



MEMORANDUM 5

Future Service Opportunities

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To: Doug Pilant, TCTD

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Project: TCTD Transit Development Plan

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This memo presents the service alternatives developed to guide the future of TCTD. The analysis documented in Memoranda 3 (Land Use Impact and Future Transportation Needs) and 4 (Evaluation Framework) provide the foundation for the service alternatives identified to address service gaps and needs. The content of this memo is divided into two main parts:

- 1 Assumptions of Future Service Alternatives – This section provides background to the development of the service alternatives, including:
 - 1.1 Population and Employment Growth in Tillamook County;
 - 1.2 Growth in Tillamook County per Future Plans and Stakeholder Input;
 - 1.3 Transit Demand;
 - 1.4 Funding and Costs; and,
 - 1.5 Alternatives Evaluation
- 2 Future Service Alternatives – This section outlines alternatives based on the assumptions, including:
 - 2.1 Service Alternatives
 - 2.2 Alternatives Evaluation
 - 2.3 Capital Alternatives

1.0 ASSUMPTIONS OF FUTURE SERVICE ENHANCEMENTS

The following section summarizes the findings from Memorandum 3 (Land Use Impact and Future Transportation Needs) pertinent to the development of future service alternatives.

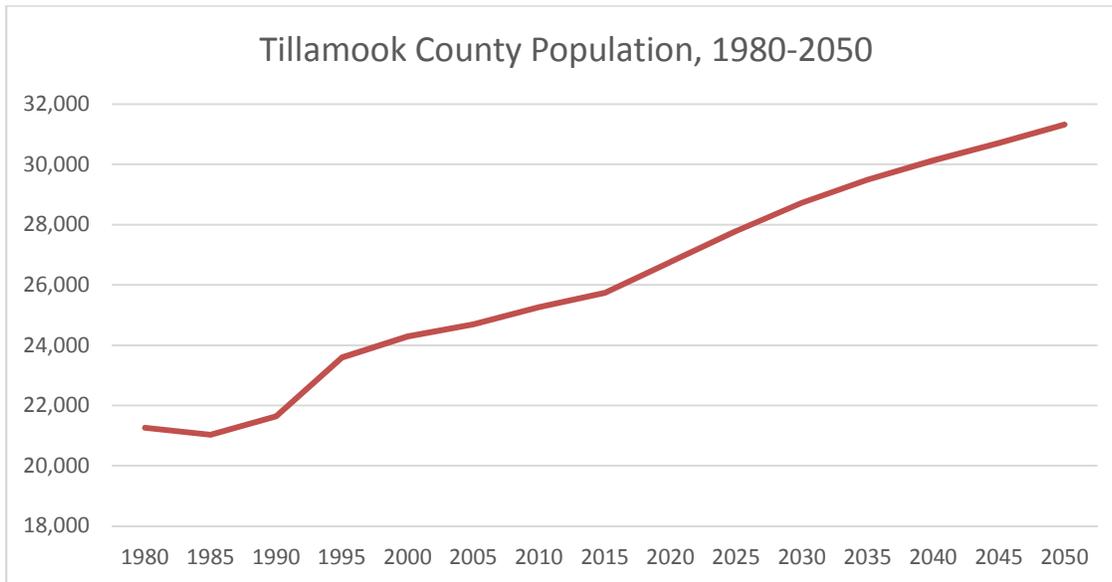
1.1 Population and Employment Growth in Tillamook County

Population Growth Patterns

The future demographics of Tillamook County, based on the best current estimates of future population and employment, are summarized herein.

Between 1980 and 2010, Tillamook County has experienced an average annual population growth rate of 0.6 percent. Based on population forecasts from the Oregon Office of Economic Analysis, on average this trend is expected to continue through 2050. Chart 1 shows the historical and forecast population growth in Tillamook County. As shown, by 2050, the population forecast in Tillamook County is expected to be between 30,000 and 32,000 people; however, over the next ten years, the projected growth is approximately 2,000 people.

Chart 1 Tillamook County Population Forecast



Source: Office of Economic Analysis, *Forecasts of Oregon's County Populations and Components of Change, 2010 – 2050*.

Between 2000 and 2010, population growth in Tillamook County was concentrated in the cities of Tillamook, Bay City, Manzanita, Wheeler, Oceanside and Nehalem. As shown in Table 1, between 2000 and 2010, all growth in the county was concentrated within cities and unincorporated urban communities, while the population of unincorporated non-urban Tillamook County decreased slightly. Based on these historical patterns, future population growth is expected to continue to be concentrated in the county's urban areas.

Table 1 Geographic Growth Patterns

Tillamook County Communities	Population		Growth	%Growth
	2000	2010		
City and Unincorporated Urban Communities	13,229	13,985	756	5.7%
Unincorporated Areas	11,462	11,215	-247	-2.2%
Tillamook County	24,691	25,200	509	2.1%

Source: U.S. Census, 2010.

Tillamook County has a relatively high proportion of potentially transit-dependent populations, including seniors, youth, low income, and persons with disabilities. In particular, Tillamook County houses a large proportion of seniors, 65 years and older, relative to Oregon as a whole. As shown in Table 2, in 2010 persons 65 and older represented 21 percent of the population in Tillamook County (approximately 5,300 people), compared to 14 percent in Oregon. In 2040, seniors are forecast to represent 31 percent of the population in Tillamook County (approximately 9,350 people), compared to 22 percent in Oregon. Based on the estimated difference in the population 65 and older between 2010 and 2040, there is a projected increase of potentially transit-dependent population of 4,000 people.

Table 2 Demographic Growth Patterns

Age	Oregon		Tillamook County	
	2010	2040	2010	2040
<65	86%	78%	79%	69%
≥65	14%	22%	21%	31%

Source: Office of Economic Analysis, *Forecasts of Oregon's County Populations and Components of Change, 2010 – 2050*.

Employment Growth Patterns

As shown in Table 3, nearly two-thirds of the new employment in the Northwest Oregon region, including Tillamook County, is forecast to occur within five industries (highlighted in grey): leisure and hospitality (900 jobs), private educational and health services (680 jobs), professional and business services (410 jobs), construction (380 jobs), and natural resources and mining (290 jobs). In total, regional employment is forecast to increase by over 4,100 jobs between 2012 and 2022, representing an annual growth rate of 1.1%.

Table 3 Northwest Region Job Growth by Industry

Industry	2012	2022	Change	% Change	Annual Growth Rate
Total Payroll Employment	35,100	39,210	4,110	12%	1.1%
Leisure and Hospitality	5,980	6,880	900	15%	1.4%
Retail Trade	4,710	5,110	400	8%	0.8%
Manufacturing	4,600	4,840	240	5%	0.5%
Private Educational and Health Services	4,050	4,730	680	17%	1.6%
Public Education	2,570	2,730	160	6%	0.6%
Local Government (Non-Education)	2,420	2,610	190	8%	0.8%
Professional and Business Services	1,740	2,150	410	24%	2.1%
Natural Resources and Mining	1,650	1,940	290	18%	1.6%
Financial Activities	1,470	1,670	200	14%	1.3%
Construction	1,420	1,800	380	27%	2.4%
Other Services	1,330	1,430	100	8%	0.7%
State Government	1,090	1,130	40	4%	0.4%
Transportation, Warehousing, and Utilities	1,000	1,130	130	13%	1.2%
Wholesale Trade	400	440	40	10%	1.0%
Federal Government	390	360	-30	-8%	-0.8%
Information	280	260	-20	-7%	-0.7%

Source: *Employment Projections by Industry and Occupation 2012-2022 Northwest Oregon*

Population and Employment Growth Patterns

Population and employment forecasts suggest that employment is expected to grow at a faster rate than population. Between 2010 and 2020, population in Tillamook County is forecast to increase by 1,500 people, or an increase of six percent. In parallel, between 2012 and 2022, employment in the Northwest Oregon region is forecast to increase by over 4,000 jobs, or a 12 percent increase. These population and employment growth patterns suggest that Tillamook County residents will have access to more job opportunities, thereby presenting TCTD the following opportunities:

- Increased ridership for work-based trips
- Increased coordination needs with neighboring transit agencies
- Improved service to cities or unincorporated urban communities in Tillamook County

1.2 Growth in Tillamook County per Future Plans and Stakeholder Input

Beyond historical and forecast population and employment growth analysis, qualitative analyses were conducted to provide a comprehensive picture of the future transit gaps, deficiencies, and opportunities, including:

- Review of adopted long-range plans, including transit and land use plans;
- Interview of stakeholders, including city, county, and community organization representatives; and
- Review of County parcel-level tax lot data.

These activities resulted in the following observations and findings:

- In general, long-range plans focus development along Highway 101, and this trend is anticipated to persist.
- Key residential growth areas as identified in planning documents and stakeholder interviews are Manzanita, Nehalem, Wheeler, Oceanside, Pacific City, and Neskowin.
- Industrial growth is anticipated at the Ports of Tillamook and Garibaldi.
- Tillamook and Pacific City have recently experienced commercial and retail growth and that trend is expected to continue, particularly in Tillamook.
- In the largest cities, most commercial and industrial sites are within walking distance of the existing transit service (1/4 mile). Most development in the coastal cities is along the Highway 101 corridor, which is also the transit route.
- The Port of Tillamook Bay is not currently served by transit and service is requested. It could potentially be served by routes 1, 3, or 4.

1.3 Transit Demand

Transit demand is anticipated to increase in conjunction with population and employment growth. Most of the population growth in Tillamook County is expected to result from people over 65 years old, which is a key transit market. Overall transit demand is expected to increase by at least 20% between 2010 and 2040. The growth rate for transit commute demand to major urban centers is expected to be even higher.

Route-specific suggestions include:

- Route 1: Provide earlier morning and later evening service, and make sure the service is reliably on time to allow riders to connect to other routes.
- Route 2: Increase afternoon frequency between 2:25 p.m. and 5:25 p.m.
- Route 3: Increase mid-day service and extend evening hours. Few riders are destined for Astoria although there are services there that can't be accessed within Tillamook County. TCTD should consider whether this connection can be improved by substituting fixed for flag stops in Rockaway and increasing the time between bus arrival and departure in Cannon Beach.
- Route 4: Add fixed-route service to Woods¹, earlier service to Tillamook, and shelters in Hebo, Cloverdale, and Beaver.
- Route 5: Continue to support the popular connections in Portland but consider how to improve connections to Beaverton and Hillsboro which have low ridership numbers, but are important employment destinations for county residents.
- Route 6: Continue to support key linkages of Lincoln City, Salem, and Grande Ronde, and consider extending service hours.

¹ Woods seems to get a relatively high number of non-emergency medical trips, but no regular DAR trips.

Regular route deviations focus on a few destinations in Nehalem and Tillamook which are very close to existing routes 3 and 4. TCTD should consider whether to incorporate some of these to the regular route, which might increase ridership and improve on-time performance for connections.

Title VI outreach revealed a number of suggestions that could enhance service to populations who rely on TCTD including:

- Purchase low-floor, level-boarding buses with a storage area for shopping bags and luggage.
- Add more signage, fare information, how-to-ride directions, and benches at bus stops.
- Increase service frequency to heavily-trafficked areas on north-south routes
- Add more stops in Tillamook, Nehalem, and Manzanita.
- Add new service to Mohler/Highway 53 and Neah Kanie.

1.4 Funding and Costs

*Costs*²

Based on the unit costs by service type, one additional bus for each type of service results in the following annual costs³:

- Dial-a-Ride: \$206,000
- City of Tillamook Service: \$221,100
- Rural Service: \$270,300
- Commuter Service: \$284,300

Funding

Anticipated housing growth in the county contributes an estimated \$224,556 in additional, cumulative tax revenue for TCTD by 2035, and \$41,970 by 2020. This indicates that new growth could potentially fund up to one additional 10-hour route servicing Tillamook or significantly fund a rural or commuter route by 2035.

In addition, the most significant increases in future revenue, approximately \$700,000, come from increased assessments of existing assessed property. If costs and revenues could be controlled such that these increases could be allocated towards increasing transit service rather than addressing

² Costs developed as part of Technical Memorandum 1

³ Additional bus service assumes a 10-hour schedule block per service

increased costs of the existing system, there is potential for several additional 10-hour route blocks to be added to the system, or to increase service hours for the entire existing system.

While actual future tax revenues are unknown and depend on a number of variables not explicitly accounted for by these estimates, the analysis provides an order-of-magnitude estimate about the potential for future service enhancements.

1.4 Evaluation/Prioritization Criteria

Memorandum 4 (Evaluation Framework) presented evaluation and prioritization criteria in order to (1) measure progress on the goals, policies, and practices and (2) prioritize future service alternatives. Five criteria were developed to prioritize alternatives proposed herein, and categorized as a quantitative and qualitative measure.

Revenue Operating Hours

Revenue operating hours relates to additional or reduced travel time between stop locations.

Cost

Future service alternatives can be evaluated based on the costs developed in Memorandum 3. Table 4 summarizes the total operational cost per hour by route. Cost estimation is thereby directly related to travel time changes.

Table 4 Operational Costs by Service

Route	Mileage Based Costs	Hourly Based Costs (\$)	Direct Cost (\$)	Indirect Costs (\$)	Total Costs (\$)	YTD Service Hours	Total Cost/Hour
Central DAR ¹	60,851	183,153	9,756	86,180	339,940	5,108	66.55
North DAR ¹	0	0	18,082	6,140	24,222	950	25.50
South DAR ¹	0	0	14,452	4,907	19,359	738	26.23
01 Town Loop	25,584	122,979	6,550	52,678	207,791	3,430	60.58
02 Netarts/Oceanside	22,659	53,817	2,867	26,945	106,286	1,501	70.81
03 Manzanita	63,074	137,919	7,346	70,754	279,093	3,847	72.55
04 Lincoln City	60,817	108,214	5,764	59,362	234,157	3,018	77.59
05 Portland	49,021	104,132	5,266	52,013	210,432	2,758	76.30
06 Salem	33,939	61,100	3,090	32,276	130,406	1,618	80.60

¹ Dial-a-Ride includes regular and non-emergency medial which are subsidized; as such, the costs documented do not account for costs associated with hours and mileage associated with non-emergency medial rides (i.e., total cost/hour is relatively low).

Ridership and Service Area

U.S. census block data and Tillamook County tax lot data were overlaid to determine anticipated increases in ridership and service area.⁴ Table 5 shows the existing routes, assuming a ¼ mile buffer to account for deviated fixed-route service, and the associated population and service area capture. As shown, Route 3 and Route 4 serve the most population and area, while Route 2 serves the least population and area. Future service alternatives can be analyzed based on this baseline analysis.

Table 5 Existing TCTD Routes Population and Area Capture Shed

Route	Area (Acres)	Population
1	508	6,278
2	435	4,474
3	1,479	9,886
4	1,430	7,144
5	652	6,253
6 ¹	na	na
Total TCTD Service ²	3,558	18,310

Source: U.S. Census, 2010.

¹ Due to the characteristics of Route 6, no population or service area estimations were calculated.

² Total TCTD Service refers to the total population and area captured for all routes. The total for both population and area will not be the sum of each individual route since some routes serve the same areas.

Reliability

In this context, reliability refers to how frequently service follows published schedules. Factors that affect reliability include deviations and bus breakdowns.

TCTD operates Routes 1, 2, 3, and 4 as deviated fixed routes, which means these routes follow a fixed route with a set schedule but can detour up to ¼ of a mile off route following a user request. As shown in Table 6, there are 13 regularly requested deviations. Regular route deviations occur on routes 3 and 4, with most occurring on Route 3. These primarily occur in the Cities of Nehalem and Tillamook to locations less than ½ mile from the designated fixed route.

⁴ Population within each U.S. Census block was allocated to tax lots defined as residential. This analysis assumes that an increase in population within the capture shed results in a direct proportional increase in potential ridership.

Table 6 TCTD Existing Route Deviations

Times	Location	Route	Days	Number of Deviations
0740/1350	Marie Mills, Tillamook ¹	3	M-F	2x day
650	North Coast Recreation District, Nehalem	3	M,W	1x day
Various	Trask River RV, S of Tillamook	Varies	Varies (F-SU)	3-5 x week, 1-2x day
1009	Nehalem Bay House	3	TH	1x day
1009/1451	Nehalem Bay House	3	SU	2x day
1029/1431	Rockaway Mormon Church	3	SU	2x day
1015SA/1741SU	Madrona House, Tillamook	3	SA, SU	1x day
0750/1445	7th Day Adventist, Tillamook ¹	3	M-F	2x day
0745/1455	Ocean Breeze, S of Tillamook ¹	3	M-F	2x day
Various	North Coast Recreation District, Nehalem	3		
Various	United Methodist, Nehalem	3		
0750/1335	Marie Mills, Tillamook	4	M-F	2x day
Various	Gienger Rd Residence, S of Tillamook	4	Varies	1-2x month, 2x day

Source: TCTD

¹ The deviations are daily and/or seasonal; as such, TCTD has reorganized these as Tripper Routes.

In evaluating the route Alternatives, reliability can be qualitatively be measured by determining if there Alternatives reduce the number of regular route deviations by accommodating them through fixed route service. In parallel, additional service enhancements may be determined by understanding the cause for these deviations including limited pedestrian infrastructure. To this end, some deviations could be eliminated if ADA-compliant sidewalks were constructed from the origin to the fixed route bus stop.⁵

Impact to Existing Transit Users

Evaluating impacts on existing users when evaluating future service alternatives refers to trips that would be made by transit regardless of whether a service alternative were implemented. Three factors are considered in evaluating the impact, including:

- Direct financial impact (i.e., change in fare)
- Service quality changes (i.e., change in actual or perceived travel time)
- Service improvement change (i.e., change in rider comfort)

⁵ While capital improvements such as sidewalk installation are not in the purview of TCTD, TCTD may choose to engage local agencies to partner to fill pedestrian gaps in the network, particularly those that link areas to existing or proposed TCTD bus stops.

2.0 FUTURE SERVICE ALTERNATIVES

2.1 Services Alternatives

Route 1

The following two Alternative alternatives are proposed for Route 1.

Alternative 1A: Reduce headways from 60- to 30-minutes by running one additional bus.⁶

- Revenue operating hours: This Alternative assumes that one additional bus would serve the same stop locations as existing Route 1. Under this presumption, the travel time of the additional bus would equal the travel time of existing Route 1 (1 hour for one full run, for 12 daily runs).
- Cost: Based on travel time, the operational cost for this additional bus is approximately \$730/day and \$266,450/year.⁷
- Ridership and Service Area: The additional bus would not increase the areas or populations served; however, because the additional bus would reduce the headways by a factor of two, we can assume that more people would use transit.
- Reliability: No impact to reliability.
- Impacts to Existing Users: Existing users would be better served with more frequent service.

Alternative 1B: Add an additional Town Loop route that serves Port of Tillamook Bay in lieu of traveling north on Highway 101. The remainder of the Town loop route, which serves residential and employment areas to the east and west of Highway 101, would continue to be served. The return route from the Port of Tillamook Bay could travel on Gienger Road to serve Trask River Mobile Home Park (an existing frequent deviation). Exhibit 1 shows the proposed route.

⁶ This route could also serve Ocean Breeze School which could eliminate the need for two existing tripper routes. In addition, depending on the schedule, this route would also provide additional coverage for Adventist School.

⁷ Based on costs developed in Memorandum 4, Route 1 has a cost of \$60.56/hour.

Exhibit 1 Alternative 1B Route



- Revenue operating hours: This Alternative assumes that one additional bus would serve the same stop locations as existing Route 1, with the exception of Tillamook Sporting Goods, Cheese Factory, and Fred Meyer. Instead, the additional bus would serve the Trask River High School, Port of Tillamook Bay, and Trask River Mobile Home Park. Under this presumption, the travel time of the additional bus would be two minutes slower (1 hour for one full run, for 12 daily runs). Table 7 shows the travel time for one run for existing Route 1 and Alternative 1B.

Table 7 Existing Route 1 and Alternative 1B Travel Time

Stop Location (Existing Route 1)	Cumulative Time	Stop Location (Proposed Alternative 1B)	Cumulative Time
Transit Center	0:00	Transit Center	0:00
Champion Park	0:14	Champion Park	0:14
Fairview	0:18	Fairview	0:18
Dept. Human Services	0:20	Dept. Human Services	0:20
TCTD Office	0:22	TCTD Office	0:22
US Post Office	0:26	US Post Office	0:26
Tillamook Sporting Goods	0:29	Tillamook County Hospital	0:29
Cheese Factory	0:32	YMCA	0:34
Fred Meyer	0:35	Safeway	0:36
Tillamook County Hospital	0:42	Showplace South	0:38
YMCA	0:47	Trask River High School	0:43
Safeway	0:49	Tillamook Air Museum	0:45
Showplace South	0:51	Trask River Mobile Home Park	0:51
County Health Dept.	0:53	County Health Dept.	0:55
Transit Center	0:55	Transit Center	0:57

- Cost: Based on travel time, the operational cost for this additional bus is approximately \$750/day and \$274,100/year.
- Ridership and Service Area: The additional bus would increase the areas or populations served. Table 8 shows the additional population and service areas served relative to existing Route 1.

Table 8 Existing Route 1 and Alternative 1B Capture Shed

Route	Area (Acres)	Population
Route 1	508	6,278
Alternative 1B ¹	474	6,364

¹ The capture shed estimated includes the existing Route 1 through Tillamook. As such, the added population and area associated with service to the Port of Tillamook Bay and the Trask River Mobile Home Park is absorbed in the total.

- Reliability: No impact to reliability.
- Impacts to Existing Users: Existing users would be better served with more frequent service and access to the Port of Tillamook Bay and Trask River Mobile Home Park.

Alternative 1C: Add an additional Town Loop route that serves Port of Tillamook Bay in lieu of traveling north on Highway 101, and operates in the opposite direction. The remainder of the Town loop route, which serves residential and employment areas to the east and west of Highway 101, would continue to be served. The return route from the Port of Tillamook Bay could travel on Gienger Road to serve Trask River Mobile Home Park (an existing frequent deviation).

- Revenue operating hours: The travel time for Alternative 1C would be similar to that of Alternative 1B which would be two minutes slower (1 hour for one full run, for 12 daily runs).
- Cost: Similar to Alternative 1B, the operational cost for this additional bus is approximately \$750/day and \$274,100/year.
- Ridership and Service Area: Similar in Alternative 1B, the additional bus would increase the areas or populations served. Table 8 shows the additional population and service areas served relative to existing Route 1.
- Reliability: No impact to reliability.
- Impacts to Existing Users: Existing users would be better served with more frequent service and access to the Port of Tillamook Bay and Trask River Mobile Home Park. In addition, users would be better served with shorter headways and travel times between destinations.

Route 2 and Route 3

Alternative 3A: New driver block that serves Route 2 twice a day and Route 3 three times a day, to fill morning and afternoon headway gaps for each route. At present, Route 2 has two relatively large service gaps in the morning (6:25-9:25 a.m.) and afternoon (2:25-5:25 p.m.). In parallel, Route 3 has two relatively large service gaps in the morning (5:38-8:00 a.m.) and afternoon (10:15 a.m.-2:00 p.m.) and stops evening service at 6:15 p.m. from the Transit Center.⁸

- Revenue operating hours: The travel time for each route would be the same as the existing Route 2 and Route 3, respectively. As such, travel time would be 90 minutes for Route 2 and 7 hours for Route 3.⁹ The total service time would be approximately 10 hours, assuming 1.5 hours allocated to driver breaks.
- Cost: Based on travel time, the cost of an additional block that serves Route 2 and Route 3 would approximately be \$720/day and \$263,400/year.¹⁰
- Ridership and Service Area: The additional bus would not increase the areas or populations served; however, because the additional bus would reduce the headways by a factor of two, we can assume that more people would use transit.

⁸ If the Cape Meares Road is eventually repaired, TCTD may consider making Route 2 a loop to serve the Cape Meares community, which is a relatively big DAR generator.

⁹ Route 3 service time assumes one service to Cannon Beach Mid Town.

¹⁰ The cost of the block assumes that travel time associated with Route 2 has an hourly cost of \$70.81, travel time associated with Route 3 has an hourly cost of \$72.55, and the break time is an average of both hourly costs.

- Reliability: No impact to reliability.
- Impacts to Existing Users: Existing users would be better served with more frequent service.

Alternative 3B: Modify Route 3 to better serve Nehalem by adding a stop along Highway 101 to serve existing deviations, namely United Methodist Church and North Coast Recreation District). In conjunction, modify Route 3 to replace flag stops through Rockaway Beach for a 3-mile zone with designated stops every $\frac{1}{4}$ to $\frac{1}{2}$ mile, with an emphasis on stop location near relatively long side streets.

- Revenue operating hours: The additional travel time associated with an additional service in Nehalem is made neutral with the anticipated time savings associated with no flag stops in Rockaway Beach.¹¹ In addition, elimination of the existing deviations would reduce travel time by eliminating left-hand turns onto Highway 101 and associated delay. As such, Alternative 3B has a net zero impact on travel time.
- Cost: Net zero impact on cost.
- Ridership and Service Area: While the modified route serves additional passengers in Nehalem and Rockaway Beach with additional designated stops, no additional population or service area is estimated. The additional stops proposed are within the existing $\frac{3}{4}$ mile capture shed assumed with the deviated fixed-route service, and within a $\frac{1}{4}$ mile walking distance capture shed.
- Reliability: Eliminating flag stops through Rockaway Beach and service existing deviations in Nehalem would improve reliability. Route 3 would more often follow scheduled bus times.
- Impacts to Existing Users: Existing users would be better served through Nehalem and Rockaway Beach, and no additional travel time has been added for users originating or destined for other locations.

Route 4

- *Alternative 4A:* Modify existing Route 4 to serve existing Pacific City loop and proposed Port of Tillamook Bay loop every other run.
 - Revenue operating hours: The Pacific City loop and Port of Tillamook Bay loop are equal in travel time, thus serving these every other run results in a net zero impact to travel time.
 - Cost: Net zero impact on cost.

¹¹ Any additional time savings associated with designated rather than flagged stops through Rockaway beach can be a buffer against slower travel times in the future due to increased demand and/or increased traffic on US 101.

- Ridership and Service Area: Additional service to the Port of Tillamook Bay would result in 8 additional acres served and approximately 16 people.
- Reliability: No impacts to reliability.
- Impacts to Existing Users: Existing users to Pacific City would be impacted by being served every other run, thereby reducing their service to Lincoln City and Tillamook by a factor of two.
- **Alternative 4B:** Create new route that serves Pacific City and Tillamook and provides service through Sandlake Road.

Exhibit 2 Alternative 4B Route



- Revenue operating hours: One run, assuming the routing shown in Exhibit 2, takes about 1.5 hours. As such, assuming a 9 hour shift with a 1.5 hour break, this new route could run five times within one day.
- Cost: Operational cost associated with the new route is based on current cost of Route 4. The cost associated with the travel time is approximately \$698/day and \$254,900/year.
- Ridership and Service Area: The new route would serve approximately 6,900 people and 1,300 acres.
- Reliability: No impacts to reliability.
- Impacts to Existing Users: Existing users between Pacific City and Tillamook would experience additional service, namely more frequent service and added service through Sandlake Road.
- **Alternative 4C:** Travel time savings to existing Route 4 as a result of Alternative 4B.
 - Alternative 4Ca: Add Port of Tillamook Bay loop

- Revenue operating hours: Net zero impact.
 - Cost: Net zero impact.
 - Ridership and Service Area: Additional service to the Port of Tillamook Bay would result in an additional 8 acres and 16 people served; however, the Port is an employment destination rather than a residential destination.¹²
 - Reliability: No impacts to reliability.
 - Impacts to Existing Users: Existing users between Pleasant Valley and Pacific City would experience increased travel time.
- Alternative 4Cb: Add Port of Tillamook Bay loop at end of run between Tillamook and Lincoln City.
- Revenue operating hours: Approximately five additional minutes for existing Route 4 run is anticipated.
 - Cost: The cost associated with an additional five minutes per run equates to \$26/day and \$9,400/year.
 - Ridership and Service Area: Additional service to the Port of Tillamook Bay would result in an additional 8 acres and 16 people served; however, the Port is an employment destination rather than a residential destination.
 - Reliability: Reliability would improve between Tillamook and Lincoln City with a shorter fixed-route between the two destinations; thereby introducing less possible deviations with a shorter fixed route.
 - Impacts to Existing Users: Existing users between Tillamook and Lincoln City would experience significantly shorter travel time.
- Alternative 4Cc: Add 5th run Route 4 to Lincoln City (reduce headways to 3-3.5 hours, rather than 4 hours)¹³
- Revenue operating hours: Approximately one to two additional hours for existing Route 4 run is anticipated.
 - Cost: The cost associated with an additional one to two hours per run equates to \$77.59-\$155.18/day and \$28,300-\$56,600/year.

¹² Recently it was announced that a nonprofit group has raised money to convert one of the current old naval buildings into a homeless shelter. Also, Tillamook County and the State of Oregon have discussed and raised funds to relocate the State's District Courts out near the County's correctional facility.

¹³ Alternative 4Cc and Alternative 4B may be combined where the 5th run provides service to Pacific City and communities along Sandlake Road. This combination would result in additional service time.

- Ridership and Service Area: The additional run would not increase the areas or populations served; however, because the additional run would reduce headways by approximately 1 hour, we can assume that more people would use transit.
 - Reliability: Reliability would improve between Tillamook and Lincoln City with a shorter fixed-route between the two destinations; thereby introducing less possible deviations.
 - Impacts to Existing Users: Existing users between Tillamook and Lincoln City would experience significantly shorter travel time.
- **Alternative 4D:** Add new bus to reduce headways by a factor of two between Tillamook and Lincoln City
 - Revenue operating hours: Assume a 10-hour shift to provide one additional bus to run between Tillamook and Lincoln City.
 - Cost: The operational cost associated with an additional bus equates to \$775.90/day and \$283,200/year.
 - Ridership and Service Area: The additional bus would not increase the areas or populations served; however, because the additional run would reduce headways by a factor of two, we can assume that more people would use transit.
 - Reliability: Reliability would improve between Tillamook and Lincoln City with a shorter fixed-route between the two destinations; thereby introducing less possible deviations.
 - Impacts to Existing Users: Existing users between Tillamook and Lincoln City would experience significantly shorter travel time.

Route 5

Adding one additional run in the afternoon to depart from Tillamook would result in an arrival back to the transit center later than any other bus route runs. As a result, increasing service times to Route 5 may be accommodated if the route were based out of Portland rather than Tillamook, and operated through external contract drivers. In doing so, an additional run could leave Tillamook in the afternoon and return to Portland in the morning.

Route 6 (Coastal Connector)

The Route 6 Coastal Connector service is a partnership between the Confederated Tribes of the Grand Ronde (CTRG), the Confederated Tribes of the Siletz Indians (CTSI), Salem Area Mass Transit District (SAMTD), Yamhill County Transit Service Area (YCTA), Lincoln County Transportation District (LCTD), Tillamook County Transportation District (TCTD) and the Oregon Department of Transportation's Rail & Public Transit Division. (RPTD). While TCTD is the designated service operator the service is subsidized

by an ODOT Section 5311(f) Intercity Grant and the Grant's local matching funds are provided by the CTRG and CTSI. Since SAMTD Cherriots Route 2X operates 8 round trips between downtown Salem and the Spirit Mountain Casino. Therefore, the Route 6 Coastal Connector service operates 3 round trips between Chinook Winds Casino and the Spirit Mountain Casino where passengers can transfer to and from the Cherriots Route 2X at the Casino's East Entrance. Since SAMTD does not operate transit services on weekends the Route 6 Coastal Connector operates 3 round trips between Chinook Winds Casino and the Amtrak/Greyhound station in Salem. As such, any additional service to Route 6 is dependent on these agencies funding. However, ensure seamless connections between Route 4 and Route 6 is important for any users traveling between Tillamook and Salem or Spirit Mountain. In addition, the alliance and connected plans can act as vehicles for coordination and partnership between these transit agencies to enhance service.

Dial-a-Ride

Exhibit 3 and Exhibit 4 show the combined dial-a-ride (DAR) origins and destinations for normal DAR and non-emergency medical DAR, respectively. As shown, the majority of DAR trips have an origin or destination on or very close to existing fixed routes. This suggests an opportunity to find ways to get existing DAR users to switch to fixed-route service. Some DAR requests may be eliminated if complete pedestrian links were present between these origins/destinations and TCTD bus stops. TCTD should work with local agencies (county, cities, and ODOT) to incorporate pedestrian facilities in their Capital Improvement Plans in order to prioritize these in the future.

Another consideration is that the hospital and the county health department seem to be the biggest trip generator of DAR trips. It takes a lot of time to travel via Route 1 when transferring, so some options that provide one-seat rides for Route 3 and 4 riders to those destinations should be considered. Options include deviating the routes (adds time), interlining buses (e.g., Route 3 turns into Route 2 when it arrives at the transit center), or changes to Route 1 to improve connections to these popular destinations.

Exhibit 3 Normal DAR

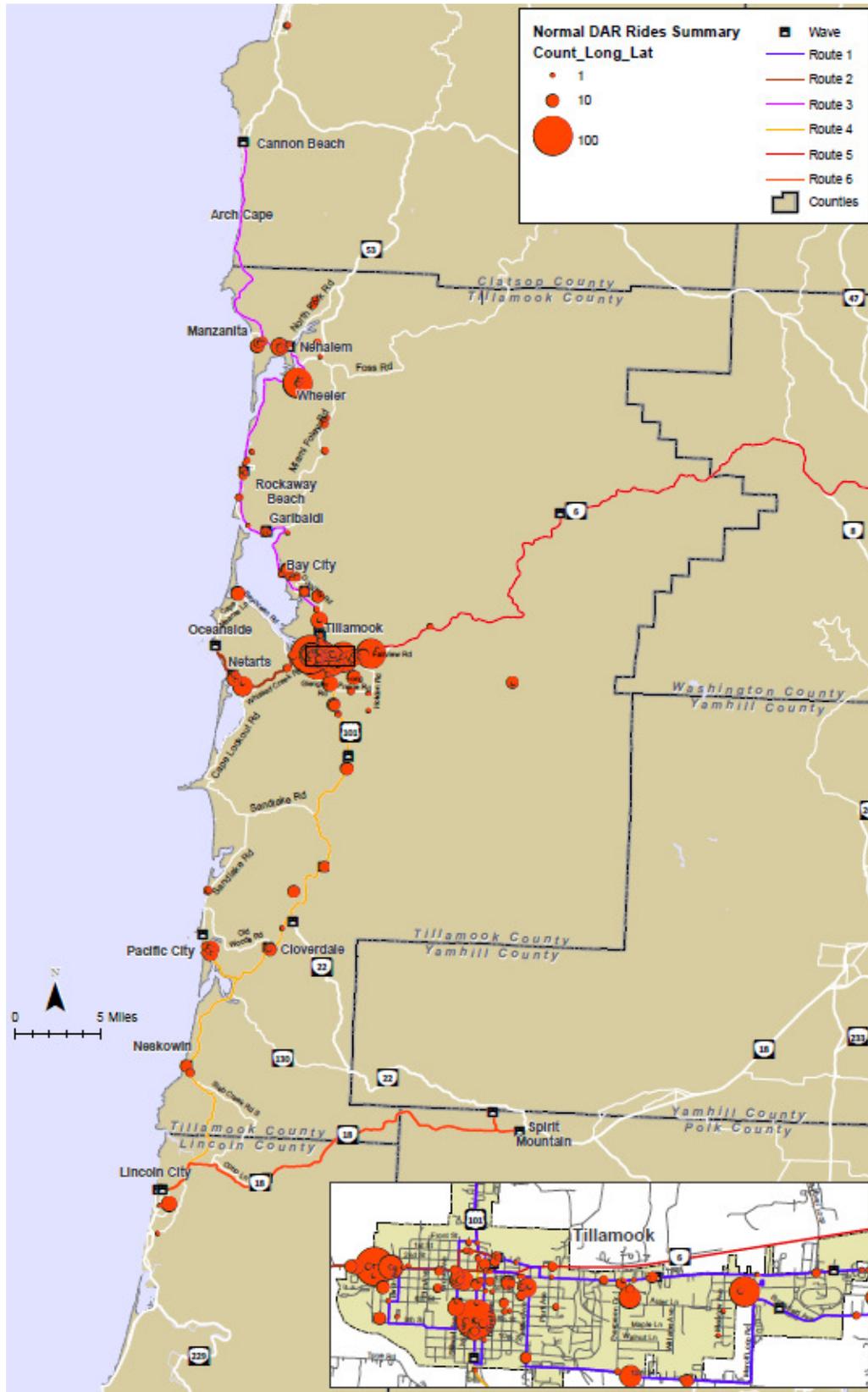
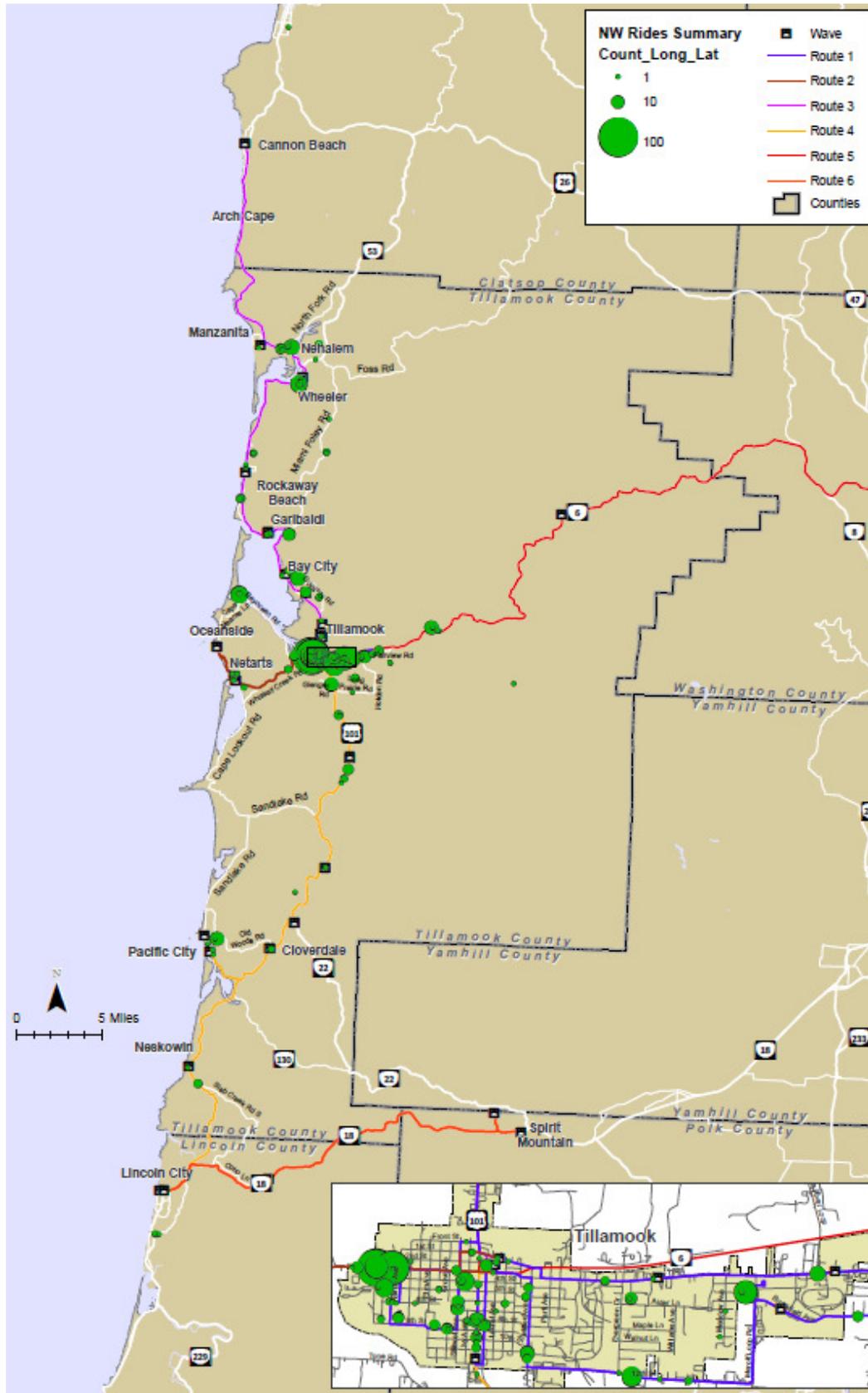


Exhibit 4 Non-Emergency Medical DAR



Deviated Fixed-Route Service

There are three alternatives related specifically to deviated fixed-route service, as follows:

- Retain existing deviated fixed-route service.
- Limit existing deviated fixed-route service to ADA passengers. This alternative would improve reliability and would continue to meet ADA regulations.
- Eliminate deviated fixed-route service. This alternative would improve reliability for the fixed-route service, but would increase costs for the DAR service since ADA regulations mandate paratransit service be provided for the length of the fixed route during the same operating hours. As such, the existing volunteer-driven DAR service may need to be employee-driven to ensure service to ADA passengers.

Fare Policy

Minimal changes to the existing fare policy are proposed. Inflation should be monitored to adjust fares accordingly every year. TCTD may choose to negotiate pass programs on a per person basis for additional organizations, rather than providing a reduced price per passenger. Table 9 shows the proportion of fare types used over a one year period, between October 1, 2014 and September 30, 2014. As shown, regular passes represent approximately 70 percent of total fares sold, and of those more than 20 percent are monthly passes. At present, monthly passes can be used for multi-zone trips.

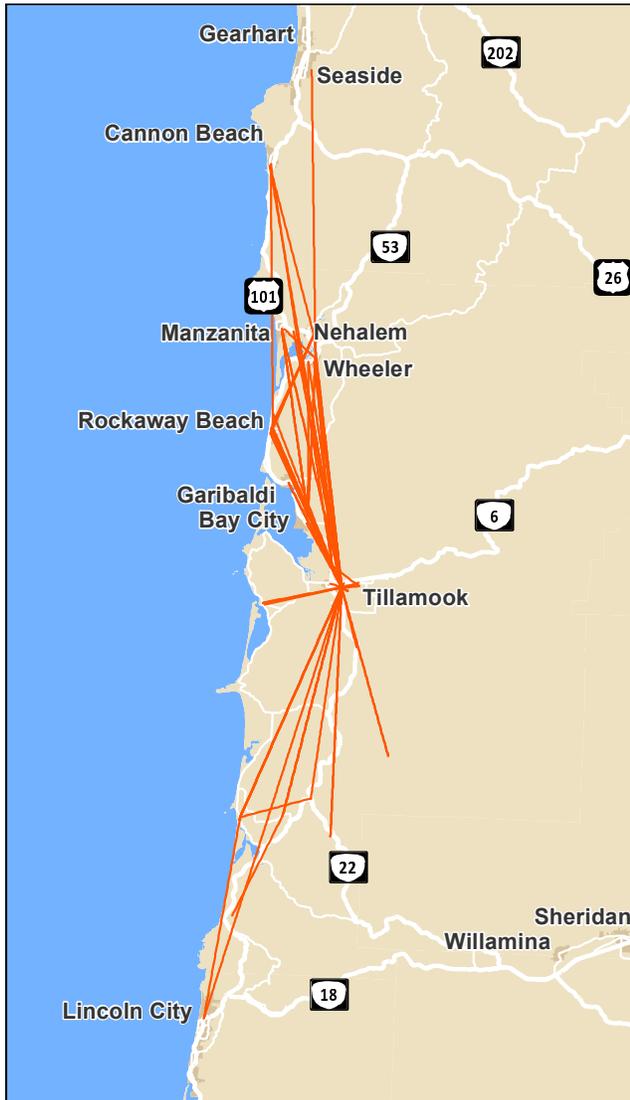
Table 9: Proportion of Fare Types (October 1, 2014 to September 30, 2015)

Fare Type	Regular	%	Reduced	%
1 Zone	12,505	17%	911	3%
2 Zone	10,165	14%	413	1%
3 Zone	2,924	4%	154	0%
Route 1 Pass	18,518	25%	1,102	3%
Monthly Pass	17,125	23%	32,572	92%
PDX Round Trip	6,769	9%	68	0%
PDX One-Way	2,818	4%	46	0%
Ride Connect 1 Zone	197	0%	14	0%
Ride Connect 2 Zone	1,455	2%	47	0%
Visitor Day Pass	1,501	2%	-	0%
Total	73,977	100%	35,327	100%

Source: TCTD

Exhibit 5 shows the bus origins and destinations for monthly pass holders only. As shown, a majority of trips are multi-zone trips. To this end, TCTD should consider a tiered monthly pass system for single- and multi-zone use.

Exhibit 5: Monthly Pass Bus Origin/Destination



Source: TCTD, Customer Survey #1

2.2 Alternatives Evaluation

To evaluate and assess each alternative according to the evaluation criteria, a scoring system was developed. Each evaluation criterion was assigned a range of values (●, ◐, ○), and each alternative was scored relative to the other alternatives. The alternative that achieves each metric better than others receives a “●”, those that do not impact the metric receive a “◐”, those that underperform compared to other concepts receive a “○” score. Table 10 outlines the elements considered in the initial evaluation and aspects of each element that characterized the variations between alternatives.

Table 10 Service Alternatives Evaluation

Alternative	Description	Criteria				
		Revenue operating hours ¹	Cost ²	Ridership/Service Area ³	Reliability ⁴	Impact to Existing Users ⁵
1A	Reduce headways from 60- to 30-minutes by running one additional bus.	◐	○	●	●	●
1B	Add an additional Town Loop route that serves Port of Tillamook Bay in lieu of traveling north on Highway 101.	◐	○	●	◐	●
1C	Add an additional Town Loop route that serves Port of Tillamook Bay in lieu of traveling north on Highway 101, and travels in opposite direction.	◐	○	●	◐	●
3A	New driver block that serves Route 2 twice a day and Route 3 three times a day, to fill morning and afternoon headway gaps for each route.	◐	○	●	●	●
3B	Modify Route 3 to better serve Nehalem by adding a stop along Highway 101 to serve existing deviations. In conjunction, modify Route 3 to replace flag stops through Rockaway Beach for a 3-mile zone with designated stops	◐	◐	◐	●	●
4A	Modify existing Route 4 to serve existing Pacific City loop and proposed Port of Tillamook Bay loop every other run.	●	●	●	◐	○
4B	Create new route that serves Pacific City and Tillamook and provides service through Sandlake Road.	○	○	●	●	●
4Ca	Eliminate existing Pacific City loop and add Port of Tillamook Bay loop	●	●	●	◐	○
4Cb	Eliminate existing Pacific City loop and add Port of Tillamook Bay loop at end of run between Tillamook and Lincoln City.	◐	◐	●	●	●
4Cc	Eliminate existing Pacific City loop and add 5 th run Route 4 to Lincoln City (reduce headways to 3-3.5 hours, rather than 4 hours) – extra 1-2 service hours per day	◐	◐	◐	●	●
4D	Add new bus to reduce headways by a factor of two between Tillamook and Lincoln City	○	○	●	●	●

¹ ○ = significant increase in travel time; ◐ = moderate increase in travel time; ● = no increase to travel time

² ○ = significant increase in cost; ◐ = moderate increase in cost; ● = no increase to cost

³ ○ = reduces existing service area; ◐ = does not change existing service area; ● = increases existing service area or provides additional headways which may increase ridership

⁴ ○ = negatively impacts reliability; ◐ = does not change reliability status quo; ● = improves reliability

⁵ ○ = negatively impacts existing users; ◐ = does not impact existing users; ● = improves service for existing users

2.3 Capital Alternatives

Vehicle Types

Currently, TCTD has a fleet of 22 vehicles ranging from medium-sized buses to modified mini-vans. The buses are typically used for the intercity and deviated fixed-route service, while the vans are used for the Dial-a-Ride service. A summary of the current fleet is shown in Table 11, below.

Table 11: TCTD Transit Fleet

Vehicle Type ¹	Fuel	Seats	Length	Useful Life	Count
B: Medium-Size, Heavy-Duty Transit Bus	Diesel	28-33	28'-33'	10yr/350,000 mile	9
D: Medium-Size, Light-Duty Bus & Van Chassis Cutaway Bus	Diesel	14-18	24'-27'	5yr/150,000 mile	3
E1: Small, Light-duty Bus	Gas	9	19'	4yr/100,000 mile	2
E3: Modified Minivans	Gas	5-6	15'-16'	4yr/100,000 mile	8

¹ Vehicle type classified by ODOT

TCTD tracks bus age and mileage to determine a bus replacement schedule. The replacement needs by year for the next five years are shown in Table 12, below.

Table 12: Cost of Vehicle Replacement by Fiscal Year

	FY 15/16	FY 16/17	FY 17/18	FY 18/19	FY 19/20
Total Cost	\$200,000	\$750,000	\$775,000	\$340,000	\$175,000
Federal/State Funding	\$166,000	\$604,000	\$620,000	\$272,000	\$35,000
Local Match	\$34,000	\$151,000	\$155,000	\$68,000	\$140,000
Vehicles Replaced this YR	3	5	5	4	1

This tracking can be converted into a fleet plan that includes a twenty year projection of fleet needs, allowing TCTD to develop long-range a long range fleet financing plan. The plan would include both a replacement schedule of existing buses as they reach the end of their useful life, as well as possible fleet expansion to accommodate service growth. Another issue that the fleet plan should address is the types of vehicle to be purchased. Transit agencies face the issue of balancing the efficiency advantages of fleet standardization with the benefits of matching vehicle size and other vehicle attributes with specific service needs. Benefits of fleet standardization are greater flexibility in vehicle assignments and a reduced need for spare vehicles since sub-fleets each require their own spare vehicles, and smaller fleets typically require a greater spare ratio. In addition fleet standardization reduces maintenance costs by requiring less parts inventory and letting mechanics focus on a reduced number of vehicle models, which allows them to become more familiar with the specific maintenance requirements of those vehicles. The benefit of having several diverse vehicle types is that a vehicle can be more closely tailored to a specific service need or operating environment. For example, the circulator route within the City of Tillamook might be more appropriately served by a small, shuttle-type vehicle and a longer

route, such as the Portland-Tillamook connection, would be better served by a larger bus with amenities such as softer seats and reading lights.

For TCTD, it is recommended that the fleet be standardized to two types of vehicles:

- Medium-sized (approximately 30 to 32-foot) buses for the fixed-route service; and
- Mini-vans or small bus for the Dial-a-Ride service

Other recommendations for the fleet are:

- Purchase heavy-duty (10-year or 12-year) buses for the fixed-route service. Heavy-duty buses typically have lower life-cycle costs and also will result in reduced maintenance costs and fewer road calls.
- If there is a question on the size of the vehicle, it is typically better to purchase the larger size. This allows for ridership growth, accommodates the occasional large passenger load, and provides for greater passenger comfort.
- Purchase vehicles in larger batches. There is an advantage in having multiple vehicles that are identical in terms of parts and maintenance needs. Even very similar vehicles purchased in different years will have differences that may impact maintenance costs.
- Maintain an average fleet age that is less than half of the average life span of the vehicles. For example, a sub-fleet of 10-year buses should have an average fleet age of five years or less.

Fleet Size

The size of the fleet is determined by the service needs, and a final size recommendation will be made once the future service plan has been established. The financial forecast has indicated that TCTD has a capacity to support up to three new buses.

Typically a 20 percent spare ratio is recommended. Adequate spare buses are particularly important for small fleets, since one or two buses that are out of service for an extended period (such as after an accident) can have a significant impact on the ability to meet service needs. In addition, with some routes operating with long headways, missing a trip due to not having an available spare bus will have a significant impact on service.

There are two approaches to establishing the spare fleet. One approach is that spares are composed of older buses that are no longer cost-effective for daily service, but are maintained to the point that they can be used on a limited basis. Typically, the maintenance costs to keep the older buses in running condition is higher than for a newer bus.

The other option is to have a spare fleet that is similar in age to the in-service fleet. In this case, the spare buses can be rotated into service, which can reduce the mileage accrued on individual vehicles and extend vehicle life. In addition, the incidence of road calls with a newer spare fleet is likely to be lower.

Fuel Types

TCTD has been purchasing diesel buses. While diesel engines have been getting “cleaner” as a result of stricter federal emissions standards, TCTD could consider the purchase of lower-emission vehicles, such as buses using hybrid-electric propulsion. 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. Given these costs and savings, the payback on the initial higher purchase price is very likely to be insufficient to justify the purchase of hybrid-electric buses simply on a direct cost-benefit basis. However, some transit agencies believe that there is additional value to hybrid technology resulting from reduced emissions and an improved community perception of the transit agency. In addition, there are occasionally federal funding incentives for the purchase of low-emission buses that may make the purchase of hybrid-electric buses more feasible.

There have also been significant advancements in all-electric buses. A promising option for all-electric bus technology appears to be quick re-charging of batteries while the bus is stopped at a station or at a layover spot, often without significantly service delay. While this technology has not advanced to the point that it is currently marketable, it may make sense for all new or reconstructed stations to be designed to accommodate higher-voltage electrical connections. This can simply involve incorporating the appropriate conduit when the facility is constructed.

Low Floor

The transit vehicle market is clearly trending toward low-floor buses. TCTD recently purchased low-floor buses, and the public reaction to the buses has been positive. Low-floor buses eliminate the steps in the vehicle, providing easier access for riders. This is particularly important for riders with mobility challenges, and for people who may have strollers or carts. It is recommended that TCTD continue to purchase low-floor buses and eventually, as part of the normal bus replacement schedule, replace all the high-floor buses with low-floor models. A potential downside with respect to TCTD’s service is maintaining an ADA-compliant slope on the ramp when it is deployed at a location where there are no sidewalks or landing pads. With this in mind, it is recommended that TCTD explore this option due to the relatively high proportion of seniors in Tillamook County¹⁴ Stakeholders interviewed for this study noted that mobility and access issues were barriers for utilizing transit.¹⁵

¹⁴ See Memorandum #1: TCTD Transit Plan Update Existing System, June 25, 2015, p. 12.

¹⁵ Ibid, pp. 44-50.

Facility Improvements

Transit passenger facilities include bus stops, passenger shelters, transit centers, and park and ride lots. Discussion of each of these follows. A good information source for transit facilities in smaller communities is *Transit in Small Cities: A Primer for Planning, Siting, and Designing Transit Facilities in Oregon*, (<http://www.oregon.gov/LCD/TGM/docs/fulltransitprimer4-4-13.pdf>).

Transit Centers and Major Transit Stops

Transit centers provide a connecting (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. For that purpose, there is a significant benefit in having a transit center or major transit stop) as a focal point in every city served by TCTD. For small communities, this could be as simple as providing a nice passenger shelter.

The following key concepts should be considered when constructing or reconstructing transit centers:

- The location of the stop or transit center should consider pedestrian access to nearby destinations, ease of access by bus that reduces out-of-direction travel and allows for safe bus operations, and a location that has high visibility, both to publicize the service and to enhance rider safety and security.
- The stop or transit center should be sized to accommodate planned 20-year growth, both in terms of the number of buses accommodated and the size of passenger amenities, such as the passenger shelter.
- Materials used should consider life-cycle costing, which usually points toward high quality, long-lasting materials that have reduced maintenance costs. This feature is especially important in coastal communities that are subject to high winds, heavy rains, and salt air.
- The stop or transit center design should use Crime Prevention Through Environmental Design (CPTED) principles to improve rider security. CPTED principles include maintaining clear sight lines into and across the station, eliminating “hiding” spots, and providing adequate lighting.
- Public art should be considered for transit centers. Art has been shown to discourage vandalism and can also be used to involve the local art community in the transit center project. Regulations now require that public art funded through FTA be “functional.” Art associated with railings, benches, pavement, windscreens, or any other element of the shelter would meet the FTA requirement. Free-standing art, such as a sculpture, would not.

Downtown Tillamook is the only location with a full transit center within the County and the only one with enough transfers to require one. Location of future transit centers and major transit stops is dependent on future route locations and frequency. However, current relatively high frequency stops

within the county that have more than 5 boardings a day¹⁶ would be considered major stops. All major stops merit consideration for a higher level of improvement, such as a shelter. Major stops include Oceanside; Rockaway City Hall; Marie Mills, the Post Office, Tillamook Bay Community College, Department of Human Services, and Fred Meyer in Tillamook; Nehalem, Manzanita, and Garibaldi. Outside of the County, major stop locations include Lincoln City Safeway, Spirit Mountain Casino, Sunset Transit Center in Beaverton and Union Station in Portland. All of the above mentioned stops should have shelters at a minimum. Final decisions about transit center locations and other stop improvements depend on the final service network.

Bus Stops

Currently, TCTD uses a combination of bus stops and flag stops. TCTD currently has only 53 bus stops with timeholders.¹⁷ It is recommended that where feasible, flag stops be replaced with designated bus stops. The cost for a new bus stop sign and pole, installed, can range from \$200 to \$500, depending on the material and the installation conditions. Designated bus stops have the following advantages:

- They provide awareness of the service, improving the visibility of TCTD in the community.
- The stop can be located to assure safe bus and passenger access
- The stop can be improved (e.g., with a paved landing pad) to facilitate access by riders needing to utilize the bus' lift or ramp
- They can consolidate access, reducing the number of stops a bus makes
- They can help communicate service information such as route numbers are included on the signs

Bus stop poles and the attached signs should be sturdy to stand up to the high coastal winds. An option of perforated metal poles in a concrete footings may work well. It is recommended that route numbers be placed on the signs to assist riders in identifying the service. Bus stop displays with specific route, schedule, and fare information can also be very helpful, though they require updating when there are services or fare changes, which adds to operating cost. If service and fare changes are relatively infrequent, the more specific rider information at the highly used bus stops is recommended. This option is especially important in areas where visitors tend to use the TCTD service, since they are less likely to be familiar with the fares, routes and schedules.

Bus stops should be located to allow for safe bus and passenger access. Where possible, bus stops would be located at locations that have sidewalks or other pedestrian connections, and that allow for safe pedestrian crossing of the street. On major roadways, such as state highways, bus stops should

¹⁶ 2014, TCTD On/Off Study as summarized in Technical Memo # 1 pp. 27-31.

¹⁷ Ibid, p. 8.

allow for the bus to stop out of the traffic lane to avoid rear end collisions and discourage unsafe passing of the bus by motorists.

Shelters

Passenger shelters add to the comfort of using transit and are generally very popular with riders. An “off the shelf” passenger shelter (there are several companies that provide them) typically costs approximately \$5,000 installed. In addition to initial capital costs, passenger shelters will incur maintenance costs, both for routine on-going cleaning and repair and replacement as needed. The primary maintenance issues for shelters, apart from the routine cleaning, are vandalism and fading/clouding of the windscreen. For routine cleaning, trash receptacles, if included, would dictate the frequency that the shelter should be serviced. If trash receptacles are not provided, the regular cleaning and servicing of shelters can be as low as a once per month.

Passenger shelters must be designed to meet the requirements of the Americans with Disabilities Act (ADA) and should be located so as to provide safe and convenient pedestrian connections with nearby destinations. Coordination of shelter placement with sidewalk and other pedestrian improvements projects planned by ODOT or local agencies is encouraged. In addition to the overhead protection (roof), shelter amenities can include:

- Windscreens
- Benches
- Trash receptacles
- Passenger information

Passenger shelters are recommended at high-use stops and all transit centers. They are especially important in a coastal community given the high incidence of wind and inclement weather. TCTD currently has 21 bus stops with shelters, each of which have schedule boards.¹⁸ All of the major stop locations noted in the transit center section should have a shelter. The condition of existing shelters at these locations should be reviewed and additional amenities considered, although final prioritization depends on the future service plan. Low-frequency stops that stakeholders have noted as in need of shelter improvements include Beaver and Hebo due to the long gap between buses and the lack of other places to wait.

There is a tradeoff between the level of wind/weather protection provided through the use of windscreens and an open shelter design, without a windscreen, that reduces maintenance costs. If vandalism is not a major problem for TCTD, windscreens are recommended for TCTD shelters both to address coastal winds and because the infrequent service can lead to longer wait times which suggests the need for a higher level of protection from the weather. Glass in lieu of acrylic should be considered to address weathering and fading issues.

¹⁸ Ibid, p. 8

An alternative to a shelter for a stop that has less ridership is a bench. Benches should be considered for stops with 3-5 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 as well. Benches that attach to the bus stop pole, such as the Simmi-Seat¹⁹ (see Exhibit 6) take up very little space, have low maintenance, and are relatively inexpensive. Installed benches vary in price from \$200 to \$1000, depending on materials, the quality of the product, and the installation conditions.

Exhibit 6 Simmi Seat



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 significant savings in travel cost or time by using transit. Without one or more of these factors, park-and-ride use is generally very low. In TCTD's service district, park and ride options are particularly important as topography issues prevent many people from walking to and from the bus stop. Park and rides can also act as a gathering point for shared ride services.

For TCTD, park-and-ride options might be feasible in the following situations:

- For the Portland-Tillamook or the Salem-Lincoln City trips, which are long enough that the transit trip may yield significant user cost savings (particularly if gas prices increase).
- For travel to communities where there are parking shortages during peak tourism times, such as Cannon Beach in the summer. Locations within Tillamook County that might be considered for this type of service are Pacific City, Manzanita, and Oceanside.

The intercity park-and-ride demand is likely to be relatively small and peak tourism park-and-ride is seasonal. Thus, it may not make sense for TCTD to invest in a significant park-and-ride program.

¹⁹ © 2015 Simme LLC

Instead, agreements with local business and community organizations to allow use of a few spaces for park-and-ride usage is recommended. For example, a major grocery store or shopping area may be willing to designate 4-6 spaces for the longer distance park-and-ride with the expectation that park and riders would often stop and shop on one end of their trip. This approach can be used to test park-and-ride demand without a significant investment by TCTD.

A seasonal park-and-ride lot to meet high tourist demand would need to be located just outside the area with parking shortages, and would need to be connected to the area via a shuttle operating with fairly high frequency, which carries with it substantial operating costs. That service is only likely to be feasible if subsidized by a merchant or business group that would benefit from the improved access.

Passenger Amenities

Additional passenger amenities requested during the stakeholder outreach for this project include Wi-Fi and more accessible storage for grocery bags and luggage on buses. Stakeholders also suggested more information about services and how to ride, in more languages, both at bus stops and on-line.

²⁰Bicycle and Pedestrian Amenities

Bicycle and pedestrian access is very important to transit. Virtually every bus rider is also a pedestrian, and bicycles provide an important “last mile” option for transit, particularly for a system such as TCTD which serves residents that are fairly widely dispersed. While it is not within TCTD’s scope or financial capability to provide safe and convenient pedestrian access to transit stops, it can work with local cities and the county to prioritize pedestrian improvements that serve transit stops. In addition, pedestrian improvements in the immediate vicinity of a transit center or shelter can sometimes be funded by the project.

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 ODOT prioritize street corners near transit centers and shelters for ADA ramps. This is also particularly relevant to TCTD due to the high proportion of seniors in its service district.

The bicycle/transit connection can be facilitated by providing for bike parking at transit centers and, space permitting, transit shelters. TCTD buses have the capability to carry bikes. However, not all stakeholders were aware of this service. TCTD should make this information more prominent on its website and other promotional materials.

²⁰ Technical Memo #1, p. 37, 44-50

Public Transportation System Technologies

Dispatching

TCTD currently uses a basic application for dispatch that it developed, called Transit Ace . Transit Ace schedules rides, dispatches the buses and manages the District's operating statistics. For Dial-a-Ride, customers currently phone in their requests. In the past, TCTD used RouteMatch. However, it found the system to be expensive and it didn't fully meet their needs for trip management and reporting.

The agency is considering expansion of its Dial-a-Ride services to accept private pay customers for out of County trips under the NW Rides brand and moving to on demand scheduling. In order to efficiently handle the volume of requests, it might need to consider enhanced dispatch software. Depending on the demand, in the future it might be worth considering a dispatch system that would allow clients to schedule their rides directly.

Two relatively low-cost dispatch systems that are used by transit agencies of a similar size with extensive paratransit as well as fixed route services are Mobilitat²¹ and StataGen²². Mobilitat is relatively inexpensive and simple, yet can be scaled up as service needs change and the system grows. It can generate the reports that TCTD needs to submit to the National Transit Database and for asset management. The tablet allows the operators to schedule and manage their own rides. has been used in Harney and Josephine Counties. StrataGen is a more robust and somewhat more expensive system. NE Oregon Public Transit which serves Baker, Union, and Wallowa counties on behalf of Community Connections of NE Oregon, Inc. uses it and has been able to expand their coverage to include several nearby agencies. TCTD plans to visit some peer agencies in order to see how these systems operate on the ground and make an informed assessment as to which might best meet their needs.

Cameras

TCTD currently equips buses with security cameras. On-vehicle surveillance provides for documentation of criminal acts and can also be used to absolve the transit agency of fault in litigation involving passenger incidents. Security cameras (Closed Circuit Television, or CCTV) should also be considered for transit centers.

CCTV can be used to enhance safety and security at transit centers. Criminal behavior can be documented and recordings used to help prosecute perpetrators. In addition, the presence of a camera at a transit center can deter criminal activity and add to the sense of security for riders. For that reason,

²¹ <http://www.mobilitat.com/>

²² <http://stratagen.com/products.html>

the presence of the cameras at the transit centers should be communicated. CCTV cameras pointed at a bicycle parking area can enhance security for bike parking that may be located at or next to a transit center.

CCTV can act as standalone units that record video that can be accessed as needed in response to an incident. They can also be paired with many other technologies, such as radio communications, silent alarms, and Automatic Vehicle Location (AVL) to create a broader security system. There are many options for security systems with wide ranges in capability and cost. Should TCTD wish to pursue a possible security system, it is recommended that a study be conducted of possible options and their associated costs to allow for the selection of a system that best meets TCTD's needs.