Opportunity Prioritization

Route	Tier 1	Tier 2	Tier 3	Further Evaluation or Monitoring Needed	Not Recommended
City Loop	» MC6: Later Evening Service	» MC4: Serve More Streets as development and street connections occur » MC5: Earlier Morning Service	» MC2: Increase Frequency Throughout the Day or during peak hours to 30 minutes (MC1)	» MC7: Add Sunday Service	» MC3: Simplified Route
Canby	» Canby1: West Line, or Canby2: East Line	» Canby5: Earlier Morning Service » Canby6: Later Evening Service	» Canby3: Increase Frequency During Peak Hour » Canby7: Add Saturday Service	» Canby8: Add Sunday Service	» Canby4: Increase Frequency Throughout the Day
CCC	» CCC6: Later Evening Service » CCC7: Add Sunday Service	» CCC4: Increase Frequency throughout the Day to 30 minutes during non-peak hours	» CCC3: Further increase Frequency During Peak Hour to 20 minutes	» CCC1: Henrici Road » CCC2: Leland Road	» CCC5: Earlier Morning Service
New Services	» None	» None	» Woodburn	» On-Demand Curb-to-Curb » Silverton » Commuter Shuttle	» Estacada
Total Additional Operating Cost	\$112,000	\$203,000 (\$305,000 Total)	\$520,000 (\$825,000 Total)	-	-
Total New Buses	0	0	+4 (+4 Total)	-	-
Information, Technology, & Facilities	» Real-time vehicle arrival information and passenger counters » Rider tools and information via website and mobile app » Bus Stop Improvements » Low-floor vehicles	» Continued bus stop improvements » Continued low-floor vehicles. » Programs to increase awareness of Transit and Travel Demand Management	» Continued bus stop improvements » Continued low-floor vehicles.	» Fare payment options » Bus stop improvements » Fleet Fuel Types » Covered bus facility » Improvements to Ross St. Transit Center	» Park-and-Ride lots

PERFORMANCE MONITORING PROGRAM

To evaluate and improve the above service opportunities after implementation, SCTD should continue to monitor the following performance measures for each route:

- » **Ridership:** Annual rides by route, stop location, and time of day would provide better data to inform.
- » **Rides per Hour:** Cost-efficiency measure comparing ridership to service hours provided
- » **Stakeholder Support:** Rider feedback through customer survey feedback
- » **Cost per Ride:** Cost-efficiency measure comparing ridership to annual operating costs
- » **Total Capital Costs:** Identifies capital costs needed to start alternative and fleet replacement impacts
- » **Total Annual Operating Costs:** Operating cost to maintain service alternative

NEXT STEPS

The Project Management Team and Technical Advisory Committee reviewed future service opportunities evaluation and provides comments and revisions. This information will be incorporated into the TDMP.

APPENDIX

- A. Evaluation Details

APPENDIX A EVALUATION DETAILS

Table A-1. New Cost and Ride Information

Alternative		New Cost	New Annual Rides	New Cost per New Annual Ride	New Buses
MC1	Double Frequency During Peak Hour	\$65,628	6,149	\$ 10.67	+1 New Bus
MC2	Double Frequency Throughout the Day	\$163,409	14,849	\$ 11.00	+1 New Bus
MC3	Simplified Route	\$0	-1,247	\$ -	No New Buses
MC4	Serve More Streets	\$0	620	\$ -	No New Buses
MC5	Earlier Morning Service	\$32,808	3,149	\$ 10.42	No New Buses
MC6	Later Evening Service	\$32,808	3,149	\$ 10.42	No New Buses
MC7	Add Sunday Service	\$24,778	2,200	\$ 11.26	No New Buses
Canby1	West Line	\$0	-1,678	\$ -	No New Buses
Canby2	East Line	\$0	1,071	\$ -	No New Buses
Canby3	Double Frequency During Peak Hour	\$72,816	5,087	\$ 14.31	+1 New Bus
Canby4	Double Frequency Throughout the Day	\$181,297	12,717	\$ 14.26	+1 New Bus
Canby5	Earlier Morning Service	\$32,808	5,600	\$ 5.86	No New Buses
Canby6	Later Evening Service	\$32,808	1,000	\$ 32.81	No New Buses
Canby7	Add Saturday Service	\$39,267	3,896	\$ 10.08	No New Buses
Canby8	Add Weekend Service	\$78,526	7,792	\$ 10.08	No New Buses
CCC0	Existing				No New Buses
CCC1	Henrici Road	\$0	18,507	\$ -	No New Buses
CCC2	Leland Road	\$0	4,363	\$ -	No New Buses
CCC3	Increase Frequency During Peak Hour	\$75,761	4,221	\$ 17.95	+1 New Bus
CCC4	Increase Frequency Throughout the Day	\$94,694	9,498	\$ 9.97	No New Buses
CCC5	Earlier Morning Service	\$18,959	300	\$ 63.20	No New Buses
CCC6	Later Evening Service	\$37,868	100	\$ 378.68	No New Buses
CCC7	Add Sunday Service	\$40,838	5,005	\$ 8.16	No New Buses
Woodburn	Woodburn	\$168,568	9,923	\$ 16.99	+1 New Bus
Estacada	Estacada	\$149,838	1,294	\$ 115.77	+1 New Bus
Silverton	Silverton	\$168,568	3,451	\$ 48.84	+1 New Bus
Commuter	Commuter Shuttle	Varies	Varies	Varies	+1 New Bus
On-Demand	On-Demand Curb-to-Curb	\$206,027	16,830	\$ 12.24	+1 New Bus

Table A-2 shows transportation-disadvantaged population evaluation details, where green indicates an increase in service to a disadvantaged population, yellow indicates no change, and red indicates a decrease.

Table A-2. Transportation-Disadvantaged Population Evaluation

Transportation-Disadvantaged Population Evaluation										
Alternative		Poverty	200% Poverty*	Minority	Seniors	Youth	Limited English	Persons with Disabilities	Households with no Vehicles*	Subjective Ranking
Existing Service District		9.0%	43.0%	7.0%	11.0%	24.0%	4.0%	14.0%	6.0%	6.0%
MC0	Existing	11.4%	28.9%	16.6%	11.7%	28.0%	1.8%	12.4%	5.3%	No Change
MC1	Double Frequency During Peak Hour	11.4%	28.9%	16.6%	11.7%	28.0%	1.8%	12.4%	5.3%	No Change
MC2	Double Frequency Throughout the Day	11.4%	28.9%	16.6%	11.7%	28.0%	1.8%	12.4%	5.3%	No Change
MC3	Simplified Route	11.6%	23.9%	18.8%	11.4%	29.8%	1.7%	11.1%	4.5%	Decreases Service for Disadvantaged Populations
MC4	Serve More Streets	11.8%	24.8%	18.4%	11.4%	29.5%	1.6%	11.3%	4.6%	Decreases Service for Disadvantaged Populations
MC5	Earlier Morning Service	11.4%	28.9%	16.6%	11.7%	28.0%	1.8%	12.4%	5.3%	No Change
MC6	Later Evening Service	11.4%	28.9%	16.6%	11.7%	28.0%	1.8%	12.4%	5.3%	No Change
MC7	Add Sunday Service	11.4%	28.9%	16.6%	11.7%	28.0%	1.8%	12.4%	5.3%	No Change
Canby0	Existing	12.4%	28.0%	22.9%	11.8%	29.1%	3.2%	11.9%	5.5%	No Change
Canby1	West Line	8.6%	24.8%	23.0%	13.2%	26.7%	2.9%	13.4%	5.6%	Decreases Service for Disadvantaged Populations
Canby2	East Line	14.4%	30.4%	21.9%	12.0%	28.6%	3.2%	12.0%	5.3%	Increases Service for Disadvantaged Populations
Canby3	Double Frequency During Peak Hour	12.4%	28.0%	22.9%	11.8%	29.1%	3.2%	11.9%	5.5%	No Change
Canby4	Double Frequency Throughout the Day	12.4%	28.0%	22.9%	11.8%	29.1%	3.2%	11.9%	5.5%	No Change
Canby5	Earlier Morning Service	12.4%	28.0%	22.9%	11.8%	29.1%	3.2%	11.9%	5.5%	No Change
Canby6	Later Evening Service	12.4%	28.0%	22.9%	11.8%	29.1%	3.2%	11.9%	5.5%	No Change
Canby7	Add Saturday Service	12.4%	28.0%	22.9%	11.8%	29.1%	3.2%	11.9%	5.5%	No Change
Canby8	Add Weekend Service	12.4%	28.0%	22.9%	11.8%	29.1%	3.2%	11.9%	5.5%	No Change

Transportation-Disadvantaged Population Evaluation										
Alternative		Poverty	200% Poverty*	Minority	Seniors	Youth	Limited English	Persons with Disabilities	Households with no Vehicles*	Subjective Ranking
CCC0	Existing	8.4%	23.2%	14.5%	13.6%	27.5%	1.6%	11.7%	5.5%	No Change
CCC1	Henrici Road	8.1%	24.3%	14.3%	13.3%	28.1%	1.7%	11.2%	5.0%	Decreases Service for Disadvantaged Populations
CCC2	Leland Road	8.3%	24.7%	15.3%	12.5%	28.6%	1.6%	10.5%	4.0%	Increases Service for Disadvantaged Populations
CCC3	Increase Frequency During Peak Hour	8.4%	23.2%	14.5%	13.6%	27.5%	1.6%	11.7%	5.5%	No Change
CCC4	Increase Frequency Throughout the Day	8.4%	23.2%	14.5%	13.6%	27.5%	1.6%	11.7%	5.5%	No Change
CCC5	Earlier Morning Service	8.4%	23.2%	14.5%	13.6%	27.5%	1.6%	11.7%	5.5%	No Change
CCC6	Later Evening Service	8.4%	23.2%	14.5%	13.6%	27.5%	1.6%	11.7%	5.5%	No Change
CCC7	Add Sunday Service	8.4%	23.2%	14.5%	13.6%	27.5%	1.6%	11.7%	5.5%	No Change
Woodburn	Woodburn	24.4%	56.0%	60.6%	7.5%	31.9%	17.0%	11.1%	7.2%	Increases Service for Disadvantaged Populations, especially compared to the service district average
Estacada	Estacada	13.7%	29.7%	11.5%	15.0%	24.6%	0.8%	13.4%	3.8%	Increases Service for Disadvantaged Populations, but lower compared to the service district average
Silverton	Silverton	10.3%	32.0%	17.5%	12.9%	27.5%	2.4%	12.0%	3.5%	Increases Service for Disadvantaged Populations, but lower compared to the service district average
Commuter	Commuter Shuttle	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Increases Service for Disadvantaged Populations
On-Demand	On-Demand Curb-to-Curb	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Increases Service for Disadvantaged Populations

*Indicates Molalla City only