

**COMMUNITY-BASED TRANSIT PERFORMANCE MEASURES:**

**SALEM-KEIZER TRANSIT**

by

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## **ABSTRACT**

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Public transportation plays a key role to shaping the livability of communities by providing access to jobs, community services, friends, and family for those without access to an automobile, and offering travel options to the entire community. The purpose of this report is to help Salem-Keizer Transit District (Cherriots) develop a set of community-based transit performance measures to serve as a background to enable the transit agency, city, and regional governments to reach their planning goals. Performance measures are compiled from regional, city, transit agency plans, and through a literature review of transit planning research. Accessibility is measured in terms of level of service and geographic distribution across the transit district's boundary, to the total population, transportation disadvantaged populations, residential dwellings, employment, and community services locations. Results show a clear link between local, regional, and transit agency planning goals, although performance towards these goals is often evaluated independently of each other. Recommendations from the findings include suggestions for improving transit performance relative to community goals and creating a uniform platform to collect data and monitor performance towards transit planning goals.

## **ACKNOWLEDGMENTS**

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## Executive Summary

Public transportation plays a key role in shaping the livability of communities. It provides access to jobs, school, community services, friends, and family for those without access to an automobile and provides travel options for the entire community. Local governments base many of their land use and transportation planning goals upon an accessible public transit system. As such a measure of transit performance from the perspective of the transit agency as well as local governments will offer a more comprehensive assessment of their overlapping goals of creating an accessible public transit system. Measuring transit performance from the viewpoint of the local governments agencies requires that transit accessibility be measured from a community's perspective with a diverse set of indicators informed from local planning goals.

The purpose of this report is to help Salem-Keizer Transit District compile a set of community-based transit performance measures to enable the transit agency, city, and regional government evaluate their overlapping transit goals. The measures are compiled from regional, city, and transit agency planning documents and informed from a literature review of transit planning research. Performance is measured with a set of accessibility indicators at the stop level.

The findings show that accessibility to the transit system is very high within the SKATS area and the City of Salem, with results above 90% for overall accessibility to transit. However, when measuring accessibility to transit stops with higher service frequencies, accessibility goes down by an average of 30-40%. The even proportion by which each indicator is served by higher service frequencies suggests that on a whole, transit service levels are equitably distributed across the region, and that Cherriots is efficiently distributing services to the community while providing a high level of geographic coverage.

Given the financial constraint of transit agencies to provide frequent service, Cherriots appears to be doing well in operating high frequency service in areas that capture an even proportion of the indicators evaluated here. Total Daily Transit Revenue Hours has steadily increased over the last ten years suggesting that Cherriots is meeting or exceeding community goals in allocating the increased transit services over the last ten years.

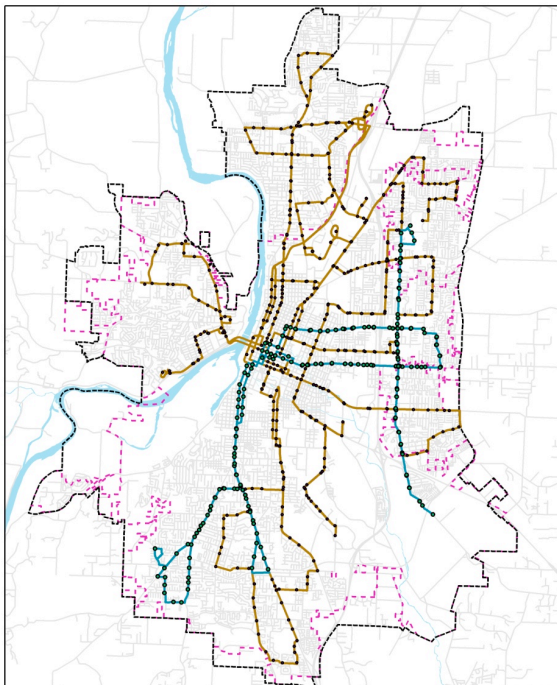
A review of the City of Salem and SKATS planning documents show a clear link between local, regional, and transit agency goals, suggesting that transit goals be monitored with a unified report to present a more comprehensive view of transit service, and to monitor performance over time and to evaluate how local government policies are affecting the performance of the transit system. An example of how such a report might look is presented on page 37 of the appendix.

## Introduction

Public transportation plays a key role in creating livable communities. It provides access to jobs, school, community services, friends, and family for those without access to an automobile, and offers travel options for the entire community. Accessibility to public transit supports the federal livability principle of offering more transportation choices by “providing a safe, reliable, and economical transportation choice to decrease household transportation costs, reduce our nation’s dependence on foreign oil, improve air quality, reduce greenhouse gas emissions, and promote public health (EPA 2011).”

Performance measures are widely used in determining the efficiency of agency operations and the effectiveness of services delivered (FHA 2008). Transit agencies must use their resources more efficiently and rationalize operating costs in the face of decreasing government financial assistance, and in order to be competitive with the private automobile, it is imperative that transit agencies also improve the quality of services that they offer (Sheth, Triantis et al. 2007). Federal funding requirements for transit investments are increasingly being tied to the use of performance standards to demonstrate how potential investments affect community livability. Meeting community goals requires that transit performance be measured with a diverse set of indicators.

## Salem-Keizer Transit System



Salem-Keizer Transit (Cherriots) provides public transit service to the Salem-Keizer area. As shown in Table 1 below, Cherriots is a medium sized agency compared to other northwest transit agencies. Salem is the third largest city in Oregon, behind Eugene and Portland. Fixed route service is run through 25 routes serving a total of 249,317 people within the region, with 154,637 people living within the City of Salem. These routes are classified as having of either 15-minutes or 30-minutes, based upon their peak service headways.

In 2010, the mode split for people who used public transportation as their primary means to work was two percent in the SKATS region, and three percent in the City of Salem.

Transit Agency	City	Population	Land Area Sq Mi	Population Density Persons per Square Mi	Annual Passenger Miles	Annual Vehicle Revenue Hours
TriMet	Portland, OR	593,820	134	4,288	453,286,367	2,873,427
LTD	Eugene, OR	156,185	43	3,574	45,882,499	381,271
<b>Cherriots</b>	<b>Salem, OR</b>	<b>154,637</b>	<b>47</b>	<b>3,228</b>	<b>11,880,841</b>	<b>395,951</b>
Whatcom	Bellingham, WA	80,885	27	2,987	18,501,948	201,888
Intercity	Olympia, WA	46,478	18	2,608	41,538,314	338,606

**Table 1. Peer Agencies**

Cherriots is in the process of adopting a new route structure identified in their strategic plan as the *3-Cs system*, (Centers, Corridors, and Circulators). This type of route structure is commonly referred to as a *multi-destinational timed transfer system* in the literature, utilizing a combination of multiple transit centers, neighborhood circulators, and grid routes to provide a greater degree of geographic accessibility over a traditional radial route structure (Bakker, Calkin et al. 1988; Guihaire and Hao 2008). Figure 2 demonstrates the difference between a multi-destinational network (B) over a traditional radial network (A).

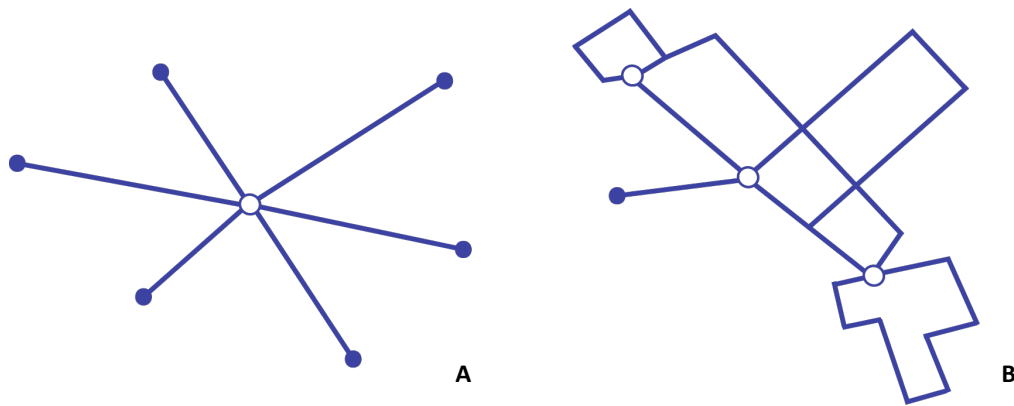
#### **Multi-destinational Timed Transfer Networks**

“In the past 40 years, most metropolitan areas have seen significant growth and dramatic redistribution of population, employment, retail centers and other trip generators. During the same period, total urban person trips have increased significantly, whereas transit trips have experienced a large decline” (Ceder and Wilson 1986). Transit networks in America were historically designed as a radial pattern serving a central business districts (CBD) from surrounding residential areas. The historic decline of the CBD and urban decentralization have been linked to lower transit ridership in traditional radial networks. A recent report by the Brookings Institute found that, “although half of work commutes still originate from, or terminate in, central cities, 39% of work trips are entirely suburban (Brookings Institution 2011).”

As a response to decentralized residential and employment centers, many transit agencies have made a switch to a grid or multi-destinational network. A multi-destinational network and a timed transfer network represent route design and scheduling components of transit service. A multi-destinational network is the geographical distribution of routes and hubs, while a timed transfer network refers to the coordination of schedules between routes. A timed transfer point is a point where busses from intersecting routes arrive simultaneously, allowing passengers to transfer between routes with a minimal dwell time (Vuchic 2005). A timed transfer network is possible with any type of transit network and is commonly understood in a radial pulse network design, where routes meet at the same time at a centrally located transit center for connections to be made.



A multi-destinational network depends on closely timed transfers between routes, at a transit center or at intersecting route lines within the network, to provide passengers with greater flexibility in reaching destinations outside the CBD.



**Figure 2. Example of Radial (A) and Multi-Destination/Grid (B) Transit Networks**

Timed transfer networks have been shown to be more effective in attracting passengers and more efficient in use of resources over radial pulse networks. In a study analyzing the effects of network design in 26 transit agencies, multi-destinational networks were 16% more cost effective, measured in operating expense per passenger mile, than traditional grid networks (Thompson). However, there is evidence that this type of system appeals more to captive riders whose demand for service is more elastic in regards to the added time for transfers.

As this type of route structure is intended to provide a greater degree of geographic coverage, transit accessibility is measured here in terms of community stated mobility, accessibility, and land use goals. Accessibility to transit is measured using a walkable distance around each stop, as it is assumed that transit riders are accessing transit as pedestrians. A background and context for transit performance measures will be used to inform a search for existing regional, city, and agency goals to develop and apply a set of performance metrics, and then present a brief review of the results.

## Background

### Performance Measures

Transit agencies, Metropolitan Planning Organizations (MPO), and local governments use performance measures to evaluate transit system performance towards stated agency goals. Performance measures rely upon indicators in order to measure progress, so the types of performance measures used by an agency depends upon agency goals and the types of data routinely collected. Because performance measures determine the actions that must be taken to accomplish a goal, the measures should be carefully selected (Seggerman, Hendricks et al. 2008).

The components of a successful transit performance monitoring system identified in a guidebook sponsored by the Federal Transit Administration (FTA) are listed below. Medium sized transit agencies such as Cherrriots may not have the resources available to other larger transit agencies, so a list of measures to include in a monitoring program should be constructed from data that is already being captured within the region, easily calculated, and be clearly aimed at meeting stated goals.

- Linkage to agency and community goals
- Clarity
- Reliability and credibility
- Variety of measures
- Level of detail
- Realism of goals and targets
- Timeliness
- Integration into agency decision-making

Source: (Transportation Research Board. Transit Cooperative Research 2003)

Transit performance measures are primarily used for regulatory and internal agency uses, such as meeting reporting requirements for the National Transit Database (NTD), compliance with the American Disability Act (ADA) and Title VI, grant applications, external reporting, budgeting, reporting, and insurance purposes. Because of the types of data required to be collected for the NTD, many of the transit performance measures currently in use are focused on ridership and financial performance, leaving measurement of the other aspects of transit such as quality of service and accessibility underrepresented (Kittelson 2003; Levinson 2004).<sup>1</sup>

Outside of the transit agency, transit performance measures can be used to guide and aid decision making in land use and transportation planning from a variety of government agencies who might use the measures in the following activities (EPA 2011):

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<sup>1</sup> Pulled from Schlossberg, Dill, Meyer, and Ma. (Forthcoming). MEASURING THE PERFORMANCE OF TRANSIT RELATIVE TO LIVABILITY. Oregon Department of Transportation. Salem. Final Report.

- Land use visioning
- Long-range transportation plans
- Corridor studies
- Programming
- Environmental review
- Performance monitoring

### **External Interest in Transit Performance**

The perspective by which a measurement is interpreted influences the resulting performance. For example productivity may mean different things from a provider or consumer perspective. Productivity measured from the transit agency's perspective measures provided service against the funding required for service provided. From the rider's perspective, productivity determines the levels of overall access to and quality of service provided. "According to the provider's viewpoint, efficient service along a route is where the transit agency will provide adequate service at the least cost, whereas for the customer, efficient service along a route is where one that has the most quality attributes such as the shortest travel time" (Sheth, Triantis et al. 2007).

An increasing trend is to measure transit performance from the passenger's point of view, moving measures from a vehicle orientation to a people orientation (Benn 1995; Levinson 2004). Measuring performance from the passenger's perspective means evaluating performance as outcomes based, rather than focusing on the inputs required to run transit service. To this end, this report identifies a set of community and regional goals representing transit accessibility and level of service to create a set of community-based transit performance metrics.

### **Categories of Transit Performance Measures**

The performance measures identified for evaluation were assembled through research of academic, professional, and local planning documents. A brief background and rationale for the types of performance measures is presented below, followed by a review of transit goals found in local government plans.

#### **Productivity Measures**

Productivity is determined by the quantity of transit services supplied per the amount of money. Productivity measures of efficiency and effectiveness are widely measured by transit agencies such as Cherrlots.

The FTA requires that all transit agencies receiving federal subsidies record and report basic performance data, consisting mostly of measures of both efficiency and effectiveness. Efficiency measures, such as Operating Expense per Vehicle Revenue Mile and Operating Expense per Vehicle Revenue Hour, are meant to maximize benefits and reduce costs. Effectiveness measures, such as Operating Expense per Passenger Mile, Operating Expense per Unlinked Passenger Trip, Passenger Trips

per Vehicle Revenue Mile, and Unlinked Passenger Trips per Vehicle Revenue Hour, on the other hand, measure the degree to which stated goals are reached.

These measures provide a measurement from the agencies viewpoint of transit service delivered per dollar spent. While these are important considerations, they do not reflect the type or quality of services delivered from the viewpoint of the community or passenger. This suggests that additional measures reflecting transit services measured from a community perspective should be included in a comprehensive performance measurement program.

### **Quality Measures**

Where efficiency and effectiveness measures capture transit performance from a transit agency perspective, quality measures are meant to measure transit service from a community perspective. Transit service provides access to employment and community services such as, health care, shopping, and other necessary services those without any other means of transportation. Basing transit planning upon efficiency goals can cause externalities that adversely affect poor and minority populations, therefore it is recommended that performance monitoring take into account social and environmental justice goals (Hanson and Giuliano 2004).

Transit supplies a community with transportation choices for workers and acts as a necessary link to jobs and services for those without access to an automobile. Improving transit accessibility to jobs enhances the efficiency of labor markets for both workers and employers, can use energy more efficiently, reduce greenhouse gas emissions, improve air quality, and make transportation more affordable (Brookings Institution 2011 ; EPA 2011).

A measure of transit accessibility reflects the relative convenience of transit, and is measured in terms of distance and travel time to transit. Transit accessibility measures identified in the literature consist of accessibility to jobs, community services, and disadvantaged populations, in addition to land use measures. Accessibility to transit is captured in a spatial element to examine the geographic extent of where is service available, and temporal element to examine what types of service are available.

## Methods

The methodological framework of this report consists of two components: identifying transit performance measures from local planning documents and utilizing a Geographic Information System (GIS) to assess transit accessibility within the context of community goals. Spatial indicators were developed to reflect each agency goal identified in the document review. The results of the measurements are then used to determine how well transit service is meeting regional, local, and agency goals.

### Identifying Community Measures of Transit Performance

The methodology for developing performance measures and criteria consist of identifying appropriate transit performance indicators from the perspective of the transit agency, the region, and the city. Measures consist of both level of service and spatial indicators to identify accessibility to transit stops and the frequency of service.

Planning documents from Cherriots, SKATS, and the City of Salem were reviewed to identify transit-based performance goals. Goals and objectives were developed from reviewing the following planning documents; a complete list of the measures pulled from these documents is shown in Table 2 below.

- Cherriots - Strategic Business Plan
- City of Salem - Comprehensive Plan
- City of Salem - Transportation Systems Plan
- SKATS - Transportation Disadvantaged

#### *Strategic Business Plan - Cherriots*

The Cherriots Strategic Business Plan is based upon the vision of developing transit as a resource for the community by contributing to the livability of the region by providing mobility to those without access to an automobile, increasing the share of trips by alternative modes in the Salem/Keizer area, and increasing the interconnections between land use and the transportation system (Salem-Keizer-Transit 2004). The strategic targets of system operation examined here are service levels, coverage, and land use.

#### *Transportation Systems Plan - City of Salem*

“A Transportation Systems Plan is a blueprint to guide a region’s transportation development for the coming 25 years; it is updated based on projections of growth in the region’s population, economic activity, patterns of housing development, and the resulting projections of travel volumes” (Hanson and Giuliano 2004). The City of Salem’s Transportation Systems Plan contains goals to increase the share of trips made by alternative modes of transportation by encouraging the locating of residential development near existing transit stops.

The Salem Transportation Systems Plan conforms with the regional transportation Systems Plan produced by SKATS. The plan identifies two transit measures used to evaluate plan effectiveness; percent of population living within ¼ mile of a transit route and total daily transit revenue hours (Salem 2007, P 17). A higher ratio of population living within a walkable distance to a transit stop indicates a more accessible transit system and the successful linkage between land use and transportation planning and policies. An increase in transit revenue hour provides more accessibility to transit service.

The Transit Element of the City of Salem's Transportation Systems Plan's goal is to create "a public mass transit system that provides convenient and accessible transit services to the citizens of the Salem Urban Area (Salem 2007, P 9-3)." The primary objective of the plan is to increase transit ridership to the point that 25 percent of all work trips are completed using transit, by focusing on routing of transit services, transit-supportive land uses, intermodal connectivity, and enhancing opportunities for the Transportation Disadvantaged (Salem 2007).

#### *Transportation Disadvantaged - SKATS*

An environmental justice analysis evaluates proposed transportation investments in light of the geographic location of minority and disadvantaged populations.

SKATS produces a "Transportation Disadvantaged" report that identifies populations that "potentially experience some level of limitation to convenient, accessible transportation", that "affects their ability to travel, to access goods, services, and recreation"(SKATS 2000). The socio-demographic profile is used to understand the relationships between disadvantaged populations and the transportation system, and to assess how transportation investments may affect them. Transportation Disadvantaged populations area defined as census tracts that include one or more of the following (SKATS 2000, P1):

- Non-white and Hispanic persons
- Linguistically isolated persons
- Elderly persons (aged 65 and older)
- Persons in households with income below poverty level
- Households with no access to vehicles

#### *Comprehensive Plan - City of Salem*

A Comprehensive Plan is a long-range planning document used to guide urban growth through controlling the timing and location of development. The Salem Comprehensive Plan's goal is to accommodate development in an efficient arrangement of land uses, facilities, and services to meet the present and future needs of the residents of the Salem urban area. The plan identifies two transit performance measures to evaluate plan effectiveness; the number of dwelling units with ¼ mile of transit stops with headways of 15 and 30 minutes. The plan sets a goal of 23% of all new dwelling units to be located within ¼ mile of transit stops by

2010, increasing to 27% by 2015 for 30 minute headway service, and 3.5% of all new dwelling units to be located within ¼ mile of transit stops by 2010, increasing to 4.5% by 2015 for 15 minute headway service (SCP, p 53).

### Local Transit Performance Goals

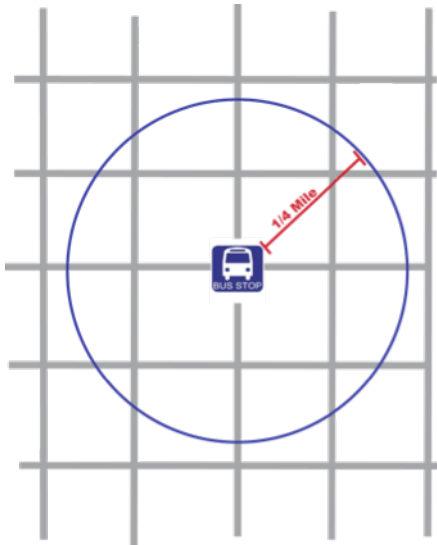
Planning documents from Cherriots, SKATS, and the City of Salem reviewed revealed several overlapping transit related presented in Table 2 below. Each goal was assigned a corresponding spatial indicator and calculation to evaluate transit performance through the stated agency goal. Each indicator was then assessed using accessibility to stops with 15-minute and 30-minute frequencies, as well as to the system as a whole.

Source	Goal	Indicator	Calculation
Salem Comprehensive Plan	Accessibility	Percent of New Dwelling Units within ¼ mile of a 15 or 30 Min Transit Stop	Sum of new dwelling units within ¼ mile of transit stops divided by total new dwelling units
Cherriots Strategic Business Plan	Focus service improvements in areas that support transit friendly development.	Average Population Density within ¼ mile of a 15 or 30 Min Transit Stop	Average population density within ¼ mile of a transit stop compared to the average population density of the MPO and City
		Percent of Jobs within ¼ mile of a 15 or 30 Min Transit Stop	Sum of jobs within ¼ mile of transit divided by the number of jobs in the MPO and City
	Promote importance of land use/ transit connection.	Percent of Community Services within ¼ mile of a 15 or 30 Min Transit Stop	Sum of community services within ¼ mile of transit divided by the number of community services in the MPO and City
Salem Transportation Systems Plan	Accessibility	Percent of Total Population within ¼ mile of a 15 or 30 Min Transit Stop	Sum of total population of each block group that intersects a ¼ mile buffer divided by the sum of total population within the MPO
		Total Daily Transit Revenue Hours	Average daily transit revenue hours
SKATS Transportation Disadvantaged Report	Mobility	Percent of Transportation Disadvantaged within ¼ mile of a 15 or 30 Min Transit Stop	Sum of Transportation Disadvantaged population within ¼ mile of transit divided by sum of total Transportation Disadvantaged population within the region

**Table 2. Local Transit Related Performance Goals and Indicators**

## GIS Methods

Assessing how transit service is meeting the community goals is determined by how transit service is geographically distributed and across the city and regional boundaries. Accessibility is reported using the district boundaries of both the City of Salem and SKATS. For instance, city measures will reflect a measurement of all transit stops within the city boundary.



**Figure 3. Pedestrian Shed**

An assumption made here is that transit passengers are accessing the system as pedestrians. Each indicator was calculated using GIS to measure pedestrian access to each bus stop, (1/4 mile is the generally agreed upon distance to which a person will walk to transit, and distance used in agency goals). As shown in Figure 3, pedestrian sheds were created using a simple circular buffer technique in order to present a simple, straightforward methodology that can be easily recreated.

Evaluation consists of a stop-based analysis comparing the differences between service levels across the boundary of SKATS and the City of Salem. Ratio measurements are measured as the sum of population, dwellings, services, or jobs

within each pedestrian shed divided by the total population of dwellings, services, or jobs within the city or regional boundary. The Transportation Disadvantaged indicators measure the ratio of each population group within the pedestrian shed to the total number of each population group within the SKATS area.

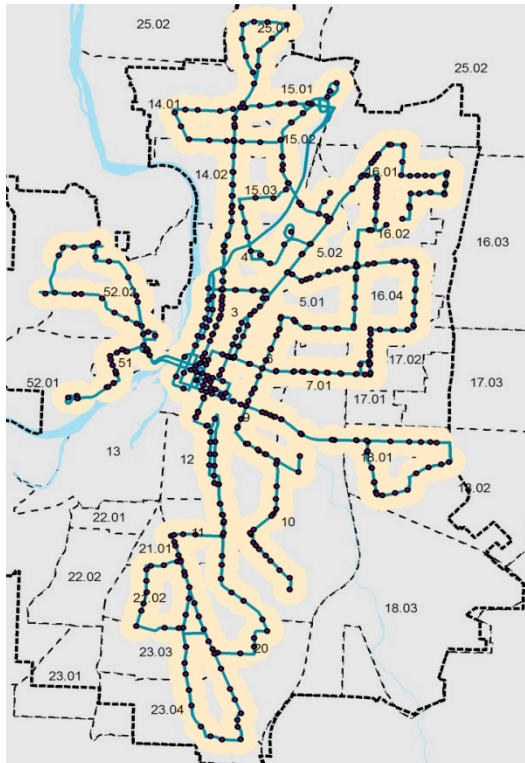
Transit level of service was defined as the peak service frequency for each route, with higher frequency service occurring generally between 8-10 am and 4-6 pm. Cherriots routes were identified as having peak headways of either 15 or 30 minutes, referred to as high or low frequency respectively.

GIS layers for each route were assigned headways, and then aggregated by level of service. Transit stops were then assigned a level of service based upon the highest available headway of the routes serving each stop. Transit stops were then aggregated and buffered by 1/4 mile to create a pedestrian shed for a 30-minute headway (Figure 4) and a 15-minute headway (Figure 5). These two pedestrian sheds were then used to select socio-demographic and land use data to reflect the accessibility to each level of service.

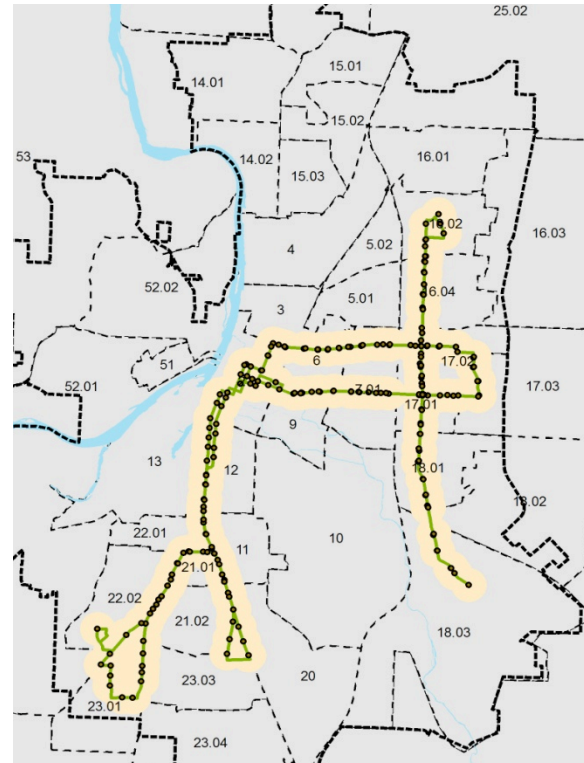
An intersecting point or polygon technique was used to select census boundaries or employment points that are within or touch the pedestrian shed of the transit system. One limitation of using an intersecting polygon technique is that it



potentially overestimates the population within walking distance as it counts the total for the entire geography even if only a corner of it touches the pedestrian shed. A comparison of the results using point data for two of the measures, which provides a more accurate measure, produced similar proportions of accessibility to level of service to the polygon data. This indicates that any potential overestimation occurring with polygon data may not be as important of a consideration given the high geographic coverage. Accordingly, a comparison over time using consistent methods will reveal the pattern of change regardless of estimation errors.



**Figure 4. 30-Minute Pedestrian Shed**



**Figure 5. 15-Minute Pedestrian Shed**

In accordance to the best practices previously identified for transit performance measurement, the data utilized consists of readily available government data collected at equal intervals, shows a clear linkage to agency and community goals, are composed of a variety of measures, and can be easily replicated. Data was obtained based upon the best available data for each indicator, from three primary sources.

- US Census- American Community Survey
- Oregon Employment Department
- Salem-Keizer Transit

Table 3 below provides an overview of the data source, unit of observation (geography), and the unit of analysis utilized for each indicator. The unit of

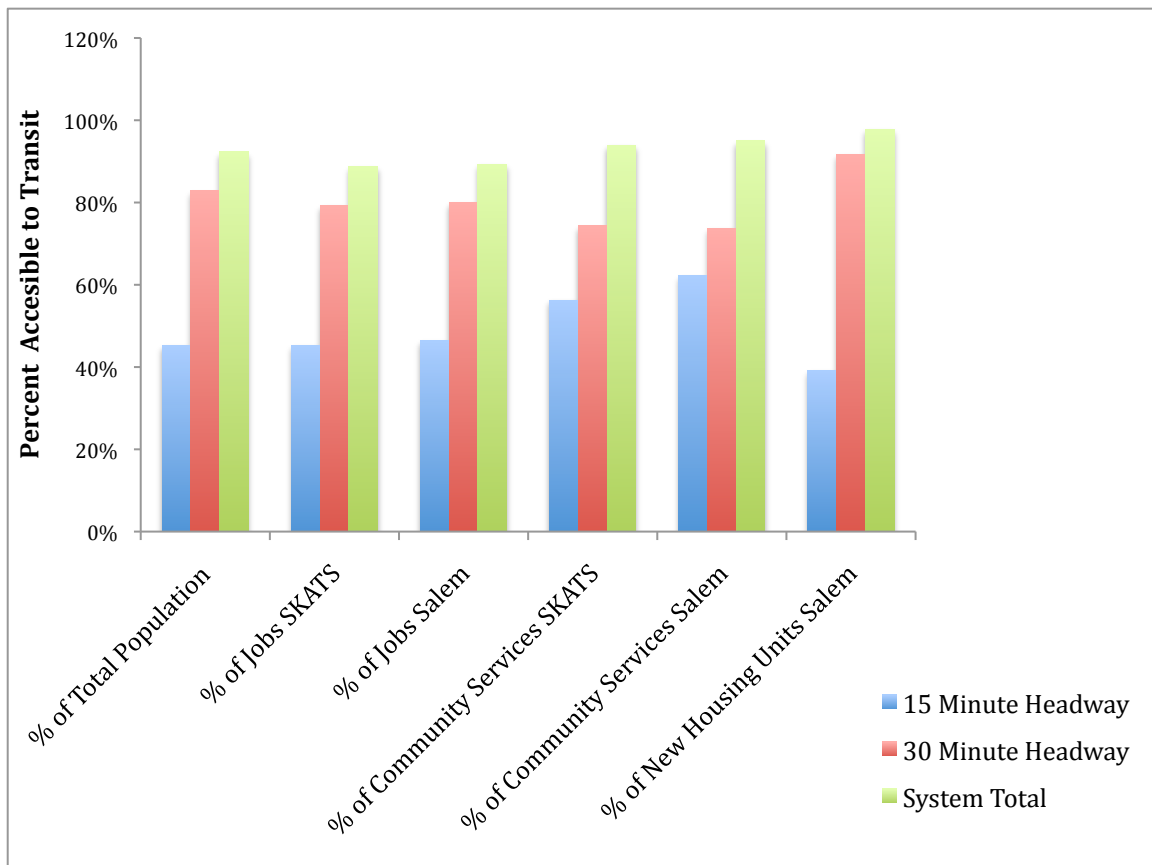
observation varies between each indicator, and is based upon the most accurate or smallest geography that the data was available. The geographies used consist of census tracts, block groups, blocks, and tax lots.

<b>Indicator</b>	<b>Data Source</b>	<b>Geography</b>	<b>Unit of Analysis</b>
Percent of Total Population within ¼ mile of a 15 or 30 Min Transit Stop	2009 ACS- <i>Total Population</i>	Block	Region
Percent of Average Population Density within ¼ mile of a 15 or 30 Min Transit Stop	2009 ACS- <i>Population Density</i>	Block	Region
Percent of Total Employment within ¼ mile of a 15 or 30 Min Transit Stop	Oregon Employment Department- <i>ES-202</i>	Tax Lot	City/Region
Percent of Total Transportation Disadvantaged Population within ¼ mile of a 15 or 30 Min Transit Stop	2009 ACS- <i>Poverty, Non- White, Ling. Isolated, Elderly, Households w/ No Car</i>	Tract	Region
Percent of Total Community Services within ¼ mile of a 15 or 30 Min Transit Stop	Oregon Employment Department- <i>ES-202</i>	Tax Lot	City/Region
Percent of Total Dwelling Units within ¼ mile of Transit Stops a 15 or 30 Min Transit Stop	2009 ACS- <i>Year Structure Built</i>	Block Group	City
Total Daily Transit Revenue Hours	NTD- <i>Agency Profile</i>	System	System

**Table 3. Data Sources for Indicators**

## Findings

The purpose of this report is to compile a set of community-based transit performance measures, which assesses transit performance through the lens of local government planning goals. An assessment of performance from multiple viewpoints requires that a diverse set of indicators be used. Based upon the set of indicators used to assess transit accessibility, Cherriots appears to be doing well in providing a high degree of coverage across its service area and providing an equitable split of service levels.



**Figure 6. Results of Transit Performance Indicators**

Within the SKATS area, 92% of the region’s population is within walking distance to a transit stop, and 45% within walking distance to frequent service. 89% of jobs are accessible to transit, with 45% of jobs accessible to frequent service. 94% of the community service locations are within walking distance to transit, with 56% within walking distance to frequent service. Population densities within walking distance to the transit system, as a whole, is also higher than the regional average, suggesting that transit services are targeted to transit supportive land uses.

Accessibility to transit service within the City of Salem reveal a similar result, with 46% of jobs accessible to frequent service and 89% accessible to the system as a whole. The number of community services within walking distance to transit is 95% for the system as a whole and 62% for frequent service. These numbers are consistent with the region’s top employers who employ 500 people or more, where 55% are within walking distance to frequent service and 100% are within walking distance to the transit system as a whole.

The average population density within walking distance to frequent routes is higher than the system as a whole and the system average for the region. The proportion of new dwelling units within walking distance compared to the total new unit count is 39% for frequent service and 92% for 30-minute service.

Transportation Disadvantaged is measured at the regional level using census tracts. Figure 7 shows the percentage of each disadvantaged population within walking distance to transit; numbers in parentheses indicate the total percentage of each population group for the SKATS area. Accessibility to transit by disadvantaged populations is measured as the ratio of each population group within a 15 or 30-minute headway pedestrian shed to the total number of each population group within the SKATS boundary.

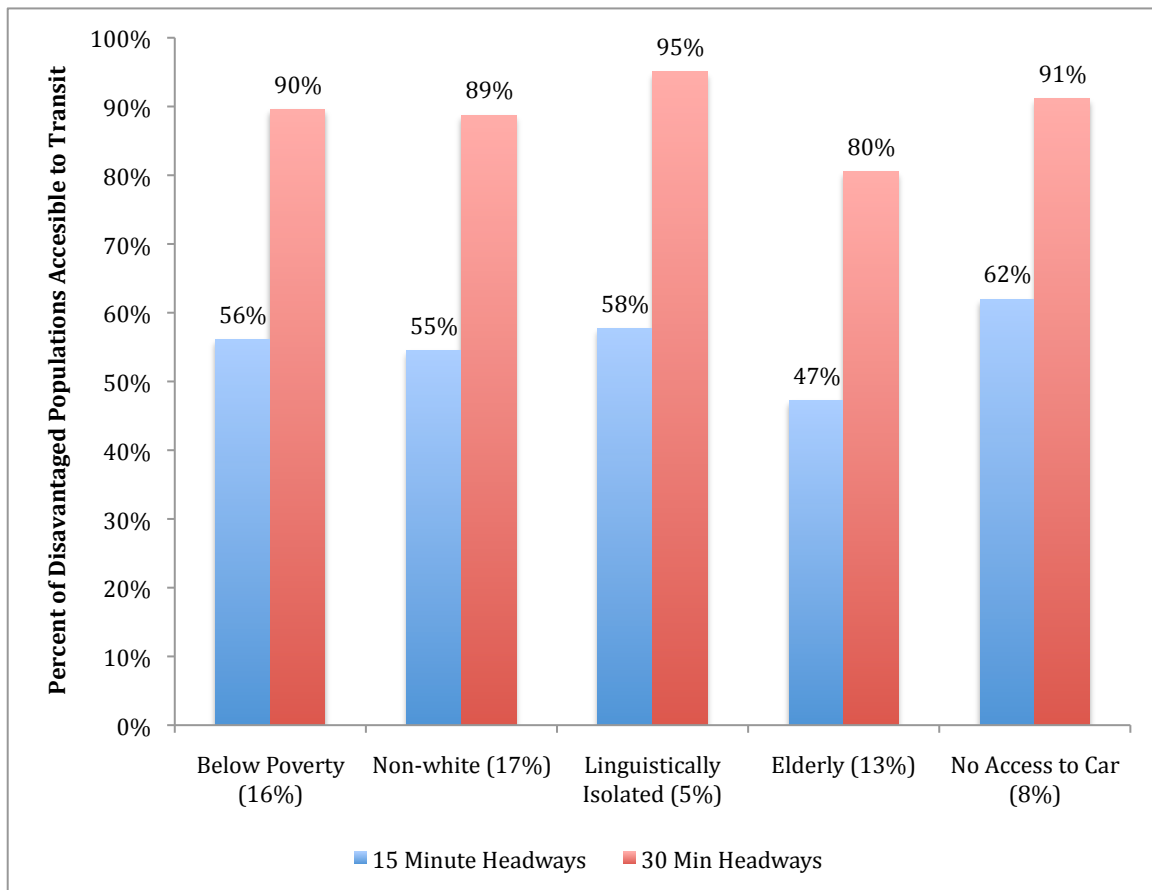


Figure 7. Results of Transportation Disadvantaged Indicators

### Percent of Total Population within ¼ Mile of Transit

The Transportation Systems Plan identifies the percentage of the total population living within ¼ mile of transit as one way to measure plan effectiveness. A higher ratio of population living within a walkable distance to a transit stop indicates a more accessible transit system and the successful linkage between land use and transportation planning and policies.

The highest numbers of population are located on the periphery of downtown Salem. Figure 6 shows good residential transit accessibility with 45% of the total regional population living within walking distance to a 15-minute transit service, 83% living within a 30-minute service area, and 92% living within distance to the system.

### Average Population Density within ¼ mile of Transit

Areas with high population density increase the potential for transit ridership by efficiently locating residential populations within smaller areas that can be better targeted by transit planning. Population and job density are closely related to higher transit ridership (Cervero 1994). Clusters of block groups with the highest population densities are located in east Salem. The findings reveal that high frequency routes are reaching block groups with higher levels of population density than low frequency routes and the region as a whole. The highway 99 corridor north of downtown Salem has higher than average population densities and might be an area supportive of higher frequencies in the future.

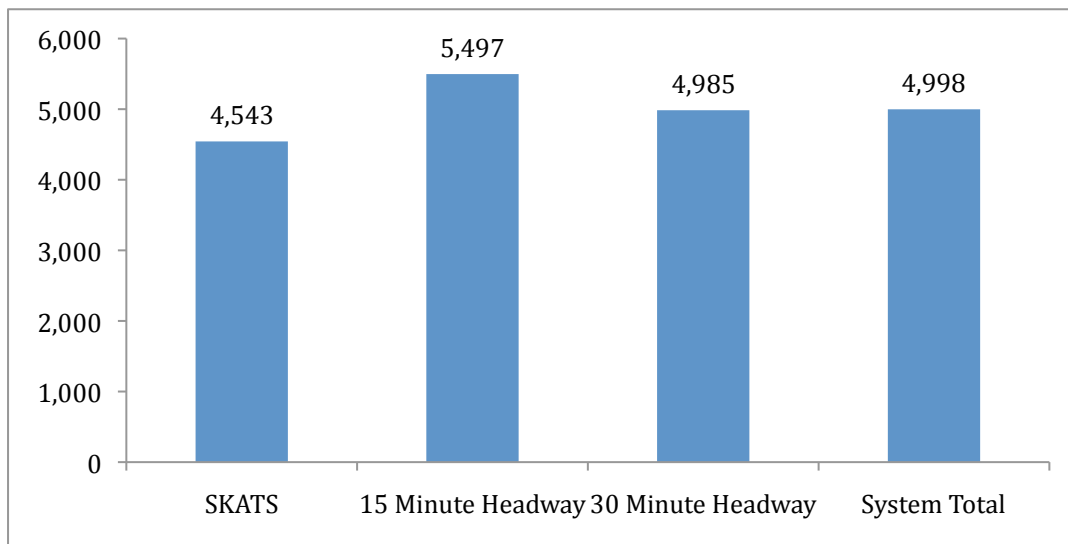


Figure 8. Average Population Density per sq Mile within Walking Distance to Transit

### Average population density within ¼ mile of 15 minute headway routes

Land uses identified in the literature that support a *multi-destinational timed transfer* route structure include measuring population densities around high frequency routes. The average population density within walking distance is higher

than the region and system as a whole, suggesting that high frequency routes are being provided to corridors of high population densities.

*Percent within ¼ mile of 30 minute headway routes*

Low frequency routes show a uniform geographic distribution, serving a large majority of the high population density block groups. Population density within walking distance to low frequency service is slightly denser than the region as a whole. The findings suggest that additional high-density block groups in south and east of downtown Salem could provide additional gains by modifying nearby routes.

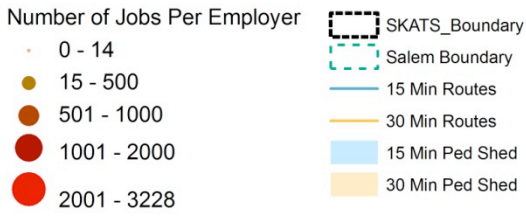
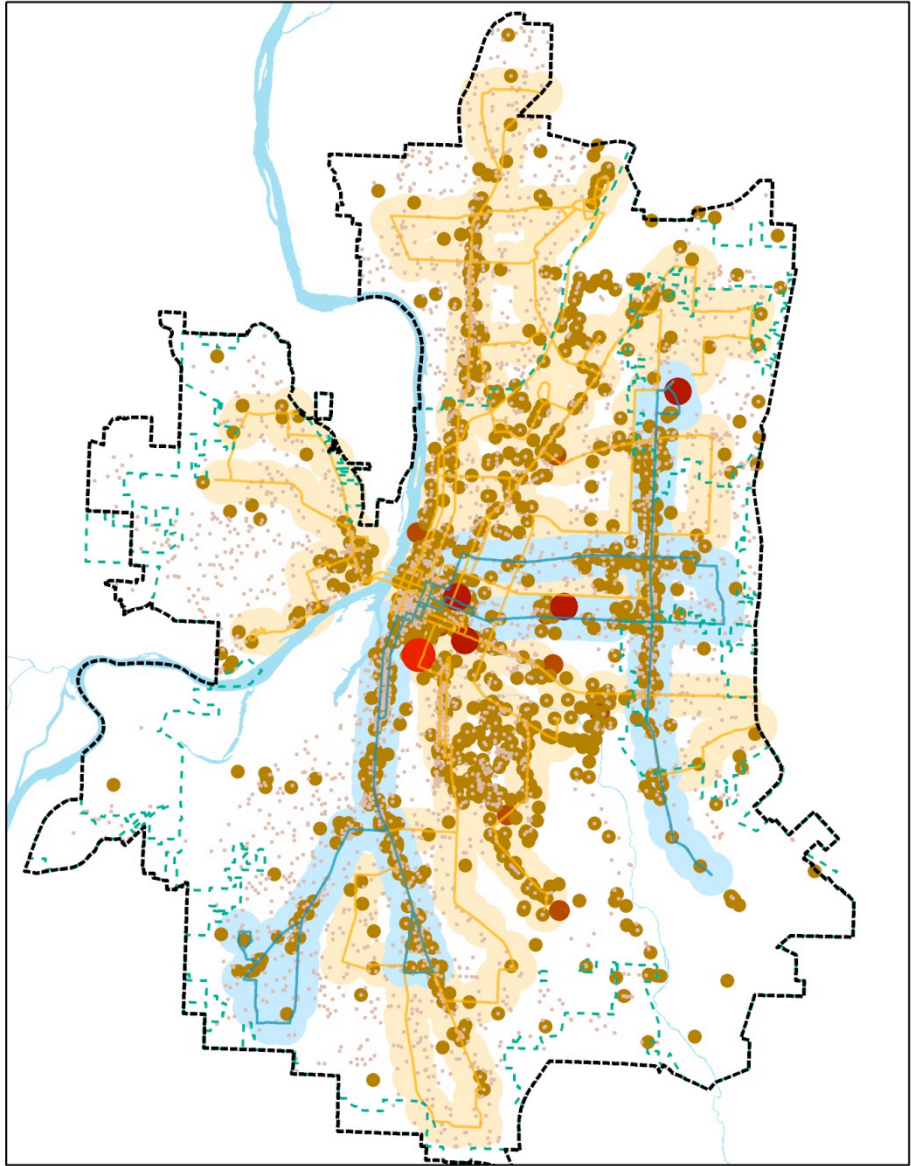
**Percent of Total Employment within ¼ Mile of Transit – SKATS**

There are a total of 99,982 jobs within the SKATS district boundary with 87,193 of the jobs located within the City of Salem. Within the region, there is an average of 14 employees per job location. Employment in the SKATS boundary and City of Salem are primarily clustered in downtown Salem and along major corridors. Just as many other regions, the Salem area shows a decentralized pattern of employment, with only 17% of the region's jobs located in the central business district.

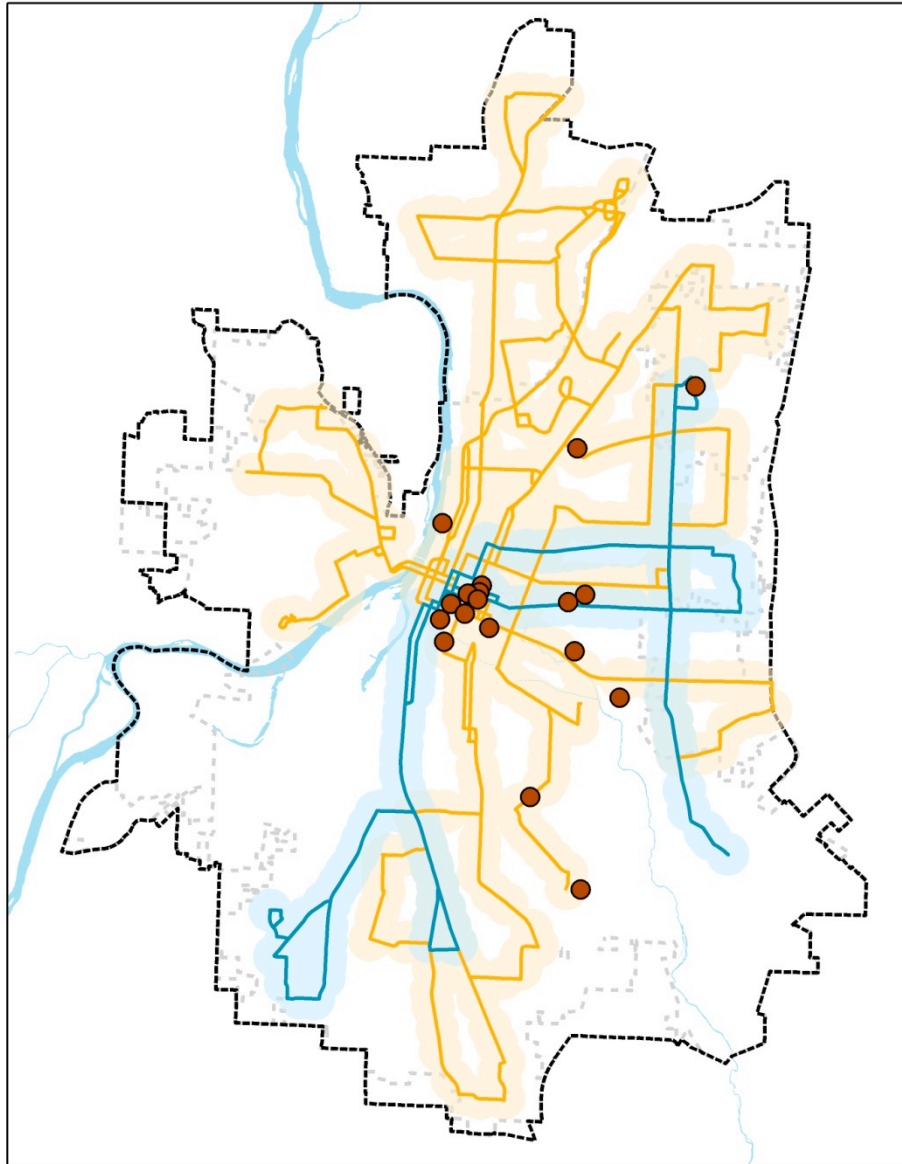
Employment is largely located on major corridors served by transit and high levels of service. An indicator of regional jobs accessibility shows that 45% of all job sites have access to 15-minute service, with 79% within walking distance to 30-minute service and 89% are within walking distance to the system as a whole. Figure 9 shows the distribution of job site by the number of employees.

The percentages of regional jobs accessibility are largely consistent with the measure of jobs within the City of Salem shown below. There are 87,193 jobs located within the City of Salem. Of these jobs, 46% are accessible to high frequency routes, 80% accessible to low frequency routes, and 89% accessible to the system as a whole.

In order to capture choice riders, higher service frequencies might be targeted around some of the major employment centers on the north side of, and southeast to downtown Salem. Of the 18 regional employers who employ 500 people or more, all but Chemeketa Community College are within the City of Salem city limits. 55% of these are located within walking distance to frequent service, and all are within walking distance to 30-minute service and the transit system as a whole. Allocating more frequent services near major employment centers may allow the transit agency to capture more choice riders.



**Figure 9. Employment within Walking Distance to Transit**



- Employers Over 500
- 15 Min Routes
- 30 Min Routes
- 15 Min Ped Shed
- 30 Min Ped Shed
- SKATS\_Boundary
- Salem Boundary



**Figure 10. Major Employers within Walking Distance to Transit**



### Percent of Community Services within ¼ Mile of Transit –SKATS

Community services are defined as services and businesses essential to satisfy life’s daily needs. They are composed of such things as grocery stores, banks, health care, retail locations, schools, and churches (a complete list of services is available in the appendix). A measure of community services within walking distance to transit is closely related to the planning goals of each of the three agencies, such as encouraging transit supportive land uses, and enhancing access opportunities for the Transportation Disadvantaged.

The SKATS area shows a decentralized pattern of community services locations similar to the employment pattern, with 20% of all community services located in the city center. Within the SKATS region, 94% of the community service locations are within walking distance to transit, with 56% within walking distance to frequent service. Within the City of Salem, these numbers increase to 95% for the system as a whole and 62% for frequent service.

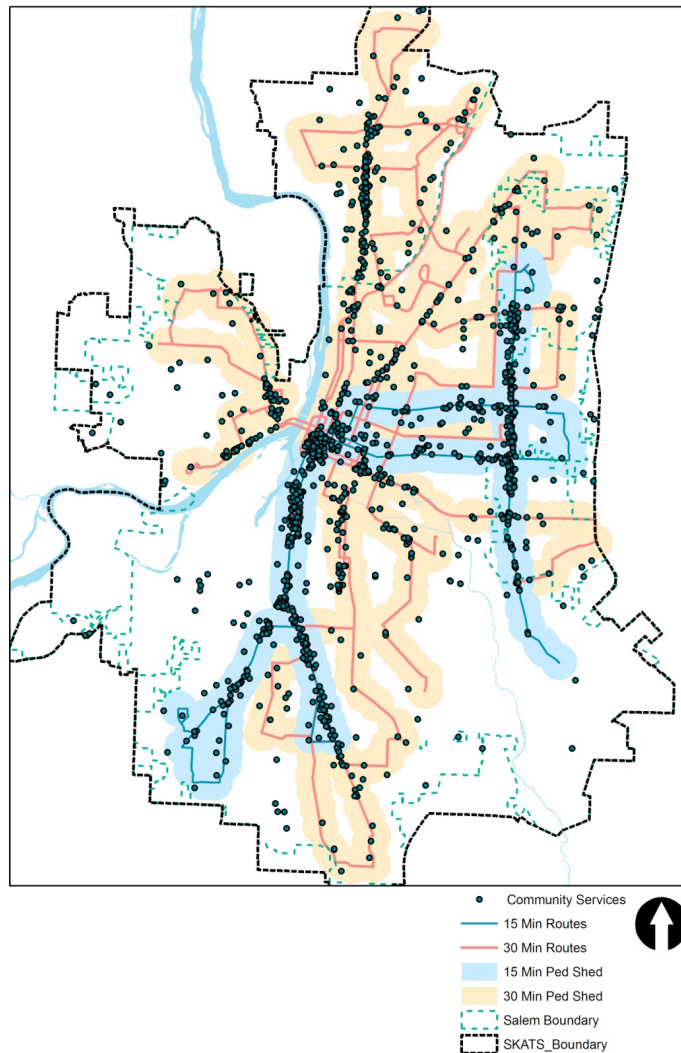


Figure 11. Community Services within Walking Distance to Transit

### Percent of Total New Dwelling Units within ¼ Mile of Transit

New dwelling units were defined as units built in the last five years. The indicator was calculated as New Dwelling Units within walking distance to transit divided by the total New Dwelling Units in Salem. This unit of measurement may prove to be too coarse to provide an accurate figure, however the data for Year Structure Built is not available at the smaller geography of the census block. A comparison of total dwelling units between the block and block group levels revealed a predictable drop off in total dwelling units within walking distance to transit. The indicator reveals a clear pattern of residential development, suggesting that the pattern of residential developments in the region over the last five years are not in line with the Salem Comprehensive Plan's Goals of steering residential development within walking distance of frequent transit service. Serving neighborhoods on the periphery with frequent service is more costly than providing services within the central area due to the low population densities and travel distances.

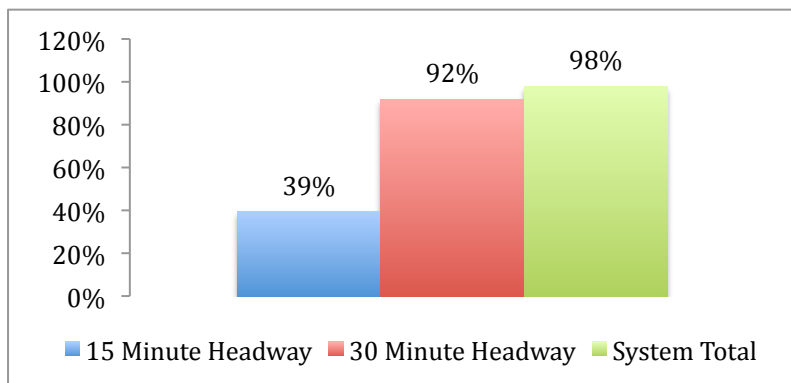
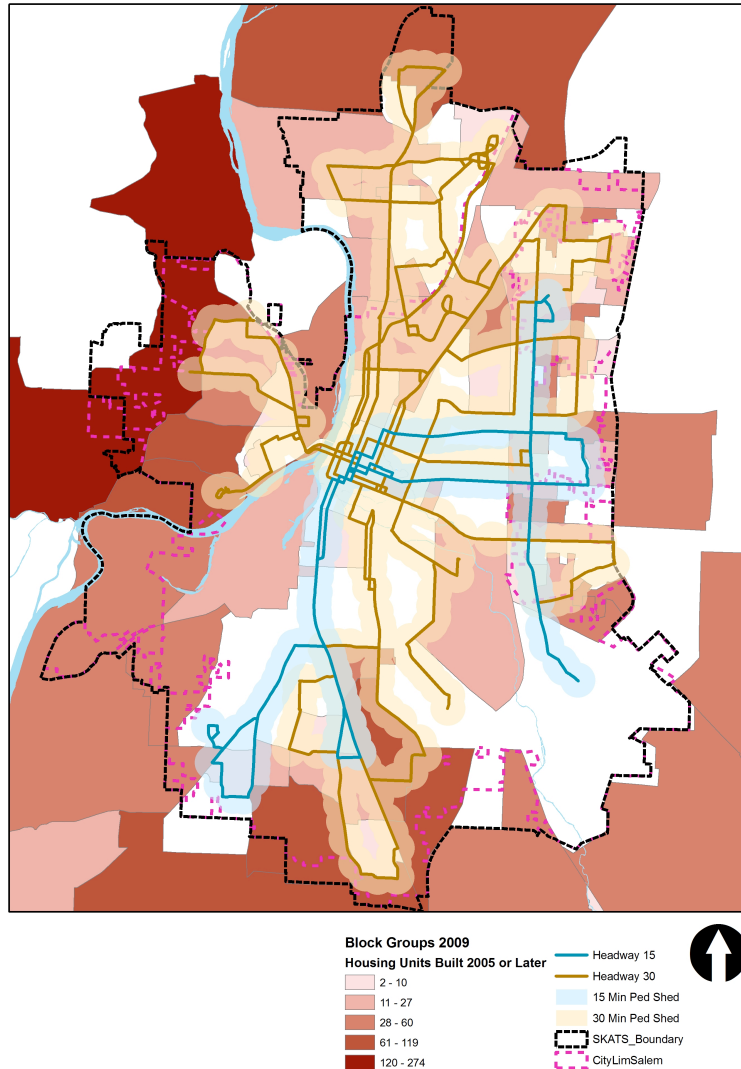


Figure 12. Percent of New Housing Units within Walking Distance to Transit

In the City of Salem, 39% of new dwelling units were within walking distance to frequent service, 92% within walking distance to 30-minute service, and 98% within walking distance to the transit network as a whole when measured at the block group level. The findings shown in Figure 13 reveal that the majority of new housing is being built on the periphery of the transit agency's service area, particularly on the south, west, and north sides.



**Figure 13. Number of New Housing Units within Walking Distance to Transit**

This indicator was developed using available public data from the 2009 ACS, which reported at the block group level, may be too coarse for the city to effectively evaluate policy with. A comparison using a measurement of Total Housing Units at the census block level reveals 42% within frequent service, 68% within 30-minute service, and 84% within the system as a whole. Using the larger geography of the block group results in an average of 20% more housing units within walking distance. The drop off is most notable in the less dense population areas comprised of larger block groups that are influenced more by the larger unit of analysis.

The Mid-Valley Council of Governments publishes building permit data for public use at the tract level and for transportation analysis zones. Although the data was not available at the time of this report, future monitoring of this indicator should include permit data at the tax lot level to gain a more detailed measurement.

## **Transportation Disadvantaged**

### **Poverty**

The census bureau defines poverty as people whose income in the last year was below the federally established poverty level. In the SKATS region, over 38,000 people (16% of the population) had income below poverty level. Of those, 22,000 (56%) lived in census tracts within walking distance to a 15-minute service, and 34,000 (90%) lived within walking distance to a 30-minute service.

Tracts with the largest share of people below poverty level are located in the central Salem area, in and around downtown. This is an area that is well served by transit due to the downtown transfer station.

### **Non-White Persons**

The non-white population is defined as people who identified themselves as Black or African American, American Indian, Asian, Native Hawaiian or Pacific Islander, some other race, or two or more races. Non-white populations have historically experienced discrimination to equal access to transportation services (SKATS).

Of the 41,500 people (16% of the population) for the SKATS region as a whole who are identified as non-white, 22,658 people (55%) live within walking distance to a 15-minute service and 36,883 (89%) to 30-minute service. The majority of the tracts with the highest concentrations of non-white population are located east of downtown Salem along the Lancaster corridor, which is well served by high frequency service and grid routes.

### **Linguistically Isolated Households**

Linguistically Isolated Households are defined as a household that didn't have a person aged 14 years or older who speaks English or speaks English very well. Linguistic isolation can create a barrier to accessing transit, by the inability to communicate with drivers and read posted schedules.

Approximately 4,800 households (5% of households) are identified as Linguistically Isolated in the SKATS region. Of those linguistically isolated households, 2,770 (58%) are within walking distance to a 15-minute service, and 4,562 (95%) are within walking distance to a 30-minute service. The geographic distribution of Linguistically Isolated tracts largely follows the Non-White measure, with the highest concentrations located east of downtown Salem, running north south along the Lancaster Drive corridor. This area is among the highest service levels in the region with high frequency routes and transfers between high frequency grid routes.

### **The Elderly**

Elderly is defined as people who are identified as aged 65 or older in the ACS. Evidence suggests increased transit ridership in areas with high concentrations of elderly populations. The elderly are more susceptible to physical barriers when accessing transit, such as bus height, street crossings, and distance to bus stops.

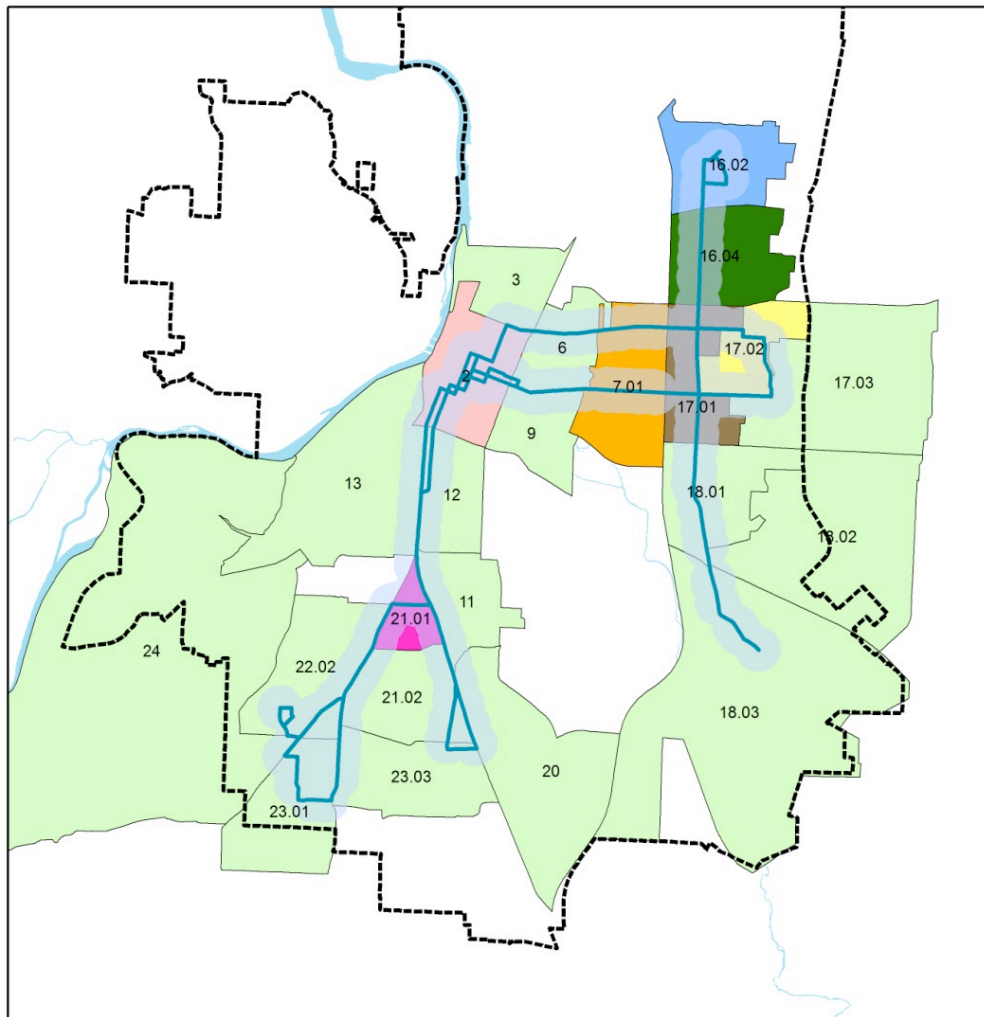
In the SKATS region, approximately 31,700 people (13% of the population) were aged 65 or older, 14,985 of those (47%) lived within walking distance to a 15-minute service, and 25,526 (80%) lived within walking distance to a 30-minute service. Census tracts with the highest concentration of elderly populations in the SKATS region are primarily located on the outskirts of the region where scheduled transit service is lowest. Four tracts showing high concentrations in south Salem between Liberty Road and Commercial Street are located within the central area. These tracts are highly accessible to high frequency transit running north south along Liberty and Commercial.

### **No Vehicle Available Households**

The lack of access to an automobile is a barrier to mobility for many households. The census defines this category as households that have no vehicle available.

Approximately 7,000 households (8% of all occupied households) didn't have a private automobile available. Of those households, 4,376 (62%) are within walking distance to a 15-minute service, and 6,440 (91%) are within walking distance to a 30-minute service. Census tracts with the highest proportion on households without access to a vehicle are primarily located within the City of Salem, between the Willamette River and Lancaster Drive. Due to their centralized location, these tracts are highly accessible to transit. The measure for accessibility to frequent service is the highest out of all Transportation Disadvantaged measures at 62%.

## Highest Percentages of Transportation Disadvantaged within ¼ Mile of Transit



**SKATS 15 Min Tracts**

15 Min Tracts

**Highest Regional Transportation Disadvantaged Populations**

Below Poverty/ No Access to Car

Below Poverty

Non-White/Linguistically Isolated

Linguistically Isolated

Non-White/ No Access to Car

Non-White

Elderly

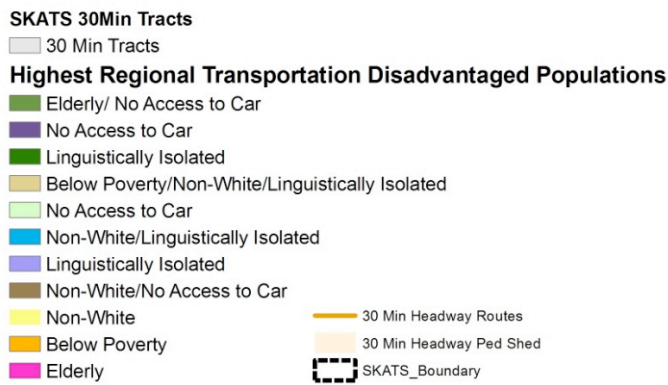
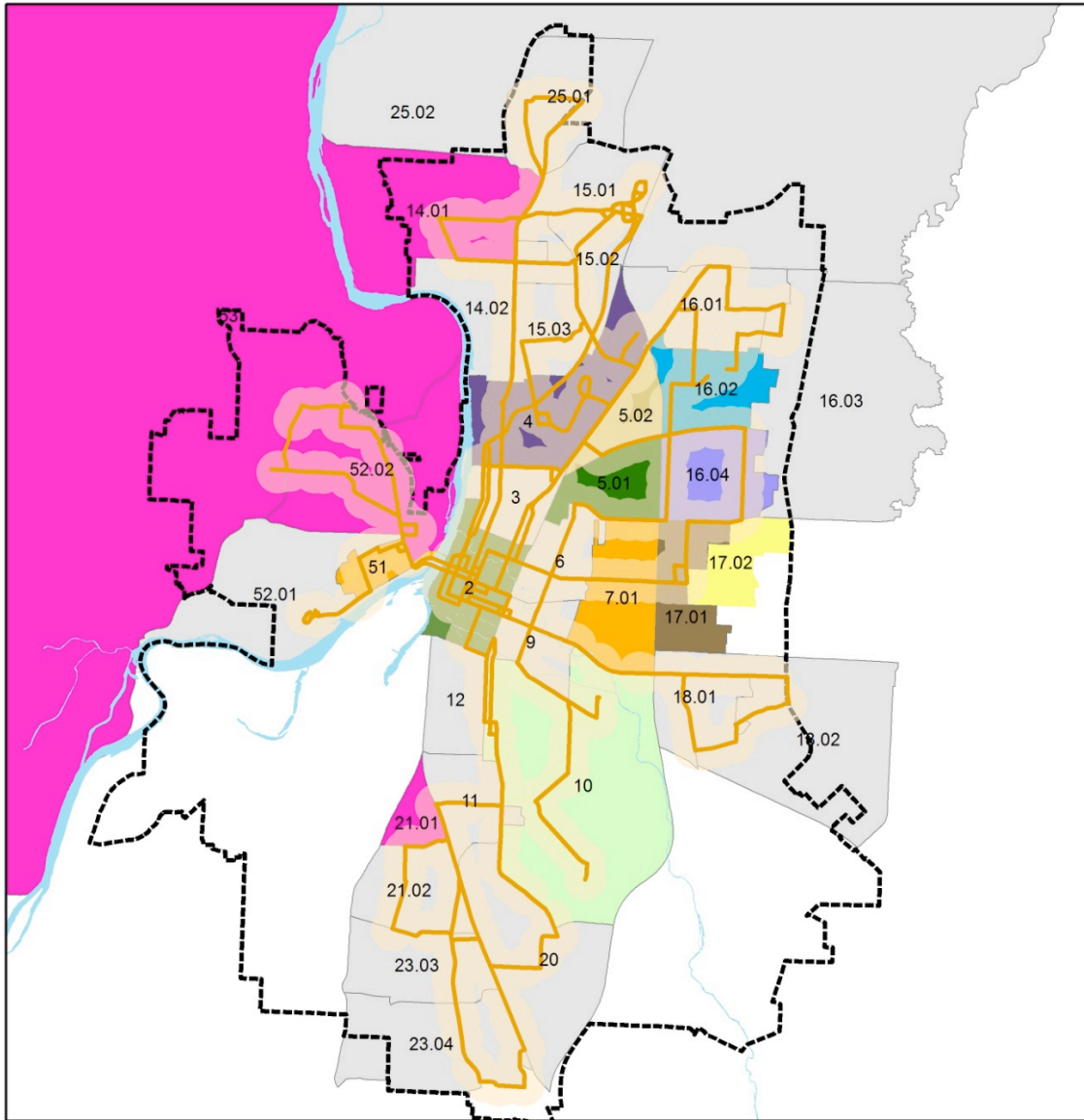
15 Min Headway Routes

15 Min Headway Ped Shed

SKATS\_Boundary



**Figure 14. Highest Regional Transportation Disadvantaged Tracts Accessible to 15 Min Headways**



**Figure 15. Highest Regional Transportation Disadvantaged Tracts Accessible to 30 Min Headways**

### Multiple Disadvantaged Populations

Four census tracts are classified as Multiple Disadvantaged Populations. As shown in Table 4 below, Multiple Disadvantaged Populations have highest percentage of one or more population groups for the five indicators used. These tracts are located downtown and to the northeast of downtown Salem in the Highland/Northgate area, and as can be seen in Figure 16, these tracts are well served by frequent transit service with three out of four having 15-min service, and transfer opportunities between routes.

Tract	Below Poverty	Non-white	Linguistically Isolated	Elderly	No Access to Car
2	37.8%	5.7%	1.3%	9.95%	22.0%
5.02	35.3%	42.7%	19.8%	4.36%	10.7%
16.02	30.4%	28.8%	22.9%	5.90%	9.9%
17.01	21.2%	33.7%	12.4%	15.02%	24.6%
SKATS Average	16.7%	16.3%	5%	13%	8%

Table 4. Multiple Disadvantaged Populations, Shaded Cells Represent Highest % of Each Category

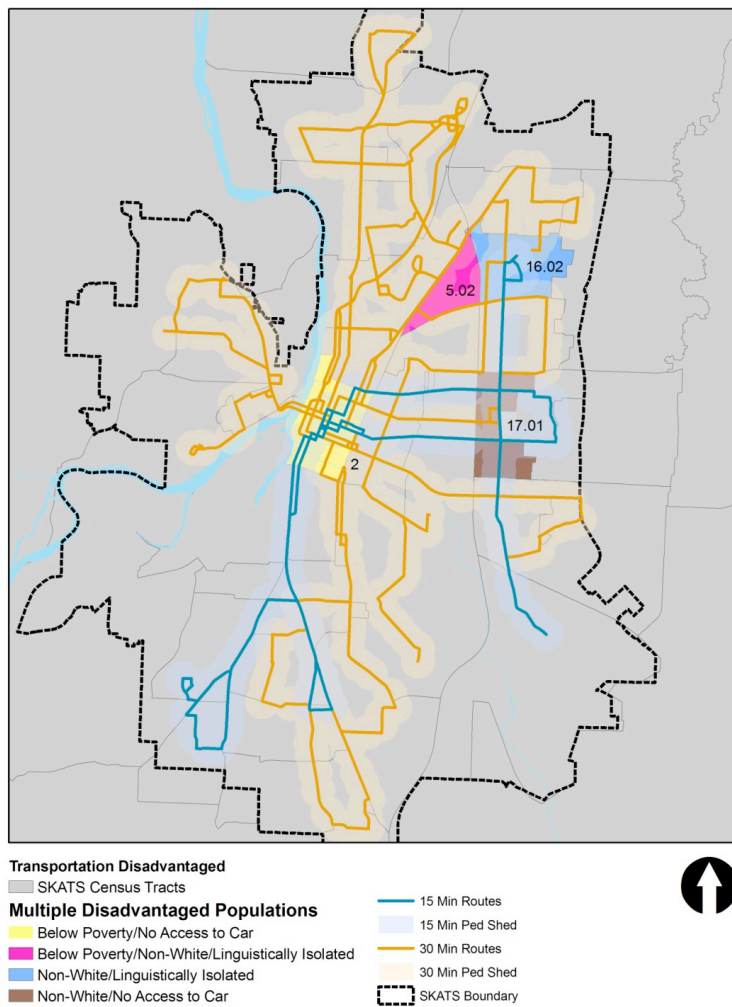


Figure 16. Multiple Disadvantaged Tracts within Walking Distance to Transit



### Total Daily Transit Revenue Hours

The Salem Transportation Systems Plan uses Average Total Daily Transit Revenue Hours as a measure of plan success. Data gathered from the NTD for the last ten years show that Average Total Daily Revenue Hours, computed as Annual Transit Revenue Hours divided by service days (365 subtract 52 weekend days and 8 holidays), has steadily grown annually. Only one year, 2009, posted a decline over previous years.

Cherriots does not provide transit service on weekends, although weekend services are a part of their strategic plan. Adding weekend services is likely to produce a dip in the Average Total Daily Transit Revenue Hours, as these services tend to operate on much lower frequencies and hours of operation than weekday services.

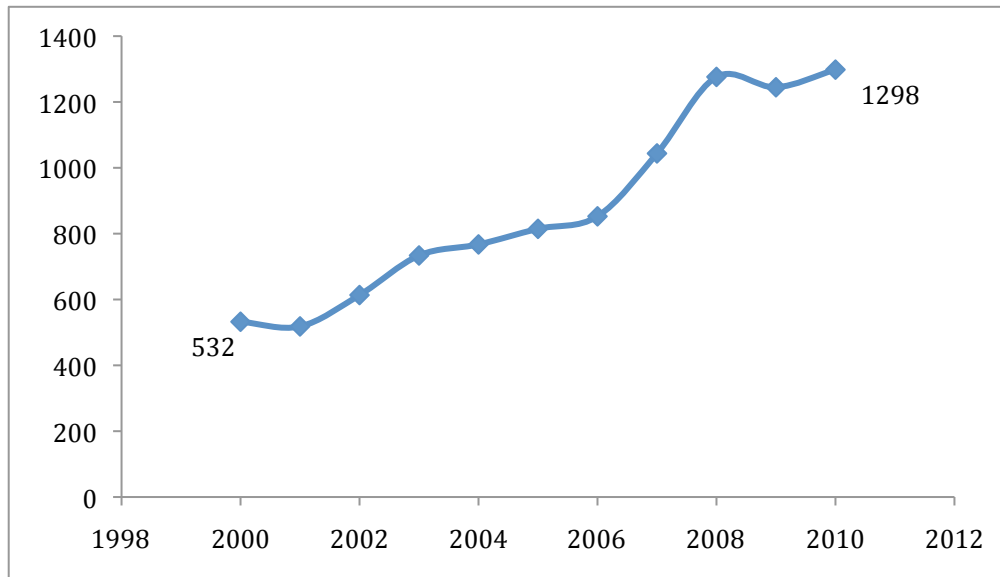


Figure 17. Average Daily Transit Revenue Hours

## Conclusions

The findings show that accessibility to transit is very high within the SKATS area and the City of Salem, with the average accessibility to each indicator above 90% for overall accessibility to the transit system. However, when measuring accessibility to transit stops with higher service frequencies, accessibility for each indicator goes down by an average of 30-40%. This finding is consistent with the overall size difference between the pedestrian shed for higher frequency routes and the pedestrian shed for lower service frequency routes, which covers 30% more area. The even proportion by which each indicator is served by the different service frequencies suggests that on a whole, transit service levels are equitably distributed across the region. This suggests that Cherriots is efficiently distributing services among the community, while providing a high level of service coverage.

Given the financial constraint of transit agencies to provide frequent service, Cherriots appears to be doing well in operating high frequency service in areas that capture an even proportion of the indicators evaluated here. Total Daily Transit Revenue Hours has steadily increased over the last ten years, meeting goals in the Salem Transportation Systems Plan. Overall, the findings suggest that Cherriots is meeting or exceeding community goals in allocating the increased transit services over the last ten years.

## Recommendations

- Use measures to target improvements
- Residential development is a regional transportation issue
- Agency goals are interrelated, requiring a uniform platform of reporting
- Further improvements to indicators are needed

Both the transit agency and local governments can utilize the diverse set of transit performance indicators used here for planning, programming, and evaluation. Transportation and land use planning directly affect each other, and a unified monitoring program will provide a more comprehensive view of the interaction. The transit agency can evaluate how services are meeting stated community goals, and local governments can evaluate the effects of development and land use changes on the transit system.

Utilizing the performance measures examined here, the transit agency can make service adjustments to the margins of existing routes to capture more potential passengers. Research suggests that adding higher service levels to major employment centers would appeal to choice riders, currently only 45% of the region's jobs, and 55% of the major employers are accessible to frequent service. Connecting regional employment centers with intercity passenger rail would be another way to appeal to choice riders, and has been shown to increase ridership for a multi-destinational system. Cherriots does not currently provide service to the

Amtrak Cascades passenger rail line, although the Salem Comprehensive Plan identifies this as a service goal.

Results measuring the distribution of new residential development indicate that the pattern of housing development in the region for the last five years are not in line with the Salem Comprehensive Plan's goal of steering residential development within walking distance of frequent transit service. Serving neighborhoods on the periphery with frequent service is more costly than providing services within the central area due to the low population densities and longer distances. The findings suggest that much of the new residential development is taking place outside of the Salem city limits, meaning that a discussion on how land use policies can be better suited for an efficient transit system need to take place on a regional level.

A review of Cherriots, the City of Salem, and SKATS planning documents show a clear linkage between local, regional, and transit agency goals, suggesting that transit performance goals be measured and presented in a unified report to provide a more comprehensive assessment of public transit. A mock up of how the transit measures evaluated here might be reported in a unified document is presented in the appendix. The idea behind a unified monitoring report is to clearly present the overlapping agency goals with respect to transit and findings of the evaluation with charts and maps to present a quick understanding of how local government goals and policies are affecting the transit network.

The findings revealed areas for improving upon the methodology used in this study, such as including interlined routes and to obtain more accurate spatial data for indicators such Total New Dwelling Units. Interlining refers to street segments that serve multiple routes. These segments effectively increase service frequencies by running two or more 30-minute services offset at 15-minute increments. Street segments with interlined routes should be identified and reclassified as 15-minute service. Reclassifying these corridors will result in increased accessibility to higher service levels. Indicators were developed using the best data available, and the findings for Total New Dwelling Units revealed that the data could be improved upon for future study. Building permit data at the tax lot level would provide a much more accurate indicator of transportation/land use policy.

A comprehensive report of transit performance can help to align transportation and land use goals among government agencies with overlapping transit goals. Further monitoring efforts should include the setting of benchmarks to develop performance targets and be repeated at even increments of time to evaluate the outcomes of service changes and land use policies. As Cherriots adds additional service routes and increases frequencies, these performance measures can be utilized to evaluate the effects of proposed services on stated goals. Similarly, from a local government perspective, performance measures repeated over time can help evaluate the effects of planning and policy from the local government agencies on the transit system.

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## Appendix

### Data Sources

Data for the regional measures come from two primary sources, the US Census and the State of Oregon Employment Department. Additional data obtained from Cherriots includes bus and route GIS layers. A full set of detailed calculation performed for each measure can be found in the appendix.

### *Socio-Demographic*

Census data collected in the long form of the 2000 decennial census are now collected in the American Community Survey (ACS). The data is collected from a rolling sample of the population in 1, 3, and 5 year estimates. The decennial census long form questions reflected a snapshot in time for the time period, where the ACS data is a rolling average of the sampling period.

The most recent 2009 5 year estimate is available at geographies as low as the block group in Summary File, however the variables used in the Transportation Disadvantaged report are not available at this level. In order to make a valuable comparison between populations within walking distance to transit and the Transportation Disadvantaged report, census tracts are used. Several of the Transportation Disadvantaged indicators available at the tract level are not available at the block group.

Transportation Disadvantaged populations are defined as “populations that potentially experience some level of limitation to convenient, accessible transportation” (SKATS 2000). The demographic profile of this population is reflected in the census variables listed below.

- Poverty
- Non-white
- Linguistically isolated
- Elderly (aged 65 and older)
- Households without access to a vehicle

### *Land Use*

Land use data was obtained from the 2009 ACS at the block group level for the variable listed below.

- Total Population
- Population Density
- Year Structure Built

*Employment and Community Services*

ES-202 employment data is an annual report from the Oregon Employment Department used to measure jobs and community services. The data contains geocoded employment records at the taxlot level making a stop level analysis possible. The records contain six digit North American Industrial Classification System (NAICS) codes that were used to identify community services. A list of community services was obtained through the LEED “Development, Density, and Community Connectivity” report, which is used to score development based upon their access to commercial and community services. The community services categories shown in Table 5 were selected from the employment GIS layer and exported as a “Community Services” layer.

<b>LEEDS Categories</b>	<b>NAICS Code</b>
Convenience/small grocery store	445120
Gas station w/ convenience store	447110
Supermarket	445110
Hardware store	444130
Fruit/vegetable market	445230
Laundry/dry cleaners	812320
Clothing store	448120
Post office	491110
Elementary school	611110
Other schools	611210, 611310, 611410
Book store	451211, 453310
Fast food restaurant	722211
Coffee place	722213
Bank/credit union	522110
Non-fast food restaurant	722110, 722211
Video store	532230
Pharmacy/drug store	446110
Salon/barber shop	812112
Recreation center	713940, 624110
Day Care	624410
Place of worship	813110
Senior Care Facility	624120
Medical/Dental	621111, 621112, 621210, 621310, 621320, 621330, 621391

**Table 5**

# SALEM-KEIZER AREA TRANSIT: PERFORMANCE MONITORING

Public transportation plays a key role in shaping the livability of communities. It provides access to jobs, school, social and community services, friends, and family for those without access to an automobile, and offers travel options to the entire community. Local governments base many of their land use and transportation planning goals upon an accessible to a public transit system, and as such it is necessary to measure transit performance from the perspective of the local governments in addition to the transit agency. Measuring transit performance from the viewpoint of the local governments agencies requires that transit accessibility be measured from stated community goals, with a diverse set of indicators informed from the overlapping goals of each agency.

A review of Cherriots, the City of Salem, and SKATS planning documents show a clear linkage between local, regional, and transit agency goals. This report suggests that transit performance goals be measured and presented in a unified report to present a more comprehensive view of transit service. To this end, this report compiles a set of community-based transit performance measures, which assesses transit performance

## LOCAL GOALS

Source	Goal	Indicator
Salem Comprehensive Plan	Accessibility	Percent of New Dwelling Units within ¼ mile of Transit Stops with Headways of 15 min. or Higher
		Percent of New Dwelling Units within ¼ mile of Transit Stops with Headways of 30 min. or Higher
Cherriots Strategic Business Plan	Focus service improvements in areas that support transit friendly development.	Average Population Density within ¼ mile of Transit Stop
	Promote importance of land use/ transit connection.	Percent of Jobs within ¼ mile of Transit Stop  Percent of Community Services within ¼ mile of Transit Stop
Salem Transportation Systems Plan	Accessibility	Percent of Total Population within ¼ mile of Transit Stop
		Total Daily Transit Revenue Hours
SKATS Transportation Disadvantaged Report	Mobility	Percent of Transportation Disadvantaged within ¼ mile of Transit Stop

through the lens of local government planning goals. An assessment of performance from multiple viewpoints requires that a diverse set of indicators be used.

The Indicators consist of both level of service and spatial indicators to identify accessibility to transit stops and the frequency of service.

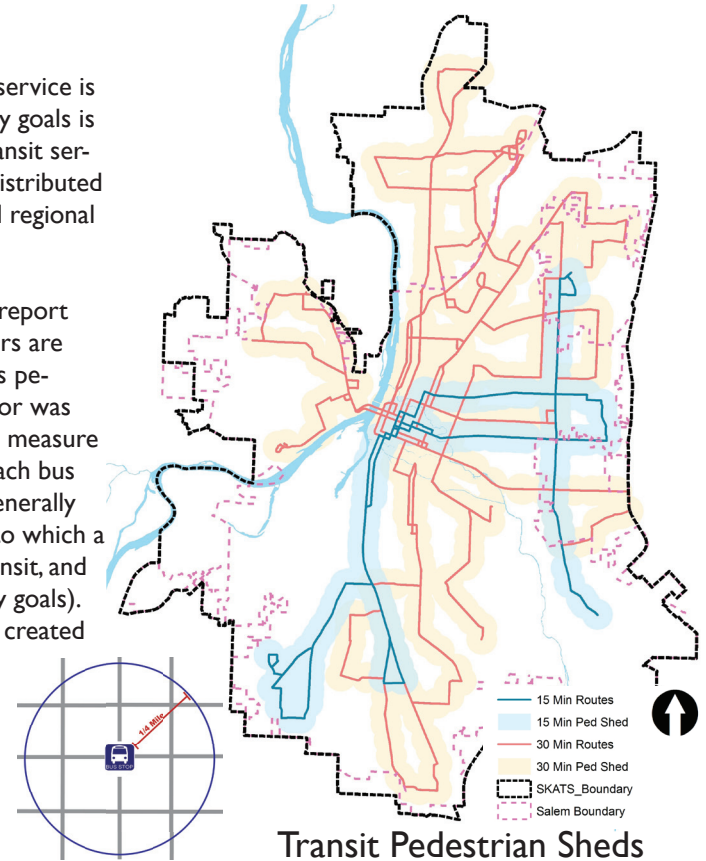
Goals and objectives were developed from reviewing the following planning documents:

- Cherriots Strategic Business Plan
- City of Salem Comprehensive Plan Transportation Systems Plan
- SKATS Transportation Disadvantaged

## METHODS

Assessing how transit service is meeting the community goals is determined by how transit service is geographically distributed and across the city and regional boundaries.

An assumption of this report is that transit passengers are accessing the system as pedestrians. Each indicator was calculated using GIS to measure pedestrian access to each bus stop, (1/4 mile is the generally agreed upon distance to which a person will walk to transit, and distance used in agency goals). Pedestrian sheds were created using a simple circular buffer technique in order to present a simple, straightforward methodology that can be easily recreated.



Transit Pedestrian Sheds

Evaluation consists of a route-based analysis comparing the differences between service frequencies across the boundary of SKATS and the City of Salem. Transit level of service was defined as the peak service frequency for each route, with higher frequency service occurring generally between 8-10 am and 4-6 pm. Cherriots routes have a peak headways of 15 and 30 minutes.

GIS layers for transit stops were assigned a level of service based upon the highest available headway of the routes serving each stops, and then aggregated by level of service to create pedestrian sheds for a 30-minute headway (Figure 4) and a 15-minute headway (Figure 5). These two pedestrian sheds were then used to select socio-demographic and land use data to reflect the accessibility to each level of service.

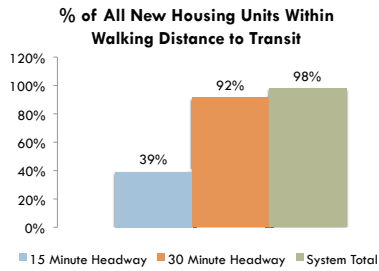
Data was obtained based upon the best available data for each indicator, from three primary sources.

- US Census- American Community Survey
- Oregon Employment Department
- Salem-Keizer Transit



# NEW HOUSING UNITS

SOURCE: Salem Comprehensive Plan



GOAL: Accessibility

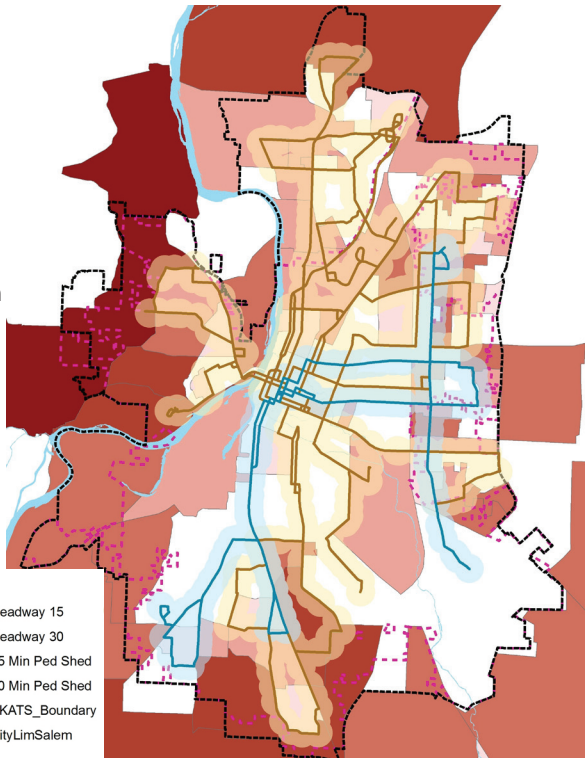
INDICATOR: Percent of New Dwelling Units within 1/4 mile of Transit Stops with Headways of 15 min. or 30 min.

CALCULATION: Sum of new dwelling units within 1/4 mile of stops with 15 and 30 minute headways divided by total new dwelling units using census block groups

## FINDINGS:

In the City of Salem, 39% of new dwelling units were within walking distance to frequent service, 92% within walking distance to 30-minute service, and 98% within walking distance to the transit network as a whole when measured at the block group level. The findings shown in Figure 13 reveal that the majority of new housing is being built on the periphery of the transit agency's service area, particularly on the south, west, and north sides.

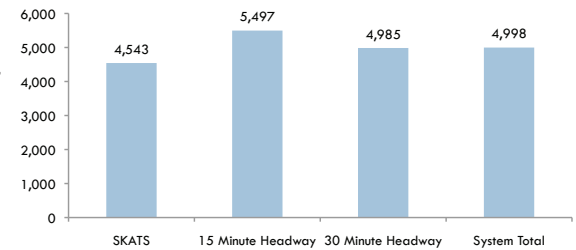
The indicator reveals a clear pattern of residential development, suggesting that the pattern of residential developments in the region over the last five years are not in line with the Salem Comprehensive Plan's Goals of steering residential development within walking distance of frequent transit service. Serving neighborhoods on the periphery with frequent service is more costly than providing services within the central area due to the low population densities and travel distances.



# POPULATION DENSITY

SOURCE: Cherriot's Strategic Business Plan

Average Population Density per sq Mile



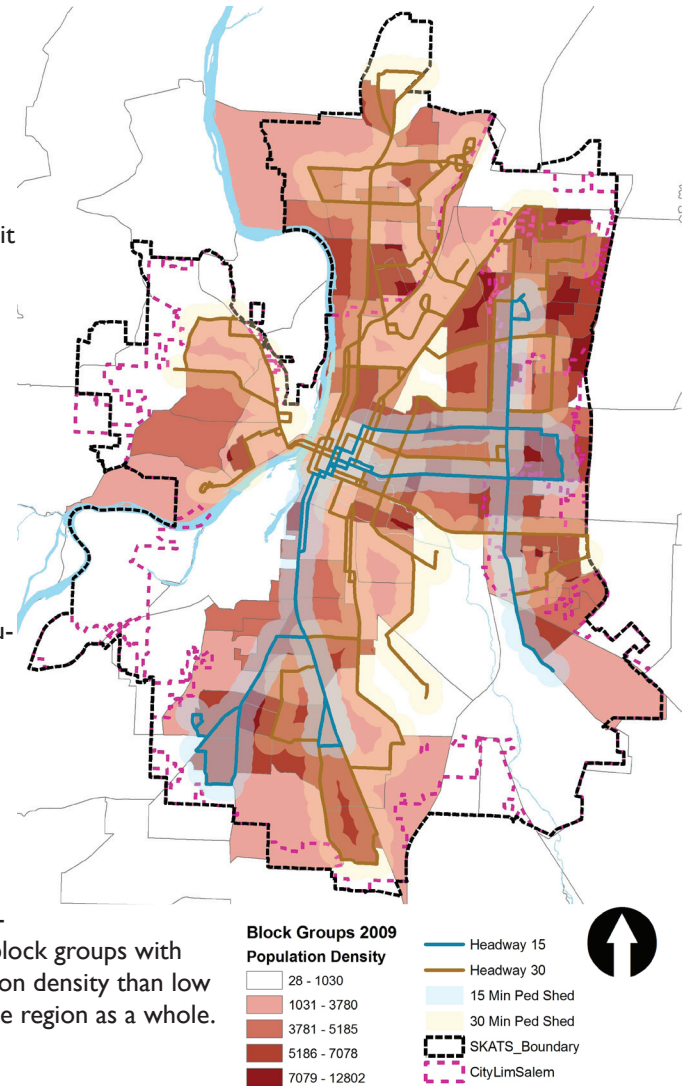
GOAL: Focus service improvements in areas that support transit friendly development. Promote importance of land use/ transit connection.

INDICATOR: Average Population Density within 1/4 mile of Transit Stop

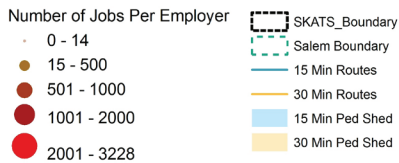
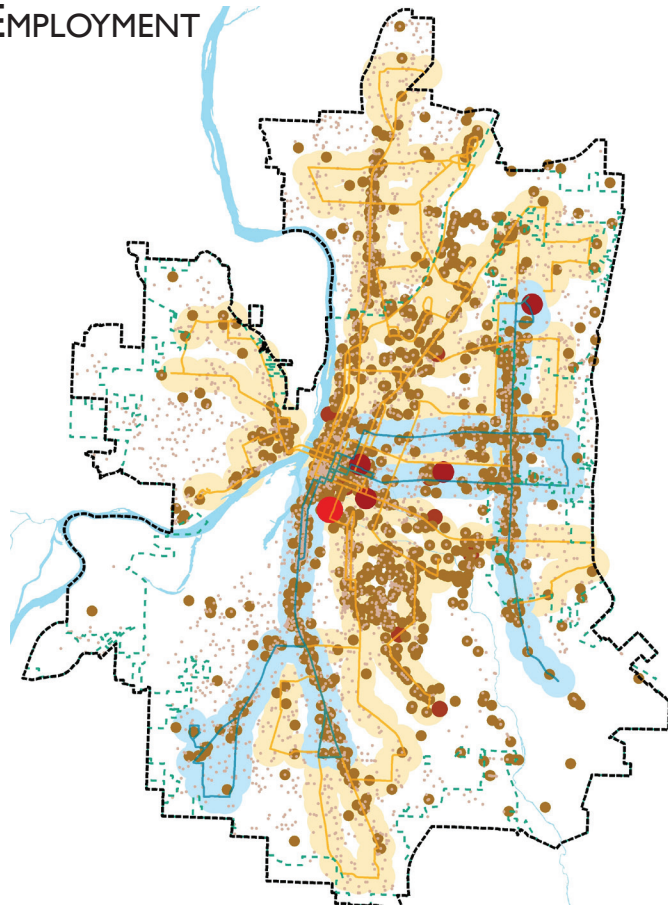
CALCULATION: Average population density within 1/4 mile of a transit stop compared to the average population density of the MPO and City using census block groups

## FINDINGS:

Areas with high population density increase the potential for transit ridership by efficiently locating residential populations within smaller areas that can be better targeted by transit planning. Block groups with the highest population densities are located in east Salem. The findings reveal that high frequency routes are reaching block groups with higher levels of population density than low frequency routes and the region as a whole.



## EMPLOYMENT



SOURCE: Cherriots Strategic Business Plan

GOAL: Focus service improvements in areas that support transit friendly development. Promote importance of land use/ transit connection.

INDICATOR: Percent of Jobs within 1/4 mile of Transit Stop

CALCULATION: Sum of jobs within 1/4 mile of transit divided by the number of jobs in the region and City using tax lots

FINDINGS: There are a total of 99,982 jobs within the SKATS district

boundary with 87,193 of the jobs located within the City of Salem. Within the region, there is an average of 14 employees per job location. Employment in the SKATS boundary and City of Salem are

primarily clustered in downtown Salem and along major corridors. Just as many other regions, the Salem area shows a decentralized pattern of employment, with only 17% of the region's jobs located in the central business district.

Employment is largely located on major corridors served by transit and high levels of service. An indicator of regional jobs accessibility shows that 45% of all job sites have access to 15-minute service, with 79% within walking distance to 30-minute service and 89% are within walking distance to the system as a whole.

## COMMUNITY SERVICES

SOURCE: Cherriots Strategic Business Plan

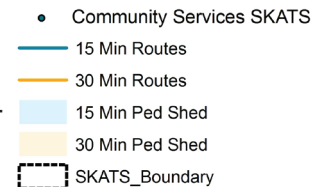
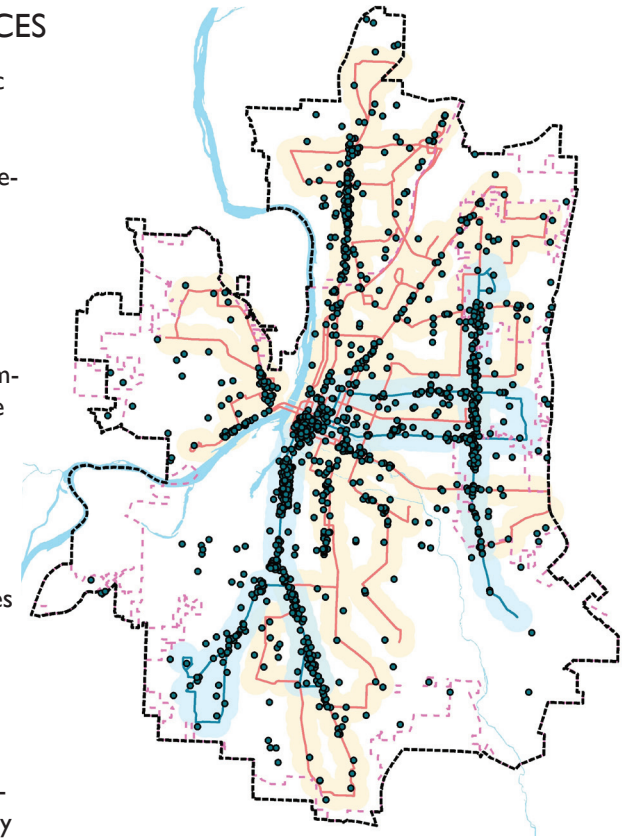
GOAL: Focus service improvements in areas that support transit friendly development. Promote importance of land use/ transit connection.

INDICATOR: Percent of Community Services within 1/4 mile of Transit Stop

CALCULATION: Sum of community services within 1/4 mile of transit divided by the number of community services in the region and City using tax lots

FINDINGS: Community services are defined as services and businesses essential to satisfy life's daily needs. A measure of community services within walking distance to transit is closely related to the planning goals of each of the three agencies, such as encouraging transit supportive land uses, and enhancing access opportunities for the Transportation Disadvantaged.

The SKATS area shows a decentralized pattern of community services locations similar to the employment pattern, with 20% of all community services located in the city center. Within the SKATS region, 94% of the community service locations are within walking distance to transit, with 56% within walking distance to frequent service. Within the City of Salem, these numbers increase to 95% for the system as a whole and 62% for frequent service.



### Community Services

- Convenience/small grocery store
- Supermarket
- Fruit/vegetable market
- Laundry/dry cleaners
- Clothing store
- Post office
- Elementary school
- Book store
- Fast food restaurant
- Coffee place
- Bank/credit union
- Non-fast food restaurant
- Pharmacy/drug store
- Salon/barber shop
- Recreation center
- Day Care
- Place of worship
- Senior Care Facility
- Medical/Dental

# TRANSPORTATION DISADVANTAGED

SOURCE: SKATS Transportation Disadvantaged

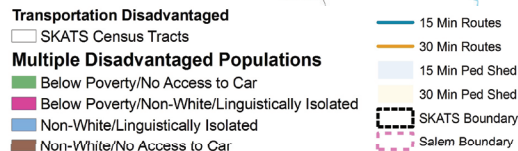
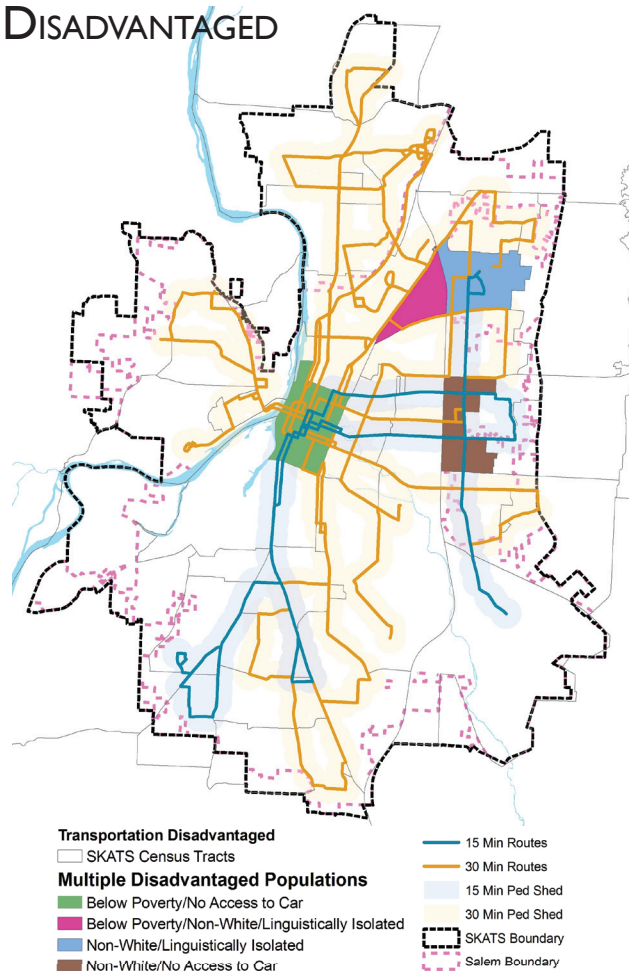
GOAL: Mobility

INDICATOR: Percent of Transportation Disadvantaged within 1/4 mile of Transit Stop

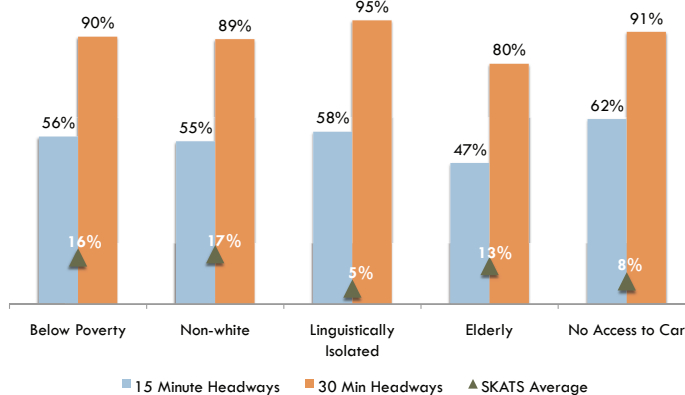
CALCULATION: Sum of Transportation Disadvantaged population within 1/4 mile of transit divided by sum of total Transportation Disadvantaged population within the region using census tracts

## FINDINGS:

The four census tracts with multiple incidences of higher than average disadvantaged populations are located downtown and to the northeast of downtown Salem in the Highland/Northgate area. These tracts are well served by frequent transit service (15-minute headways, with the exception of tract 5.02 which is 30-minute) and transfer opportunities between routes.

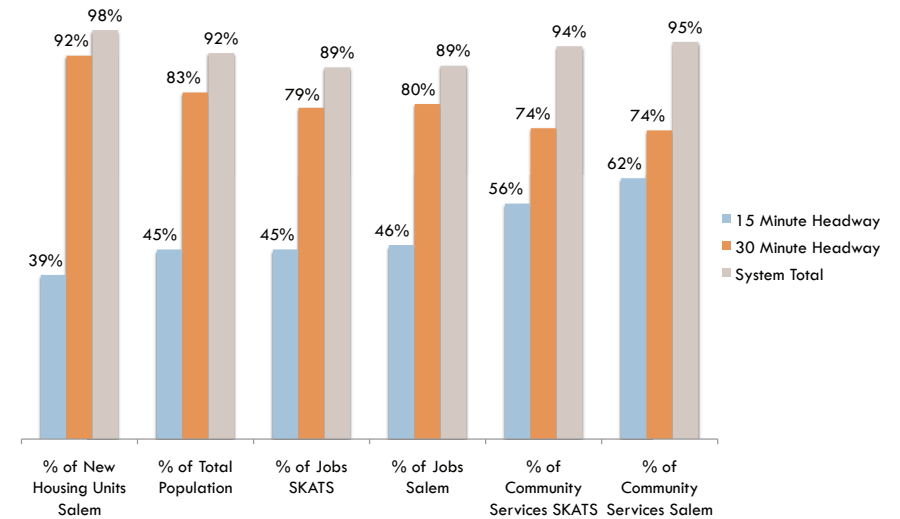


% of Transportation Disadvantaged within Walking Distance to Transit



# CONCLUSIONS

% of Each Indicator Within Walking Distance to Transit



Based upon these set of indicators used to assess transit accessibility, Cherriots appears to be doing well in providing a high degree of coverage across its service area and providing an equitable split of service levels. The findings show that accessibility to transit is very high within the SKATS area and the City of Salem, with the average accessibility to each indicator coming in above 90% for overall accessibility to transit. However, when measuring accessibility to transit stops with higher service frequencies, accessibility for each indicator goes down by an average of 30-40%. This finding is consistent with the overall size difference between the pedestrian shed for higher frequency routes and the pedestrian shed for lower service frequency routes, which covers 30% more area. The even proportion by which each indicator is served by the different service frequencies suggests that on a whole, transit service levels are equitably distributed across the region. This suggests that Cherriots is efficiently distributing services among the community, while providing a high level of service coverage.

Given the financial constraint of transit agencies to provide frequent service, Cherriots appears to be doing well in operating high frequency service in areas that capture an even proportion of the indicators included in this report. Total Daily Transit Revenue Hours has steadily increased over the last ten years, meeting goals in the Salem Transportation Systems Plan. Overall, the findings suggest that Cherriots is meeting or exceeding community goals in allocating the increased transit services over the last ten years.