

C-TRAN of VANCOUVER, WA
COLUMBIA RIVER CROSSING PROJECT

**C-TRAN Bus Fleet
Management Plan**

FD Application
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Executive Summary

This report summarizes the Bus Fleet Management Plan formulated by the Clark County Public Transportation Benefit Agency, hereafter referred to as C-TRAN, of Vancouver, Washington as required by the New Starts Process. It has been prepared in association with the Columbia River Crossing Project (CRC) which includes a large transit component. This plan articulates the operating environment and the maintenance plans that C-TRAN currently has enacted. There is also an overview of the safety and security policies in place. Bus assignment, road call, and other procedures are similarly outlined. C-VAN, the Americans with Disabilities Act (ADA) complementary paratransit service is also included in all categories. C-TRAN also operates a connector service to small communities within our service area. Where appropriate, this service is listed separately, but it utilizes the same vehicle types as the C-VAN service and is budgeted under fixed route as a deviated fixed route service. Therefore it is often included with those services.

C-TRAN now also operates a commuter vanpool program modeled after similar programs run in the state of Washington. There are 15 transit agencies operating 2700 vanpools statewide and they all use the same internally operated business model. This program is designed to bring transit service to those commuters who cannot reasonably access traditional transit. This program was also selected to serve as a major component in the congestion mitigation plans surround the CRC project.

Construction on the CRC project is projected to start in 2012 and end in 2019. All data in this report falls into the range of 2008 through 2021. This report provides data for four years in advance of the project through two years after completion. Data from prior years matches what has been reported elsewhere. Current year data has been estimated based upon data reported during the 1st six months of the year. Projected data is based upon projected budgets and C-TRAN's 20 Year Transit Development Plan (TDP) or New Starts Submittal paperwork.

Chapter 1- Historical & Current Conditions

1.1 Introduction

C-TRAN began service in 1981 to provide public transportation in Clark County, Washington. C-TRAN is officially classified as a Public Transportation Benefit Area (PTBA). As such, it is funded by 0.5% local sales tax. C-TRAN is governed by a nine member board of directors selected from elected officials representing the various jurisdictions served by C-TRAN. C-TRAN's service area is 137.14 square miles and has a service area population of 345,110 according to the 2000 Census data. 93% of the minority population of the service area lives within 3/4 of a mile of our fixed route system. C-TRAN's service boundary includes the city of Vancouver and its urban growth area and the city limits only of Battle Ground, Camas, La Center, Ridgefield, Washougal, and the Town of Yacolt.

C-TRAN fills an integral role in Clark County, with both fixed route and Paratransit services. In addition, C-TRAN also provides some general demand response service (called the Connector), limited stop service, and express commuter service into Portland, Oregon. For fixed route service, C-TRAN operates 105 buses over 29 routes (including deviated fixed route services). The Connector service is budgeted and maintained within the fixed route service. Where appropriate, it has been listed separate, but there are not separate budget numbers. Connector Service vehicle retirement and purchase plans are grouped with Fixed Route services. The Connector Service has some dedicated vehicles and also uses some fixed route coaches on an as needed basis. The dedicated vehicles are listed in Chapter 2 in their own chart. Sixty-nine vehicles are used by the paratransit service. In 2009, Vanpool was added as a service for commuters with a 30 van fleet. All of C-TRAN's vehicles, except Vanpool, are maintained at a central facility located at 2425 NE 65th Avenue, Vancouver WA.

Vanpool vehicles are maintained by an outside vendor, Ron’s Automotive of Vancouver, which has two locations. This is due to the decentralized nature of vanpool operations.

Clark County is a suburb of Portland. As a result, every day thousands of Clark County residents commute to work in Portland. Traffic congestion crossing the Columbia River is a major regional transportation issue. C-TRAN runs several commuter routes across both the Interstate 5 and Interstate 205 bridges. Also, freight traffic on the I-5 corridor is a regional and even national issue. The Southwestern Washington Regional Transportation Council (RTC) serves the as the Metropolitan Planning Organization for the area and oversees the Transportation Improvement Plan (TIP) process.

1.2 Ridership

C-TRAN has seen increases in ridership across all modes of transportation in recent years. A redesigned system plan (implemented November 2007) combined with higher gasoline prices has resulted in a transit friendly environment in 2008. However, C-TRAN ridership declined with the economy in 2009. Yet, C-TRAN expects a continuing rise in ridership in all modes due to the growing population of the county and the travel patterns projected in C-TRAN’s 20 Year TDP as well as local comprehensive land use plans.

Figure 1-1 System Ridership 2008 thru CRC Project Construction

Year	Annual Ridership	Weighted Daily Average	Data Type
2008	6,984,933	19,089	Actual
2009	6,201,190	16,947	Actual
2010	7,240,801	19,788	Budgeted
2011	7,003,434	19,140	Projected
2012	7,211,534	19,708	Projected
2013	7,538,672	20,602	Projected
2014	7,762,910	21,215	Projected
2015	8,320,476	22,739	Projected
2016	8,585,985	23,465	Projected
2017	8,841,251	24,162	Projected
2018*	14,277,578	39,019	Projected
2019*	14,703,564	40,183	Projected
2020*	15,273,596	41,741	Projected
2021*	15,729,097	42,986	Projected

Source: C-TRAN Development & Finance Departments

* Light Rail services Vancouver and will affect ridership levels

Chapter 2- Operational Summary

2.1 Bus Fleet Overview

Fixed Route:

The revenue fleet for fixed route service at C-TRAN consists of 108 vehicles in the following categories:

- 15 low floor 29-foot diesel buses
- 8 high floor 35-foot diesel buses
- 12 low floor 35-foot diesel buses
- 56 high floor 40-foot diesel buses
- 12 low floor 40-foot hybrid diesel-electric bus
- 2 low floor 40-foot diesel buses
- 3 high floor 25-foot diesel buses (Connector Service)

C-TRAN retains fifteen buses in its contingency fleet for emergency purposes (not counted in above tally). C-TRAN does not anticipate the ratio of smaller to larger buses changing significantly. However, the agency is pursuing a Bus Rapid Transit project which could result in articulated buses being added to the fleet. While there is no formal policy on fleet age, it is the goal of staff to keep the average fleet age to roughly 8 years. It is anticipated that future procurements will include more technology such as additional cameras, Wi-Fi connected cameras for real time viewing, and more units with hybrid engine technology.

Paratransit:

The revenue fleet for the C-VAN Paratransit fleet consists of 69 vehicles in the following categories:

- 57 high floor 25-foot diesel buses
- 12 Toyota Sienna Mini-vans

The C-VAN fleet is used for shared ride, curb-to-curb service for individuals unable to use fixed route bus service due to disabilities or disabling health conditions. C-VAN does provide limited door-to-door service for clients with special circumstances. All high floor 25-foot vehicles in operation are wheelchair accessible and adhere to ADA compliance standards. C-TRAN has purchased Toyota Sienna Mini-vans to transport ambulatory ADA clients in a more cost effective manner as they are cheaper to operate and a majority of clients are ambulatory.

This smaller vehicle concept is a cost control method that is employed by many agencies. While there is no formal policy on fleet age, it is the goal of staff to keep the average fleet age to roughly 7 years for the 25-foot buses. The mini-vans are too new to have a projected life span or to estimate what the ideal average fleet age should be.

Figure 2-1, C-TRAN Fixed Route Fleet, provides detailed information on the 105 vehicles used for fixed-route revenue operations. Figure 2-2, C-VAN Paratransit Vehicles, provides detailed information on the 69 vehicles used for Paratransit operations. Figure 2-3, C-TRAN Connector Fleet, provides detailed information about the 3 vehicles used in the Connector service. Figure 2-4, C-TRAN Contingency Fleet, provides information on the vehicles currently assigned to that fleet. Figure 2-5 provides the vanpool fleet make up. C-TRAN service vehicles are included in Appendix A.

All vehicle inventory data is based upon the Master Vehicle Certificate of Title list maintained by C-TRAN's executive office. Actual year vehicle counts may not reflect the arrival of new vehicles or the anticipated removal of older vehicles that will occur later in the year. So vehicle counts may change significantly from year to year due to the influx or outflow of vehicles. This is demonstrated in Figure 2-6, which shows the change in fleet size over time.

Figure 2-1. C-TRAN Fixed Route Fleet (as of July 1st, 2010)

Manufacturer-Model	Length	Seats-Standees	Year	# in Bus Fleet
Optima Low Floor	29'	23-10	2004	10
Gillig Low Floor	29'	26-10	2008	5
Gillig Phantom	35'	37-15	1995	8
Gillig Low Floor	35'	32-15	2008	5
Gillig Low Floor	35'	32-15	2009	7
Gillig Phantom	40'	43-20	1995	5
Gillig Phantom	40'	43-20	1999	14
Gillig Phantom	40'	43-20	2002	1
Gillig Phantom	40'	43-20	2003	36
Gillig Low Floor	40'	40-20	1998	2
Gillig Hybrid Diesel-Electric (LF)	40'	36-16	2008	12
Total Fleet Size				105
Average Age of Bus in Fleet				6.45

Source: C-TRAN Certificate of Title Records

Figure 2-2. C-TRAN Paratransit Fleet (as of July 1st, 2010)

Manufacturer-Model	Length	Seats-Standees	Year	# in Bus Fleet
Ford Eldorado	25'	16-0	1997	14
Ford Eldorado	25'	16-0	1999	1
Ford Eldorado	25'	16-0	2004	11
Ford Eldorado	25'	16-0	2006	7
Ford Eldorado	25'	16-0	2007	14
Ford Eldorado	25'	16-0	2008	5
Ford Eldorado	25'	16-0	2010	5
Toyota Sienna		5-0	2010	12
Total Fleet Size				69
Average Age of Bus in Fleet				4.5

Source: C-TRAN Certificate of Title Records

Figure 2-3. C-TRAN Dedicated Connector Fleet (as of July 1st, 2010)

Manufacturer-Model	Length	Seats-Standees	Year	# in Bus Fleet
Ford Eldorado	25'	16-0	1997	2
Ford Eldorado	25'	16-0	2008	1
Total Fleet Size				3
Average Age of Bus in Fleet				9.33

Source: C-TRAN Certificate of Title Records

Figure 2-4. C-TRAN Contingency Fleet (as of July 1st, 2010)

Manufacturer-Model	Length	Seats-Standees	Year	# in Bus Fleet
Gillig Phantom	30'	26-10	1995	6
Gillig Phantom	35'	32-15	1995	1
Gillig Phantom	40'	43-20	1995	8
Total Fleet Size				15
Average Age of Bus in Fleet				15

Source: C-TRAN Certificate of Title Records

Figure 2-5. C-TRAN Vanpool Fleet (as of July 1st, 2010)

Manufacturer-Model	Length	Seats-Standees	Year	# in Bus Fleet
Chevrolet Uplander	Mini Van	7-0	2008	12
Chevrolet Express	Full Size Van	12-0	2009	18
Total Fleet Size				30
Average Age of Vans in Fleet				1.4

Source: C-TRAN Certificate of Title Records

Figure 2-6 Total Fleet Units by Mode

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Fixed Route	110	110	105	108	105	115	119	121	121	122	130	139	145	145
F/R Peak Fleet/ Spares*	89/ 21	89/ 21	87/ 18	86/ 22	88/ 17	92/ 23	95/ 24	97/ 24	97/ 24	98/ 24	104/ 26	111/ 28	116/ 29	116/ 29
C-VAN	47	53	69	58	58	58	58	58	58	61	64	66	69	69
C-VAN Peak Fleet*	47	47	47	47	48	48	48	50	50	51	52	55	57	59
Vanpool	0	30	30	20	20	20	20	20	21	22	23	24	25	26
VP Spares*	0	21	21	3	3	5	5	4	4	4	4	4	4	4

Source: C-TRAN 20 Year Development Plan, Preferred Alternative Scenario
 *2008, 2009, & 2010 actual data, 2011 thru 2021 is projected data

2.2 Service Overview

C-TRAN operates 6 main services: Express Commuter, Limited Stop, Local Fixed Route, Connector, C-VAN, and Vanpool.

C-TRAN has a successful Commuter Express service that serves the Portland, Oregon commuter market. There are 11 routes that operate on various frequencies assisting commuters every weekday. Local Fixed Route Service is operated 7 days a week. There are 16 routes involved in local service and an additional 4 routes that provide weekday Limited Stop service. The Limited Stop Service provides faster service to riders of the Local Fixed Route Service and also runs to Tri-Met Light Rail Stations. The Connector service is a deviated fixed route service to rural parts of Clark County. It is provided so that citizens from outlying areas can have a connection to C-TRAN's other services, but is budgeted within C-TRAN's Fixed Route service. C-VAN is the ADA required Paratransit service operated by C-TRAN. Vanpool is a recently added service geared towards commuters that cannot access traditional transit for their commute.

Figure 2-7. As of July 1, 2010, C-TRAN had the following general operating characteristics:

	Weekday Span of Service	Weekday Peak/Base Fleet	Saturday Span of Service	Saturday Peak/Base Fleet	Sunday Span of Service	Sunday Peak/Base Fleet
Fixed Route Service	4:47 am- 12:39 am	87/59	6:00 am- 12:38 am	36/36	6:15 am- 12:30 am	26/26
C-Van (Para- transit)	4:45 am- 12:00 am	47	6:15 am- 12:00 am	19	6:15 am- 12:00 am	20

Source: C-TRAN Operations Department

C-TRAN's Dispatch and Field Operations office is open seven days a week and is responsible for assigning replacement vehicles when needed in accordance with the available vehicle list from maintenance. C-TRAN maintains a Fixed Route Spare Ratio of 19.32%. Operations hours of service are:

Fixed Route Dispatch

Monday-Friday 3:30 AM until 1:00 AM
 Saturday 5:00 AM until 1:00 AM
 Sunday 5:30 AM until 1:00 AM

C-VAN Dispatch

Monday-Friday 4:00 AM until 12:00 AM
 Saturday 5:30 AM until 12:00 AM
 Sunday 6:00 AM until 12:00 AM

Before service operation, all vehicles are given a pre-trip inspection as follows:

- Start-up and all systems check
- Exterior walk around inspection

- Interior inspection
- Operator's compartment set up and checks
- Air pressure and brakes check
- Wheelchair lift inspection
- Radio check upon exiting yard
- Wheelchair Strap Check

Defects found upon completion of the pre-trip inspection are reported to the on-duty dispatcher and recorded on a Vehicle Condition Report. The vehicle is either removed from service or the problem is resolved by maintenance when the vehicle is no longer in revenue operation.

2.3 Service Standards

C-TRAN recently adopted service standards for the various services it offers. For the purposes of this report, the following service standards are the ones that apply and shall be represented.

Fixed Route:

Fixed Route Service performance is measured against a variety of goals including, but not limited to:

- 27.85 Passengers/Revenue Hour
- 90% On-Time Performance
- \$4.05 Cost/Passenger Trip

C-VAN Service:

C-VAN performance is measured against a variety of goals including, but not limited to:

- 3.0 Passengers/Revenue Hour
- 95% On-Time Performance
- \$35.23 Cost/Passenger Trip

Vanpool Service:

Vanpool performance is measured against a variety of goals including, but not limited to:

- 90% Fleet Utilization
- \$3.75 Cost/Passenger Trip
- 6.6 Passenger Miles per Revenue Mile

2.4 Vanpool Service Overview

C-TRAN operates a commuter vanpool program for Southwestern Washington. Anyone whose commute starts, ends, and passes through Clark County is eligible to use the program. This region often has longer commutes due to the geographic nature of the region. C-TRAN anticipates significant growth in the Vanpool Program due to this. Also, the Columbia River Crossing has adopted Vanpool as a major element of its TDM plan and will be a source of significant and sudden growth.

Performance goals for Vanpool concentrate on utilization. C-TRAN wants to make sure that a majority of vans are always in service and that the vans are being well utilized with high daily ridership. This will enable us to provide the maximum public benefit at a lower cost per passenger trip.

Figure 2-8 Service Standard Goals versus Actual Performance

Mode	2008 Performance Standards	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Fixed Route¹	27.85 Passengers/Revenue Hour	24.93	22.49	25.86	23.2	23.57	23.94	24.33	24.71	25.10	25.50	25.91	26.32	26.74	27.16
	90% On-Time Performance	67% ³	71% ³	99% ³	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%
	\$4.05 Cost/Passenger Trip	\$4.05	\$4.63	\$4.73	\$5.35	\$5.53	\$5.71	\$5.88	\$6.05	\$6.23	\$6.42	\$6.61	\$6.81	\$7.02	\$7.23
C-VAN²	3.0 Passengers/Revenue Hour	2.78	2.66	2.92	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80
	95% On-Time Performance	97.87%	97.96%	98%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%
	\$35.23 Cost/Passenger Trip	\$35.78	\$36.30	\$33.14	\$26.41	\$27.44	\$28.80	\$30.13	\$31.53	\$32.99	\$34.53	\$36.13	\$37.82	\$39.58	\$41.43
Vanpool⁴	90% Fleet Utilization	n/a	30.0%	40.9%	40.0%	40.0%	74.4%	75.3%	80.0%	80.8%	81.5%	82.3%	83.0%	83.6%	84.3%
	\$3.75 Cost per Passenger	n/a	\$20.01	\$12.57	\$4.01	\$4.13	\$4.09	\$4.05	\$4.01	\$3.97	\$3.93	\$3.89	\$3.85	\$3.81	\$3.78
	6.6 Passenger Miles Per Revenue Miles	n/a	5.8	5.9	5.9	6.0	6.1	6.1	6.2	6.2	6.3	6.4	6.4	6.5	6.6

¹ Fixed Route data based upon 2008 and 2009 are actual with 2010 estimated and future years are based on the submitted New Starts Paperwork

² C-VAN data for 2008 and 2009 actual, 2010 estimated and future years are projected

³ Based upon partial year data due to incomplete data sets

⁴ Vanpool data based upon 2009 and 2010 actual, 2011 and 2012 budgeted, and future years are based upon C-TRAN's 20 year plan

Figure 2-9 Local Service Fixed Route Frequency

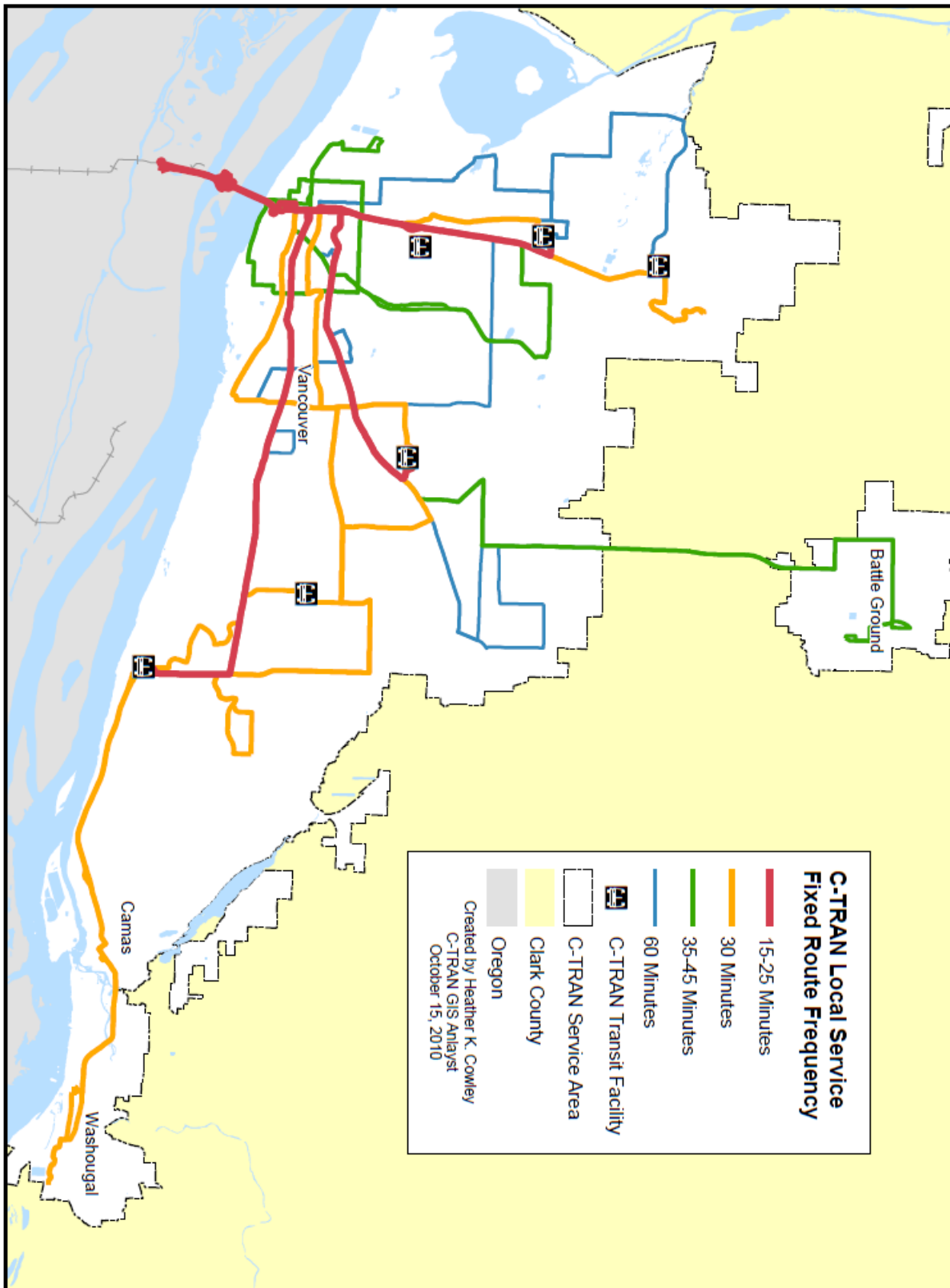
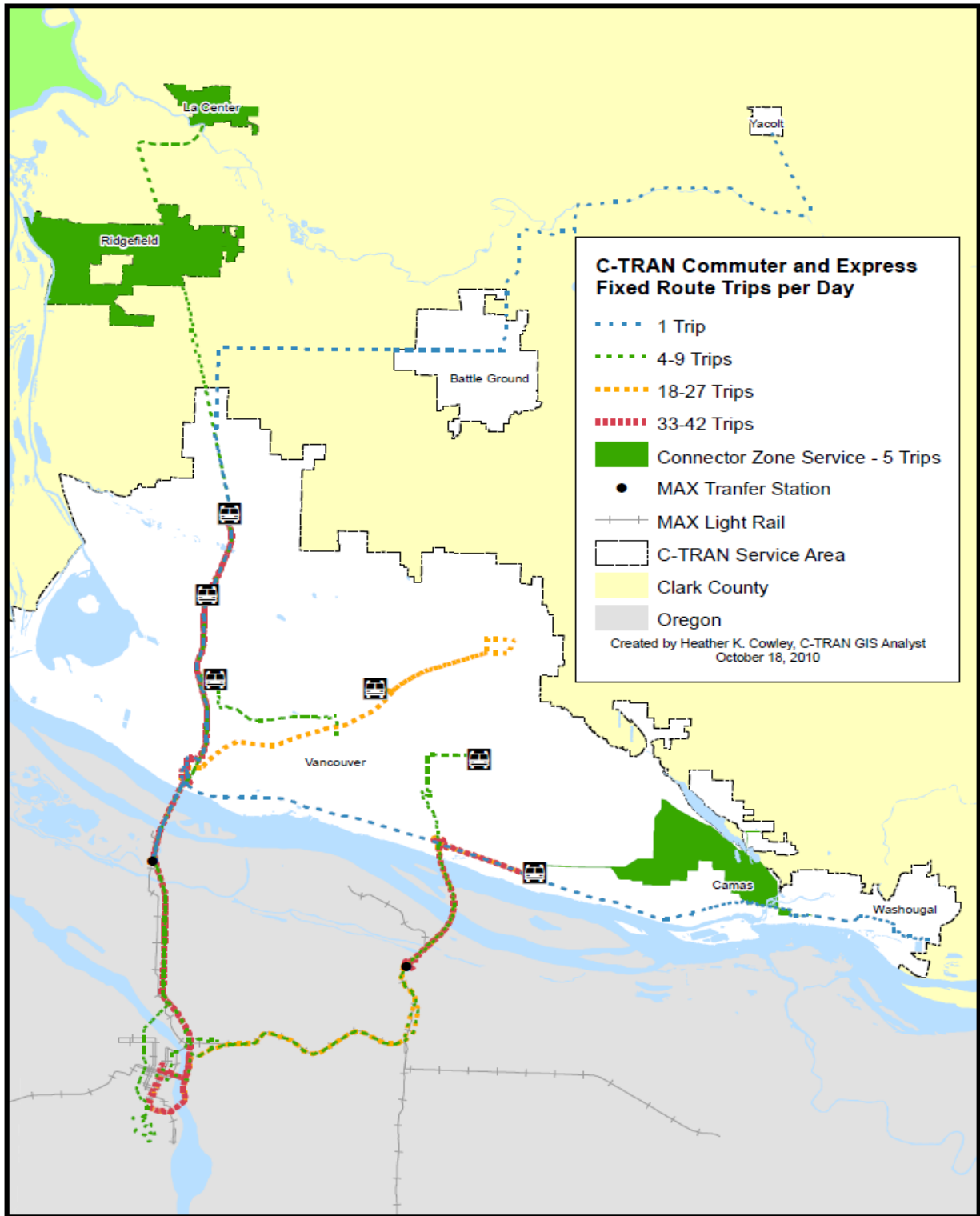


Figure 2-10 Commuter & Express Fixed Route Service



2.5 C-VAN Service Overview

C-TRAN provides Complementary Paratransit service as required by the Americans with Disabilities Act (ADA). The complementary Paratransit service is called C-VAN. C-VAN is a shared-ride public transportation service for people who are unable to use buses due to a disability or disabling health condition. C-VAN operates during the same hours as regular bus service.

The boundary of the C-VAN service area is three-fourths of a mile from the outermost portions of the fixed route bus system including all locations inside that boundary, except for areas that are not part of the C-TRAN service district. C-VAN operates all of its own service and maintenance is provided by C-TRAN. All rides are by advance reservation only and must be requested no later than 5 p.m. the day before the trip on weekdays and 4 p.m. on weekends.

2.6 Contingency Fleet Plan

The purpose of C-TRAN's Contingency Fleet Plan is to provide to provide some spare capacity in the case of an emergency such as a natural disaster. It will function as part of the total C-TRAN operating fleet in accordance with Federal Transportation Administration (FTA) policies. FTA Circular 9030.1A sets forth the policy permitting transit agencies to place buses in an inactive contingency fleet for future emergency use in lieu of disposition.

Contingency Fleet - the buses held in the contingency fleet are for emergency operations (evacuation), energy shortages, or replacement of buses in the active fleet. Buses in the contingency fleet have reached the end of their normal minimum useful life in accordance with Federal Transportation Administration (FTA) policies.

- A standard-sized, heavy-duty bus (35-40 feet) must be in service twelve (12) years or have traveled more than 500,000 miles.
- A medium-sized, heavy-duty bus (30 feet) must be in service ten (10) years or have traveled more than 350,000 miles.
- A small, medium-duty bus (under 30 feet) must be in service seven (7) years or have traveled at least 200,000 miles.
- Other vehicles such as regular and specialized vans must be at least four (4) years old or have traveled more than 100,000 miles.
- In the case of a rehabilitated bus, it will have been in revenue service in excess of five (5) years from the date of rehabilitation.

C-TRAN will have 17 standard-sized buses in its fixed route contingency fleet as of August 31st, 2009. This represents a current ratio of 19.32% of the total active fixed route bus fleet. A contingency fleet is to protect against the many variables which could require that some or all of these stored buses be quickly placed back into regularly scheduled service. This objective will be met as older buses are replaced and reassigned from the active to the contingency fleets. The following highlights some of the reasons that a contingency fleet is felt to be justified:

- *Unanticipated Surge in Ridership*

A sudden, unanticipated increase in bus ridership could require that a corresponding increase in the level of bus service be implemented. Such a ridership increase would most likely occur as a result of an energy-related emergency. However, a similar situation could occur due to a major transportation corridor construction project (causing extreme delays) or the failure of a major transportation facility such as a river crossing. Although it may be of shorter duration, ridership increases could result from major weather-related events such as an ice/snow storm or special service

events requiring expanded bus service.

- *Bus Availability*

An event that would require major bus fleet expansion may well be national in scope (an energy crisis, for example). Consequently, many transit agencies may be attempting to procure additional buses at the same time. This could result in long lead times to purchase which would be prohibitive in terms of responding to the crisis. New technology in support of the Clear Air Act of 1990 could also contribute to long lead times in receipt of new equipment. Thus, a contingency fleet would be imperative.

Storage, Maintenance, and Funding

The contingency fleet will be stored on site to ensure security and allow ready access to the fleet. In addition, these vehicles will be placed on a 90-day preventative maintenance cycle. On-site storage allows this to occur with little disruption to routine preventative maintenance processes. Periodic start-ups will occur between normal preventative maintenance inspections so the fleet remains ready for service at all times. All records associated with these vehicles will be maintained in the vehicle-history file. C-TRAN has developed its contingency fleet from its current, existing fleet. Ongoing operational and maintenance costs will be funded through the agency’s annual operating budget.

2.7 Support Vehicles

C-TRAN’s has 33 vehicles and trailers that it uses to support staff and operations. This number is not currently expected to change. These vehicles come in a wide variety including cars for staff use as well as heavy duty trucks for maintaining the buildings and grounds. They are maintained by C-TRAN staff and are replaced on an as needed basis. Given the rather utilitarian nature of support vehicles, no further fleet description is provided and they will only be referenced as needed. There are 16 vehicles used by Administration and Operations staff with the remaining 17 vehicles/trailers used by Maintenance.

2.8 Fare Information

C-TRAN’s fares are listed in the following tables:

Figure 2-11 C-TRAN Cash Fares

	Adults	Senior, Youth, Reduced, Disabled	Day Pass
C-Zone	\$1.55	\$.75	\$3.75
All-Zone	\$2.40	\$1.20	Uses Express Day Pass
Express	\$3.25	\$3.25	\$6.50

Source: C-TRAN Finance Department

Figure 2-12 C-TRAN Monthly Passes

	Adults	Senior, Youth, Reduced, Disabled
C-Zone	\$54	\$27
All-Zone	\$88	\$31
Express	\$110	\$110

Source: C-TRAN Finance Department

C-TRAN charges fares by zones. C-Zone fare is for travel within Clark County, WA. All-Zone is for travel between Multnomah County, OR and Clark County, WA. Express fares are for riding C-TRAN’s Express service between Portland, OR and Vancouver, WA. Express fares provide valid transfers to Tri-Met. But regular fare does not transfer to the Express service.

2.9 Budgetary Information

C-TRAN is funded by a voter approved sales tax. Figure 2-13 shows a breakdown of past, current, and projected budgets. Our 20 Year Transit Development Plan and the CRC Project are dependent on voters approving increases to our sales tax levy to fund future improvements. Figure 2-13 also displays our budget breakdown for Capital and Operating budgets. The Operating Budget is detailed further by showing the portions dedicated to Maintenance and Operations.

Figure 2-13 C-TRAN Budgetary Figures

Type	2008 ³	2009 ³	2010 ⁴	2011 ⁴	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	
Capital	Total Capital Funds Needed	\$13,872,936	\$13,473,773	\$8,416,372	\$6,667,461	\$7,509,024	\$65,472,156	\$45,151,129	\$11,340,126	\$16,247,036	\$10,345,468	\$29,307,000	\$39,058,719	\$30,840,677	\$26,886,282
	Rolling Stock Funding Need	\$12,608,993	\$4,381,590	\$4,770,927	\$6,222,994	\$5,367,845	\$7,086,581	\$6,539,239	\$7,039,441	\$7,250,625	\$8,470,705	\$17,686,356	\$8,269,413	\$9,701,134	\$8,894,028
	Capital Facilities Funding Needs	\$553,295	\$2,033,835	\$374,785	\$58,526	\$808,014	\$832,254	\$793,269	\$3,350,607	\$8,017,831	\$866,826	\$10,582,468	\$24,016,942	\$14,164,008	\$10,807,454
	Capital Equipment Funds Needed	\$710,648	\$3,212,848	\$2,470,660	\$385,940	\$753,528	\$835,837	\$922,405	\$950,078	\$978,580	\$1,007,937	\$1,038,175	6,772,364	6,975,535	7,184,801
	Other Capital Funding Needs ⁶	-	\$3,845,500	\$800,000	-	-	-	-	-	-	-	-	-	-	-
Operating	Total Operating Funds Needed	\$37,474,067	\$43,385,077	\$44,150,213	\$43,500,996	\$45,451,040	\$48,343,242	\$50,531,295	\$54,701,231	\$57,296,286	\$59,912,247	\$75,551,266	78,955,552	83,222,153	86,985,561
	Fixed Route Operating Funds Needed	\$28,283,504	\$33,479,659	\$34,240,940	\$33,886,666	\$35,319,011	\$37,664,201	\$39,274,146	\$42,540,519	\$44,452,983	\$46,347,236	\$58,464,127	60,967,034	64,281,073	67,043,327
	Demand Response Operating Funds Needed	\$8,791,796	\$7,960,343	\$7,939,532	\$8,597,389	\$9,027,259	\$9,478,622	\$9,952,553	\$10,450,180	\$10,972,689	\$11,521,324	\$12,097,390	12,702,259	13,337,372	14,004,241
	Other Operating Funds Needed	\$398,767	\$1,945,075	\$1,969,741	\$1,016,941	\$1,104,771	\$1,200,420	\$1,304,597	\$1,710,532	\$1,870,614	\$2,043,687	\$4,989,750	5,286,259	5,603,708	5,937,992
Maintenance⁵	Actual/Estimated Funds Available	\$10,839,082	\$12,210,180	\$12,317,909	\$12,136,778	\$12,680,840	\$13,487,765	\$14,098,231	\$15,261,643	\$15,985,664	\$16,715,517	\$21,078,803	\$22,028,599	\$23,218,981	\$24,268,971
	Facility Maint.	\$2,169,615	\$2,166,527	\$2,613,049	\$2,559,185	\$2,673,827	\$2,844,192	\$2,972,842	\$3,218,748	\$3,371,399	\$3,525,240	\$4,449,808	\$4,650,205	\$4,901,585	\$5,123,126
	Fixed Rte Maint.	\$7,373,237	\$6,307,508	\$8,244,300	\$8,074,355	\$8,436,057	\$8,973,569	\$9,379,465	\$10,155,310	\$10,636,932	\$11,122,309	\$14,039,365	\$14,671,630	\$15,464,747	\$16,163,720
	C-VAN	\$1,375,244	\$1,041,543	\$1,456,406	\$1,426,384	\$1,490,281	\$1,585,235	\$1,656,939	\$1,793,997	\$1,879,079	\$1,964,823	\$2,480,139	\$2,591,833	\$2,731,941	\$2,855,419
	Vanpool	\$3,500	\$3,394	\$4,154	\$4,069	\$4,251	\$4,522	\$4,726	\$5,117	\$5,360	\$5,605	\$7,075	\$7,393	\$7,793	\$8,145
	% of Total Operating Funds	28.9%	28.1%	27.9%	27.9%	27.9%	27.9%	27.9%	27.9%	27.9%	27.9%	27.9%	27.9%	27.9%	27.9%

³ 2008 & 2009 Data is Actual

⁴ 2010 & Future Data are based on the submitted New Starts Paperwork

⁵ Maintenance Budget is normally distributed in the mode operating funds. For the purposes of this report, C-TRAN is demonstrating how much of the Operating funds above are dedicated to maintenance purposes.

⁶ Other Capital Funding Needs- This is funding used to match grants

Chapter 3- Maintenance

3.1 Current Maintenance Administration and Staffing

C-TRAN maintenance employees operate on a 24-hour, seven days a week work schedule. All shifts are staffed to accommodate scheduled preventive maintenance and fleet modifications as well as unscheduled repairs when vehicles are out of operation. C-VAN maintenance is also done in the same facilities as the fixed route service and by the same maintenance staff. Therefore, C-VAN maintenance procedures and statistics are included in this chapter as well. Table 3-1, C-TRAN Maintenance Staff Description, illustrates the number of employees in each job classification.

Figure 3-1. Maintenance Budgeted Staff Levels

Position	#
Director of Maintenance	1
Fleet Maintenance Manager	1
Fleet Maintenance Supervisor	2
Janitor/Hostler – Full time	1
Janitor/Hostler – Part time	4
Vehicle Service Worker	7
Preventative Maintenance Worker – Tire	1
Preventative Maintenance Worker - Lube	4
Lead Mechanic	3
Mechanic	11
Apprentice Mechanic	2
Coach Technician	2
Coach Technician- Apprentice	1
Maintenance Training Supervisor	1
Facility Maintenance Manager	1
Lead Facility Maintenance Worker	1
Facility Maintenance Mechanic Apprentice	1
Facility Maintenance Worker	3
Facility Service Worker	4
Facility Helper	1
Inventory Supervisor	1
Inventory Analyst	1
Inventory Technician	4
Total Employees	57

Source: C-TRAN Maintenance Department

The 4 positions labeled as “Janitor/Hostler – Part time” are part of a supported work program sponsored by C-TRAN. The personnel holding these positions all have a disability. They are brought on staff to provide cleaning services while helping them to become self-sufficient and learn important life skills.

C-TRAN budgets significant funding for its maintenance program. The table below shows that bus maintenance is something worth investing in year after year.

3.2 Scheduled Preventive Maintenance

The emphasis of Preventative Maintenance is on preventive rather than reactive maintenance. The preventive maintenance program has effectively reduced overall maintenance costs by decreasing the number of road calls and the high cost of unpredictable maintenance activity. In C-TRAN's case, where the average age of the fixed route fleet is 6.45 years, the prevention of increasing maintenance expense related to an aging fleet necessitates a strong preventive maintenance program in order to be successful at controlling costs.

The preventive maintenance program schedules the inspection of buses based on a variety of categories. This is dependent upon usage and fleet type. The schedule is progressive in that each level of inspection includes a higher level of maintenance inspection activity. Vehicles receive an inspection based on fleet type, mileage and time, along with annuals. All preventive maintenance programs follow, at the least, the minimum guidelines and requirements recommended by the manufacturers, suppliers, or builders.

Certain components such as video cameras and Automated People Counters (APCs) do not have a preventative maintenance cycle. Such specialized equipment either works or it doesn't, there are no moving parts to maintain. Maintenance is alerted to any failures and either repairs or replaces the components as needed. Each sub-fleet has its own specific PM schedule, as outlined below:

Fixed Route Coaches

These coaches are inspected/serviced every three months/6,000 miles, based on the manufacturer's recommendations and oil sampling results.

- 6,000 Inspection/A Service: Safety inspection, proper operation and functions, steam cleaned, brakes and adjustment check, lubrication, inspection of interior, operating controls, exterior, batteries, undercarriage, engine compartment, transmission, motor guard system, brake efficiency, and road tested. Change engine oil and filters.
- 12,000 Inspection/B Service: 6,000-mile service, service transmission, replaces fuel and coolant filters, plus minor extras.
- 18,000 Inspection/C Service: 6,000-mile service.
- 24,000 Inspection/D Service: 6,000-mile service, service transmission, replace fuel, coolant, hydraulic, and air filters, plus minor extras.
- 24,000 Miles: Wheelchair major inspection.
- 30,000 Inspection/E Service: 6,000-mile service.
- 36,000 Inspection/F Service: 6,000-mile inspection, service transmission, replaces fuel

and coolant filters, plus minor extras.

- 36,000 Transmission Service – Voith (tracked separately)
- 42,000 Inspection/G Service: 6,000-mile service.
- 48,000 Inspection/H Service: 6,000-mile service, take engine, transmission, and differential oil samples, service transmission and differential, replace fuel, coolant, hydraulic, and air filters, plus minor extras.
- 50,000 Miles: Major inspection and service for engine, air suspension, and chassis systems.
- Annual air-conditioning service.
- Annual farebox service.
- Annual emissions testing.

Demand Response and Fixed Route Cutaways

These vehicles are inspected/serviced every 3 months/5,000 miles, based on the manufacturers recommendations and the results of long term oil analysis and oil sampling results.

- 5,000 Inspection/A Service: Safety inspection, proper operation and functions, steam cleaned, brakes and adjustment check, lubrication, inspection of interior, operating controls, exterior, batteries, undercarriage, engine compartment, transmission, motor guard system, brake efficiency, and road tested. Perform chairlift maintenance. Change oil and filters.
- 10,000 Inspection/B Service: 5,000 mile service, plus replace secondary fuel filters.
- 15,000 Inspection/C Service: 5,000 mile service.
- 20,000 Inspection/D Service: 5,000 mile service, change transmission oil and filter, change differential oil, replace both fuel filters, replace air filter, flush hydraulic system, plus minor extras.
- 24,000 Miles: Wheelchair major inspection.
- 25,000 Inspection/E Service: 5,000 mile service.
- 30,000 Inspection/F Service: 5,000 mile service, replace secondary fuel filter.
- 35,000 Inspection/G Service: 5,000 mile service.
- 40,000 Inspection/H Service: 5,000 mile service, change transmission oil and filter, change differential oil, replace both fuel filters, replace air filter, flush hydraulic system, take engine oil sample, take transmission oil sample, plus minor extras.
- Annual air conditioning service.
- Annual emissions testing.

Staff/Support Vehicles

- Staff and support vehicles are inspected/serviced every three (3) months/3,000 miles based on manufacturers’ recommendations and results of oil analysis. Shop equipment service inspections are based on hours of operation and are scheduled on hours/months which can vary depending on equipment.
- 3,000 miles/3 months Inspection: Service inspection of all safety items, major functions, oil changes, lubrication, and oil samples are taken.
- Annual air conditioning service.
- Annual inspection of emission pollution control systems are completed along with a state required emissions testing of tailpipe pollutants.
- These services are tracked by computer and a log sheet is maintained by the service worker.

The effectiveness of our Preventative Maintenance program is judged by certain performance indicators such as on-time pull outs (includes late pull outs as well) and miles between road calls. Recently, C-TRAN installed a new computer tracking system for Maintenance that enables better tracking of work flows and data. This new system now enables us to track the how often preventative maintenance is performed on schedule. The table below details the main indicators we monitor. According to our 2008 & 2009 statistics, C-TRAN’s efforts are paying dividends. It should be noted that C-TRAN initiated a brand new service scheme starting in November 2007 and it required many minor adjustments to improve minor operational issues in 2008. Looking forward, C-TRAN’s goal is to reach 100% pull out and to see an increase in the miles between road calls each year.

Figure 3-2 On-Time Pull Outs & Road Calls

	% of On-Time Pull Outs	Miles between Road Calls		% of On-Time Pull Outs	Miles between Road Calls
2008 Actual	97.6%	11,054	2015	0	n/a
2009 Actual	98.5%	11,105	2016	0	n/a
2010 Estimated	TBD	21,285	2017	0	n/a
2011	0	n/a	2018	0	n/a
2012	0	n/a	2019	0	n/a
2013	0	n/a	2020	0	n/a
2014	0	n/a	2021	0	n/a

Source: C-TRAN Operations & Maintenance Departments

Figure 3-3 Timeliness of Preventative Maintenance

	Fixed Route	Demand Response	Vanpool		Fixed Route	Demand Response	Vanpool
2008 Actual ¹	N/A	N/A	N/A	2015			
2009 Actual ¹	N/A	N/A	100%	2016			
2010 Estimated	95.9%	97.04%	95%	2017			
2011	0	n/a		2018			
2012	0	n/a		2019			
2013	0	n/a		2020			
2014	0	n/a		2021			

Source: C-TRAN Maintenance Department

¹ C-TRAN had not yet implemented tracking computer system in Maintenance to obtain this data.

3.3 Preventative Maintenance on ADA Components

Preventative Maintenance has always been and will continue to be the focal point of the Maintenance Department's philosophy in assuring that transportation equipment and accessories, both for Revenue and Paratransit service, are in proper working order and condition. This is especially true for the ADA components. Vehicles need to be fully functional to provide the level of service the public expects.

Fleet Maintenance Supervisors oversee mechanic and service workers daily workloads and monitor equipment performance to assure proper scheduling of preventative maintenance and repairs to optimize efficiency. Basic maintenance criteria are initially based on manufacturer's recommendations and industry experience. Adjustments to techniques, procedures and time intervals between services are made as needed to compensate for wear rates on equipment based on cycling intervals, usage, and commitment to service needs. It is the philosophy of the agency that when an accessibility feature on a vehicle that is in service is deemed inoperable, it is to be removed from service as soon as feasibly possible.

The following is an outline of the service preventative maintenance scheduling as of 1994:

WHEELCHAIR LIFTS, LIFT-U

- Every 6,000 Miles Minor Service: Pressure wash slide rails, inspect and lubricate critical wear points, operate and test safety devices to assure proper operation.
- Every 24,000 Miles Major Service: Pressure wash slide rails, inspect and lubricate critical wear points, adjust chains and proximity/limiting switches, replace damaged sensitive pressure mats and edges, test fluid pressures and replace oil filter.

WHEELCHAIR LIFTS - CUTAWAYS

- Every 6,000 Miles Minor Service: Inspect, lubricate and perform operational test to confirm proper operation.
- Every 24,000 Miles Major Service: Clean, inspect, lubricate, adjust, and repair broken loose parts. Perform test on all safety systems and repair as needed.

KNEELING SYSTEMS

- Every 6,000 Miles Minor Service: Inspect front suspension components including air springs, radius rods and skinner valves, warning alarms (when applicable) and electric controls. Lubricate components and test for proper operation of kneeling system and brake interlock.
- Every 50,000 Miles Major Service: Inspect for and repair worn suspension components, adjust ride height and kneel height, adjust/repair cycle rates, adjust/repair kneel operation lock-out and brake interlock safety feature, adjust front suspension alignment to manufacturer's specifications.

WHEELCHAIR RESTRAINTS

- Every 6,000 Miles: Inspect wheelchair tie-down mounting and lock strips for proper securement, inspect tie down straps and belts for proper operation, free of sharp edges,

fraying and ease of operation. Inspect accessible seating for proper securement, latching and operation.

PUBLIC ADDRESS SYSTEM

- Every 6,000 Miles: Inspect and operate system to assure proper performance.

PASSENGER SIGNAL CHIMES

- Every 6,000 Miles: Inspect and operate system to assure proper performance.

On Route Failures

Upon discovery that there is a mechanical or electrical failure on a wheelchair lift or ramp, the vehicle will be promptly removed from service. If the Operations Department does not have the resources available to make the exchange then the shop will use its resources to make the vehicle exchange.

Any vehicle equipped with a wheelchair lift or ramp that has a mechanical defect or failure of one of its safety systems will not be put into service until a proper and permanent repair is made. It will be the shops responsibility to inspect, repair, or deadline any vehicle that is found to have a wheelchair or ramp problem at the time of pre-trip by the Coach Operator.

3.4 Unscheduled Maintenance

Unscheduled maintenance is classified into four categories: Road Calls, Pullout Repairs, Operator Reported Defects and Unit Repairs.

- Road Call Repairs: A disruption of service where another vehicle must be put into service to replace the disabled vehicle for mechanical or safety concerns.
- Pullout Repairs: Problems with a vehicle, typically minor mechanical or safety issues that are found by the operator and must be fixed before the vehicle is put into service.
- Operator Reported Defects: Problems with a vehicle that do not warrant a disruption of service and are mainly comfort, cosmetic, or minor mechanical issues.
- Unit Repairs & Rebuilds: C-TRAN's Maintenance staff and facility maintains the ability to do extensive repairs and re-builds of essential components. In addition to major components such as engines and transmissions, C-TRAN rebuilds many smaller components such as alternators, starters, AC compressors, rear end differentials, and steering boxes. C-TRAN is also a full service body shop that can perform all of its own body work including frame straightening and painting in the paint shop. C-TRAN does not have any tow trucks on site, but does have 3 service trucks. One is used for building and grounds maintenance. One is used for revenue vehicle servicing. The remaining vehicle can be used for either purpose.

3.5 Cleaning & Fueling Program

At C-TRAN, it will be the responsibility of all Vehicle Service Workers to ensure that the cleaning and fueling of all vehicles are completed on schedule and to record all defects on a Vehicle Condition Report and report them to the supervisor. If at any time a defect is noted that renders a vehicle unserviceable, then Vehicle Service Workers should complete a Vehicle Condition Report on defect, and then immediately notify the supervisor on the status of the vehicle.

There are four different areas that are addressed in the following procedures. All of the cleaning procedures require the use of an inspection check sheet while performing your duties. The fueling procedures require following a basic guideline with no inspection check sheet used in the process. Vehicle Service Workers are responsible for following these guidelines from start to finish. Although an inspection check sheet is not required to complete the fueling process, a check list is posted at the fuel island for viewing.

Each cleaning requires using a check off list when performing specific duties. After completing the inspection sheet, it is required to record the type of cleaning completed, date work was done, and employees initials in the Cleaning Records book. After completing the above procedures, return to Dispatch with vehicle keys, if applicable. Remove the out of service notification tag from the vehicles assigned key location. Return keys to key location which indicates that the vehicle is now back in service and ready for use.

3.6 Maintenance Facilities

Fleet and facility maintenance is centered on C-TRAN's only garage located at 2425 NE 65th Avenue in Vancouver, WA. It also is the vehicle storage facility for all vehicles. C-TRAN has a total of 166 revenue service vehicles that represent different sizes, makes and models of vehicles needed. All service vehicles start and end each service day and receive all necessary maintenance at this garage.

Bodywork is performed at this facility as well, which is equipped and staffed to repair accident damage, body defects, and paint damage. C-TRAN does its re-builds and engine overhauls at this facility. The current facilities were completed in 1983. The current facility is nearing its maximum capacity. To further enhance its capabilities, C-TRAN has used local and stimulus funding to make the following improvements:

- 3 bus lifts are being replaced with new units that work more efficiently
- 1 bus lift is being modified from only 40' buses to any size vehicle
- 2 bus canopies are being built so that bus cleaners and hostlers do not require indoor space
- Fall protection is being added to make it easier and safer for mechanics to work on components on top of vehicles
- New maintenance computer system to automate functions such as time management, work order tracking and other record keeping streamlining productivity. Previously, such functions were performed by hand or on paper.

As part of C-TRAN's 20 Year Transit Development Plan, the agency is currently planning on an expansion of the current facility as well as the possible development of a satellite maintenance facility. The agency is projecting a cost of \$22,725,000 for expanding the current site. C-TRAN is funded by voter approved sales tax. The exact nature of the agency's physical facilities will depend upon future funding levels set forth by the voters.

3.7 Vanpool Contracted Maintenance

Fleet and facility maintenance is centered on C-TRAN's only garage located at 2425 NE 65th Avenue in Vancouver, WA. It also is the vehicle storage facility for all vehicles. C-TRAN has a total of 166 revenue service vehicles that represent different sizes, makes and models of vehicles needed. All service vehicles start and end each service day and receive all necessary maintenance at this garage.

Chapter 4- Bus Fleet Management

4.1 Safety Policy

Orientation of new employees, rehires, part-time employees and those transferred from another department within the organization will begin the first day of employment on the new job. This program will provide an introduction of company/department policies and rules and will include a thorough safety briefing. The orientation should include a tour of the facilities to acquaint the employee with the entire operation. The employee should also be advised how the safe performance of his/her job is important to the overall operation of C-TRAN.

The immediate supervisor of the employee, or his designated representative, will thoroughly instruct him/her in job safety requirements. The form "Safety Orientation Checklist" is provided for this purpose. The checklist must be completed by checking each item as it is covered, signed by the supervisor and employee, and returned to Human Resources for placement into the employee's file. The "Employee Responsibility List" will also be reviewed with the employee by the supervisor or Risk Specialist. The supervisor will tell, show, and then let the employee do the job under close observation. The supervisor should continue to check back frequently to see that proper work methods, including safe practices, are being followed.

On-going safety education programs will be provided for all employees in an effort to increase awareness of accident-causing factors; to improve team spirit; and to promote acceptance of safety rules by presenting accident prevention as a positive, desirable and integral part of all activities. Supervisors will provide a systematic accident prevention program for the employee. This program will provide on-the-job training in the employee's work area and will familiarize each person with company safety requirements. Specific training will be provided for certain jobs and types of equipment. First aid and CPR training and certification will be required for all lead persons, supervisors, or persons in direct charge of crews in order to assure that all employees can be afforded quick and effective first aid in the event that an injury occurs on the job.

To afford the employee immediate and effective attention should an injury result, the Director of Administrative Services will ensure that certified first aid personnel will be available. Other persons will be trained as designated by management to surpass or augment the standard requirements which will include all designated building wardens. Valid first aid certificates are recognized as ones which are less than three (3) years old. Annual cardiopulmonary resuscitation (CPR) training is required in addition to the regular first aid training, if a first aid course does not combine the two subjects.

First aid kits will be in accordance with the requirements of the General Safety and Health Standards. First aid kits are located in each C-TRAN location and in each transit vehicle. All first aid kits are properly maintained and restocked on a regular basis. The Safety Bulletin Board is another method used by C-TRAN to increase employee awareness of safety and health, and communicate management's safety message. Safety Bulletin Boards are posted in designated, highly visible areas and dedicated exclusively to the posting of safety related material.

The following items are required to be posted:

1. WISHA Poster, LI-416081
2. Industrial Insurance Poster, LI-210-191
3. Citation and Notice (as appropriate)
4. OSHA 200 Summary (specifically during month of February)

The following programs are examples of major safety programs currently being implemented at C-Tran:

- Personal Protection Equipment Program
- Hearing Conservation Program
- Respirator Awareness Program
- Lock Out/Tag Out Program
- Hazardous Communications Program/An Employee’s Right to Know
- Blood Borne Pathogens Exposure Control Plan
- Quarterly Facility Safety Inspections
- On The Job Injury Reporting

4.2 Safety Performance Data

The accident frequency data is based upon what regulatory agencies define as a government-reportable accident. For C-TRAN, our standard follows the reporting rules for the annual National Transit Database (NTD) rules. We also report minor safety/security incidents following the NTD guidelines.

Figure 4-1 NTD Reportable Statistics

	# of incidents reported to NTD	Miles between Accidents
2008 Actual	7	639,529 Miles
2009 Actual	5	857,872 Miles
2010 Estimated	6	744,984 Miles
2011	0	
2012	0	
2013	0	
2014	0	
2015	0	
2016	0	
2017	0	
2018	0	
2019	0	
2020	0	
2021	0	

Source: C-TRAN Office of Risk Management

Figure 4-2 Minor Safety/Security Incidents

Reporting Year	# of minor incidents reported to NTD	Reporting Year	# of minor incidents reported to NTD
2008 Actual	60	2016	0
2009 Actual	90	2017	0
2010 Estimated	68	2018	0
2011	0	2019	0
2012	0	2020	0
2013	0	2021	0
2014	0		
2015	0		

Source: C-TRAN Office of Risk Management

4.3 Security Policy

C-TRAN's security policy is that all employees and customers serve as the "eyes and ears" for security awareness and reporting. By encouraging the customers to report incidents and hazards, we decrease the ability of a criminal or anyone else to act undetected. It is impossible for C-TRAN or any transit agency to place all areas under observation at all times, however, our customers are often present when agency personnel are not. Security procedures assure rapid communication and response to a reported security situation. C-TRAN's Operation and Dispatch Center works with local 9-1-1 dispatch to permit the fastest possible police or emergency response.

C-TRAN buses have security cameras on-board and public telephones are installed at transit center platforms to call 9-1-1. There are also cameras and Emergency Alarms installed at the Fisher's Landing Transit Center and the 99th Street Transit Center. Contracted Transit Security Officers, and Field Supervisors, patrol along our route system and our physical facilities. All revenue service vehicles possess GPS equipment that pinpoints its exact location. This allows all vehicles to be tracked in real time and can assure a rapid response should an operator not be able to provide their location for any reason.

C-TRAN receives information about homeland security threats potentially affecting transit systems through emailed DHS Daily Open Source Infrastructure Reports and various other sources. Agency personnel then take the appropriate action. C-TRAN has adopted transit agency best practices and training related to domestic security, which all operating personnel have been trained on. We continually monitor emerging trends in mass transit security and homeland security.

4.4 Quality of Service/Performance Monitoring

Market research shows that transit service must be reliable in order to be a viable alternative transportation choice. This is achieved by writing accurate schedules; minimizing the time buses are delayed by traffic congestion; efficient boarding and fare payment systems; proper training and supervision of drivers; and restoring service promptly after a disruption. All coach operators undergo customer service training in order to provide a higher level of service.

A key component to maintaining high quality service is having a strong performance monitoring program in place. C-TRAN is also in the process of adopting an upgraded set of service standards. The recently installed CAD/AVL system is introducing a new level of data access and reporting. So the performance monitoring program and the service standards are being updated to reflect this change.

4.5 Vehicle Deployment Standards

C-TRAN deploys vehicles in the fixed route service on the basis of a variety of factors. Those factors include, but are not limited to:

- Average Daily Ridership
- Size of Vehicle
- Headway Frequency
- Availability of sidewalks

Figure 4-3 Coach Assignment Table

Route #	Route	Coach Assigned
2	Lincoln	29'
3	City Center	29'
4	Fourth Plain	40'
7	Battle Ground	35'
9	Felida	29'
19	Salmon Creek	29'
25	Fruit Valley/St. Johns	35'
30	Burton	40'
32	Evergreen-Andresen/Hazell Dell Avenue	35'
37	Mill Plain/Highway 99	40'
39	Clark College/Medical Center	29'
41	Camas/Washougal Express	40'
44	Fourth Plain Limited	40'
47	Battle Ground Limited	29'
65	Parkrose Limited	40'
72	Orchards	35'
78	78th Street	35'
80	Van Mall/Fisher's	35'
92	Camas/Washougal	35'
105	I-5 Express	40'
134	Salmon Creek Express	40'
157	Lloyd District Express	40'
164	Fisher's Landing Express	40'
177	Evergreen Express	40'
190	Marquam Hill Express	40'
199	99th Street Express	40'
varies	Connector Service	25'-29'

Source: C-TRAN Operations Department

In many older areas, sidewalks are not present. In order to provide service in these areas to the disabled community, C-TRAN has many lift equipped vehicles. The majority of vehicles assigned to fixed route service are high floor, lift equipped vehicles and the rest are ramp equipped low floor buses.

4.6 In-Service Repairs/Road Calls

In the event that a revenue vehicle in operation has a maintenance failure, C-TRAN's policy is straight

forward. The operator will contact maintenance. C-TRAN has a dedicated radio channel for this purpose. A mechanic will then try to assist the operator with correcting the fault over the radio. If the fault is not fixed and it is not safety or ADA-related, the revenue vehicle will stay in service. However, if the fault is safety or ADA-related, the operator must be able to correct the fault before continuing. If the operator cannot correct the fault, then maintenance will contact dispatch and arrange for a replacement vehicle to be delivered to the operator's location.

4.7 Route Design - Fixed Route

C-TRAN service is designed to meet ridership demands while maintaining a high level of service efficiency. C-TRAN recently underwent a major revision and re-alignment of fixed route service in November of 2007. This process was undertaken to provide better service in the heavily used corridors and to maintain on-time performance.

An important component to maintaining this efficiency is in designing service schedules to meet the varying demand levels for service throughout the day. The basic variable that gives service planners this flexibility is altering service headways throughout the day. However other variables such as span of service, inter-lining bus trips, and offering peak-only service can improve the efficiency of service on the street.

A bus is considered on time if it arrives no more than 1 minute early or 5 minutes later than its scheduled arrival time. Information on bus arrival times is continually collected and summarized. The goal is for at least 90 percent of all bus trips to arrive at time points on time during an average Weekday, Saturday or Sunday. In 2010, C-TRAN has an on-time performance rating of 90%.

4.8 Technology Upgrades

Over the past 5 years (2005 – 2010), C-TRAN has embraced Intelligent Transportation Systems (ITS) applications and demonstrated benefits in terms of improved customer service and satisfaction, better on-time performance, and reduced capital and operating costs. C-TRAN has been pioneering in the deployment of such technologies and has been independently deploying technology applications to improve operational performance and customer service.

- Computer Aided Dispatch & Automated Vehicle Locator
- Automated Passenger Counter
- Mobile Display Terminals
- On-board Surveillance Cameras
- Scheduling & Run-Cutting
- Automated Stop Announcements
- Demand Response Interactive Voice Response
- Fleet & Fuel Maintenance Management
- Trip Planner

Significant additional benefits can be envisioned by coordinating and promoting Intelligent Transportation Systems activity to provide an improved return on investment, greater deployment efficiency, a higher level of functionality through system interaction and consistency of service delivery.

The next 5 years (2010 – 2015) establishes a plan which builds on the current extensive transit ITS deployment to outline a coordinated approach to deploying transit ITS technologies. To undertake the project to develop this plan, C-TRAN has seized the opportunity to assume a lead role in this coordination effort, helping to facilitate the proliferation of interoperable systems among transit operators in our bi-state region or with other WA State transit agencies. The plan considers the

application of the key enabling transit ITS technologies which include:

- Transit Signal Priority
- Real Time Information (phone, web, mobile, text)
- Regional Electronic Fare System
- Automated Fare Box
- Yard Management
- Fixed Route Commercial Wireless Data Communications
- Incident Management
- Multi-Modal Advance Transportation Information System

C-TRAN's short term plans have been analyzed to identify opportunities for coordination to maximize the benefits that can be achieved from these technology investments. Additionally, outreach activities within this planning project have identified a number of strategic initiatives which can be employed to provide cross-cutting regional benefits and address some of the challenges to efficiently accessing the benefits of transit ITS. These measures include partnerships in specifying and procuring systems, the application of standards, the sharing of knowledge, and development of staff skill sets. Information sharing among transit agencies, resource sharing, and joint procurement activities will improve the accessibility of technology, in particular for the smaller properties. While these coordinated activities can provide assistance and support to operators in deploying ITS, there is an underlying need for an internal champion that owns the process and truly understands the problem, process and product. There are also a number of regional initiatives which should be pursued with the cooperation of multiple transit and transportation stakeholders. These include participation in the statewide 511 program, provision of real time traveler information at key activity centers and on priority corridors, and the creation of low cost vehicle tracking and customer information solutions. There are also opportunities for common wireless communications systems and open data access.

4.9 Fleet Retirement and Purchase Plans

C-TRAN has a long term plan outlined in its 20 Year plan for retiring and replacing revenue service vehicles. This plan is based on the passage of the ballot initiatives contained in that 20 Year plan and is therefore subject to change should they not pass. The implementation and funding of the Columbia River Crossing Project can also affect the fleet count. The congestion mitigation plans call for enhanced bus and vanpool service. In Appendix A, Chart 2 details our Revenue Vehicle Retirement and Replacement plan as it is currently projected based upon anticipated funding levels.

Chapter 5- Future Growth

5.1 Columbia River Crossing

The Columbia River Crossing Project is one of the single most important public works project to happen in this region in decades. Population growth, traffic congestion, and freight traffic make the completion of this project imperative. The I-5 Crossing has become a major choking point in the regional transportation system. C-TRAN is also planning on participating in congestion mitigation efforts during construction. A committee of staff from various involved agencies is assembling a plan that calls for expanded bus and vanpool services during construction. This committee is assembling a series of recommendations for consideration by the Executive staffs of the participating agencies.

The bus portion is still being decided upon, but Vanpool will get incentives and funding for 115 vans. This will also include support for a marketing campaign and staff. The bus portion may consist of enhanced bus service crossing the I-5 Bridge. There is also the possibility of additional limited stop service to both the Parkrose and Delta Park Light Rail Stations. None of these options have been enacted as official policy, but are some of the recommendations put forth by the committee in charge of formulating the Transportation Demand Management (TDM) plan. These recommendations have yet to work their way through the collaborative process that is guiding the formulation of the Columbia River Crossing project.

In conjunction with such a project, C-TRAN is currently updating its 20 Year Transit Development Plan. Multiple options are being considered so that C-TRAN has the financial resources to meet the growing needs of its service area including getting commuters to the new light rail stations. As part of the public process of the CRC Project, C-TRAN is presenting service options for downtown Vancouver to the public. Based upon feedback from the public and other agencies, C-TRAN will develop a final bus service scenario for what bus service will look like after light rail begins service. Staff is incorporating various tax revenue scenarios, multiple service options, and a no build scenario in its current plan. While there is a Preferred Alternative Scenario put forth by staff, it is still in its public feedback stage and has not been acted on by C-TRAN's Board of Directors. So it is not detailed here, but will be included in future updates of this plan.

However, one element does merit mention now. C-TRAN, the City of Vancouver, and other partner agencies are pursuing the possibility of a Bus Rapid Transit (BRT) line in Vancouver. C-TRAN is currently seeking funds for an Alternatives Analysis of the major possible routes which are Highway 99, Mill Plain Blvd, and 4th Plain Blvd. This BRT effort will go forward no matter what happens with the Columbia River Crossing Project. Should the CRC project receive funding, BRT will most likely end in downtown Vancouver. However, should the CRC project not move forward, this project will most likely end at the Delta Park Light Rail Station. Either way, C-TRAN staff is currently committed to identifying what BRT in Vancouver might look like and evaluating its costs and benefits.

5.2 Light Rail Fleet Management Plan

When the Columbia River Crossing is built with light rail, it is the intention of C-TRAN to enter into an inter-governmental agreement. This will allow Tri-Met to operate and maintain the Light Rail Fleet necessary for service.

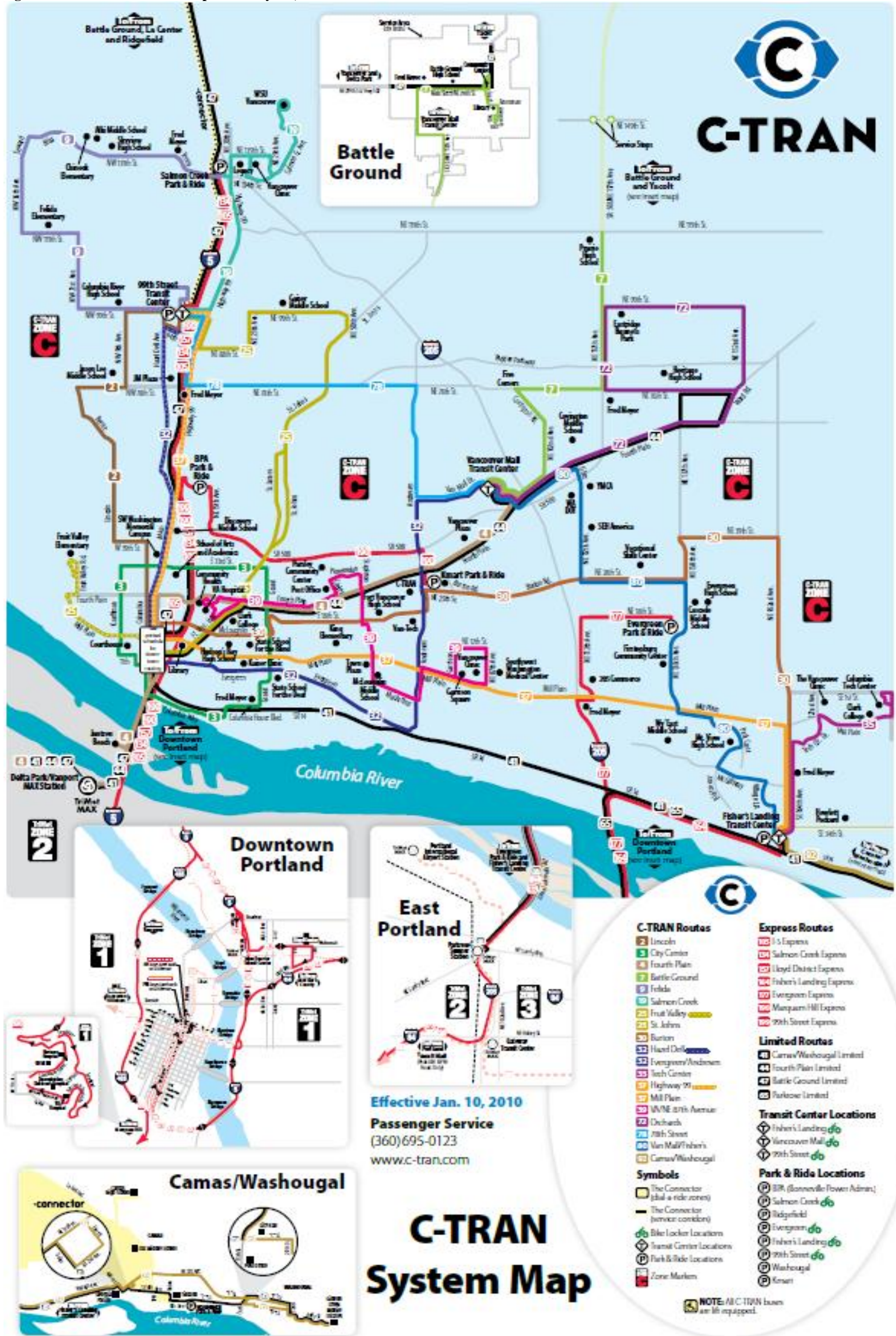
5.3 C-TRAN 20 Year Transit Development Plan

As a part of the 20 Year Transit Development Plan, C-TRAN is currently planning on an expansion of the current facility as well as the possible development of a satellite maintenance facility. The agency is currently projecting a cost of \$22,725,000 for expanding the current site. C-TRAN is funded by

voter approved sales tax. The exact nature of the agency's physical facilities will depend upon future funding levels set forth by the voters.

C-TRAN would like to expand its current Park & Ride facilities. There are several sites for potential new park & ride lots. However, much of these plans hinge on the success or failure of implanting light rail service in Vancouver.

Figure 5-1. C-TRAN Service Map as of July 1st, 2010



Source: C-TRAN Operations Department

Appendix A

Chart 1 C-TRAN Service Vehicles

Vehicle Number	Category	Vehicle Description
0013	Staff Support Vehicles	16Ft Tandem Axle Tlr
1992	Staff Support Vehicles	1991 ATCO Lavatory
162	Staff Support Vehicles	1993 Dodge W3PU
167	Staff Support Vehicles	1995 Dodge Ram PU
170	Staff Support Vehicles	1999 Dodge One-Ton Flatbed
171	Staff Support Vehicles	1999 Ford Taurus
173	Staff Support Vehicles	2000 Ford F550
175	Staff Support Vehicles	2000 Ford Taurus
176	Staff Support Vehicles	2000 Ford Taurus
177	Staff Support Vehicles	2001 Toyota Prius
178	Staff Support Vehicles	2001 Toyota Prius
183	Staff Support Vehicles	2004 Isuzu Sweeper Truck
181	Staff Support Vehicles	2005 Dodge Caravan
182	Staff Support Vehicles	2005 Dodge Caravan
186	Staff Support Vehicles	2007 Dodge Grand Caravan
187	Staff Support Vehicles	2007 Dodge Grand Caravan
188	Staff Support Vehicles	2007 Dodge Grand Caravan
185	Staff Support Vehicles	2007 Ford, F5D, Crew
184	Staff Support Vehicles	2007 Ford, F5D/4B, F550
190	Staff Support Vehicles	2008 Chevy Uplander
191	Staff Support Vehicles	2008 Chevy Uplander
189	Staff Support Vehicles	2008 Ford F3S
192	Staff Support Vehicles	2008 Freightliner Utility Van
193	Staff Support Vehicles	2009 Honda Civic Hybrid
194	Staff Support Vehicles	2009 Honda Civic Hybrid
195	Staff Support Vehicles	2009 Dodge Caravan
146	Staff Support Vehicles	72819/5W027 Trailer-Tilt Bed
1991	Staff Support Vehicles	BOXVAN - Fair Booth
145	Staff Support Vehicles	Brossard-Trailer-2 Axle
0018	Staff Support Vehicles	Taylor-Dunn Mod B2-48
144	Staff Support Vehicles	Utility Trailer-1999 HM
140	Staff Support Vehicles	Utility Trailer-Roadking 2003

Source: C-TRAN Certificate of Title

Chart 2 Revenue Vehicle Retirement and Replacement Plan

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Fixed Route														
Retirements	9	17	13	0	0	0	3	5	7	6	0	0	3	9
Purchases	22	7	8	0	0	7	7	7	7	7	8	9	9	9
C-VAN														
Retirements	8	5	16	0	0	4	4	4	5	3	3	3	4	6
Purchases	6	12	9	0	0	4	4	4	5	6	6	5	7	6
Vanpool														
Retirements	0	0	8	2	0	0	0	5	5	5	5	5	5	5
Purchases	0	0	0	0	0	0	0	5	6	6	6	5	6	6