Technical Memorandum #18 - Transit Solutions - DRAFT

DATE: October 24, 2017

TO: Corvallis TSP/TDP Project Management Team and Stakeholders

FROM: Nelson\Nygaard Consulting Associates

SUBJECT: **Corvallis Transportation System Plan (TSP) Update and Transit Development Plan (TDP) Task 7.2 Transit Solutions**

Introduction

The City of Corvallis is developing a long-term vision for the transit system that responds to the needs of existing riders and also makes transit a convenient choice to attract new riders. System changes range from minor tweaks such as adding a trip or two to meet demand, to major changes such as adding Sunday service and extending weekday evening service. This memorandum provides a phased progression toward the vision, with the goal of helping decision-makers and the public prioritize which changes have the most benefit in the short versus longer-term timelines.

This memorandum also includes an initial transit improvements scenario evaluation and a menu of recommendations to support transit through other activities such as marketing and regional coordination. Based upon feedback gathered from the project Technical Advisory Committee, Steering Committee, transit working group, and public, this scenario will be refined into Tech Memo #20: Transit System Recommendations.

The memorandum is organized in four sections:

I. **Existing Corvallis Transit System:** an overview of current public transportation services
II. **Service Design Guidelines:** the transit principles supporting service improvement recommendations
III. **Recommended Transit Improvements:** maps, schedules, and description of transit changes during the short, medium, and long-term phases to achieve the transit vision
IV. **Transit-Supportive Programs and Investments:** non-operating programs and policies that connect people to transit

I. Existing Transit System

The information presented below is a summary of the information presented in Technical Memorandum #8 Transit Existing Conditions.

The Corvallis Transit System (CTS), a municipally-run transit system operated by the City of Corvallis, provides 16 fixed routes in the study area. The system consists of eight fixed routes operating Monday through Saturday, five limited service routes, and three routes that operate as late-night (Night Owl) services on Thursday, Friday and Saturday nights while Oregon State University (OSU) is in session. The City contracts with a third-party vendor to operate the service and maintain the City-owned buses. CTS also operates the Philomath Connection between Philomath and Corvallis. This route is entirely funded by the City of Philomath, thus will not be the focus of this memo.

CTS also provides complementary paratransit service, as required under the Americans with Disabilities Act (ADA). Paratransit service is for passengers whose origin and destination is within ¾-mile of a CTS fixed route but who cannot use the fixed-route service due to a physical or mental disability. Paratransit is operated by a third-party vendor in partnership with Benton County.

The other fixed-route provider within the City of Corvallis is Oregon State University, which operates several Beaver Bus shuttles on campus. Benton County operates countywide demand response service for seniors and those with a disability, along with three general public services: the 99 Express between Corvallis and Adair Village; the Coast to Valley connecting to the coast; and the new Corvallis-Amtrak Connector linking Corvallis to the Albany Amtrak Station. Additional service in the region is provided by the Linn-Benton Loop between Corvallis and Albany. This is operated by the City of Albany.

The CTS fixed route and paratransit services are fareless. Local funds are generated by the Transit Operations Fee (TOF), which is collected from all City of Corvallis utility customers via monthly City Services bill.

Fixed Routes

CTS routes operate Monday through Saturday. Weekday service starts between 6:00 and 7:30 a.m., and ends between 7:00 and 9:00 p.m. Most routes operate every 60 minutes all day except for the two busiest routes, 5 and 6, which operate every 30 minutes. When OSU is in session, supplemental trips on Route 6 provide 15-minute service during the afternoon peak. CTS owns 15 35-foot Gillig low floor buses plus a trolley. A total of 10 are needed to operate peak period service.

On Saturdays, service begins between 7:00 and 8:00 a.m., and ends between 6:00 and 7:30 p.m. Most routes operate every 60 minutes all day, with Routes 5 and 6 operating every 30 minutes for most of the day.

The figures on the following pages describe the Corvallis Transit System fixed routes.

- Figure 1 summarizes CTS fixed routes including span (service hours), frequency, run time (i.e., the time needed to serve the route outbound and inbound), and the number of vehicles needed to operate the route.
- Figure 2 maps CTS routes plus major connecting services.
- Figure 3 shows service frequency during a typical weekday midday.
- Figure 4 illustrates the late-night Night Owl routes.
- Figure 5 shows the span and frequency of each route on weekdays and Saturday. Night Owl routes are also included, though they only operate on Thursday-Saturday nights when OSU is in session.

Figure 1 Existing CTS Service Summary

Route	Corridor	Span			Frequency (minutes)				Run Time (minutes)	Vehicles (10 total)
		Weekday	Saturday	Sunday	Peak	Off-Peak	Saturday	Sunday		
1	Witham Hill/ Timberhill	7:00 a.m. – 7:30 p.m.	8:00 a.m. – 7:05 p.m.	--	60	60	60	--	55	1
2	9th Street/Hospital	6:15 a.m. – 7:50 p.m.	7:15 a.m. – 6:40 p.m.	--	60	60	60	--	25	0.5
3	Philomath Blvd	6:45 a.m. – 7:20 p.m.	8:45 a.m. – 6:10 p.m.	--	60	60	60	--	25	0.5
4	5th St/Highland/Hospital	6:15 a.m. – 7:22 p.m.	7:45 a.m. – 6:12 p.m.	--	60	60	60	--	27	0.5
5	Kings Blvd	6:25 a.m. – 9:20 p.m.	7:45 a.m. – 8:10 p.m.	--	30	30	30	--	25	1
6	South Corvallis	6:15 a.m. – 8:50 p.m.	7:15 a.m. – 7:40 p.m.	--	30 AM 15 PM	30	30	--	25	2
7	29th St/ Circle/Conifer	6:30 a.m. – 8:25 p.m.	7:30 a.m. – 7:25 p.m.	--	60	60	60	--	55	1
8	Philomath Blvd	7:15 a.m. – 6:50 p.m.	8:15 a.m. – 6:40 p.m.	--	60	60	60	--	25	0.5
C1	Kings/Witham Hill	7:25 – 9:35 a.m.; 1:05 – 5:35 p.m.	--	--	60	--	--	--	30	0.5
C1R	Kings/Witham Hill	3:35 – 6:00 pm	--	--	60	--	--	--	30	0.5
C2	2nd Street	6:45 – 8:00 a.m.; 5:00 – 6:15 p.m.	--	--	60	--	--	--	15	0.5
C3	Harrison/53rd Street	7:05 a.m. – 6:45 p.m.	9:05 a.m. – 3:05 p.m.	--	4 trips	2 trips	4 trips	--	30	0.5
CVA	Crescent Valley	7:25 a.m.; 3:15 p.m.; 5:40 p.m.	--	--	3 trips	--	--	--	40	1
NO-N	Night Owl North	Thursday/Friday 8:45 p.m. – 2:40 a.m.	8:45 p.m. – 2:40 a.m.	--	--	60	60	--	55	1
NO-SE	Night Owl Southeast	Thursday/Friday 9:15 p.m. – 2:40 a.m.	9:15 p.m. – 2:40 a.m.	--	--	60	60	--	25	1
NO-SW	Night Owl Southwest	Thursday/Friday 8:45 p.m. – 2:10 a.m.	8:45 p.m. – 2:10 a.m.	--	--	60	60	--	25	1

Figure 2 Existing Transit Routes

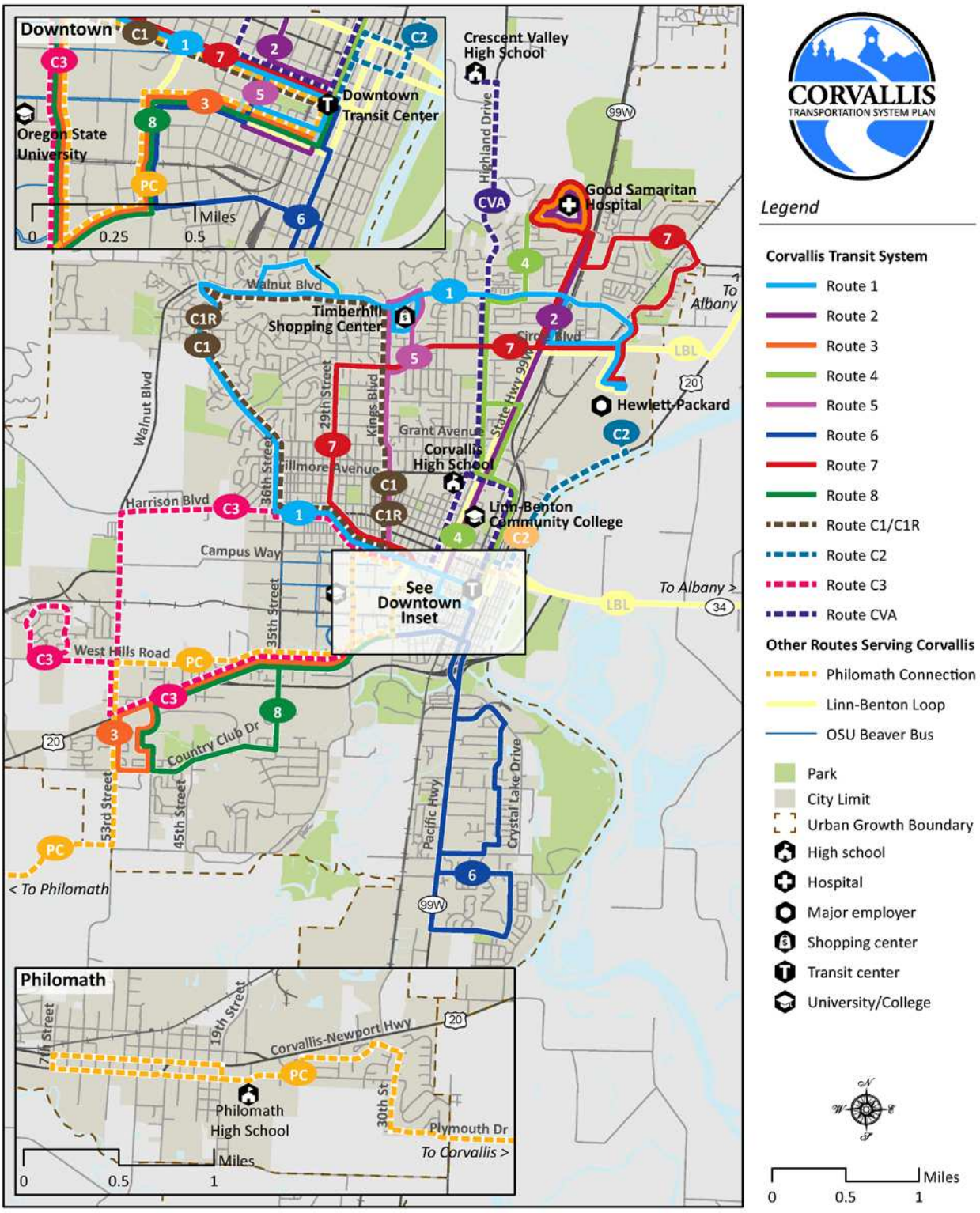


Figure 3 Existing Midday Frequency

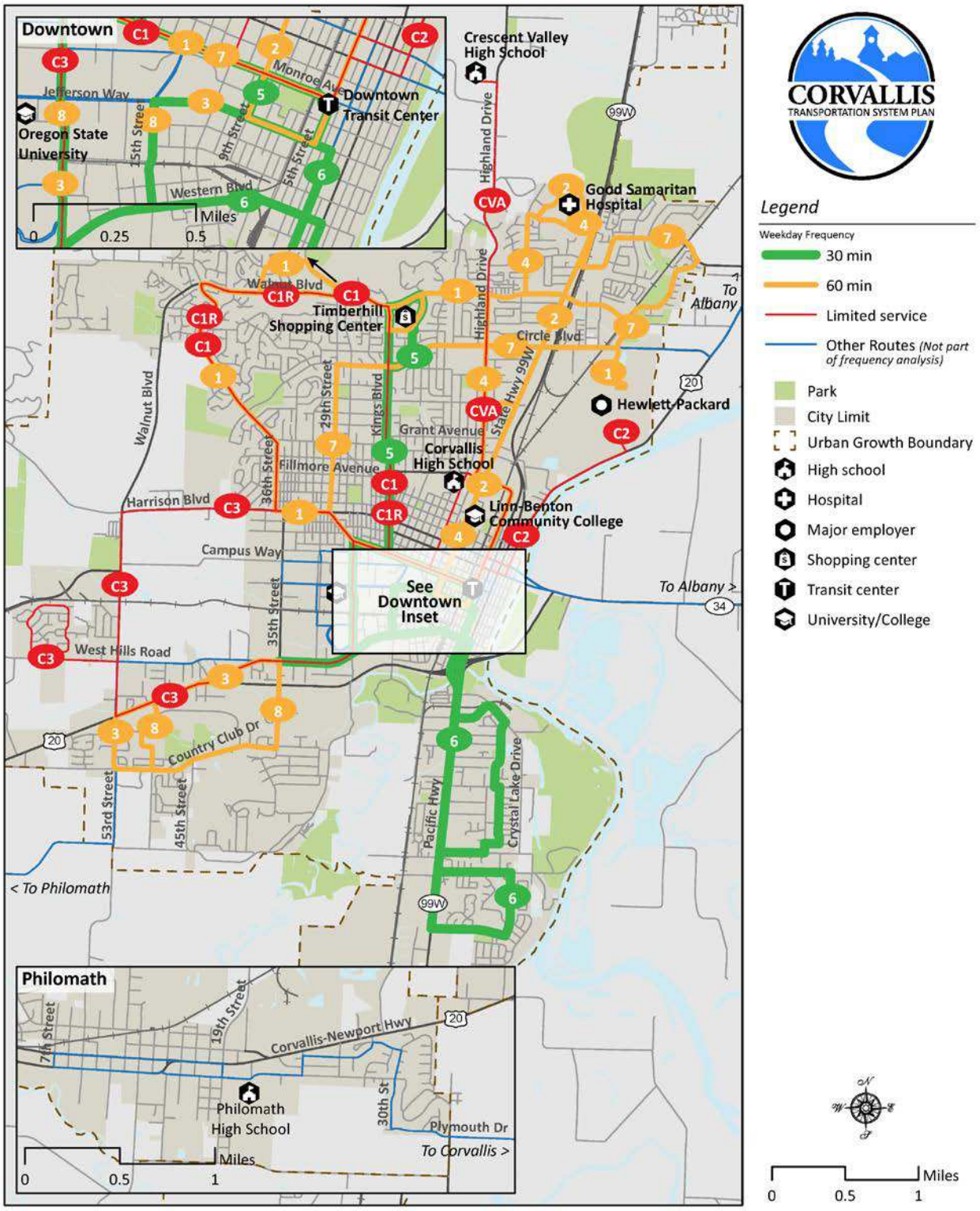


Figure 4 Existing Night Owl Routes

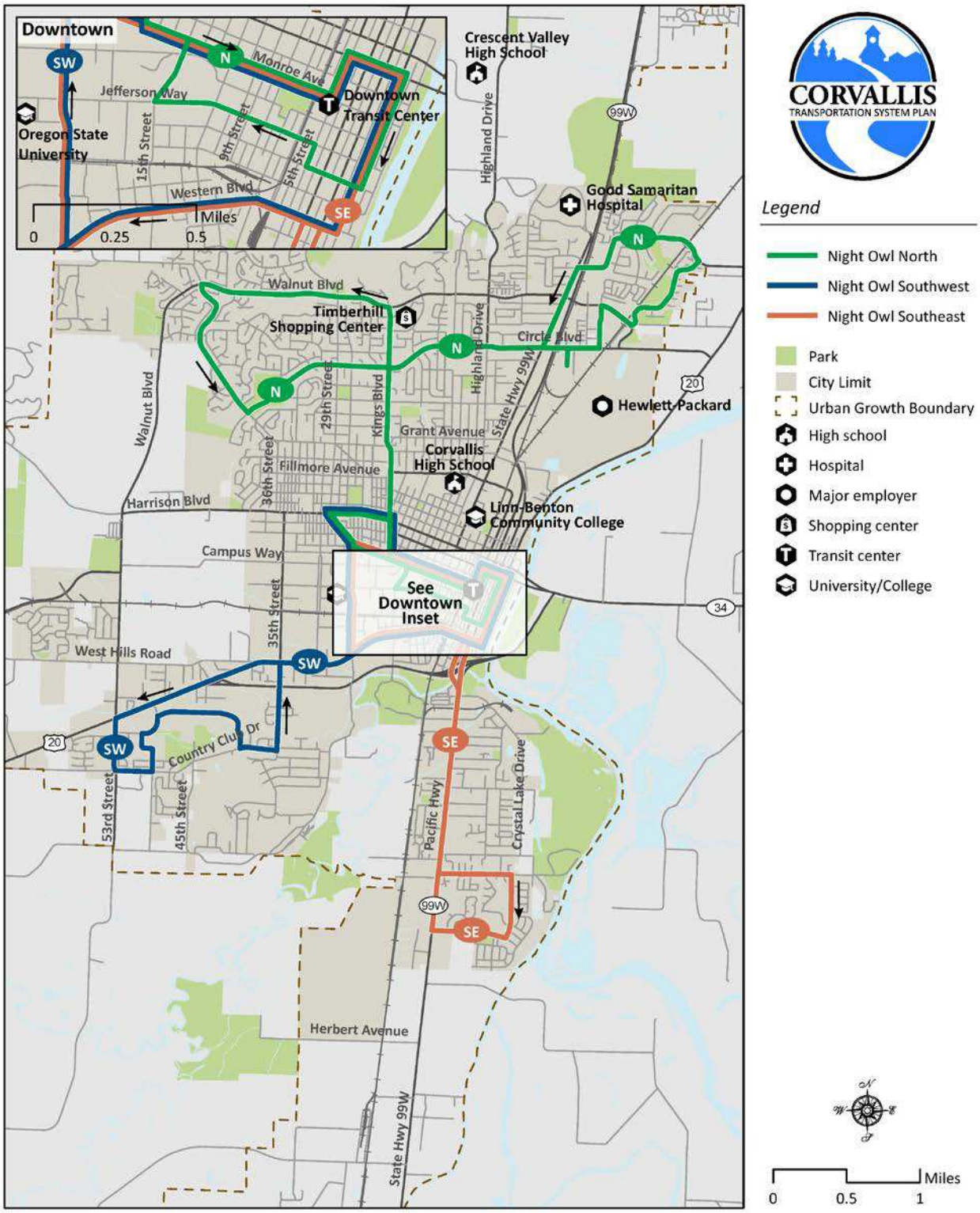
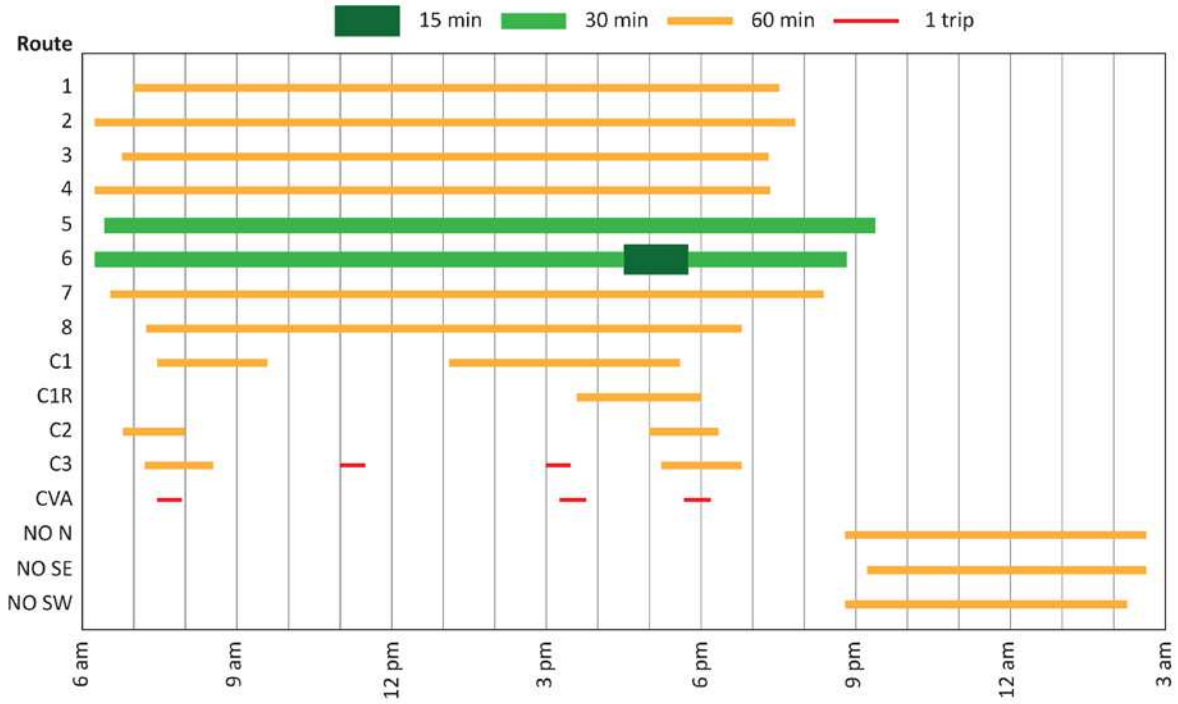
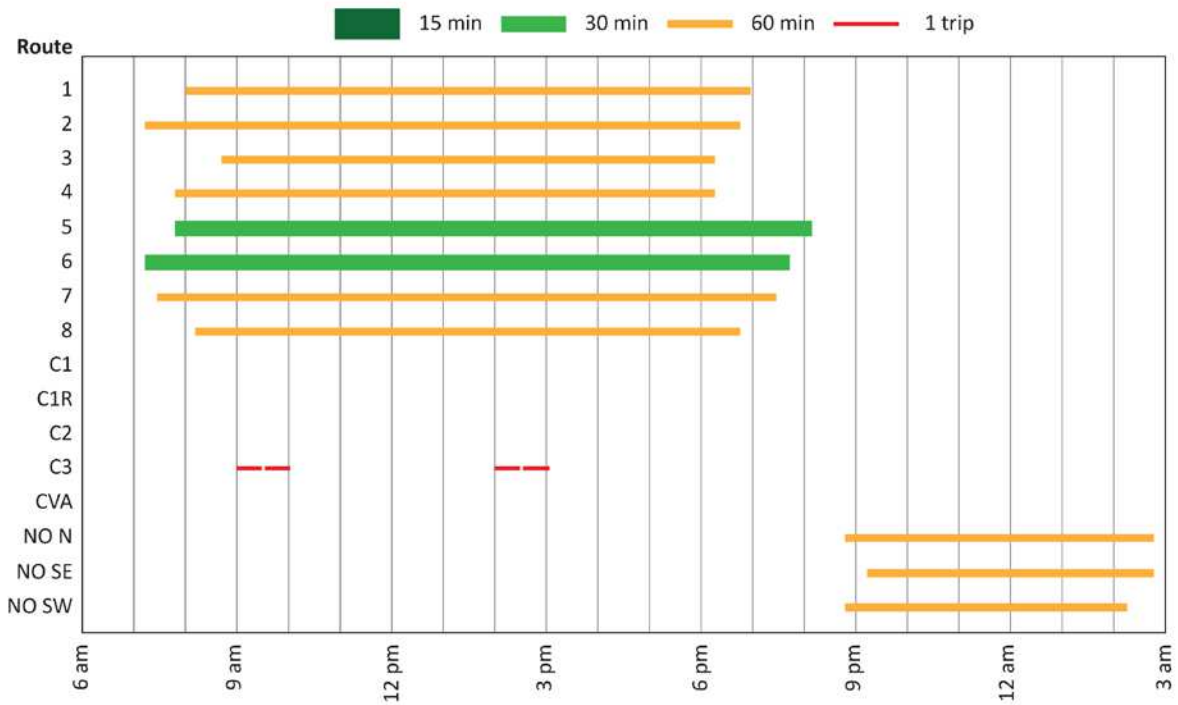


Figure 5: Daily Frequency and Span of Service, by Route

Weekday



Saturday



Source: Corvallis Transit System

Demand Response Transit

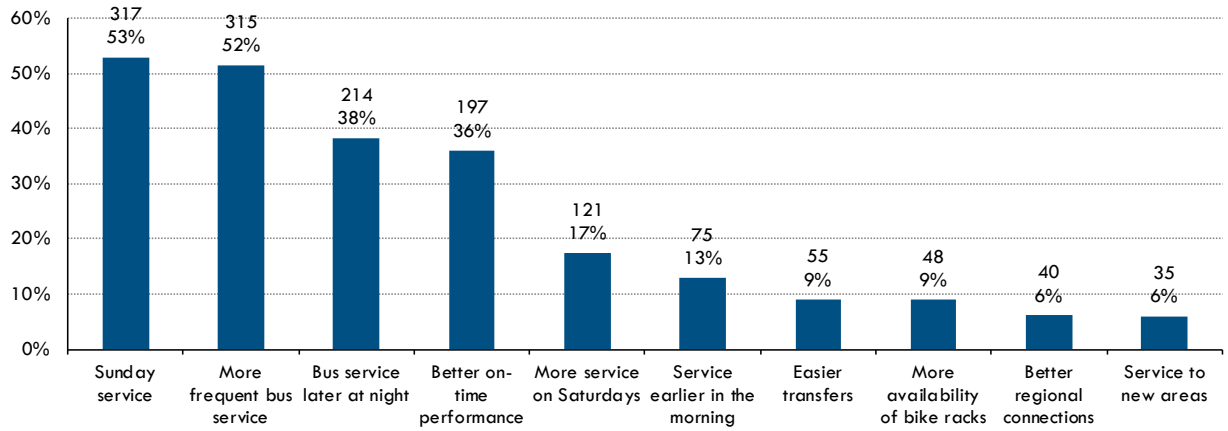
Within the CTS service area, complementary ADA paratransit service is provided during the fixed route service span, from 6:15 a.m. to 9:20 p.m. on weekdays and 7:15 a.m. to 8:10 p.m. on Saturdays. When OSU is in session, CTS also provides paratransit service Thursday through Saturday from 8:45 p.m. to 2:40 a.m., matching Night Owl hours. Passengers must reserve a trip the day before their planned travel day. ADA complementary service is fareless since the fixed-route service is fareless. The City of Corvallis contracts with Benton County to provide the service, who in turn contracts with a third-party vendor for operations and maintenance.

Benton County's demand response service (Benton County Dial-A-Bus) provides another option to transport people countywide. People 60 years of age or older and people of any age with a documented disability may qualify for Benton County's demand response service. Passengers enrolled in the CTS ADA paratransit program qualify for the Benton County Dial-A-Bus program, but the reverse is not true (i.e., enrollment in the Benton County Dial-A-Bus program does not automatically enroll the passenger in the CTS ADA service). Benton County offers countywide demand response service seven days a week, 8:00 a.m. to 7:00 p.m. on weekdays, 8:30 a.m. to 6:00 p.m. on Saturdays, and 8:30 a.m. to 2:30 p.m. on Sundays.

Existing Conditions Key Findings

Overall, CTS meets the needs of many riders today, providing buses every 30 to 60 minutes to within a quarter-mile of nearly any part of the city. Public outreach with transit riders, summarized in Figure 6, indicated demand for increased span of service (later and earlier service, in addition to new Sunday service), increased frequencies, and improved on-time performance.

Figure 6 Transit rider survey service improvement requests



Source: CTS On-Board Survey Results (Fall 2014)

System-Level Findings

The system-level findings help to understand the issues and opportunities that the long-term system vision developed in Section III will address. The findings are organized into five public transportation design and performance categories, including geographic coverage, service span and schedule, frequency (i.e., headways), on-time performance (i.e., reliability), and stop spacing. These five topics are carried throughout the document to the discussion of service design principles and service standards.

Geographic Coverage

- Monroe Avenue from Kings Boulevard to the Downtown Transit Center (Monroe Avenue and SW 5th Street) has a high level of bus service in terms of frequency.
- Community input that "buses don't go downtown".
- Community and agency stakeholders noted that east-west transit service is lacking between Monroe Avenue and Circle Boulevard, and 9th Street and 36th Street (aka the "transit hole").
- West and South Corvallis – served by Routes 6 and 8 – are not connected by transportation infrastructure and transit due to natural barriers (Marys River and wetlands).
- Some passengers would like consistent direction of travel, including around Good Samaritan Hospital (Routes 2,4, and 7) and on 49th Street (Routes 3 and 8).
- Routes 3 and 8 are duplicative, and Route 8 has low use on Country Club Drive and 35th Street (approximately 30 boardings and alightings on a typical day).
- Multiple routes serve Hewlett-Packard (1, 7, C2, and the Linn-Benton Loop), though there is only relatively moderate travel demand.
- Future development is expected on 35th Street between Harrison Boulevard and Western Boulevard that may provide the opportunity for transit-supportive land use design, and generate demand for transit service along 35th Street.

Span and Schedule

- Stakeholders noted the demand for weekday evening service (most routes end service between 7:00 and 8:00 pm). Some stakeholders, in particular, suggested Night Owl service on 9th Street.
- On-board passenger surveys identified a demand for transit service on Sunday.

Frequency

- Riders want more frequent service system-wide. CTS most commonly receives requests for increased frequency on Routes 2, 5, and 6.
- Route 2 could sustain service running every 30 minutes; some Route 4 passengers are trying to get to and from 9th Street and use Route 4 because Route 2 only runs every 60 minutes.

On-Time Performance

- Buses are on-time about 56% of the time. "On-time" is defined as buses arriving at a timepoint within 4 minutes of its scheduled arrival or departure time.
- The routes with the lowest on-time performance are Routes 1, 2, 3, 8 and C1R.
- Routes 2, 3 and 8 don't always meet on-time performance expectations during weekday peak periods.

Stop Spacing

- All routes have an average stop-spacing of less than 1/5 mile (1,056 feet); generally people comfortably walk up to 1/4 mile (1,320 feet) to and from bus stops.[1]
- Over half (54%) of stops on Routes 2 and 5, and nearly half (48-49%) of stops on Routes 3, 6, and 8 are less than 0.15 miles (792 feet) apart.
- Stop spacing is directly related to bus travel speed (shorter spacing results in slower bus speed, as the number of stops increases). The slower a bus speed is relative to alternate forms of transportation like driving, the less likely a service will be to attract choice riders.

Route-by-Route Findings

Some findings are specific to one route serving a distinct public transportation market. The following section includes key issues and opportunities for Routes 1 through 8, as well as the limited service C-routes.

Route 1: Witham Hill and Walnut Boulevard

- The first run of the day (7 a.m.) has very heavy ridership, often standing room only.
- Stops along Witham Hill Drive accounts for about 70% of all boardings and alightings on this route.
- Few riders get on or off on Walnut Boulevard and Arrowood Circle.

Route 2: Good Samaritan Hospital via 9th Street

- Route has strong ridership all day, with most boardings and alightings near commercial areas on 9th Street.
- Low on-time performance due to constrained schedule relative to ridership level and roadway congestion.
- Poor pedestrian environment with high vehicle speeds and no buffer between sidewalk and auto traffic.

[1] 75-80% of passengers walk 0.25 miles or less (or approximately 5 minutes). Source: Transit Capacity and Quality of Service Manual, 3rd Edition, Chapter 4, pg 4.18.

Route 3: Western and Philomath Boulevards to 53rd Street & 8: Western Boulevard to West Corvallis

- Low on time performance, in part due to travel through congested roads within and surrounding OSU.
- Routes 3 and 8 both serve Sunset/49th Street area, but travel in different directions, which may be confusing for riders.

Route 4: Highland and 5th Street to Good Samaritan Hospital

- Inbound and outbound route variations may be confusing to riders.
- Low on-time performance, as route length and frequent stops make it difficult to meet a 30-minute route.
- Some geographic redundancy with Routes 1 and 7.

Route 5: Timberhill Shopping Center

- Strong ridership, good performance and no major comments from the public.

Route 6: South Corvallis via SE 3rd Street

- Strong all-day ridership, with high transfers to other routes; provides direct service onto Route 5 at the Downtown Transit Center without a transfer.

Route 7: 29th Street and Circle Boulevard to Good Samaritan Hospital

- Good ridership along most of the route, particularly at Timberhill Shopping Center.
- Moderate to low on-time performance.

Routes C1, C1R, C2, C3, and CVA

- Routes C1 and C1R provide additional service in areas already served by Routes 1 and 5.
- Route C2 has the lowest ridership in the entire system with seven passengers per day.
- Relatively low ridership on Route C3 at eight stops on Harrison and 53rd Streets, with about 12 boardings and alightings on a typical day.
- Passengers generally did not understand that the “C” routes are supplementary service.

II. Service Design

The system and route recommendations in this memorandum follow transit service design principles. These principles are the foundation of customer-friendly, efficient, and convenient service stemming from transit planning best practices.

Service Design Guidelines

Provide simple, direct paths

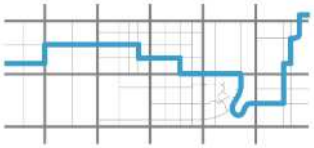
Operating direct routes provides clarity to customers and can maintain higher productivity (i.e., rides per service hour).

Circuitious, complicated

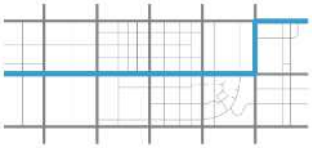
Direct, easy to understand

Serve major roads

Arterial roadways tend to provide faster travel times, clear routing and high-density rider markets.



Travels slowly on local streets



Travels on main roads with many destinations

Symmetrical routes

Keeping routes on one roadway in both directions provides clear, consistent service and information. Loop or circular routes can provide some coverage benefits that should be balanced against route efficiency and productivity.

One-way services

Two-way service

Serve well-defined markets

Match service to demand by serving destinations that typically rely upon transit. Activity centers change; evalute service periodically to ensure that routes serve the highest demand areas.

Serves areas with little demand

Serves major destinations

Coordinate public transportation services

Connecting routes provides mobility and travel time benefits to public transportation riders. Coordinate systems with timed transfers.

Lack of coordination

Service operates as a system

Stops should be spaced appropriately

Stop spacing directly affects bus travel times, schedule reliability, and customer access. Closely spaced stops or stops with inconsistent spacing increases travel time and reduces legibility.

Inconsistent stop spacing

Consistent stop spacing

CTS Service Level Standards

Service level standards provide quantitative and qualitative benchmarks that CTS can use to develop and monitor transit improvement strategies. Figure 7 summarizes industry practice service design standard benchmarks for each of the five service design areas described above.

Figure 7 Public Transportation Service Design Standards and Benchmarks

Topic	Metric	Existing System	Proposed Guideline	Sources
Coverage What areas support fixed route bus service?	*Household Density*			
	60-min frequency[A]	7.5 people / acre	8-16 people / acre	Analysis: CALM Model Goal: TCRP Transit Capacity and Quality of Service Manual
	30-min frequency[B]	9.3 people / acre	16-32 people / acre	
	15-min frequency	NA	32 + people / acre	
	Employment Density			
	60-min frequency[A]	4.4 jobs / acre	4-8 jobs / acre	Analysis: CALM Model Goal: TCRP Transit Capacity and Quality of Service Manual
	30-min frequency[B]	4.7 jobs / acre	8-16 jobs / acre	
	15-min frequency	NA	16+ jobs / acre	
Span What times of day best meet people's needs?	Major corridors	6:30 a.m. – 8:00 p.m.	6:00 a.m. – 10:00 p.m.	Goal: TCRP Transit Capacity and Quality of Service Manual; Public outreach
	Saturday service	7:30 a.m. – 7:00 p.m.	6:00 a.m. – 8:00 p.m.	
	Sunday service	NA	7:00 a.m. – 7:00 p.m.	
Frequency How often should the bus pass by major route stops?	AM Peak	30-60 minutes	15-30 minutes	Goal: TCRP Transit Capacity and Quality of Service Manual; Public outreach
	Midday	60-120 minutes	30-60 minutes	
	PM Peak	30-60 minutes	15-30 minutes	
	Evening	60 minutes	30-60 minutes	
	Saturday	60 minutes	60 minutes	
	Sunday	NA	60 minutes	
On-time performance How many routes are on-time?	All day departing no more than 5 minutes after schedule	40% - 90%	80% – 90%	Goal: TCRP Transit Capacity and Quality of Service Manual
Stop spacing How close together should bus stops be?	Downtown Corvallis	0.18 miles (system-wide average)	750-1,000 feet (0.14-0.19 miles)	Goal: Bus Stop Optimization Policy, Maryland Transit Administration (includes peer review)[2]
	OSU, commercial districts and central neighborhoods		750-1,320 feet (0.14-0.25 miles)	
	All other areas		1,000-2,640 feet (0.19-0.50 miles) Minimum 0.15 miles	

[A] Includes routes that operate at least every 60 minutes all day (Routes 1, 2, 3, 4, 5, 6, 7 and 8). Based on 1/8-mile buffer from routes. Calculated using an area-weighted sum of CALM 2010 TAZs.
[B] Includes routes that operate at least every 30 minutes all day (Routes 5 and 6). Based on 1/8-mile buffer from routes. Calculated using an area-weighted sum of CALM 2010 TAZs.

[2] See https://mta.maryland.gov/sites/default/files/Bus_Stop_Optimization_Policy_Pilot.pdf, accessed July 2017.

III. Recommended Transit Improvement Scenario

This section describes a long-term transit improvement vision that integrates existing and future land use conditions, input expressed through public outreach, and transit service design guidelines. Three phases were created (short, medium, and long) that act as stepping stones to achieve the vision.

Figure 8 summarizes the phases toward implementing the transit vision, the timeline for each phase, and total operating revenues available. The Long-Term phase is unconstrained; however, an expected revenue amount of $7.2 million was used as an estimate.

Figure 8 Scenario Phases and Funding

Phase	Timeline	Total Annual Revenues	Proposed System Annual Operating Cost	Annualized Capital Costs	Number of New Vehicles Needed
Existing	Present	$3.20 million	-	-	-
Short	1-3 years	$4.55 million	$4.51 million	-	0
Medium	3-10 years	$5.28 million	$5.13 million	$0.13 million	2
Long	10-20+ years	$7.20 million	$7.46 million	$0.26 million	6

Proposed Transit System Improvements

Long-Term System Vision

In the 20-year planning horizon, Corvallis will have a frequent, connected transit network. The future system will provide people with reliable service that connects residential, employment and commercial areas with downtown and OSU. The future system will operate until 10 pm on weekdays, until 8 pm on Saturdays, and with new service on Sundays. Additionally, more service will be provided during peak hours so that people can get where they want to go quickly and easily.

The following sections describe key improvements by short-, medium-, and long-term phases. Within each phase, individual projects are organized by the service design category they address most directly (service coverage, span, frequency, on-time performance, and stop spacing). No changes to Night Owl are included in any of the phases; future changes may be discussed between Oregon State University, the Associated Students of OSU, and CTS.

- Figure 9 summarizes the long-term improvements by route, including service hours (i.e., span), frequency, and run times.
- Figure 10 and Figure 11 provide system maps.
- Figure 12 maps the envisioned midday frequencies on weekdays.
- Figure 13 shows the phasing of frequency improvements for weekdays over the planning horizon.
- Figure 14 shows the system vision span and frequency by route for weekday, Saturday and Sunday service.

Scenario Assumptions

The transit scenario is underpinned by several assumptions related to CTS' operating revenues and expenditures, and intermittent capital costs. Expenditures are built on hourly costs associated with providing transit services today. The key assumptions include:

- Average fixed route transit operating cost: $85 per hour. This is based on existing operating expenditures for today's level of service.
- Average ADA paratransit service operating cost: $38 per hour. Whenever service areas are added or hours extended, ADA paratransit must be available during the same times.
- Vehicle operating speed: Assumed at 14 miles per hour, which takes into account bus stops. This travel speed was used to calculate route cycle times.
- Layover: On each trip, a certain amount of time is assumed to account for congestion, driver breaks, or other elements that delay vehicles. An assumed layover time of +10% of route runtime was used. Route runtime and layover were estimated using Remix software.
- Cost for new vehicles: $440,000 for a 35-foot bus. The City of Corvallis currently has a high spare ratio with five spares. As service grows, the phases assume that two of the five spares can be put into revenue service. Any additional vehicles needed to operate under each phase would have to be purchased by the City. The last two vehicles added to the CTS fleet were 100% paid for by the City. The number of vehicles purchased in each phase ensure that at least three vehicles will remain as spare vehicles.
- Future funding may be available from a new statewide funding program. It is assumed that existing state and federal funding programs continue at the same levels, accounting for inflation.

Figure 9 Long-Term System Vision – Service Summary

Route	Route Name	Span			Frequency (minutes)				Route Run Time (minutes)
		Weekday	Saturday	Sunday	Peak	Off-Peak	Saturday	Sunday	
1	Witham Hill	6 a.m. – 10 p.m.	7 a.m. – 9 p.m.	10 a.m. – 6 p.m.	15	30	60	60	48.7
2	9th Street	6 a.m. – 10 p.m.	7 a.m. – 9 p.m.	10 a.m. – 6 p.m.	15	20	30	60	30.0
3	Western / Sunset / 49th St	6 a.m. – 10 p.m.	7 a.m. – 9 p.m.	10 a.m. – 6 p.m.	15	30	30	60	30.0
4	Highland / Conser / Conifer	6 a.m. – 10 p.m.	7 a.m. – 9 p.m.	10 a.m. – 6 p.m.	30	60	60	60	45.0
5	Kings	6 a.m. – 10 p.m.	7 a.m. – 9 p.m.	10 a.m. – 6 p.m.	15	15	30	60	25.6
6	South Corvallis	6 a.m. – 10 p.m.	7 a.m. – 9 p.m.	10 a.m. – 6 p.m.	15	15	30	60	30.0
7	29th Street / Circle	6 a.m. – 10 p.m.	7 a.m. – 9 p.m.	--	30	60	60	--	52.6
8	Country Club	6 a.m. – 10 p.m.	7 a.m. – 9 p.m.	--	60	60	60	--	49.5
9	Grant / Buchanan	6 a.m. – 10 p.m.	7 a.m. – 9 p.m.	--	60	60	60	--	38.3
10	Downtown	6 a.m. – 10 p.m.	7 a.m. – 9 p.m.	--	15	15	15	--	6.8
11	Crescent Valley	7 a.m.; 3 p.m.; 5 p.m.	--	--	3 trips	--	--	--	41.0

Note: Service hours are approximate and will change based on detailed route scheduling.

Source: Nelson\Nygaard

Figure 10 Long-Term System Vision – Weekday Routes

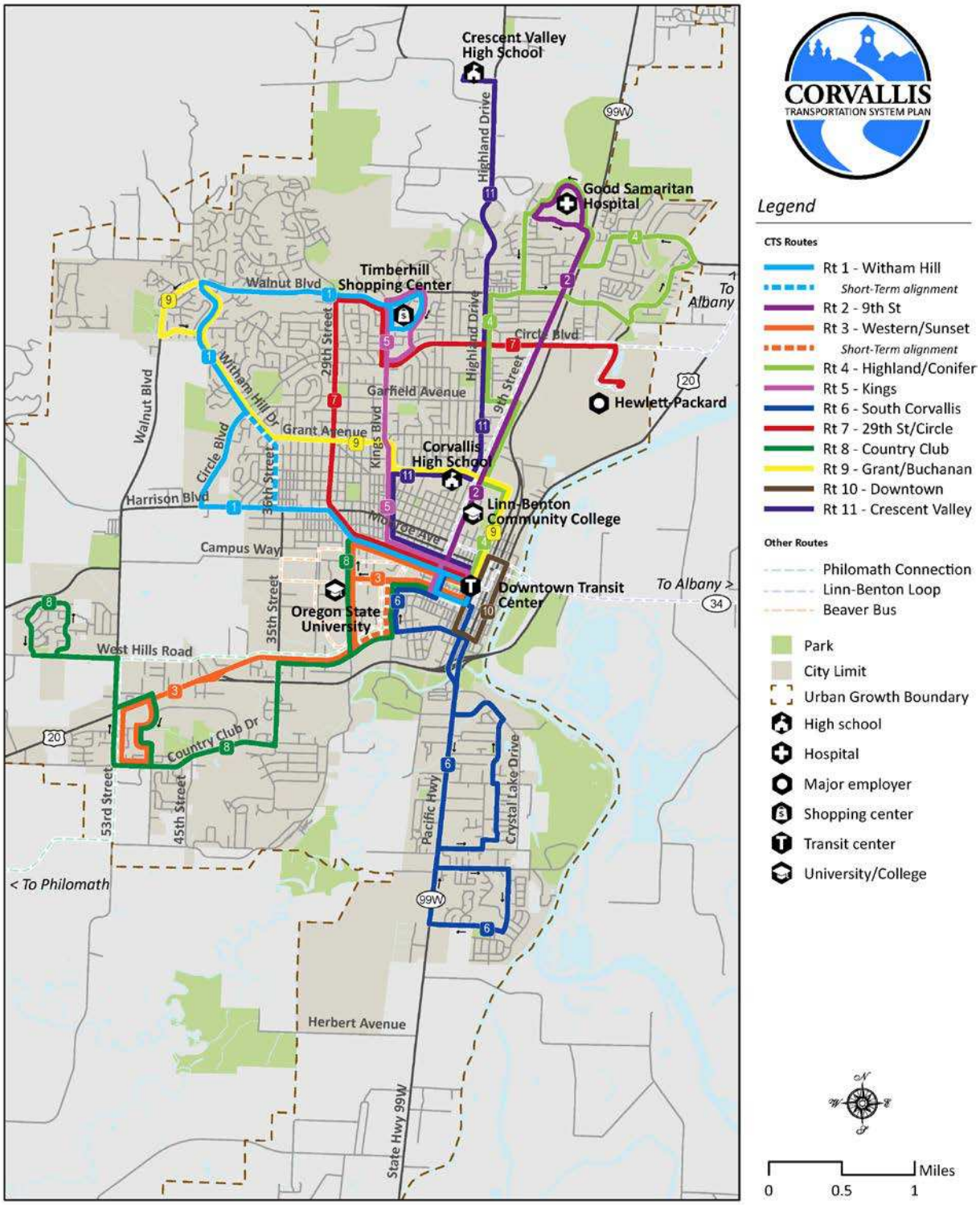


Figure 11 Long-Term System Vision – Central Corvallis

Figure 12 Long-Term System Vision – Weekday Midday Frequency

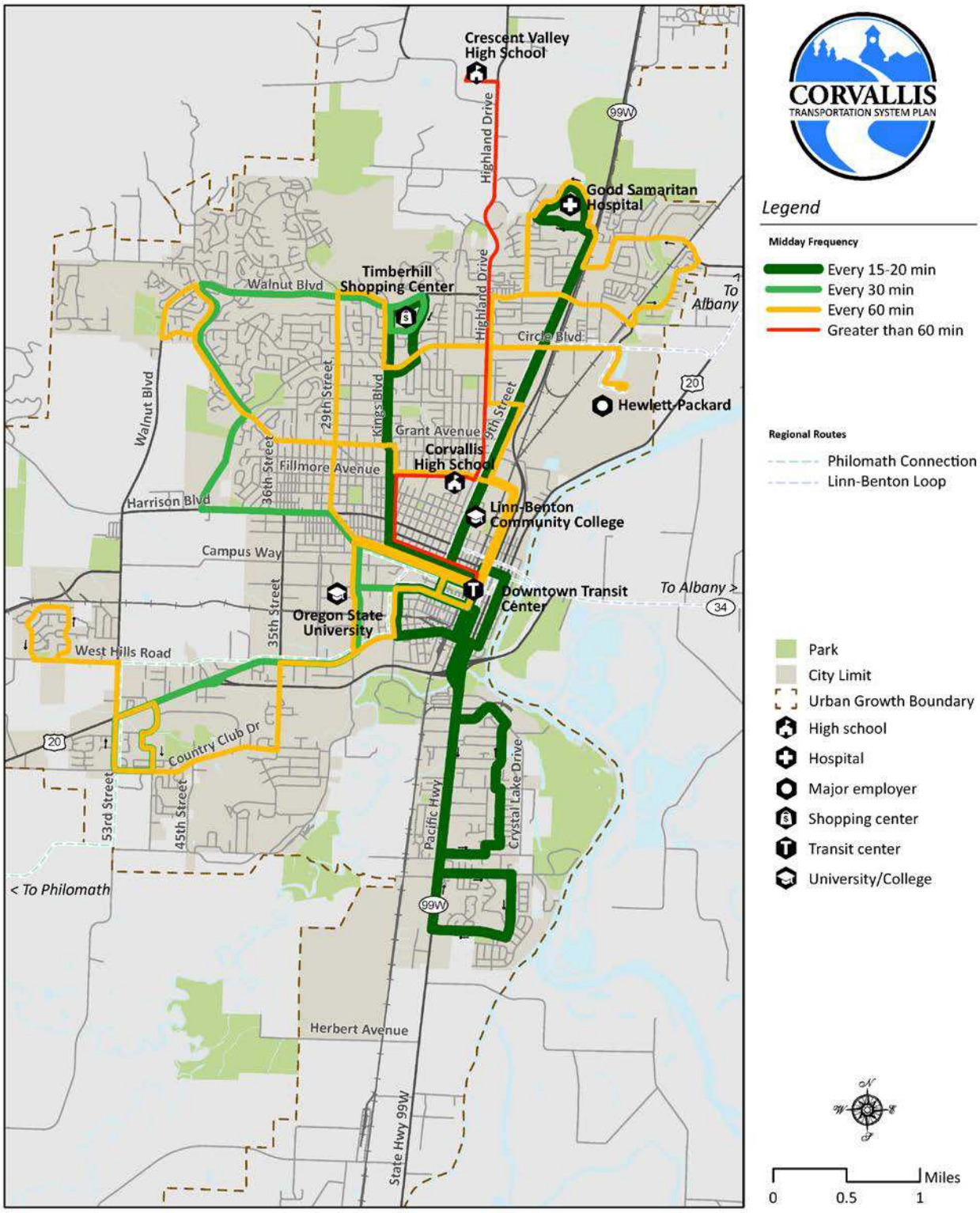


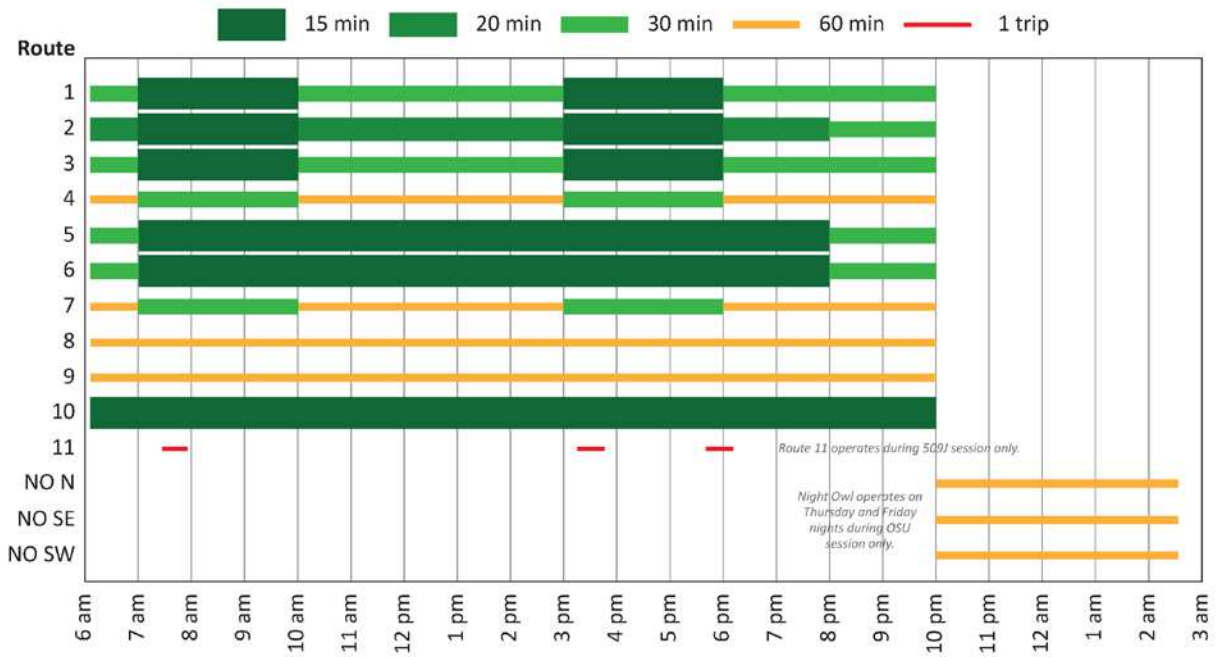
Figure 13 Weekday Frequency Phasing Summary

Route Number	Route Name	AM Peak / Midday / PM Peak (minutes)			
		Existing	Short-Term Phase	Medium-Term Phase	Long-Term Phase
1	Witham Hill	60 / 60 / 60	**30** / 60 / **30**	30 / 60 / 30	**15** / **30** / **15**
2	9th Street / Hospital	60 / 60 / 60	**30** / **30** / **30**	30 / 30 / 30	**15** / **20** / **15**
3	Western / Sunset / 49th St	60 / 60 / 60	**30** / **30** / **30**	30 / 30 / 30	**15** / 30 / **15**
4	Highland / Conser / Conifer	60 / 60 / 60	60 / 60 / 60	60 / 60 / 60	**30** / 60 / **30**
5	Kings	30 / 30 / 30	**20** / 30 / **20**	**15** / 30 / **15**	15 / **15** / 15
6	South Corvallis	30 / 30 / 15	**20** / 30 / **20**	**15** / 30 / **15**	15 / **15** / 15
7	29th Street / Circle	60 / 60 / 60	60 / 60 / 60	60 / 60 / 60	**30** / 60 / **30**
8	Country Club	60 / 60 / 60	**120** / **120** / **120**	120 / 120 / 120	**60** / **60** / **60**
9	Grant / Buchanan	-	**120** / **120** / **120**	120 / 120 / 120	**60** / **60** / **60**
10	Downtown Circulator	-	**30** / **30** / **30**	**15** / **15** / **15**	15 / 15 / 15
11	Crescent Valley	3 trips	3 trips	3 trips	3 trips

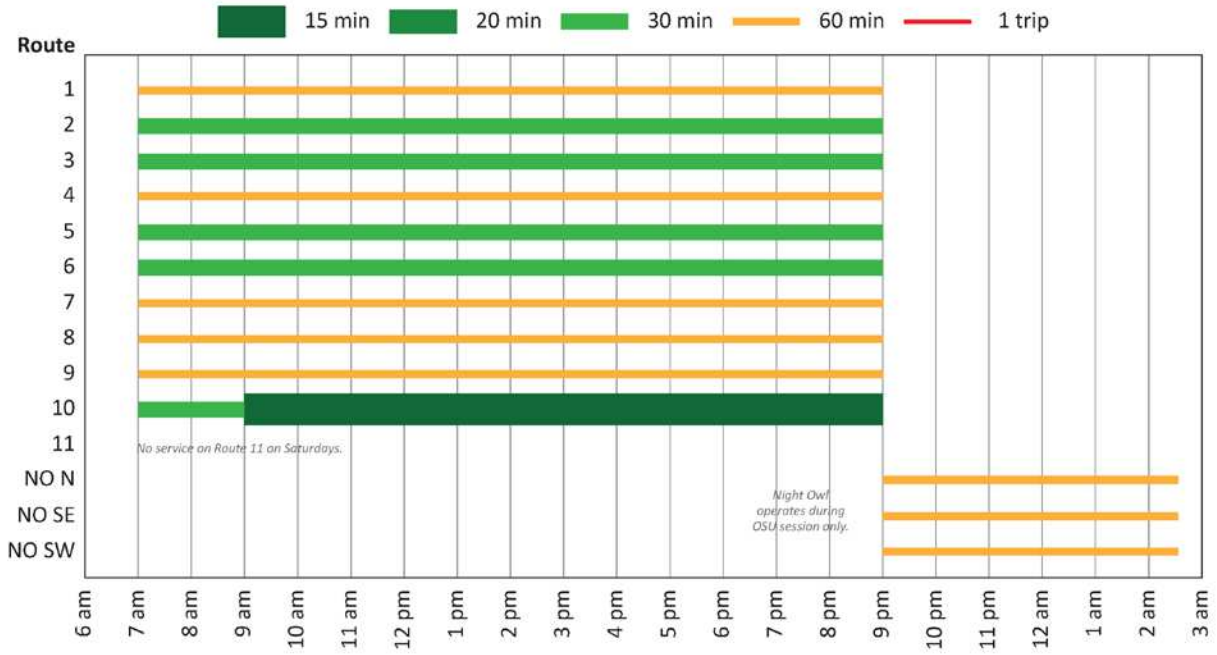
Notes: **Bold text** indicates iterative change from previous scenario.

Figure 14 Long-Term System Vision – Span and Frequency

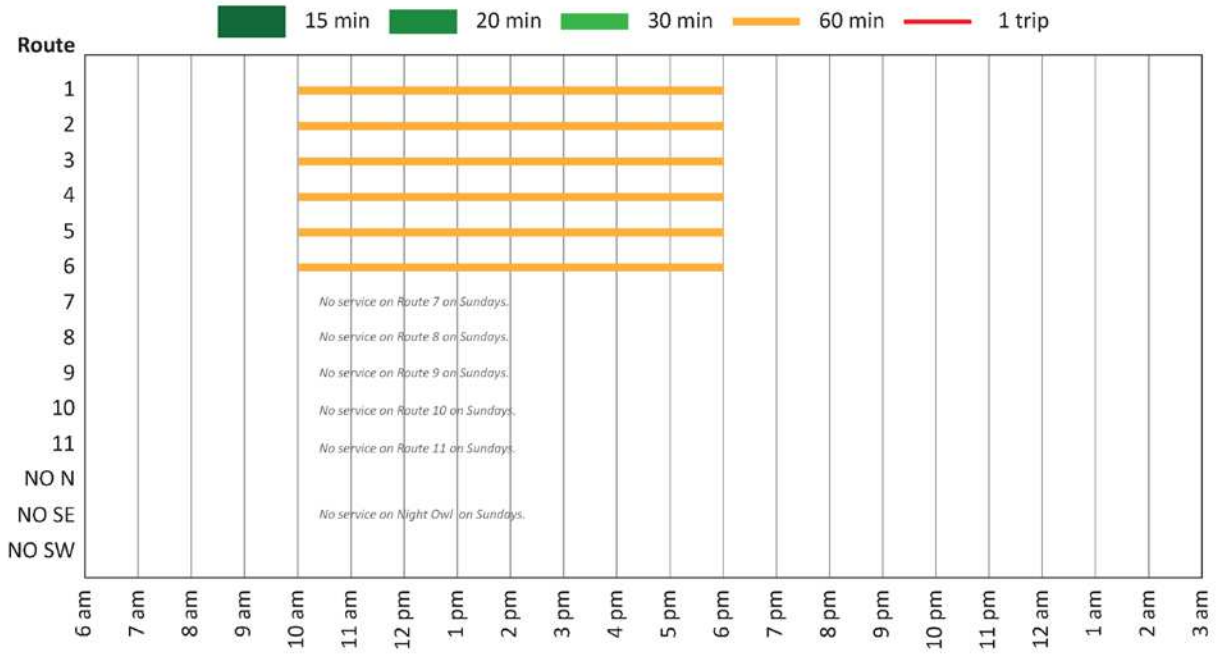
Weekday



Saturday



Sunday



Source: Nelson\Nygaard

Short-Term Phase

The Short-Term Phase includes many service changes that provide the foundation upon which the Long-Term vision can be implemented. Short-Term projects include:

- Alignment changes
- Stop consolidation to reduce running time on select routes
- Three new routes
- Extended evening hours on weekdays
- New service on Sundays

The Short-Term Phase covers fiscal years 2018-19 to 2020-21. If the City of Corvallis receives a 42% increase in available funding for CTS within the short-term timeframe,[3] a large number of changes are feasible quickly after Transit Development Plan (TDP) approval. The City would have about $4.55 million dollars available annually for transit service. Figure 15 lists the costs to implement and operate the Short-Term Phase. Overall, the Short-Term Phase will cost approximately $4.5 million annually, or an increase of $1.3 million from 2017.

Figure 15 Short-Term Phase Operating Summary

Existing annual operating cost	$ 3,200,000
Short-Term additional annual operating cost	$ 1,308,500
Total annual operating cost	$ 4,508,500
New vehicles	0
Annualized capital cost for new vehicles	$ 0
Total Annual Cost	**$ 4,508,500**

Figure 16 summarizes the span and frequency of each route in the short-term.

[3] The increase is due to the passage of HB2017. City staff believe the additional transit funding needed for the Short-Term Phase will be available for CTS. In the event HB2017 funding is not available, alternate funding sources would be required to implement the proposed service changes.

Figure 16 Short-Term Phase Route Summary

Route	Route Name	Span			Frequency (minutes)				Route Run Time (minutes)
		Weekday	Saturday	Sunday	Peak	Off-Peak	Saturday	Sunday	
1	Witham Hill	6 a.m. – 10 p.m.	8 a.m. – 7 p.m.	10 a.m. – 6 p.m.	30	60	60	60	44.3
2	9th Street	6 a.m. – 10 p.m.	7 a.m. – 7 p.m.	10 a.m. – 6 p.m.	30	30	60	60	30.0
3	Western / Sunset / 49th St	6 a.m. – 10 p.m.	8:30 a.m. – 7 p.m.	10 a.m. – 6 p.m.	30	30	30	60	30.0
4	Highland / Conser / Conifer	6 a.m. – 10 p.m.	7:30 a.m. – 7 p.m.	10 a.m. – 6 p.m.	60	60	60	60	45.0
5	Kings	6 a.m. – 10 p.m.	7:30 a.m. – 8 p.m.	10 a.m. – 6 p.m.	20	30	30	60	25.6
6	South Corvallis	6 a.m. – 10 p.m.	7 a.m. – 8 p.m.	10 a.m. – 6 p.m.	20	30	30	60	30.0
7	29th Street / Circle	6 a.m. – 10 p.m.	7:30 a.m. – 7 p.m.	--	60	60	60	--	52.6
8	Country Club	6 a.m. – 10 p.m.	8 a.m. – 7 p.m.	--	120	120	120	--	49.5
9	Grant / Buchanan	6 a.m. – 10 p.m.	8 a.m. – 7 p.m.	--	120	120	120	--	38.3
10	Downtown	6 a.m. – 10 p.m.	8 a.m. – 7 p.m.	--	30	30	30	--	6.8
11	Crescent Valley	7 a.m.; 3 p.m.; 5 p.m.	--	--	3 trips	--	--	--	40.0

Short-Term Phase Project List

Transit operates as a system, and making changes to one route often necessitates changes to another route. Figure 17 provides a list of all the changes necessary to implement the Short-Term Phase. Each project code encompasses one or multiple changes, depending upon whether certain actions must be grouped together. Figure 17 also provides justification for each project, additional cost from the existing service, priority (based on public and stakeholder input), and level of effort to implement.

Figure 17 Short-Term Phase Project List

Project Code	Description	Reasoning	Daily Hours	Additional Annual Operating Cost	Priority	Level of Effort
A	Eliminate Route C2	Low ridership	(1)	$ (29,500)	Medium	Low
B	Eliminate route deviation on Route 1 to Arrowood Circle	Low ridership; Makes route more intuitive to riders because it does not deviate off of Walnut Boulevard.	-	-	Low	Low
C	Operate Routes 3 and 8 in the same direction along 49th Street	Passengers confused by variation in routing	-	-	Low	Low
D	Operate consistent routing around Samaritan Hospital on Routes 2 and 4	Passengers confused by variation in routing	-	-	Low	Low

Project Code	Description	Reasoning	Daily Hours	Additional Annual Operating Cost	Priority	Level of Effort
E	Modify Route 1. Terminate at Timberhill Shopping Center	Existing alignment of Route 1 is long	12	$ 156,900	Medium	Medium
	Modify Route 4. Serve Conser St/Conifer Blvd service area	Ridership on Conser/Conifer loop provides a strong market on north end of route				
	Modify Route 7; Serve Timberhill Shopping Center; Shorten route by moving Conser St/Conifer Blvd to Route 4. Remove Samaritan Hospital	Existing alignment of Route 7 is long				
	Coordinate Route 2 and 7 schedules to facilitate transfers at Circle Blvd and 9th St	Connect west side passengers to hospital				
	Add Route 10; Add loop onto the ends of Routes 1 and 4 to provide service every 30 minutes	Feedback that buses do not serve downtown				
	Change Route 1 schedule to leave DTC at 15 minutes past the hour on every run; Bus returns to DTC at the top of the hour and becomes Route 10	Feedback that buses do not serve downtown				
F	Rename Route CVA to Route 11 so all routes have a number convention	Consistent number convention.	-	-	Low	Low
	Realign Route 11 to serve Buchanan, Kings and Monroe	Serve Corvallis HS and OSU				
	Realign Route 4 northbound onto 9th Street between Garfield and Buchanan for bi-directional service	Bi-directional service on Route 4				
G	Move eastbound bus stop at NW Circle at Janssen St further east so bus does not block crosswalk	Pedestrian safety and access	-	-	Low	Low
H	Consolidate stops on 9th Street (Route 2)	Improve on-time performance	-	-	High	Low

Project Code	Description	Reasoning	Daily Hours	Additional Annual Operating Cost	Priority	Level of Effort
I	Consolidate stops in Southwest Corvallis (Route 3)	Improve on-time performance	-	-	Medium	Low
J	Consolidate stops in South Corvallis (Route 6)	Improve on-time performance	-	-	Medium	Low
K	Add 1 additional morning trip at 6 am on Route 1	Route 1 has high ridership on 7 am trip	1	$ 22,100	Low	Medium
L	Extend weekday service to 10 pm on all routes	Later hours was the 3rd most common passenger request	21	$ 416,600	High	High
	Provide paratransit service on weekdays until 10 pm	Federal requirement	-			
M	Provide hourly Sunday service on Routes 1, 2, 3, 4, 5, and 6 from 10 am - 6 pm.	Sunday service was top passenger request	56	$ 189,000	High	Medium
	Provide paratransit service on Sunday from 10 am to 6 pm	Federal requirement				
N	Operate Route 5 every 20 minutes during peak periods	High ridership route	4	$ 139,400	Medium	Medium
	Operate Route 6 every 20 minutes during peak periods	High ridership route				
	Remove supplemental Route 6 service	Remove supplemental service when frequency increases				
	Operate Route 1 every 30 minutes during peak periods	High ridership route				
	Eliminate C1 and C1R	Eliminate route redundancy with increased service on Routes 1 and 5				
O	Operate Route 2 every 30 minutes all day	Frequency was the 2nd most common passenger request	7	$ 143,700	High	Medium

Project Code	Description	Reasoning	Daily Hours	Additional Annual Operating Cost	Priority	Level of Effort
P	Operate Route 3 every 30 minutes all day	Frequency was the 2nd most common passenger request	19	$ 270,300	High	High
	Combine Route 8 and C3; Remove service along Harrison Blvd	Low ridership along Harrison Blvd				
	Eliminate Route C3; serve Grand Oaks on Route 8	Low ridership route				
	Operate Route 8 every 120 minutes	Provide coverage service; low demand area				
	Add Route 9 on Buchanan and Grant. Operate every 2 hours	Feedback that there is a "transit hole" between Monroe and Circle Blvd				
	Install advanced stop line for vehicles on Kings Blvd southbound turning left onto Buchanan Ave	Difficult turn for buses				
			Total	$ 1,308,500		

Short-Term Project Details

This section provides additional details for some of the larger and more complex projects listed above: projects E, H, I, J and P. Project E and P include alignment changes to multiple routes at once, and Projects H, I and J outline methods to reduce running time on three routes.

Project E

The primary intent of Project E is to improve the reliability of service on select corridors, provide shorter, more direct routes, and reduce or eliminate service where there is limited ridership. This project entails changes to Routes 1, 2, 4, 7, and 10.

The strongest market on Route 1 is along Witham Hill Drive, with less ridership on Walnut Boulevard between Timberhill Shopping Center and Hewlett-Packard. Route 1 service east of Timberhill Shopping Center would be eliminated. Service from Timberhill Shopping Center to Hewlett-Packard would be preserved with modifications to Route 7.

Today, Route 7 does not directly serve the Timberhill Shopping Center, although it provides service within one-third of a mile from it. Route 7's proposed short-term alignment would serve the shopping center, and continue east to Hewlett-Packard. The route today is long and circuitous, serving many markets. The Samaritan Hospital, Conser Street and Conifer Boulevard loop would be eliminated and added onto Route 4 to make Route 7 more direct. Today Route 4 is very similar to Route 2 along 9th Street. Adding the high-ridership Conser Street and Conifer Boulevard loop to Route 4 will add a new market to that service.

The ridership at the hospital does not warrant service on three routes (2, 4 and 7)[4]. Instead, service on Routes 2 and 4 would continue to serve the hospital while Route 7 would not.

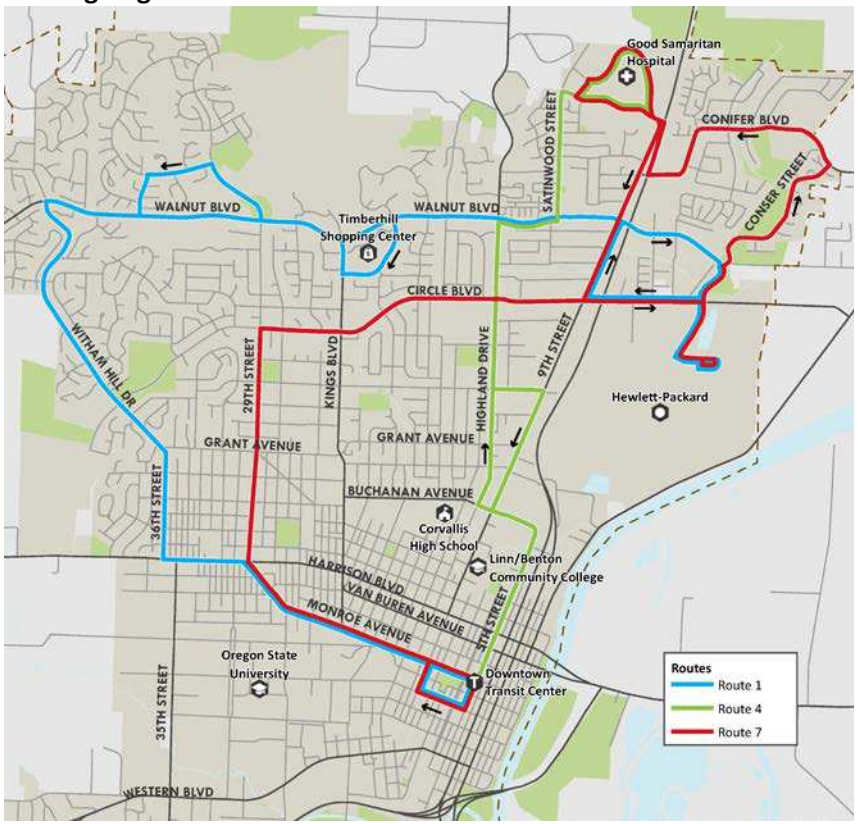
With these new alignments, the run times for both Route 1 and 4 are low enough (44.3 and 40.9 minutes, respectively) to allow vehicles to provide additional service before the completion of the 60-minute cycle. Both routes would provide service on Route 10 – a downtown circulator – after operating their own individual routes. Since both Routes 1 and 4 would operate every 60 minutes, Route 10 would operate every 30 minutes. Route 10 would provide a direct transit connection between the Transit Center and 2nd St in Downtown Corvallis.

Figure 18 provides two maps, showing the existing alignment of Routes 1, 4 and 7 on the left, and the short-term alignments of Routes 1, 4, 7 and 10 on the right.

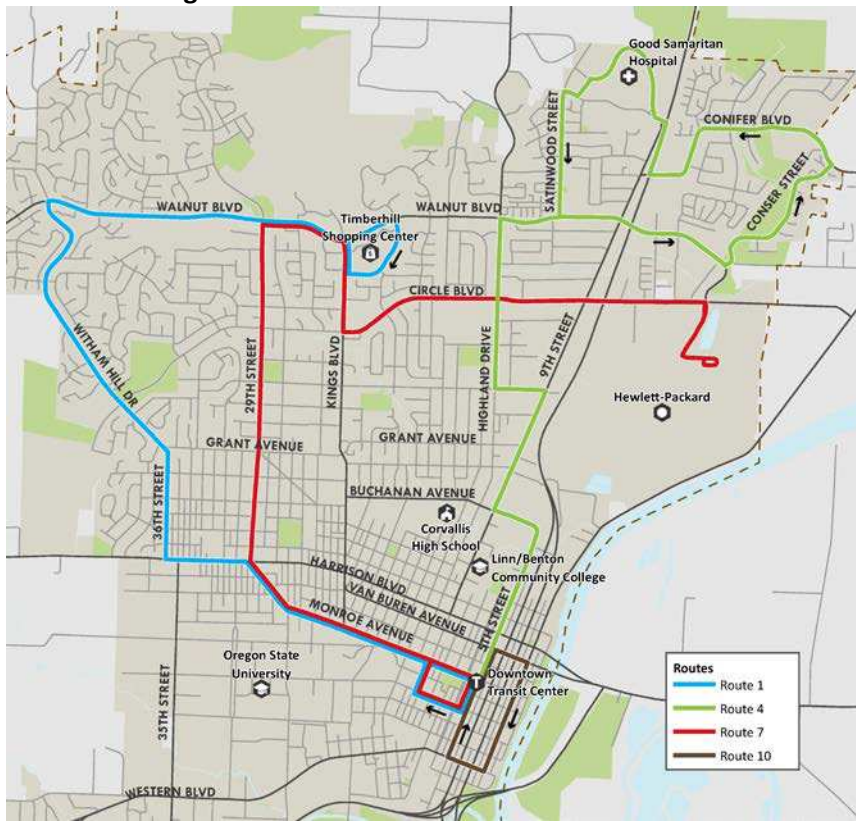
[4] On-board data collection from November 2014 recorded approximately 102 boardings and 76 alightings at all stops along Elks Drive and Samaritan Drive.

Figure 18 Project E Route Changes

Existing Alignment



Short-Term Alignment



Projects H, I and J

Three projects consolidate stops along busy corridors: 9th Street, Western Boulevard/Philomath Boulevard, and in Southeast Corvallis. Today, Routes 2, 3, and 6 suffer from poor on-time performance, causing passengers to miss transfers. The routes have high ridership and no portions should be removed, thus the best solution for reducing running time is reducing the number of bus stops.

Stop spacing has a direct relationship to bus running time. The more stops there are, the more time the bus needs to serve the route. On average, each bus stop requires about 30 seconds for the bus to stop, pick up passengers, and accelerate back into traffic (20 seconds for loading/unloading and 10 seconds for acceleration and deceleration). This time may be longer or shorter depending on the number of boardings, wheelchair boardings, traffic congestion, and roadway geometry. CTS also found that after its system went fareless, trip lengths went down as passengers began taking the bus for just a few blocks. This has resulted in a system where one or two passengers are often waiting at almost every stop. As a result of the above factors, a cycle time of 30 minutes or less is difficult to achieve. Reducing stops could reduce running times and improve speed and reliability

This involves moving some stops and eliminating others to establish consistent spacing, provide good connectivity with safe and walkable pedestrian environments, and locating stops close to areas of high demand. Specific stops that would be moved or relocated would be identified based on multiple criteria, including distance from other stops, specific land uses adjacent to each stop, and the pedestrian network near the stop.

Project P

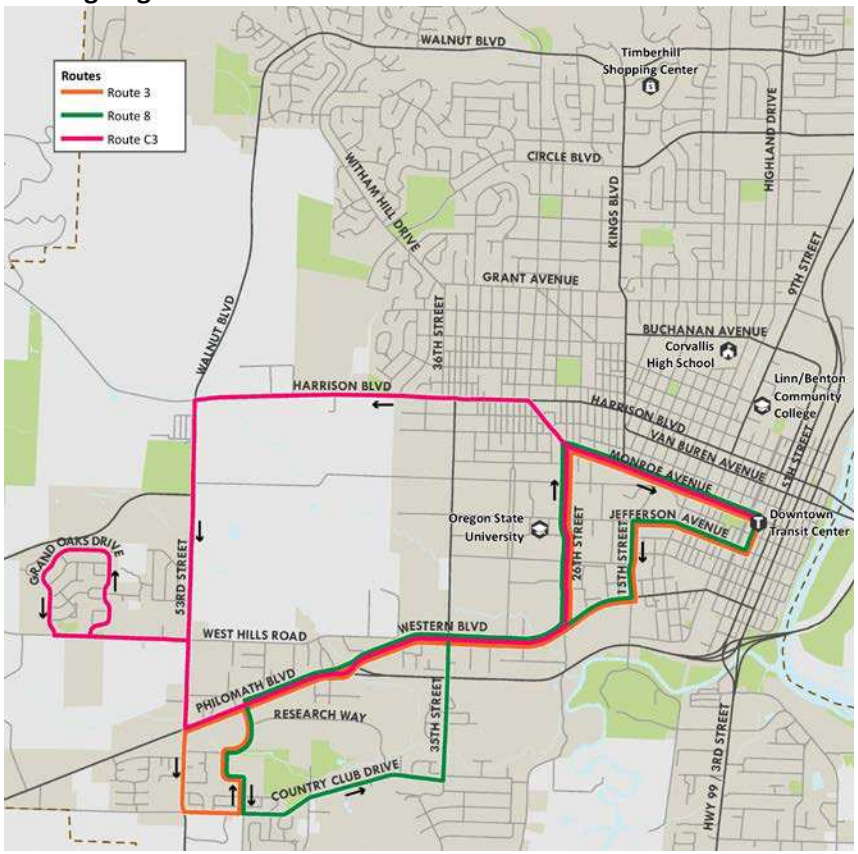
Like Project E5, Project P involves a number of simultaneous changes on multiple routes. Project P modifies Routes 3 and 8, eliminates Route C3, and creates a new Route 9. Today, Routes 3 and 8 serve nearly the same alignment in southwest Corvallis. Meanwhile, Route C3 has low ridership outside City limits along Harrison Boulevard and 53rd Street north of West Hills Road. Eliminating the low-ridership sections of C3 and combining the rest of C3 with Route 8 frees up resources to operate Route 3 every 30 minutes.

Route 8 would continue to serve Country Club Drive, but would operate every 120 minutes. Additionally, it would replace service on Route C3 to the Grand Oaks area by extending service up 53rd Street from Philomath Boulevard to West Hills Road and Grand Oaks Drive. Route 8 would have a run time of approximately 50 minutes. The remaining hour of service in the cycle would be used to operate a new crosstown service: Route 9 along Witham Hill Drive, Grant Avenue and Buchanan Avenue. This would fill in the east-west gap in transit service between Monroe Avenue and Circle Boulevard.

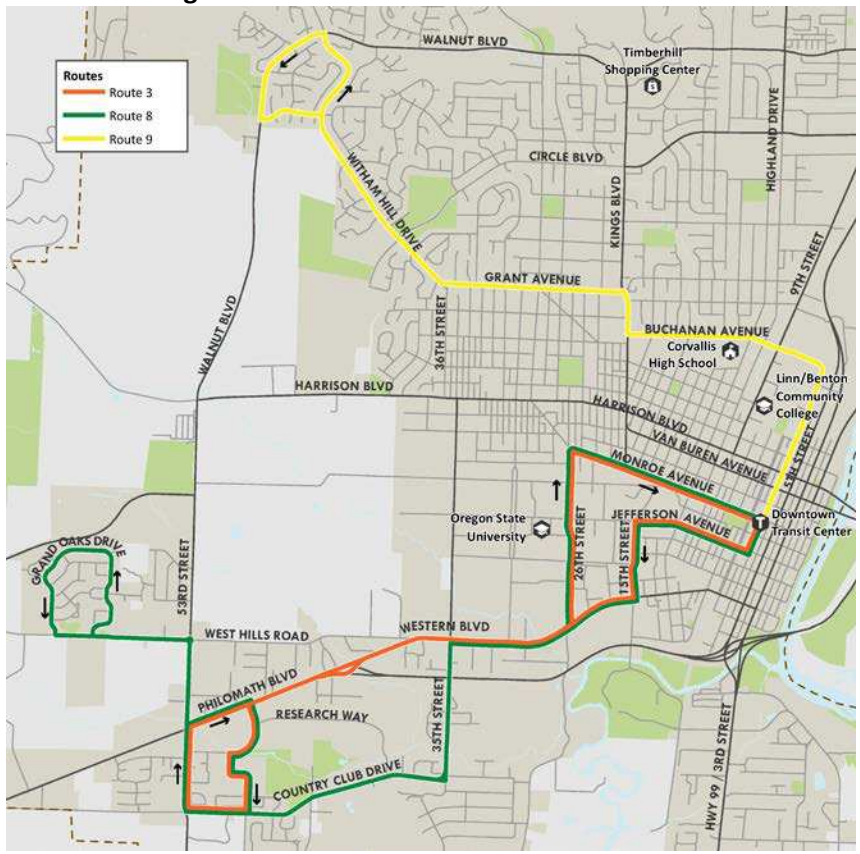
Figure 22 provides two maps, showing the existing alignment of Routes 3, 8 and C3 on the left, and the short-term alignments of Routes 3, 8 and 9 on the right.

Figure 19 Project P Route Changes

Existing Alignment



Short-Term Alignment



Medium-Term Phase

The Medium-Term Phase includes projects that are expected to be implemented between 3 and 10 years after adopting the Corvallis TDP, or fiscal years 2021-22 to 2027-28.

The Medium-Term Phase includes additional route and frequency adjustments to improve upon the Short-Term system. Projects include:

- Route alignment changes on Routes 1 and 3
- All-day frequent service on Route 10 (Downtown Circulator)
- Later service on Saturday evenings
- Increased peak-hour frequency on Routes 5 and 6.

The City of Corvallis may receive a total of $5.28 million each year to spend on operations and capital in the Medium-Term. It would be approximately $2.08 million more than the 2017 budget and an increase of approximately $730,000 per year from the Short-Term.[5] Figure 20 lists the costs to implement and operate the Medium-Term Phase. Overall, the Medium-Term Phase will cost approximately $5.3 million annually, within the City's expected revenue amount.

Figure 20 Medium-Term Phase Operating Summary

Short-Term annual operating cost	$ 4,508,500
Medium-Term additional annual operating cost	$ 622,800
Total annual operating cost	$ 5,131,300
New vehicles	2
Annualized capital cost for new vehicles	$ 125,714
Total Annual Cost	**$ 5,257,014**

Figure 21 provides a summary of the span and frequency of each route in the Medium-Term.

[5] The increase is due to the passage of HB2017. City staff believe the additional transit funding needed for the Medium-Term Phase will be available for CTS. In the event HB2017 funding is not available, alternate funding sources would be required to implement the proposed service changes.

Figure 21 Medium-Term Phase Route Summary

Route	Corridor	Span			Frequency (minutes)				Route Run Time (minutes)
		Weekday	Saturday	Sunday	Peak	Off-Peak	Saturday	Sunday	
1	Witham Hill / Circle	6 a.m. – 10 p.m.	8 a.m. – 9 p.m.	10 a.m. – 6 p.m.	30	60	60	60	48.6
2	9th Street	6 a.m. – 10 p.m.	7 a.m. – 9 p.m.	10 a.m. – 6 p.m.	30	30	60	60	30.0
3	Western / Sunset / 49th St	6 a.m. – 10 p.m.	8:30 a.m. – 9 p.m.	10 a.m. – 6 p.m.	30	30	30	60	30.0
4	Highland / Conser / Conifer	6 a.m. – 10 p.m.	7:30 a.m. – 9 p.m.	10 a.m. – 6 p.m.	60	60	60	60	45.0
5	Kings	6 a.m. – 10 p.m.	7:30 a.m. – 9 p.m.	10 a.m. – 6 p.m.	15	30	30	60	25.6
6	South Corvallis	6 a.m. – 10 p.m.	7 a.m. – 9 p.m.	10 a.m. – 6 p.m.	15	30	30	60	30.0
7	29th Street / Circle	6 a.m. – 10 p.m.	7:30 a.m. – 9 p.m.	--	60	60	60	--	52.6
8	Country Club	6 a.m. – 10 p.m.	8 a.m. – 9 p.m.	--	120	120	120	--	49.5
9	Grant / Buchanan	6 a.m. – 10 p.m.	8 a.m. – 9 p.m.	--	120	120	120	--	38.3
10	Downtown	6 a.m. – 10 p.m.	8 a.m. – 9 p.m.		15	15	15	--	6.8
11	Crescent Valley	7 a.m.; 3 p.m.; 5 p.m.	--	--	3 trips	--	--	--	40.0

Medium-Term Phase Project List

Figure 22 provides a list of all the changes necessary to implement the Medium-Term Phase, including the additional cost from the prior phase, priority (based on public and stakeholder input) and level of effort necessary for each project. Each project code encompasses one or multiple changes, depending upon whether certain actions must be grouped together.

Figure 22 Medium-Term Phase Project List

Project Code	Description	Reasoning	Daily Hours	Additional Annual Operating Cost	Annualized Capital Cost	Priority	Level of Effort
Q	Realign Route 3 to operate westbound through OSU's campus on outbound trips	More direct service to OSU	-	$ -		Medium	Low
R	Operate Route 1 via Circle Blvd extension instead of 36th St	Access more passengers	-	$ -		High	Low
S	Extend Saturday service to 9 pm on all routes	Desire for later service	13	$ 55,700		Medium	Medium
T	Add supplemental service on Route 7 during the PM peak	High ridership in the PM	2	$ 38,700		Low	Medium
U	Operate Route 5 every 15 minutes during peak periods	High ridership route; Frequency was common passenger request	6	$ 132,800	$ 62,857	Medium	Medium
	Operate Route 6 every 15 minutes during peak periods	High ridership route; Frequency was common passenger request					
V	Operate Route 10 every 15 minutes on weekdays	Shorter frequencies to match typical circulator-style service; Dedicated vehicle	16	$ 342,600	$ 62,857	Medium	High
W	Operate Route 10 every 15 minutes on Saturdays for 12 hours per day	Add service as ridership grows	12	$ 53,000		Medium	Medium
			Total	$ 622,800	$ 125,714		

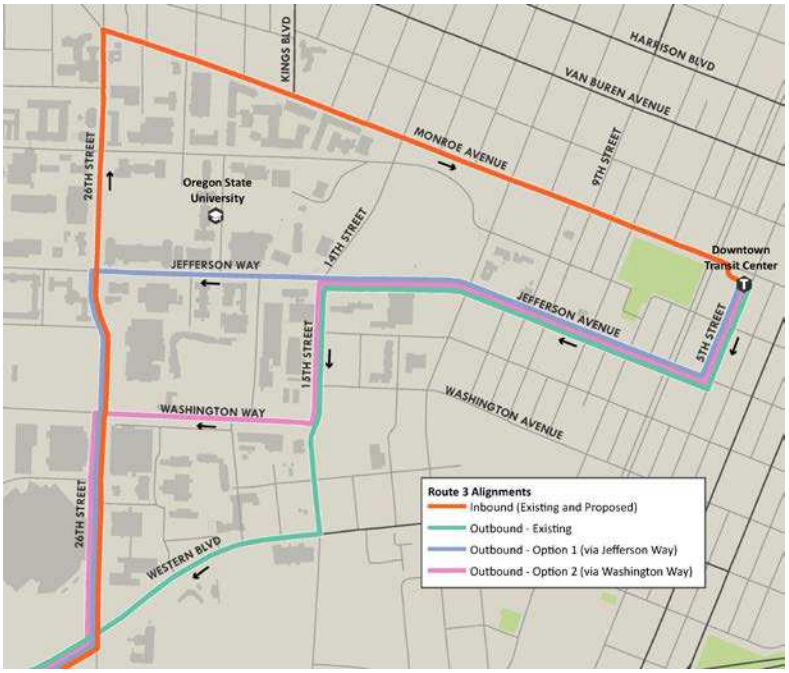
Medium-Term Project Details

This section provides additional details for some of the larger and more complex projects listed above: projects Q and R, both of which modify alignments on Routes 3 and 1, respectively.

Project Q

The large one-way loop on Route 3 through OSU's campus increases complexity for passengers traveling between OSU and southwest Corvallis by locating the boarding and alighting locations on OSU's campus several blocks apart. By realigning service through OSU's campus on outbound trips (either via Jefferson Way or Washington Way), the inbound and outbound alignment would be more closely matched. Further discussions with OSU would be required prior to implementing this routing change as it would necessitate capital improvements for bus stops and changes to lane configurations. Figure 23 shows two potential alignment options through OSU.

Figure 23 Project Q - Route 3 Alignment Options through OSU

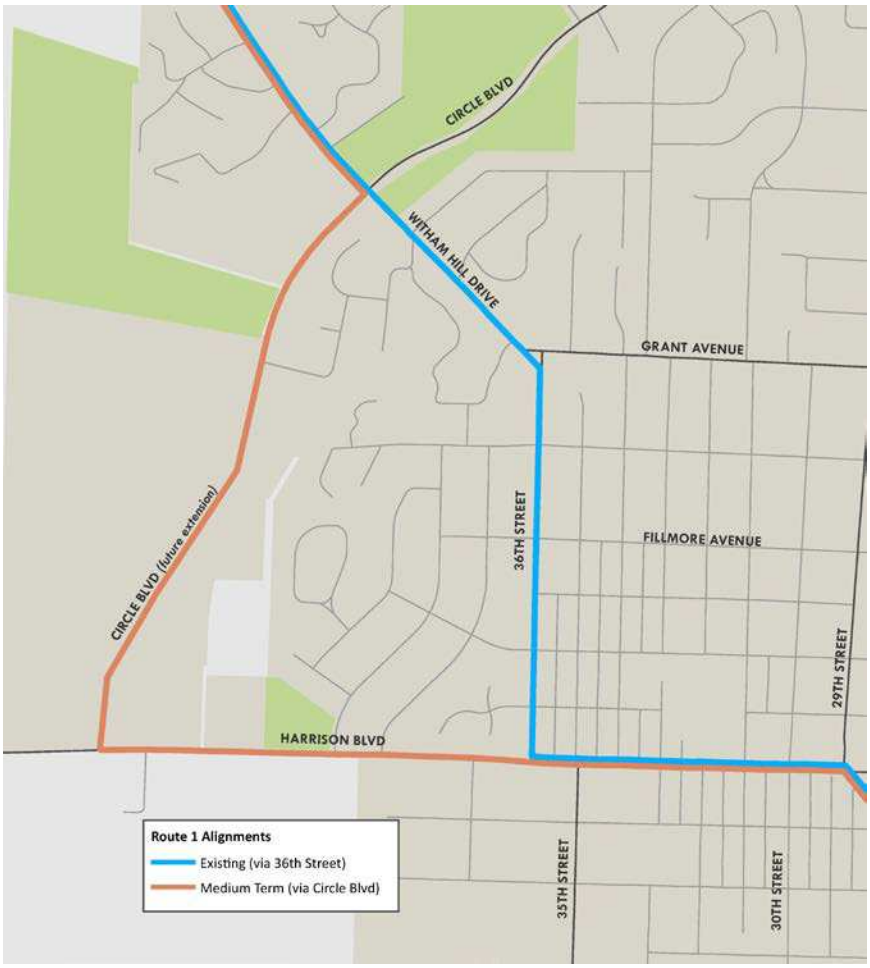


Project R

Circle Boulevard is scheduled to be extended from Witham Hill Drive out to Harrison Boulevard in the near future. A future housing development marketed to OSU students along this extended section of Circle Boulevard is likely to generate demand for transit services. Project R leverages the new roadway

and future transit demand by realigning Route 1 off of 36th Street and onto Circle Boulevard. Figure 24 shows the proposed Route 1 alignment that would begin in the Medium-Term Phase.

Figure 24 Project R - Route 1 Alignment Changes



Long-Term Phase

The Long-Term Phase includes projects that are expected to be implemented between 10 and 20 years after adopting the Corvallis TDP, or fiscal years 2028-29 to 2037-2038.

The Long-Term Phase includes the final service changes to achieve the system vision. Changes planned for the Long-Term Phase include:

- Earlier service on Saturday mornings
- Increased midday frequency on Routes 1, 2, 5, 6, 8 and 9
- Increased peak-hour frequency on Routes 1, 2, 3, 4 and 7; an alternative option in the Long-Term is a set of express trips that operate along key corridors.

If the City has approximately $7.2 million available each year to spend on operations and capital in the Long-Term Phase, it would be approximately $4 million more than the 2017 budget, and an increase of approximately $1.92 million per year over the Medium-Term.[6] Figure 25 lists the costs to implement and operate the Long-Term Phase. Overall, the Long-Term Phase will cost approximately $7.8 million annually, or an increase of $4.6 million from 2017. Since this phase is unconstrained, the total cost to operate the system with all projects is higher than the amount the City is projecting to have available.

Figure 25 Long-Term Phase Operating Summary

Medium-Term annual operating cost	$ 5,131,300
Long-Term additional annual operating cost	$ 2,361,100
Annual operating cost	$ 7,492,400
New vehicles	6
Annualized capital cost for new vehicles	$ 264,000
Total Annual Cost	**$ 7,756,400**

Figure 26 provides a summary of the span and frequency of each route in the Long-Term.

[6] The increase is due to the passage of HB2017. City staff believe the additional transit funding needed for the Long-Term Phase will be available for CTS. In the event HB2017 funding is not available, alternate funding sources would be required to implement the proposed service changes.

Figure 26 Long-Term Phase Route Summary

Route	Corridor	Span			Frequency (minutes)				Route Run Time (minutes)
		Weekday	Saturday	Sunday	Peak	Off-Peak	Saturday	Sunday	
1	Witham Hill	6 a.m. – 10 p.m.	7 a.m. – 9 p.m.	10 a.m. – 6 p.m.	15	30	60	60	48.7
2	9th Street	6 a.m. – 10 p.m.	7 a.m. – 9 p.m.	10 a.m. – 6 p.m.	15	20	30	60	30.0
3	Western / Sunset / 49th St	6 a.m. – 10 p.m.	7 a.m. – 9 p.m.	10 a.m. – 6 p.m.	15	30	30	60	30.0
4	Highland / Conser / Conifer	6 a.m. – 10 p.m.	7 a.m. – 9 p.m.	10 a.m. – 6 p.m.	30	60	60	60	45.0
5	Kings	6 a.m. – 10 p.m.	7 a.m. – 9 p.m.	10 a.m. – 6 p.m.	15	15	30	60	25.6
6	South Corvallis	6 a.m. – 10 p.m.	7 a.m. – 9 p.m.	10 a.m. – 6 p.m.	15	15	30	60	30.0
7	29th Street / Circle	6 a.m. – 10 p.m.	7 a.m. – 9 p.m.	--	30	60	60	--	52.6
8	Country Club	6 a.m. – 10 p.m.	7 a.m. – 9 p.m.	--	60	60	60	--	49.5
9	Grant / Buchanan	6 a.m. – 10 p.m.	7 a.m. – 9 p.m.	--	60	60	60	--	38.3
10	Downtown	6 a.m. – 10 p.m.	7 a.m. – 9 p.m.	--	15	15	15	--	6.8
11	Crescent Valley	7 a.m.; 3 p.m.; 5 p.m.	--	--	3 trips	--	--	--	41.0

Long-Term Phase Project List

Figure 27 provides a list of all the changes necessary to implement the Long-Term Phase, including the additional cost from the prior phase, priority (based on public and stakeholder input) and level of effort necessary for each project. Each project code encompasses one or multiple changes, depending upon whether certain actions must be grouped together.

Future housing developments, new roadways and a shift in travel patterns may result in different needs and priorities for transit service. The Long-Term phase is most likely to need further refinement and updating as the implementation year (2028) approaches to respond to these changes. The projects and routes listed below may be modified or refined as necessary.

Figure 27 Long-Term Phase Project List

Project Code	Description	Reasoning	Daily Hours	Additional Annual Operating Cost	Annualized Capital Cost	Priority	Level of Effort
Y	Begin Saturday service at 7 am on all routes	Match Saturday span more closely with weekday span	6	$ 25,000		Low	Medium
	Provide paratransit service on Saturdays starting at 6 am	Federal requirement	-				
Z	Operate Route 2 every 20 minutes all day	High ridership route	8	$ 171,200	$ 44,000	High	Medium
AA	Operate Route 5 every 15 minutes all day	High ridership route	14	$ 309,400	$ 44,000	High	High
	Operate Route 6 every 15 minutes all day	High ridership route					
AB	Operate Route 1 every 30 minutes all day	High ridership route	14	$ 309,400		High	High
AC	Operate Route 8 and 9 every 60 minutes on weekdays	Add service as ridership grows	15	$ 331,600		Medium	High
AD	Operate Route 1, 2, 3 every 15 minutes during peaks, and Routes 4 and 7 every 30 minutes during peaks	Attract new riders	39	$ 867,400	$ 132,000	Medium	High
AE	Provide hourly Saturday service on Routes 8 and 9 from 8 am-7 pm	Add service as ridership grows	11	$ 48,600		Low	Medium

Project Code	Description	Reasoning	Daily Hours	Additional Annual Operating Cost	Annualized Capital Cost	Priority	Level of Effort
AF	Create express variants on Routes 1, 2, 3, 5, 6, e.g. 1X, 2X. Sign stops to mark which stops are served by the local versus the express. Operate express service during peak times, every 60 minutes, during OSU session only.	Reduce travel times for passengers at major stops	18	$ 267,600		Low	High
AG	Purchase additional spare vehicle	Add to fleet to maintain spare ratio	-	$ -	$ 44,000	Low	Low
AH	Increase frequency on Route 2 to every 30 minutes on Saturdays.	High ridership route	7	$ 30,900		Medium	Medium
			Total	$ 2,361,100	$ 264,000		

Long-Term Project Details

This section provides additional details for two of the larger and more complex projects: Project AD and AF. Both projects increase service during weekday peak hours on select routes. Although both options can be implemented together, due to funding constraints and a desire for the most efficient provision of service, it is recommended that only one project be implemented. The two projects both increase frequencies and decrease travel times, but take different approaches: Project AD adds frequency to existing routes during peak times, while Project AF adds an overlay of express services with limited stops and a new naming convention.

Project AD

Project AD adds peak-hour trips on weekdays on Routes 1, 2, 3, 4 and 7. These extra trips would provide 15-minute service during peak hours on Routes 1, 2, 3 (to complement the 15-minute service already on Routes 5 and 6 – implemented in Project U in the Mid-Term Phase), and 30-minute service during peak hours on Routes 4 and 7.

Project AF

Project AF adds express routes that would supplement service on Routes 1, 2, 3, 5 and 6 with limited stops. Stops served by the express routes would be selected based on ridership and appropriate distance from adjacent stops to guarantee faster travel times. To reduce passenger confusion, an express naming system could be created with information on bus stop signs so people know which service stops at each location. For example, CTS could create a Route 1X. Route 1 would stop at every stop, while Route 1X would only stop at designated express stop locations.

Preliminary Scenario Evaluation

The Short-, Medium-, and Long-Term Phases are best understood in relation to how effective they are in meeting Corvallis' transportation goals. A subsequent technical memorandum (Technical Memorandum #20) of the TDP will compare detailed indicators for the scenario. Here, a qualitative, order-of-magnitude comparison helps to first assess and refine the phases.

The Corvallis Transportation System Plan (TSP) and TDP are guided by four goals:

- Goal 1: Provide an efficient transportation system that supports economic vitality by facilitating the local and regional movement of people and goods.
- Goal 2: Provide a transportation system that enhances the health and safety of residents.
- Goal 3: Provide a diversified and accessible transportation system that ensures mobility for all members of the community and provides viable alternatives to automobile travel.
- Goal 4: Provide a sustainable transportation system through responsible stewardship of financial and environmental resources.

Two TSP objectives relate most directly to public transportation and guided the development of the service improvement strategies and phases presented in this memorandum:

- Objective 3a: Increase transit ridership by improving the quality of available transit service as measured by **coverage**, **hours of service**, and **frequency**.
- Objective 4g: Increase the number of **walking, bicycling and transit trips** in the city.

Figure 28 summarizes qualitative, order-of-magnitude evaluation results for each phase. The indicators demonstrate a relatively consistent level of coverage in the future, with increasing span and frequency of service as the phases are implemented. Population and employment estimates for the Short-, Medium- and Long-Term Phases are based on a straight-line increase between 2010 and 2040 CALM model data.

Figure 28 Preliminary Scenario Evaluation Indicators

Issue	Evaluation Indicators	Phases			
		Existing	Short-Term	Medium-Term	Long-Term
Coverage (based on CALM 2010 and 2040 data)	Households within 1/4-mile of CTS service (Percent of Corvallis UGB)	20,300 (82%)	20,400 (81%)	21,000 (80%)	21,800 (78%)
	Jobs within 1/4-mile of CTS service (Percent of Corvallis UGB)	28,400 (88%)	28,200 (85%)	29,700 (84%)	32,700 (84%)
Span	Weekday, major corridors	6 am – 9:20 pm	6 am – 10 pm	6 am – 10 pm	6 am – 10 pm
	Saturday	7:30 am – 8:15 pm	7:30 am – 7 pm	7:30 am – 9 pm	7 am – 9 pm
	Sunday	NA	10 am – 6 pm	10 am – 6 pm	10 am – 6 pm
Revenue Hours	Annual revenue hours	29,500	46,000	53,300	81,100
Frequency	Number of routes with service at least every 30 minutes	2[A]	5[B]	5[B]	6[C]
	Number of routes with service at least every 15 minutes	--	--	1[D]	3[E]
Reliability	Expected system-wide on-time performance (departing w/in 4 minutes of schedule)	56%	85%	85%	85%
Average Stop Spacing	Downtown Corvallis	0.18 miles (system-wide average)	0.18 miles	0.18 miles	0.18 miles
	OSU, commercial districts, and central neighborhoods		0.25 miles	0.25 miles	0.25 miles
	All other areas		0.25 miles	0.30 miles	0.30 miles

[A] Routes 5 and 6

[B] Routes 2, 3, 5, 6 and 10

[C] Routes 1, 2, 3, 5, 6 and 10

[D] Route 10

[E] Routes 5, 6 and 10

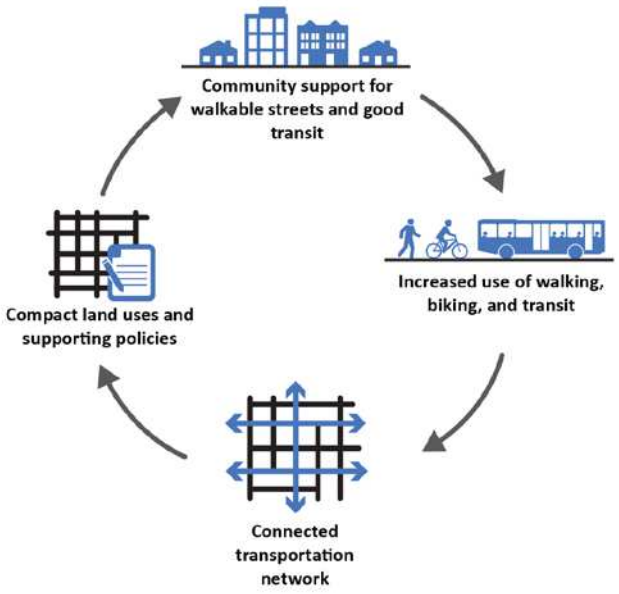
Note: Coverage values are based on interpolated data between 2010 and 2040 CALM model estimates. Existing represents 2017, Short-Term values represent 2020, Medium-Term values represent 2025 and Long-Term values represent 2035.

IV. Transit-Supportive Programs and Investments

Quality public transportation services are strongest when supported by policies, practices and programs that create an environment where public transportation is an integral part of the transportation system.

Land Use

County and city land use policies can guide developers to land use forms that have the greatest benefits given the local transportation system resources. Comprehensive plans and development codes are two places most commonly used to direct development patterns.

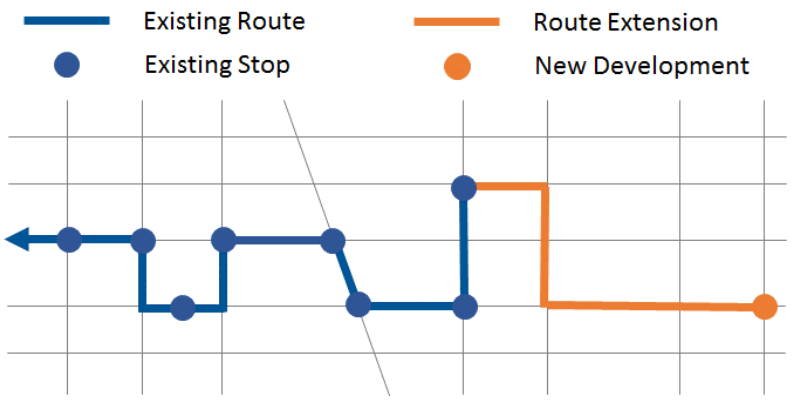


The Corvallis Comprehensive Plan sets policies that guide land use and transportation planning, and is one way for transit providers and the City to direct growth to clustered, compact neighborhoods that can be efficiently and safely served by public transportation. The Comprehensive Plan also documents the urban growth boundary, or where future development can occur.

Development codes implement the policies set in the Comprehensive Plan. These include zoning provisions directing issues such as subdividing property, parking requirements, and pedestrian infrastructure.

According to CALM model forecasts, population and jobs within the Corvallis UGB are expected to grow during the next 20 years, increasing more than 20% between 2017 and 2040. In the 2040 Baseline land use model scenario developed for the TSP and TDP, some population and employment growth will occur in the downtown core, which is most heavily served by public transportation. The most rapid growth, however, is expected to occur in areas that are undeveloped today and not served by transit. As communities expand, development can result in the need for costly transportation infrastructure investments compared to higher density building patterns in developed areas that rely upon existing infrastructure. This type of development can lead to transit service “chasing” new residential and business centers, increasing bus cycle times and operating cost. Figure 29 represents how an existing route will need new segments to serve an expanding development pattern. Greenfield development is attractive to developers when needed infrastructure and transportation service costs like public transportation are external to the development process. Transit-supportive land use practices can help sustain transit service and transit infrastructure. Yet a much larger policy shift is needed, such as a Comprehensive Plan amendment or update, to fundamentally change the approach to city growth in a cost-effective manner for transit.

Figure 29 How transit resources are stretched over time

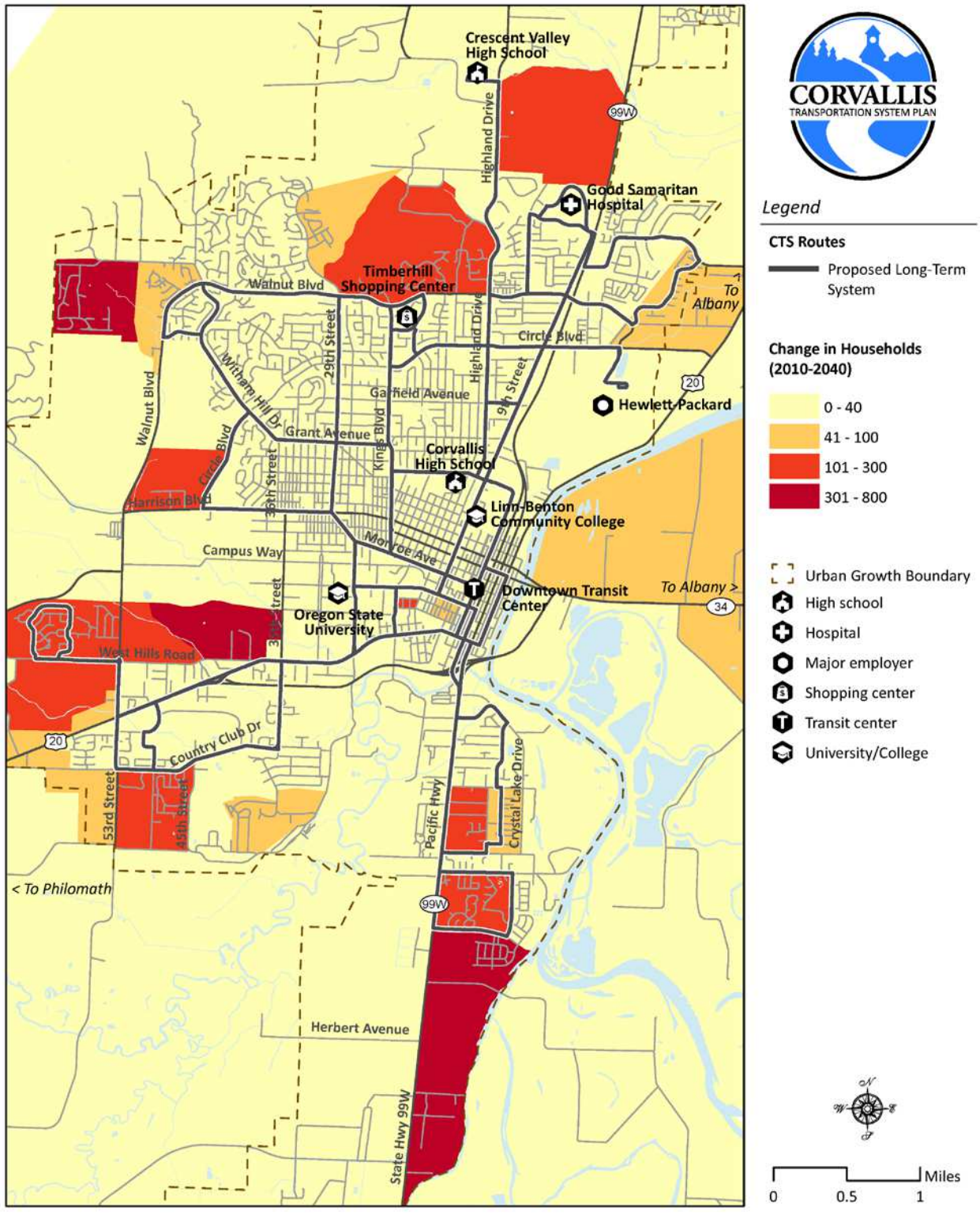


Source: Nelson\Nygaard

Areas where major growth is forecasted are indicated with dark red in Figure 30 and include the following areas:

- The south Corvallis neighborhoods will expand further south. The highest growth zone adds more than 600 households and includes areas south of where Route 6 serves today.
- Areas west of downtown beyond 35th Street between Reservoir Avenue and West Hills Road show high growth. Routes 3 and 8 serve just the southeast corner of this area, at Western Boulevard and 35th Street.
- A high development area is projected west of Walnut Boulevard and south of Ponderosa Avenue. Much of this zone includes land beyond the existing Route 1.

Figure 30 Baseline Scenario Household Growth



Source: City of Corvallis and DKS Associates

Transit-supportive recommendations are described below.

Recommended Actions

- **Engage in future land use planning around the 35th Street extension project listed in the TSP** (between Harrison Boulevard and Western Boulevard) to ensure that future developments include safe and accessible bus stops and pedestrian connections, and are wide enough and have proper turning radius for transit vehicle operations if a route extension is planned.
- **Add or enhance transit-supportive policies through Comprehensive Plan updates**. This can guide land development to more clustered, compact neighborhoods that can be efficiently served by public transportation. Suggested policies include, but are not limited to:
    - *The City will facilitate CTS transit services, with special attention to people for whom transit is a primary travel resource due to factors such as age, income, or disability.*
    - *The City will locate and implement new transit stops and park-and-ride lots within the city in support of the public transit system, with an emphasis on sites that are safe and convenient for riders, and enable efficient transit operations.*
    - *The City will work to improve safety for transit riders through measures such as providing enhanced roadway crossings, restricting transit stops from being sited where there are existing driveways, and restricting driveways from being located near an existing or planned transit stop.*
    - *The City will target improvements to the pedestrian environment, including lighting, landscaping, public art, marked and protected crossings, and curb ramps, to improve conditions for and encourage walking and to promote transit.*
    - *The City will invite transit service providers to participate in the review of land use applications that may have implications for existing or planned transit service.*
    - *The City will support higher-density and mixed land use around transit stops and in transit corridors to make transit service more feasible and effective.*

Suggested changes to development code includes, but is not limited to:

- *Add bicycle parking requirements for transit stops and transit centers, and for commercial uses such as general retail services and business and professional services in Section 4.1.30 Off-Street Parking Requirements.*
- *Add definitions for sidewalks, walkways, bikeways, and multi-use paths and potentially amend the definition for accessways in Section 1.6.30 Specific Words and Terms to ensure new development provides adequate active transportation facilities connecting to bus stops. Further distinguish use of these terms in the Development Code. Ensure consistency between these terms and those used to describe pedestrian and bicycle facilities in the TSP.*
- *Consider adding standards for minimum walkway spacing through large parking lots, in particular where bus stops provide access from a nearby roadway in Sections 4.10.60.06*

Pedestrian Circulation and 4.10.70.03 Pedestrian Oriented Design Standards, or in 4.0.50 Transit Requirements.

- *Establish maximum distance requirements between building entrances and major transit stops in Sections 4.10.60.06 Pedestrian Circulation and 4.10.70.03 Pedestrian Oriented Design Standards. Major stops are currently defined as having frequent service, within one-quarter mile of medium to high density development, and/or with high ridership volumes.*
- *Add provisions in Section 4.1.20 General Provisions that allow existing development to redevelop a portion of existing parking areas for transit-oriented improvements identified in adopted long-range plans of the Corvallis Transit System, granted that minimum parking requirements can still be met.*

Active Transportation

Many active transportation strategies support public transportation by making access to bus stops by walking, bicycling and other non-vehicle modes safe and convenient.

Recommended Actions

- **Provide safe and convenient pedestrian access to all bus stops and stations.** Getting to a bus stop is a critical part of any trip by public transportation. Corvallis has assessed the sidewalk network in the TSP in conjunction with this TDP, including sidewalk ramps and crosswalks. The City of Corvallis can leverage transit infrastructure funds to supplement citywide active transportation infrastructure where needs and demand exist. Key characteristics of quality pedestrian access to transit include:
  - Direct - There should be a continuous and connected network of streets, sidewalks, and other types of pedestrian paths that provide efficient walking routes.
  - Accessible - Sidewalks must be barrier-free and have curb ramps at intersections. Transit riders with mobility devices require a clear end-to-end sidewalk path from their front door to the bus stop.
  - Safe - Street crossings must serve transit stops on both sides of a street. There should be ample lighting along the street and at bus stops and clear lines of sight. Protected crossings are important on multi-lane arterials with fast-moving traffic.
  - Comfortable - Seating and shelters provide a comfortable wait at bus stops. Location of seating and shelters should be related to ridership and market served (e.g., a bus stop at a senior center might require seating).
  - Visually engaging – While not the highest priority, studies suggest that people will comfortably walk farther on streets that have street-facing buildings and visual interest.

- **Assess and improve sidewalk connections to future and existing bus routes**. Specific locations with missing sidewalks along current or future transit routes include:[7]
  - SW Country Club Drive between 35th Street and 45th Street: add south side sidewalk to provide access to bus stops (Existing and Proposed Route 8) – Project P22
  - SW Country Club Drive between SW 49th Street and SW 53rd Street: add south side sidewalk, to provide access to bus stops (Existing and Proposed Route 3) – Project P50
  - Highway 20 / Philomath Boulevard between Technology Loop and SW 53rd Street: add north side sidewalk to provide access to bus stops (Existing Routes 3 and C3; Proposed Routes 3 and 8) – Project P51
  - SW 53rd Street: add east side sidewalk between Philomath Boulevard and West Hills Road to provide access to bus stops. (Existing Route C3, Proposed Route 8) – Project P52
  - SW West Hills Road: add south side sidewalk between SW Winding Way and SW 53rd Street to provide pedestrian access to buses stops (Existing Route C3; Proposed Route 8) – Project P53
  - NW Witham Hill between NW 36th Street/NW Grant Avenue and Circle Boulevard: add east side sidewalks to provide access to bus stops (Existing and Proposed Route 1) – Project PB14
- **Provide secure bicycle parking at bus stops and stations**. Bicycles provide an affordable and efficient first/last mile connection to public transportation, increasing potential rider markets. Secure bicycle parking at transit stops and transit centers gives bicycle riders a place to store bicycles while they take transit. CTS should work with the City to implement bus stop design and maintenance guidelines. Suggested locations include:
  - Downtown Transit Center (All Routes): Existing bicycle racks could be enhanced with shelter from weather or additional bicycle lockers that provide greater security.
  - Timberhill Shopping Center (Proposed Routes 1, 5, 7): Existing and proposed routes intersect at Timberhill Shopping Center, providing an informal transit "center" for passengers. This could be a key stop to add enhanced bicycle parking to increase the transit rider market.
  - Witham Hill Drive and Walnut Boulevard (Proposed Route 1) may offer a good location to add bicycle lockers or racks, given the expected housing development areas in north Corvallis.
  - NW Kings Boulevard and NW Fillmore or NW Buchanan (Proposed Routes 5, 9, 11): These stops have high ridership today that will likely continue with future transit service, and would be well served by bicycle racks.
  - SW 53rd Street and SW Country Club Drive or Highway 20: Increased future development and an intersection with the existing multi-use path suggest that bicycle parking near this location would benefit riders. High security measures (sheltered racks or lockers, and lighting) should be considered given the relatively low-visibility of this location.

[7] These pedestrian projects are also listed in Tech Memo #17: Transportation Solutions

- **Provide safe and convenient bicycle racks on vehicles that let riders bring their bikes with them**. Nine percent of riders indicated in a 2015 survey that more bicycle racks were needed on buses. CTS buses today have external bicycle carrying racks for two bikes. Three-bike rack models are available. CTS should invest in added carrying capacity where need and resources allow, and replace aging equipment over time to maintain rider convenience and safety. Three-bike racks typically cost about $1,100 each.

Transportation Demand Management and Marketing

Transportation Demand Management (TDM) or "transportation options" are terms for strategies that support transportation system efficiency by encouraging a shift from drive-alone trips to other means of travel such as transit, bicycling, walking, and ridesharing. Strategies aim to reduce drive-alone trips overall or focus on peak-hour commuting times as a way to reduce roadway congestion. CTS' free fares are already a strong incentive to use transit. Additional strategies the City can focus on to enhance ridership are described below.

The existing Corvallis Transportation Options program supports TDM through three program areas:

- Education and Outreach: Corvallis has a Bicycle and Pedestrian Advisory Board that meets monthly. The City of Corvallis fosters education programs such as the two-week event Get There Corvallis, promotes the Bike Commute challenge each year, and tables at numerous Oregon State University and community events.
- The Corvallis Transportation Program Specialist works directly with employers to manage programs that provide incentives for employees to bike, walk, use transit, or carpool to work. There are currently 20 businesses, representing about 8,000 employees, participating in the Employee Transportation Coordinator program.

Regional TDM programming is also provided through Cascades West Rideshare. This organization is housed within the Oregon Cascades West Council of Governments and covers Benton, Linn, and Lincoln Counties. Cascades West Rideshare services include vanpool matching through the Valley Vanpool program, which offers 17 routes, six of which connect Corvallis to Eugene, Salem, Sheridan, and Springfield. Cascades West Rideshare also offers employer outreach, an Emergency Ride Home program, regional Safe Routes to School support, regional park-and-ride planning, and promotes the statewide Drive Less Connect ridesharing tool.

The core CTS marketing efforts include print media such as a route and schedule brochure, and webpages in the City of Corvallis website (www.corvallisoregon.gov). Other documents target specific rider types and provide details on how to ride the bus or schedule trips on ADA paratransit. The City has created other marketing materials in the past such as advertisements, quarterly newsletter, and branded items such as lip balm, thumb drives, and stylus pens. The transit system has branding with logo, tagline ("going your way"), and brand-specific fonts and colors that are presented on brochures, buses, bus stop signs, and online webpages. CTS staff table also at numerous Oregon State University and community outreach events to promote the transit system and provide travel planning.

Additional TDM actions are listed below.

Recommended Actions

- **Work with regional partners on transportation demand management programs facilitating public transportation use.** The City of Corvallis employs a half-time employee to oversee TDM for the City and Cascades West rideshare employs staff to cover the three-county region. Additional staff resources at the city level could enhance TDM and add new programming that supports transit ridership. These programs might include:
  - Work shuttles: Some employment sites can be a good market for public transportation, especially if the company has limited parking or incentives for not driving alone. Shuttle programs are typically sponsored by the employer and provide transportation between the employment site and major transit stops.
  - Individualized marketing: Individualized marketing campaigns typically target a neighborhood, corridor, or employment site. Corvallis has done such a campaign in the past, and recurring campaigns have been shown to effectively promote transportation options.
  - Information kiosk: An on-site kiosk at the Downtown Transit Center would provide information on transit routes, schedules, and fares; carshare and vanpool ridematching services; bicycle maps and resources; and other ways to help people travel by using alternative modes. Currently there is no staff available at the Downtown Transit Center to provide this service.
  - Integrated trip planning: CTS's online trip planner could be enhanced by adding other modes and regional transit service providers. Connecting transit providers include the Linn Benton Loop, Benton County and several regional carriers at the Albany Train Station. Some transit agencies, such as DART in Dallas, Texas, have integrated Uber and Lyft ridehailing services into the transit trip planner so passengers can use one web-based application to plan a trip with these two different modes.
- **Continue travel training and mobility management services in coordination with Benton County and Oregon Cascades West Council of Governments**. Travel training includes a suite of services to introduce new or potential riders to a transit system. General travel training can also include events and training to let people of all ages and needs get familiar with public transportation. Training for seniors and people with disabilities can facilitate accessibility for specific demographics, or facilitate access to the public fixed-route system.
- **Continue strong rider information and marketing materials**. Marketing can include reinforcing the CTS "brand" to ensure information is recognizable and familiar, and lead to clear, understandable and broadly accessible materials. Marketing for transit includes information and materials that lets transit customers know how to use—and remember how to use—the Corvallis Transit System and related travel programs. The marketing programs should continue to be easy and inexpensive to implement to preserve operating

resources, integrated into other parts of the City's activities such as transportation options, and designed to reach existing and potential rider markets.