Puget Sound Region
TOD Demand Estimates

Commercial and residential demand estimates around light rail transit in the Central Puget Sound Region for 2020, 2030 and 2040

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prepared for:
Puget Sound Regional Council
Growing Transit Communities Program

STRATEGICECONOMICS

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I. INTRODUCTION

Report purpose

Strategic Economics was retained by Puget Sound Regional Council's Growing Transit Communities program to estimate commercial and residential demand in proximity to transit over the next three decades. Based on a strong body of research on transit-oriented development (TOD) around fixed guideway transit systems, these demand estimates focus on existing and potential light rail station areas, and do not include Bus Rapid Transit (BRT) station areas, although it is possible that the region will see TOD growth related to BRT as well.[1] The estimates are provided in ten-year intervals for 2020, 2030 and 2040, with each forecast decade corresponding to a different stage of system expansion. Employment growth and housing demand projections are provided for the light rail system as a whole and for each of the three corridors—North, East and South—and Downtown Seattle. Housing demand is also segmented by income level.

To illustrate a range of possible outcomes, two scenarios are contemplated. The "status quo growth scenario" assumes that future commercial and residential demand in the transit shed will be consistent with the current share of jobs and households located in the existing and potential station areas. This implies that the expansion of the light rail network will not induce employers or households to concentrate in station areas. In contrast, the "transit-oriented growth scenario" assumes that, in keeping with historical growth patterns around long-standing fixed guideway transit systems in other regions, the expansion of the transit network will lead to increased demand for commercial and residential space near light rail transit stations.

Similar to PSRC's UrbanSim growth allocation forecasting model, Strategic Economics' growth estimates are derived from regional forecast numbers produced by the 2012 PSRC Regional Economic Forecast. Unlike UrbanSim, however, the growth estimates provided here are predominantly demand-driven, and pertain more to the potential of the light rail station areas to attract jobs and households than their current capacity to absorb them. Supply factors such as availability of vacant land and public policy are not considered.[2] Thus, the final projections are not explicitly constrained by current development capacity, the assumption being that factors such as zoning regulations are subject to change and are not permanent indicators of future growth potential.

These estimates are intended to help PSRC staff, council and member jurisdictions anticipate how the development of the LINK light rail system could influence existing growth patterns in the region, and particularly the light rail corridors, over the next three decades. While economic fluctuations, market conditions and other factors will influence transit-oriented development, local and regional policy decisions and coordination among public and private sector actors will play a critical role in determining the degree to which employment and household growth is focused along the PSRC transit corridors.

[1] The forecast methodology developed by Strategic Economics is research-driven. To date, most research on TOD has focused on fixed guideway transit systems, due in part to the complexities of comparing BRT implementations from city to city. While fixed guideway systems entail significant infrastructure investments that confer a high degree of certainty about future access along the system corridors and in station areas, BRT systems vary greatly in this regard.

[2] The estimates are also not purely demand-driven, but "informed demand" growth estimates that are influenced by some supply-side factors. The analysis underlying the forecasts considers existing development patterns, current market condition and pipeline activity, all of which reflect demand but are also shaped by supply.

Report structure

The remainder of this introduction defines key terms and geographies related to the anticipated system expansion and associated forecasts. Section II presents key insights from national research on transit-oriented development, laying the foundation for the rationale underlying the forecasts. Section III presents the commercial forecasts, including a summary of regional employment trends, a brief description of the methodology and a detailed discussion of forecast numbers. The residential forecasts are discussed in a similar manner in Section IV, starting with an overview of demographic trends in the Puget Sound transit corridors.

Appendices A and B describe the details of the commercial and residential forecast methodologies respectively. Appendix C provides a correspondence table for different industry groupings used in the analysis, and Appendix D contains commute shed maps for the Eastside job centers. Appendix E contains a report evaluating regional economic forecasts from Gardner Economics.

Definition of key geographies

PSRC rail corridor cities (or simply '**corridor cities'**): the 16 cities located along the existing and planned light rail system. These cities are: Everett, Lynnwood, Mountlake Terrance, Shoreline, Mercer Island, Beaux Arts Village, Bellevue, Redmond, Tukwila, SeaTac, Des Moines, Kent, Federal Way, Fife, Tacoma, and Seattle.

North Corridor, East Corridor, South Corridor and Downtown Seattle: The PSRC rail corridor is divided into four sections: the North Corridor, South Corridor, East Corridor and Downtown Seattle. These distinctions are shown in Figures 1, 2, 3 and 4.

Station area: An area defined by a half-mile radius circle around an existing or potential station, approximately 503 acres. While the true walk shed of a station will vary with street network and topography, a half-mile radius is broadly used as an approximation of the reasonable walking limit from employment or housing to transit.

Transit shed: The aggregate of all station areas in the transit system. Because the system will continue to expand over the next three decades and because the North Corridor alignment is not yet finalized, this analysis defined four different transit shed geographies, covering three phases of system expansion and including two North Corridor alignments. The following subsection provides detailed descriptions and maps of the transit shed associated with each phase of expansion.

Region: In keeping with the 2012 PSRC Four-County Regional Economic Forecast, the region in which the PSRC rail network is contained is defined as the four counties of Snohomish, King, Pierce and Kitsap.

System expansion and definition of transit sheds

Because the light rail system expansion plans are not finalized, particularly beyond 2030, it was necessary to make assumptions about which stations will comprise the transit network in each forecast decade. These assumptions were provided to Strategic Economics by the Puget Sound Regional Council, and are based primarily on Sound Transit's project schedules and long range plans. In some cases, a subset of study areas were selected for inclusion based on reasonable spacing of stations and locations of major activity nodes. Depending on future decisions about funding, timing and station locations, the actual system alignment may vary from the assumptions used in this analysis.

Both the Growing Transit Communities program's *Existing Conditions Report*, and the *Central Puget Sound Region TOD Market Study*, prepared by Strategic Economics, include 74 study areas. For the commercial and residential TOD demand estimates in this report, it was more important to pare down the study areas to a realistic number than to include all study areas. A total of 54 station areas are included in this analysis; 18 are existing station areas and 36 are potential station areas.

2020 Transit Shed

Between now and 2020, the transit shed is assumed to expand to three new station areas: Capitol Hill and UW Stadium in the North Corridor and S. 200th Street in the South Corridor (Figure 1). The South Corridor at this stage of expansion consists of the southern portion of the Central Link, from SODO to SeaTac, as well as the Tacoma Link. It is assumed that the Tacoma Link segment will not be connected to the Central Link until the decade between 2030 and 2040.

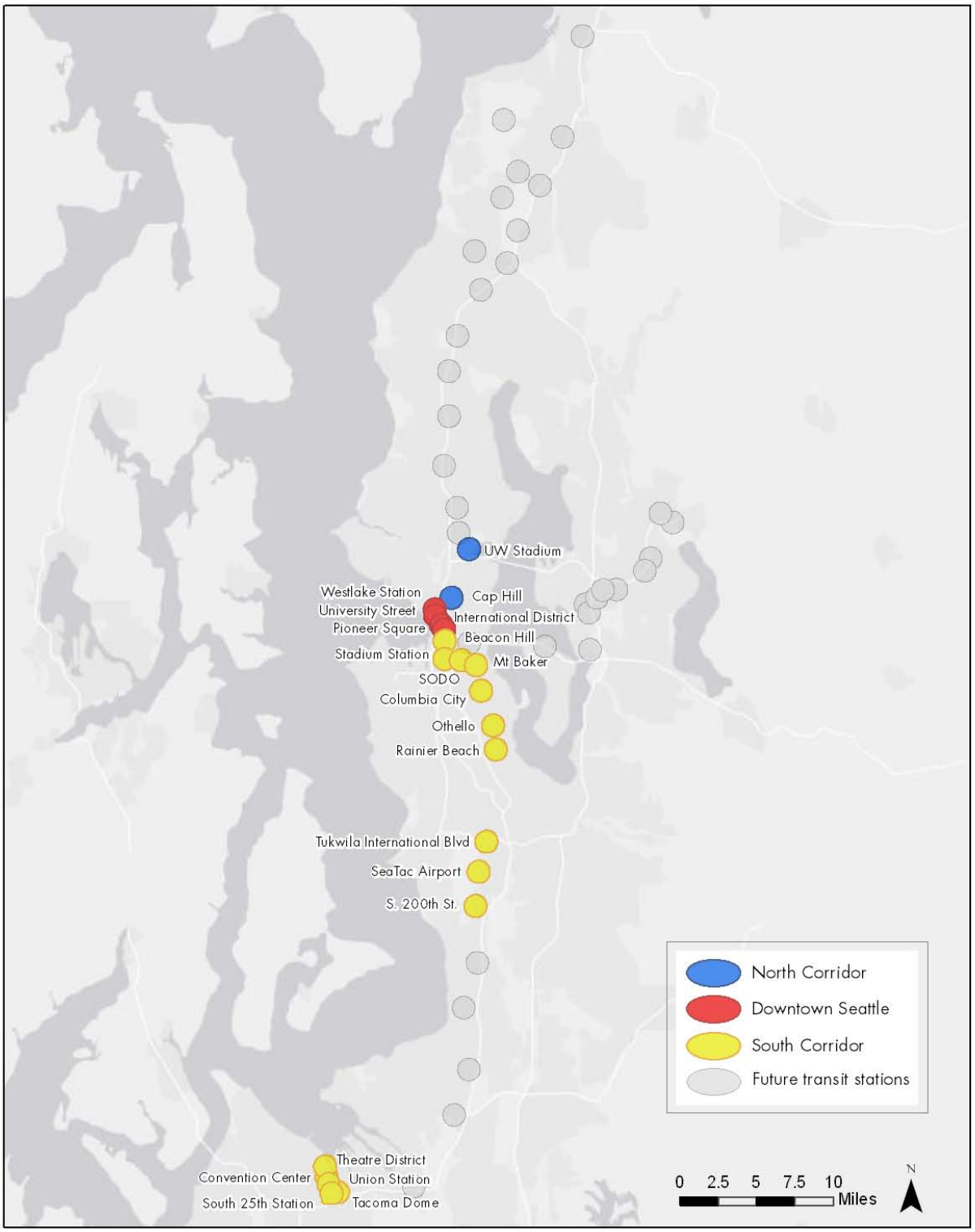
2030 Transit Shed

Between 2020 and 2030, the transit network is assumed to expand considerably to the east and north (Figure 2). Most of the East Corridor stations, with the exception of the Downtown Redmond and Southeast Redmond, are expected to start operation during this decade. In the North Corridor, it is assumed that seven stations from Brooklyn to Lynnwood will be added. The South Corridor is not expected to grow considerably during this decade. In the set of assumptions used for this analysis, the sole addition to the South Corridor in this decade is Highline CC Station.

2040 I-5 Transit Shed and 2040 SR-99 Transit Shed

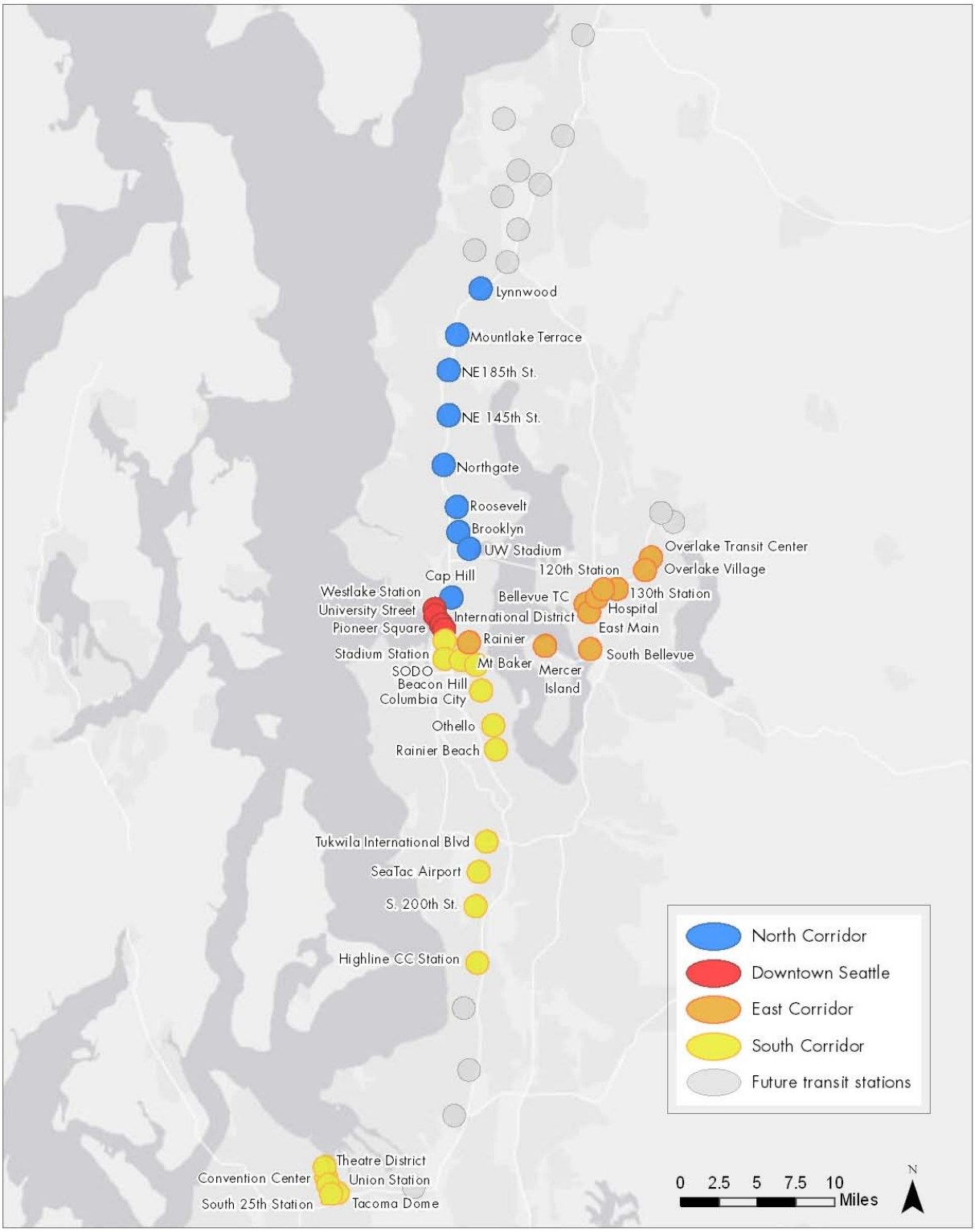
In the final stage of system expansion, the East Corridor is assumed to add two stations in Redmond, and the existing Tacoma Link stations will be connected with the rest of the South Corridor through the addition of four stations between Fife and Redondo. The North Corridor is expected to expand by five stations, terminating at Everett Station. These TOD demand estimates include two scenarios that represent two possible alignments for this segment of the North Corridor, one that runs along the I-5 (Figure 3) and another that runs along the SR-99 and then over to the Boeing plant at Paine Field (Figure 4). Given the number of jobs at the Boeing job center and the distinction in land uses and development patterns surrounding the two alignments, there may be significant difference in potential growth for the two alignments.

Figure 1. Assumed Transit Shed in 2020



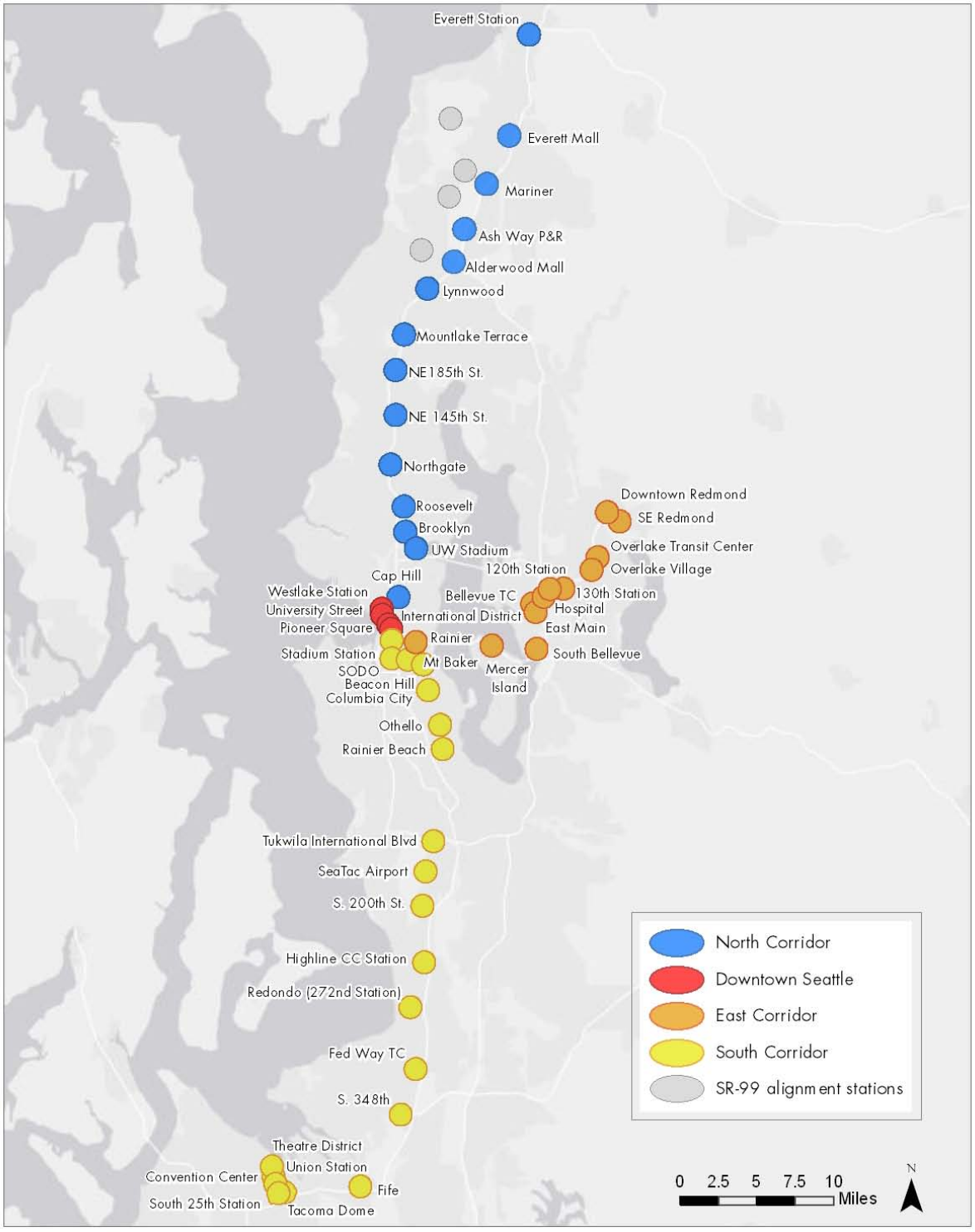
Source: PSRC, 2012; Strategic Economics, 2012

Figure 2. Assumed Transit Shed in 2030



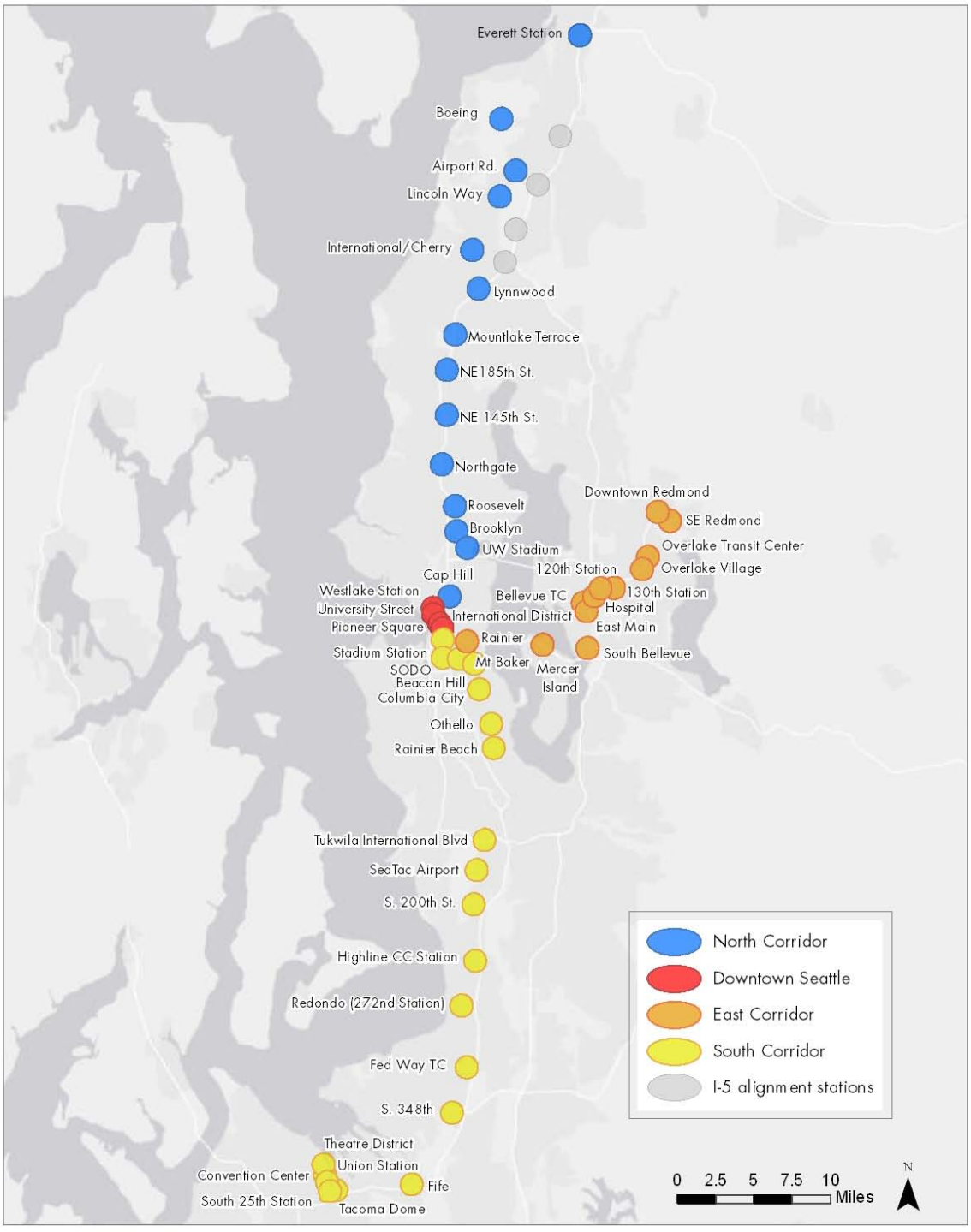
Source: PSRC, 2012; Strategic Economics, 2012

Figure 3. Assumed Transit Shed in 2040 with I-5 alignment in North Corridor



Source: PSRC, 2012; Strategic Economics, 2012

Figure 4. Assumed Transit Shed in 2040 with SR-99 alignment in North Corridor



Source: PSRC, 2012; Strategic Economics, 2012

II. NATIONAL RESEARCH ON TRANSIT ORIENTED DEVELOPMENT

Household and employer preferences

Ongoing research over the past decade into the locational preferences and behavior of people and businesses suggests that certain subsets of each group have strong – and potentially unmet – demand for transit-oriented residential and commercial space. This section builds on the research included in the *Central Puget Sound Region TOD Market Study* to provide insight into the types of households and employers that choose to live around transit, with the goal of informing the residential and commercial TOD demand estimates.

Young singles and couples without children are most likely to live around transit.
In the mid-2000s, the Center for Transit-Oriented Development (CTOD) created a national TOD database to determine how many and what kinds of households lived within a half-mile of an existing fixed-rail transit station. The national TOD database found that households composed of one or two people, non-family households, and households with householders age 15 to 34 were most likely to live near existing transit stations – in other words, young singles and couples with no children.[3] In addition, young singles are the group most interested in "walkability," mixed-use neighborhoods, and short commutes.[4] Recent Department of Transportation statistics show that average daily vehicle miles travel (VMT) for people under 35 has declined steadily since 1995, while daily VMT for the population over 35 has continued to increase except for during the recession of the last few years.[5]

Young families, particularly those with children, overwhelmingly prioritize high-quality schools in making location decisions and are more likely to choose single-family homes even if it means a longer commute to work.[6] The fact that families are currently underrepresented in station areas may reflect a lack of supply of family-sized units or lack of family-friendly amenities, rather than household preference for locations away from transit. Thus, these types of households may still represent unmet demand for transit-oriented housing..

Research on changing household preferences suggests that the Baby Boomer generation may be interested in downsizing and moving to more amenity- and transit-rich neighborhoods. Although CTOD found that householders age 65 and older were the least likely to live near transit in 2000, there is evidence to suggest that the preferences of older householders are changing, particularly as the Baby Boomer generation enters retirement age. Recent surveys found that people age 55 and over are more likely to prioritize public transportation, "walkability," and access to amenities, and are more receptive to townhouses and condos with smaller yards than are younger households.[7] Based on these findings, CTOD

[3] Center for Transit-Oriented Development, *Hidden in Plain Sight: Capturing the Demand for Housing Near Transit*, September 2004, http://www.reconnectingamerica.org/resource-center/books-and-reports/2004/hidden-in-plain-sight-capturing-the-demand-for-housing-near-transit/.

[4] Belden Russonello & Stewart, *The 2011 Community Preference Survey,* National Association of Realtors, March 2011, http://www.realtor.org/government_affairs/smart_growth/survey.

[5] U.S. Department of Transportation, "Table 33. Vehicle Miles of Travel (VMT) per day for Younger Population Groups by Urban and rural Household Location 2009 NHTS," Summary of Travel Trends: 2009 National Household Travel Survey, June 2011, http://nhts.ornl.gov/2009/pub/stt.pdf.

[6] Belden Russonello & Steward, 2011; Myers, Dowell and Elizabeth Gearin. "Current Preferences and Future Demand for Denser Residential Environments," Housing Policy Debate 12, no. 4, 2001.

[7] Myers and Gearin, 2001; Belden Russonello & Steward, 2011.

projected that the percent of households age 65 and older living near transit will increase 10 percent by 2030.[8]

Recent demographic trends suggest that household preferences for urban living are on the rise. In an analysis of 51 major metropolitan areas, the Brookings Institution found that from 2010 to 2011 (and for the first time since the rise of the automobile in the 1920's) major cities grew faster than their suburbs.[9] While this may partially reflect the disproportionate impact of the late 2000's housing collapse on the suburban market, it also suggests that household preferences may be changing to include greater demand for urban areas, which typically include compact, walkable neighborhoods with greater access to services, amenities and a range of transit choices.

Employment centers and downtown districts are among the most important factors in influencing the location of new development along transit. In a 2011 report documenting real estate development along three new transit lines[10], CTOD found that while there had been a significant amount of development along all three lines, development had occurred unevenly within the corridors. New development was most likely to locate near downtowns and other employment centers. City-led planning processes, infrastructure investments, and other public sector efforts were also found to play an important role in influencing the location of development.

The Government, Knowledge-based and Entertainment industries are more likely to locate near transit and benefit the most from transit-rich locations. A recent CTOD report suggests that although, on average, 23 percent of employment for all transit regions nationwide in 2008 was located within a ½ mile of transit zones, the "capture rate" of employment around transit varied considerably by industry. These findings are described in more detail below.

- **Government jobs**, which were shown to have the greatest affinity for transit, tend to cluster in central districts within capitals or other major cities, with a much smaller number of jobs in "branch" offices. Often these jobs will not only locate in areas with high employment densities, but will also be placed near transit as a matter of policy, to both support the transit system and facilitate access by employees and citizens.

- **Knowledge-based jobs,** which includes Information; Finance and Insurance; Real Estate; Professional, Scientific and Technical Services; and Management of Companies and Enterprises, were also more likely to be attracted to transit-rich locations. While low transportation costs and building space requirements allow these firms to cluster more densely, their role within the regional economy often dictates whether they chose to do so. For instance, a financial services firm for which the rapid transmission of information may be critical to business may have a strong incentive to aggregate within a major financial services node. In contrast, local-serving firms (such as commercial banks) may locate closer to their customers, in smaller, peripheral, retail or general commercial nodes. In addition, there is evidence that high-tech,[11] bio-tech[12] and information technology[13] firms also gain significant benefits from agglomeration in industry nodes.

[8] CTOD, 2004

[9] Frey, William. "Demographic Reversal: Cities Thrive, Suburbs Sputter." *State of Metropolitan America*. Brookings Institution, 2012, http://www.brookings.edu/research/opinions/2012/06/29-cities-suburbs-frey.

[10] Center for Transit Oriented Development. *Rails to Real Estate: Development Patterns Along Three New Transit Lines*. 2011.

[11] Rosenthal, Stuart, and William Strange. The Determinants of Agglomeration, *Journal of Urban Economics*, Vol. 50, 2001.

- **Entertainment jobs**, which include Arts, Entertainment, and Recreation; and Accommodation and Food Services sectors, showed a moderate propensity to locate near transit, and experienced job growth within transit zones at a faster rate than the region as a whole. There appears to be a positive effect of agglomeration for artistic and cultural services such as schools, dance studios, and art galleries. The literature suggests that the ability to share workers, technology, and marketing compels artistic and cultural enterprises to locate in areas with a high concentration of similar firms.[14] These agglomerations are most likely to be in cultural centers in central cities are near major educational institutions.

- **Education and Medical jobs** are a mix between those that serve residential populations, such as primary schools, secondary schools and community hospitals, and those that serve the region, such as large universities and research hospitals. While the first category is more likely to locate according to demographic factors, the second category – large universities and research hospitals – make strategic locational decisions which vary by institution and by region. Although the CTOD study did not show a direct relationship between "Eds and Meds" jobs and transit at the national level, University of Washington recent decision to locate in Downtown Tacoma suggests that transit is an important factor when considering the location and expansion of educational and medical campuses throughout the region.

Evidence from peer regions

In addition to the insights into household and employer preferences described in the preceding section, data on transit systems throughout the United States provide a valuable quantitative reference for estimating TOD demand as a transit system grows. The national TOD database is an online resource provided by the Center for Transit-Oriented Development as a tool for planners, government officials, developers, academics and others. The database provides economic and demographic data for every existing and proposed fixed guideway transit station area in the U.S., in 54 metro areas. Data is derived from nationally available data sets including the 2000 and 2010 Decennial Census, the 2009 American Community Survey, the 2000 Census Transportation Planning Package, and 2002 - 2009 Local Employment Dynamics.

To get a sense for realistic employment and household capture rates in comparable systems, Strategic Economics examined six transit systems in six different regions, including San Diego, Denver, Portland and San Francisco. These peer regions were chosen on the basis of several factors, including the nature of the transit system (light rail in all cases except for San Francisco), number of total households and jobs in the region, and transit shed employment capture rate. Some of the peer regions have transit systems comparable in size to the expected Puget Sound light rail network in 2020, while other peer regions have more extensive systems comparable to the expected Puget Sound light rail network in 2040. Appendix B includes more details about these peer systems.

A key insight from CTOD's research and from Strategic Economics' analysis of peer regions is that transit access to employment is a key factor in demand for housing near transit. A comparison of employment and household capture rates in the peer regions shows a clear correlation between the two.

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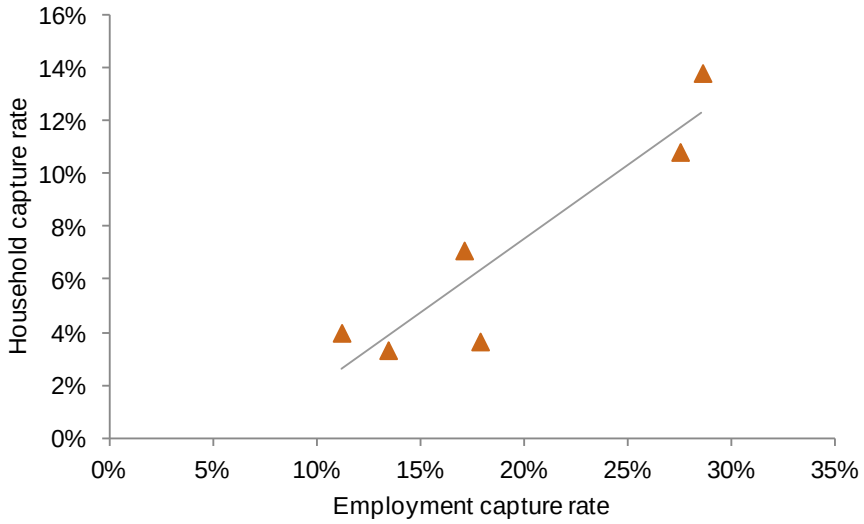
[12] Sambidi, Pramod R. *Spatial Econometric Analysis of Agglomeration Economies Associated with the Geographical Distribution of the Biotech Industry*. Diss. Louisiana State University, 2007.

[13] Ibid

[14] Gabe, Todd M. City-Industry Agglomeration and Changes in the Geographic Concentration of Industry. Rep. Morgantown: *Review of Regional Studies*, 2008.

As illustrated in Figure 5, a one percent increase in employment capture rate corresponds to a roughly 0.5 percent increase in household capture rate, implying that demand for housing near transit increases as more employment is captured within transit station areas.

Figure 5. Relationship between household and employment capture rates for transit systems in peer regions



Source: CTOD, 2012; Strategic Economics, 2012

III. COMMERCIAL DEMAND ESTIMATES

These commercial demand estimates are presented in terms of projected job growth. The first part of this section provides a summary of regional and transit shed employment trends from 2000 to 2010, providing historic context for the employment growth projections presented in the second part of this section.

Employment Trends

This trends analysis is informed by a memo on growth patterns prepared by Gardner Economics, which is included in Appendix E and referenced throughout. Figures 6, 7 and 8 contain a breakdown of employment trends by build out year, including 2010, 2020, 2030 and both the State Route 99 and Interstate 5 alignments in 2040. Key findings are summarized below.

Despite a regional increase in total employment, PSRC transit sheds experienced a decrease in employment from 2000 to 2010. Although overall employment in the Puget Sound region grew 3 percent from 2000 to 2010, transit sheds in all build out years experienced significant job loss – both in absolute numbers and as a share of regional growth (Figures 6, 7 and 8). Two significant recessions (2001 – 2003 and 2007 – 2012) during this time period may have played a significant role in the loss of jobs within the transit sheds compared to outlying areas.[15] For example, the collapse of Washington Mutual resulted in the loss of thousands of jobs in Downtown Seattle. The loss of jobs in the transit sheds – particularly those in Downtown Seattle – may also reflect a broader national trend towards decentralization in recent decades, with job growth in the suburbs consistently outpacing that in more urban areas.[16]

In general, transit-supportive industries defied the broader trend, adding jobs and share of regional employment within the transit shed. Employment decentralization did not impact all industries and locations in the Puget Sound region evenly. Although the broader industry groups[17] listed in Figures 6, 7 and 8 lost overall employment share, a more detailed evaluation of the employment trends at the industry level reveals that certain industries and locations added employment within the transit sheds from 2000 to 2010:

- The **Information Services sector**[18] (a component of the Knowledge-based industry group) **experienced significant growth from 2000 to 2010 in the 2030 transit shed**, primarily driven by the presence and growth of Microsoft and other high tech firms in the East Corridor. The 2030 transit shed gained nearly 12,000 new Information Services jobs from 2000 to 2010, outpacing the nation by a wide margin (34 percent growth in Information Services employment,

[15] *Commentary on the 2012 Regional Economic Forecast Results & the Factors Influencing Regional Growth Patterns*; Gardner Economics, p17 and 18 (see Appendix E).

[16] Kneebone, Elizabeth. Job Sprawl Revisited: The Changing Geography of Metropolitan Employment." *Brookings Institution*. 2009.

[17] Consistent with Strategic Economics' previous employment analyses, employment trends in Figures 5, 6 and 7 are presented at the industry group level – in which industries classified by the two-digit North American Industry Classification System (NAICS) are clustered together based on shared characteristics to simplify analysis. See Appendix C for a listing of two-digit NAICS industries within each larger industry group.

[18] According to the U.S. Census Bureau, the main components of the Information Services sector are "publishing industries, including software publishing, and both traditional publishing and publishing exclusively on the Internet; the motion picture and sound recording industries; the broadcasting industries, including traditional broadcasting and those broadcasting exclusively over the Internet; the telecommunications industries; the industries known as Internet service providers and web search portals, data processing industries, and the information services industries."

compared to a loss of 25 percent at the national level[19]). By 2010 the 2030 transit shed contained more than half (54 percent) of the region's Information Services jobs.

- The **Entertainment industry group[20] experienced growth** in total number of jobs and capture rate **in transit sheds for all build out years**. The Entertainment industry added approximately 5,000 new jobs from 2000 to 2010 in the 2040 transit sheds, reflecting a growth rate of 14 percent compared to 9 percent region-wide. Transit nodes in the 2010 transit shed accounted for more than half of this job growth, likely driven by growth in Downtown Seattle.

- The **Education sector[21] experienced a positive growth in jobs and a steady capture rate in all transit sheds** from 2000 to 2010. The strongest growth occurred in the 2020 transit shed, which includes the transit nodes around the University of Washington Seattle and Tacoma Campuses. The 2020 transit shed added approximately 2,800 new Education jobs from 2000 to 2010, accounting for a 10 percent increase over 2000, which is consistent with regional growth in Educational employment in that time period.

- The **State Route 99 alignment of the 2040 transit shed captured a greater share of regional employment in the Metal Manufacturing[22] sector of the Manufacturing industry** in 2010 compared to 2000. Although the SR-99 2040 transit shed experienced an absolute loss in Metal Manufacturing employment from 2000 to 2010, the rate of loss was significantly less than the region (-5 percent compared to -20 percent). The relatively stronger performance of Metal Manufacturing in the SR-99 alignment of the 2040 transit shed is driven by the presence of the Boeing plant in Everett.

If historic growth patterns continue, Information Services employment is likely to continue to concentrate around the East Corridor study areas. The PSRC regional employment forecast predicts that employment in the Information Services sector will more than double from 2010 to 2040, outpacing total employment growth significantly (101 percent growth in Information Services employment from 2010 to 2040 compared to 58 percent for all sectors). Other transit supportive industries, such as Entertainment and Education, are also projected to experience robust growth from 2010 to 2040. Given that Information Services and other transit-supportive industries are more likely to locate within the transit shed, their relatively strong growth may contribute to the recentralization of employment in the Puget Sound Region. The presence of more than 6.6 million square feet of planned and proposed development[23] in Downtown Seattle area provides further evidence of this trend.

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[19] *Commentary on the 2012 Regional Economic Forecast Results & the Factors Influencing Regional Growth Patterns*; Gardner Economics, p14 (see **Appendix E).**

[20] The Entertainment Industry group includes the Arts, Entertainment, and Recreation and Accommodation and Food Services sectors. According to the U.S. Census Bureau, the **Arts, Entertainment, and Recreation sector includes** "1) establishments that are involved in producing, promoting, or participating in live performances, events, or exhibits intended for public viewing; (2) establishments that preserve and exhibit objects and sites of historical, cultural, or educational interest; and (3) establishments that operate facilities or provide services that enable patrons to participate in recreational activities or pursue amusement, hobby, and leisure-time interests." **The Accommodation and Food Services sector includes** "establishments providing customers with lodging and/or preparing meals, snacks, and beverages for immediate consumption."

[21] The Education sector in this analysis varies from the traditional NAICS definition in that it includes only publicly funded Education employment, including primary and secondary education, as well as public universities.

[22] The Primary Metal Manufacturing sector includes Aerospace and Other Durable Goods.

[23] Source: City of Seattle Planning Department.

Figure 6: 2000 and 2010 employment by industry group for the region and 2010 Transit Shed

	Region			2010 Transit Shed (Existing Station Areas)					
				Jobs			Capture Rate		
	2010 Jobs	Total Change 2000-10	% Change 2000-10	2010 Jobs	Total Change 2000-10	% Change 2000-10	2000	2010	Change 2000-10
Knowledge-Based	304,707	13,939	5%	62,249	-13,048	-17%	26%	20%	-5%
Education and Medical	321,093	54,674	21%	20,236	3,082	18%	6%	6%	0%
Entertainment	153,625	12,921	9%	22,072	2,778	14%	14%	14%	1%
Government	236,906	32,805	16%	42,856	-412	-1%	21%	18%	-3%
Retail	170,757	-4,527	-3%	8,894	-6,404	-42%	9%	5%	-4%
PDR	286,617	-59,282	-17%	14,506	-18,394	-56%	10%	5%	-4%
Natural Resources	5,431	-2,169	-29%	158	-9	-5%	2%	3%	1%
Other	133,278	-8,862	-6%	9,443	-2,087	-18%	8%	7%	-1%
Total	1,612,414	39,499	3%	180,414	-34,494	-16%	14%	11%	-2%

Source: Washington State; Puget Sound Regional Council; Strategic Economics 2012

Figure 7: 2000 and 2010 employment by industry group for 2020 transit shed and 2030 transit shed

	2020 Transit Shed (Existing and Potential Station Areas)						2030 Transit Shed (Existing and Potential Station Areas)					
	Jobs			Capture Rate			Jobs			Capture Rate		
	2010 Jobs	Total Change 2000-10	% Change 2000-10	2000	2010	Change 2000-10	2010 Jobs	Total Change 2000-10	% Change 2000-10	2000	2010	Change 2000-10
Knowledge-Based	66,042	-12,496	-16%	27%	22%	-5%	129,663	-3,232	-2%	46%	43%	-3%
Education & Medical	48,848	4,022	9%	17%	15%	-2%	66,088	7,041	12%	22%	21%	-2%
Entertainment	25,308	3,141	14%	16%	16%	1%	35,703	4,082	13%	22%	23%	1%
Government	44,014	-389	-1%	22%	19%	-3%	50,436	-171	0%	25%	21%	-4%
Retail	10,474	-6,797	-39%	10%	6%	-4%	23,358	-7,856	-25%	18%	14%	-4%
PDR	20,876	-14,247	-41%	10%	7%	-3%	28,344	-19,892	-41%	14%	10%	-4%
Natural Resources	158	-9	-5%	2%	3%	1%	160	-81	-34%	3%	3%	0%
Other	10,015	-2,193	-18%	9%	8%	-1%	18,519	-2,471	-12%	15%	14%	-1%
Total	**225,736**	**-28,967**	**-11%**	**16%**	**14%**	**-2%**	**352,271**	**-22,580**	**-6%**	**24%**	**22%**	**-2%**

Source: Washington State; Puget Sound Regional Council; Strategic Economics 2012

Figure 8: 2000 and 2010 employment capture rates by industry group for 2040 I-5 and 2040 SR-99 transit sheds

	2040 / I-5 Transit Shed (Existing and Potential Station Areas)						2040 / SR-99 Transit Shed (Existing and Potential Station Areas)					
	Jobs			Capture Rate			Jobs			Capture Rate		
	2010 Jobs	Total Change 2000-10	% Change 2000-10	2000	2010	Change 2000-10	2010 Jobs	Total Change 2000-10	% Change 2000-10	2000	2010	Change 2000-10
Knowledge-Based	136,188	-5,452	-4%	49%	45%	-4%	134,414	-6,321	-4%	48%	44%	-4%
Education & Medical	71,547	8,901	14%	24%	22%	-1%	70,686	8,604	14%	23%	22%	-1%
Entertainment	43,614	5,395	14%	27%	28%	1%	41,625	5,091	14%	26%	27%	1%
Government	56,768	745	1%	27%	24%	-3%	56,019	777	1%	27%	24%	-3%
Retail	34,266	-7,275	-18%	24%	20%	-4%	30,287	-7,789	-20%	22%	18%	-4%
PDR	32,881	-21,670	-40%	16%	11%	-4%	49,502	-18,039	-27%	20%	17%	-2%
Natural Resources	174	-76	-30%	3%	3%	0%	160	-90	-36%	3%	3%	0%
Other	20,912	-3,137	-13%	17%	16%	-1%	20,773	-3,460	-14%	17%	16%	-1%
Total	396,350	-22,569	-5%	27%	25%	-2%	403,466	-21,227	-5%	27%	25%	-2%

Methodology overview

Strategic Economics' projections for employment growth in the PSRC rail corridor are based on the concept of a transit shed "capture rate." Over the next three decades, the station areas in the light rail network will capture a certain percentage of regional employment growth. Forecasts for each decade of growth are derived by applying this capture rate to regional employment projections.

One of the key insights informing the projections is that different industry sectors vary in their propensity to agglomerate and to locate near transit. As noted in the preceding discussion of employment trends and summarized in Figure 6, the capture rates for the existing (2010) transit shed are significantly higher in the knowledge, entertainment and government sectors than in other sectors. These sectors, along with education and medical employment, are also strongly represented in the 2020, 2030 and 2040 transit sheds.

The "status quo growth scenario" assumes that future job growth in the transit shed will be consistent with the current share of jobs in each sector that are located in the existing and potential station areas. In other words, the expansion of the light rail network throughout the region will neither increase nor decrease the demand for commercial space in the transit shed. If the sectors with high existing capture rates account for a disproportionate share of job growth over the next few decades, the overall concentration of jobs near transit will increase relative to the present.

In the "transit-oriented growth scenario," the expansion of the light rail network results in increased employment growth near transit relative to the region as a whole. This is modeled by increasing the transit shed's capture rate of new jobs in transit-supportive industries, acknowledging recent trends toward agglomeration and expansion of key industries around existing central job centers, as noted in the Employment Trends section. This higher growth scenario effectively corrects for de-centralizing recessionary conditions of the 2000s in key sectors.

Within the transit shed, job growth is distributed among the corridors based on the existing distribution of jobs by sector. For example, Downtown Seattle contains a large share of the transit network's financial services jobs, so it will receive a proportional share of growth in this sector.

Details on the forecast methodology are provided in Appendix A.

Regional growth overview

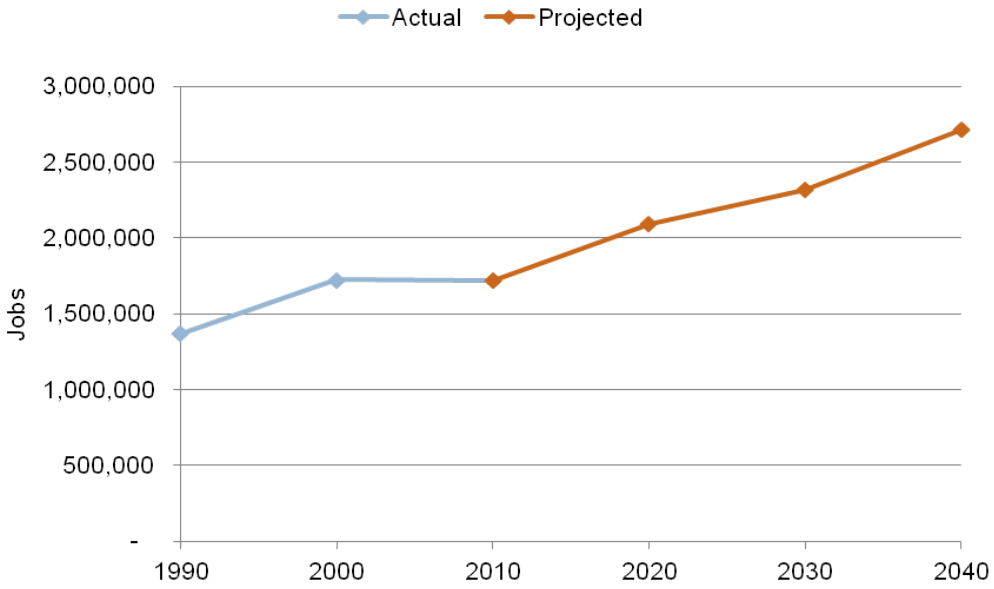
The 2012 PSRC Regional Economic Forecast forms the starting point for Strategic Economics' TOD growth estimates.[24] These projections also serve as the regional control totals for the 2012 Land Use Forecasts derived from the UrbanSim model.

[24] The 2012 PSRC Regional Economic Forecast is produced by a new regional economic model system, which is actually a series of linked forecasting modules. The model system was developed by the firm ECONorthwest (Dr. Andrew Dyke and Dr. Randall Pozdena). The model system links one of the best national economic models (a model by Professor Ray Fair of Yale University) to a top-level regional model, and then to a series of regional sub models. These sub models provide geographic dimensionality and, in turn, are linked to transportation tax base modules. This model was originally created for the region in 2006 and has been updated for use in the 2012 Land Use Forecasts and reflects the latest thinking on the regional and national economies.

Figure 9 below shows actual and projected employment growth in the four-county region. As of 2010, the four-county region had 1.7 million jobs, roughly the same number of jobs as in 2000. While the employment grew by 26 percent from 1990 to 2000, the two recessions in the past decade have resulted in flat job growth between 2000 and 2010.

Over the next three decades, job growth is expected to resume, with a particularly strong recovery in this decade. The 2012 PSRC Regional Economic Forecast projects growth of nearly 1,000,000 jobs between the years 2010 and 2040. The rate of employment growth across the forecast period is not constant and is influenced considerably by national economic conditions and trends. From 2010 to 2020 the region is expected to gain 371,000 jobs representing job growth of 22 percent. Sometime around 2020, federal budgetary pressures are assumed to require some form of fiscal consolidation which results in a considerably lower rate of job growth of 226,000, or 11 percent, for the decade. Finally, during the last decade of the forecast period both the national and regional economies are expected to see strong job growth and a strong export economy as a dividend from the previous period of fiscal retrenchment. The increase in employment within the region for that last decade of the forecast period is nearly 394,000 jobs. As has occurred historically, the central Puget Sound region is expected to experience the same economic trends as the nation as a whole, but with a somewhat more pronounced magnitude.

Figure 9. Employment growth in the four-county region



Source: PSRC, 2012

TOD Employment Growth Projections

Figure 10 summarizes projected job growth for each corridor in each decade of system expansion, under both the status quo and transit-oriented growth scenarios. These numbers reflect job growth only in station areas that comprise the transit shed in the given forecast decade; job growth is assumed to occur outside the transit shed as well, but is not captured in the table. For example, although there will certainly be job growth in the future station areas of the East Corridor between 2010-2020, no job growth is listed for the East Corridor for 2010-2020 because the East Corridor stations will not be part of the transit shed until the forecast decade 2020-2030.

Figure 10. Transit shed employment growth projections for 2020, 2030 and 2040

Corridor	2010-20 Job Growth		2020-30 Job Growth		2030-40 I-5 Job Growth		2030-40-SR99 Job Growth	
	Status Quo Growth	Transit-Oriented Growth	Status Quo Growth	Transit-Oriented Growth	Status Quo Growth	Transit-Oriented Growth	Status Quo Growth	Transit-Oriented Growth
North	6,400	6,400	8,200	9,400	16,200	18,600	17,300	19,000
Downtown Seattle	34,200	47,500	20,200	23,100	36,600	41,200	36,600	41,300
East	N/A	N/A	22,900	28,700	41,900	51,300	41,900	51,600
South	13,500	13,500	7,800	8,700	17,200	18,900	17,200	19,000
Total	**54,100**	**67,400**	**59,100**	**69,900**	**111,900**	**129,900**	**113,000**	**131,000**

Note: Numbers may not sum due to rounding

Source: Strategic Economics, 2012

2010 to 2020

Transit shed job growth

The status quo growth scenario assumes that the 2020 transit shed's share of the regional employment growth will be the same as the current share of jobs located in the existing and potential station areas. Based on this assumption, the combined 21 station areas in the 2020 light rail network will gain 54,100 jobs between 2010 and 2020, representing 15 percent of regional job growth during this period. A significant 57 percent of these new jobs in the transit shed will be in the knowledge-based sectors of information services, financial services and professional and business services. This high share is due to the fact that these sectors are growing in the region as a whole and that firms in these sectors are likely to locate near transit.

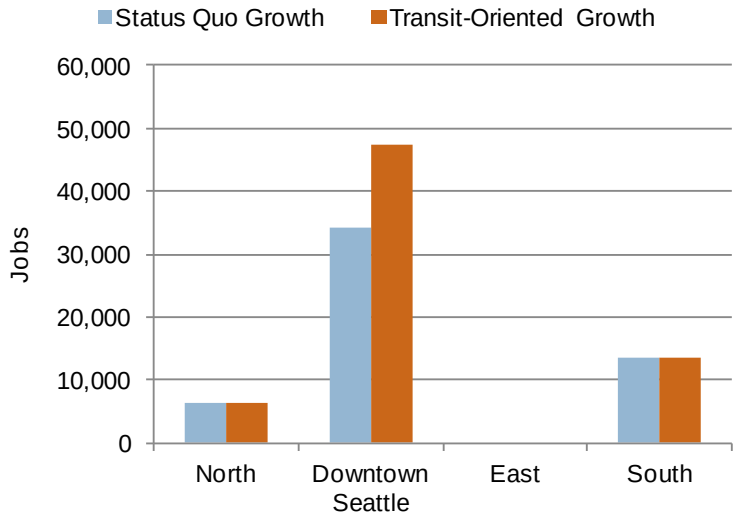
The 2020 transit-oriented growth scenario increases the transit shed's capture rate of regional job growth in Retail and in the knowledge-based industries of Information Services, Financial Services and Professional and Business Services. (The inclusion of Retail as a transit-supportive industry is based on the recognition that online retailers, which are a major presence in the Puget Sound economy, tend to have workforce needs and locational preferences more akin to knowledge sector firms than to traditional retailers.) The transit shed employment capture rates for these sectors were increased based on current and pipeline development activity in the Downtown Seattle job center, where there is a strong indication that employment growth will continue to concentrate over the course of this decade. This is in keeping with recent national trends showing commercial development growth returning first to major regional job centers, post-recession. This scenario results in a projected 67,400 new jobs in the transit shed during this decade, representing 18 percent of regional job growth.

Distribution of jobs among corridors

In 2020, Downtown Seattle will still be by far the largest job center in the transit network, with job centers in the East Corridor and Boeing not joining the transit shed until later decades. As of 2010, the Downtown Seattle transit station areas contained 57 percent of all jobs in the 2020 transit shed. Because Downtown Seattle has high concentrations of employment in the very sectors which are expected to grow over the next 10 years, it is projected to capture an even greater share of new job growth – 63 percent in the status quo scenario and 70 percent of new job growth in the transit-oriented growth scenario.

The North Corridor, which is assumed to consist of only the Capitol Hill and UW Stadium Stations in 2020, is projected to add 6,400 jobs during this decade, primarily in Public Education and Professional and Business Services. The South Corridor is projected to add 13,500 jobs over the course of the decade, primarily in Professional and Business Services, Health and Social Services, and Transportation and Warehousing. Neither the North Corridor or the South Corridor are projected to benefit substantially in the near term from increased commercial TOD demand; hence the projected employment growth for these corridors remains the same in both the status quo and transit-oriented growth scenarios.[25]

Figure 11. Projected 2010-20 employment growth for 2020 transit shed



Source: Strategic Economics, 2012

2020 to 2030

Transit shed job growth

These TOD estimates assume that the light rail network will expand significantly between 2020 and 2030, adding 18 stations. In particularly, the addition of the East Corridor will bring a large share of tech sector jobs into the transit shed. In 2010, the geographic area corresponding to the 2030 transit shed contained 22 percent of the region's jobs. For certain sectors, the transit shed's 2010 capture rate was much higher than the average: 54 percent for Information Services and 37 percent for Financial Services. Assuming that these sector-specific capture rates remain constant, the transit shed will attract 59,100 jobs between 2020 and 2030, corresponding to 26 percent of regional job growth.

In the transit-oriented growth scenario, it is assumed that the transit shed will increase its share of new retail and knowledge sector job growth. Densification of employment in these sectors will be driven by firms seeking agglomeration benefits and by firms' recognition that transit access and urban amenities

[25] The north end of the South Corridor and south end of Downtown Seattle overlap substantially in the SODO, Pioneer Square and International District station areas. Because the near-term planned development of the CenturyLink Stadium North parking lot is closer and easier to walk to from either the Pioneer Square or International District station, potential job growth related to this prospective TOD project is assigned to the Downtown Seattle area.

are valued by their workforce. Based on these factors, transit shed employment growth is projected to be 69,900 over the ten year period, or 31 percent of regional job growth.

In both the status quo and transit-oriented growth scenarios, the share of growth captured by the 2030 transit shed is much higher from 2020 to 2030 than from 2010 to 2020, due to the larger geographic area of the network. Because the regional job growth is projected to slow down considerably relative to the previous decade, however, the number of jobs added to the transit shed in this decade is not significantly more than in the previous decade.

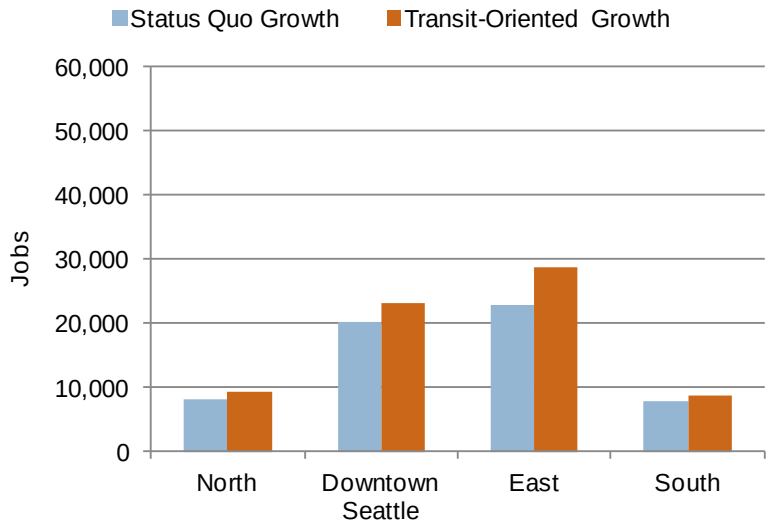
Distribution of jobs among corridors

With the addition of the jobs-rich East Corridor to the transit shed, the distribution of jobs among the corridors changes considerably from the previous decade. As shown in Figure 12, the East Corridor is projected to capture a slightly larger share of transit shed jobs than Downtown Seattle. At this point, it is unclear how intra-regional competition for jobs will unfold between Downtown Seattle and the East Corridor. Both are major job centers, and both have strong potential for future growth. While the East Corridor currently has a much larger share of the fast-growing Information Services sector than Downtown Seattle, recent and pipeline development in South Lake Union and Denny Triangle indicate that Seattle is increasingly becoming attractive to tech companies seeking a more urban environment. At the same time, as the economic forecast memo from Gardner Economics points out, some locations in the East Corridor, such as the Spring District, are planning for higher intensity mixed use development in proximity to future light rail stations. Although industrial districts such as the Bel-Red corridor lack the momentum currently seen in Downtown Seattle, they also have substantial capacity for long-term growth in proximity to the existing Downtown Bellevue and Microsoft/Overlake job centers. The Spring District master plan alone provides capacity for up to 4.1 million square feet of office space.[26]

Over the course of the decade, the North Corridor is projected to gain between 8,200 and 9,400 jobs, while the South Corridor is projected to gain between 7,800 and 8,700 jobs. In the transit-oriented growth scenario, both corridors are projected to benefit somewhat from an increase in capture rate of retail and knowledge sector jobs, but the increase in job growth is not as great as for Downtown Seattle and the East Corridor, which have a much higher share of jobs in these sectors than the North and South Corridors.

[26] Pryne, Eric. "Developers plant seeds for 'Spring District' growth in Bellevue", *Seattle Times*, June 13, 2012, http://seattletimes.nwsource.com/html/businesstechnology/2018426714_spring14.html

Figure 12. Projected 2020-30 employment growth for 2030 transit shed



Source: Strategic Economics, 2012

2030 to 2040

Transit shed job growth

These TOD demand estimates assume that the transit network will expand at the outer reaches of the North, East and South Corridors between 2030 and 2040, adding a total of 12 stations. Of the five new stations that are expected to be added to the North Corridor during this decade, the location of four will depend on whether the I-5 or SR-99 alignment is chosen. Because the existing conditions around these two alignments differ, the existing and projected employment capture rates will also differ.

The SR-99 alignment would bring the Boeing job center into the reach of the transit network, and thus the transit shed will capture a greater share of regional jobs with the SR-99 alignment than with the I-5 alignment. In 2010, the 14 station areas of the North Corridor including the four I-5 alignment stations contained 81,000 jobs, while the North Corridor with the SR-99 alignment contained 97,200 jobs. In the status quo growth scenario, the transit system as a whole with the I-5 alignment would gain 111,900 jobs, while the system as a whole with the SR-99 alignment would gain 113,000 jobs.

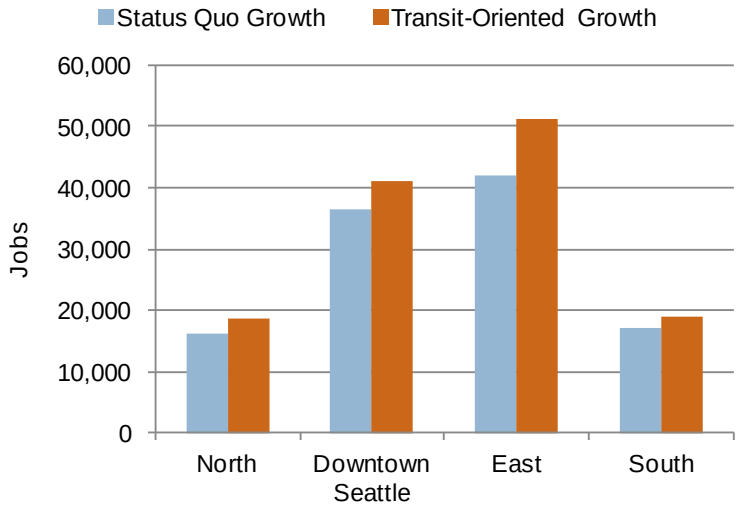
In the transit-oriented growth scenario, the SR-99 alignment's greater share of regional employment has a diminished effect because the I-5 alignment has a larger share of retail and professional services, which are expected to see some transit-oriented growth, while the SR-99 alignment has a concentration of manufacturing employment, which is not typically suited for transit-oriented development. Projected growth for the East Corridor and Downtown Seattle varies by a few hundred jobs depending on whether the I-5 and SR-99 alignment is chosen, because greater employment in one corridor could potentially help attract more jobs elsewhere in the transit network.

Job distribution by corridor

The distribution of job growth in this decade is quite similar to the previous decade, with the East Corridor receiving the greatest share of new jobs (37 percent) and Downtown Seattle receiving a large share of job growth as well (32 percent). With the addition of four new stations that finally link the downtown Tacoma stations to the rest of the network, the South Corridor is projected to increase its share of growth from 13 percent in the previous decade to 15 percent in this decade. In the status quo

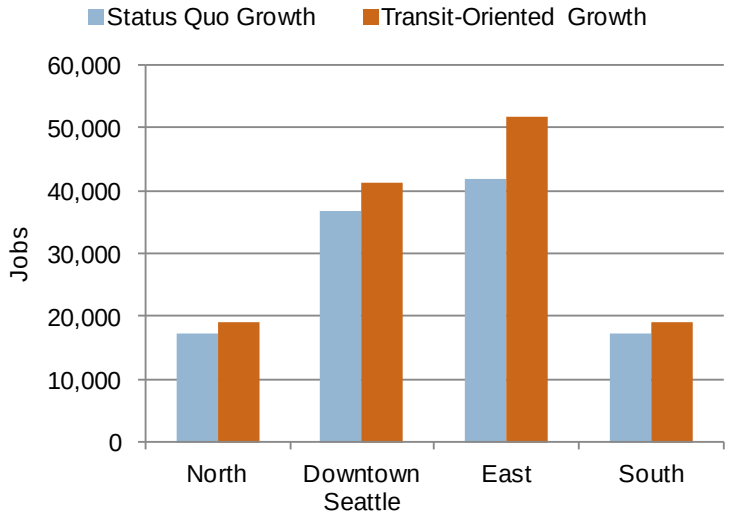
growth scenario, the share of growth captured by the North Corridor is 14.5 percent with the I-5 alignment and 15.3 percent with the SR-99 alignment. In the transit-oriented growth scenario, most of the additional transit-oriented growth is captured by the East Corridor and Downtown Seattle, so both alignments decrease in share of total job growth to 14.3 percent for the I-5 alignment and 14.5 percent for the SR-99 alignment.

Figure 13. Projected 2030-40 employment growth with I-5 alignment in North Corridor



Source: Strategic Economics, 2012

Figure 14. Projected 2030-40 employment growth with SR-99 alignment in North Corridor



Source: Strategic Economics, 2012

IV. RESIDENTIAL DEMAND ESTIMATES

This section begins with an overview of demographic trends relevant to demand for housing in the Puget Sound light rail transit corridors. These findings help to set the context for the housing demand estimates, which are provided for each corridor and stage of system expansion. Details of the forecast methodology are provided in Appendix B.

Demographic trends

This discussion highlights similar themes to the overview of demographic trends in the *Puget Sound Region TOD Market Study*, also prepared by Strategic Economics; however, in this report, the trends are analyzed over a longer timeframe, extending back to 1990.

Regional household growth

The region has sustained strong household growth over the past two decades, although growth slowed between 2000 and 2010 relative to the prior decade. Between 1990 and 2000, the number of households in the region grew by 20 percent, with the addition of 212,000 households. Between 2000 and 2010, 172,000 household were added, representing 13 percent growth and bringing the number of households in the region to just under 1.5 million.

Household distribution

Households are highly concentrated towards the center of the transit network, and household densities in these locations have been increasing over the past decade. The highest household densities are found near the existing Downtown Seattle stations, the planned southernmost stations of the North Corridor (Capitol Hill, Brooklyn and Roosevelt), and the planned Bellevue Transit Center station in the East Corridor. Although Seattle has continued to grow, Seattle lost share of the region's population over the past two decades, receiving only 10 percent of household growth between 1990 and 2000, despite having 22 percent of the region's population in 1990. Between 2000 and 2010, Seattle absorbed 15 percent or 21,800 of the region's new households.

There are secondary concentrations of households in the northern end of the North Corridor, between Alderwood Mall and Everett, and at the southern end of the South Corridor, in Downtown Tacoma. While the household densities in these locations are not has high as towards the center of the network, these areas also show a trend towards densification between 2000 and 2010.

Household type, size and age of householder

As explained in Section II, research on transit systems throughout the United States has found that the households most likely to live near transit are small households that are either non-family households or young families without children. This section provides observations about trends related to households with these characteristics in the Puget Sound region.

The focus on small households is not intended to imply that there is no demand for family-sized units near transit. The lower representation of families with children among households near transit may be attributed to lack of supply of family-sized units and family-friendly amenities rather than to an aversion to transit-rich locations.

The cities in the PSRC rail corridor have a high share of non-family households, and this share has been increasing steadily over the past two decades. In 2010, 47 percent of households in the corridor cities were non-family households, compared to 37 percent in the region as a whole and 34 percent nationally. This share of non-family households has increased by 3 percent between 1990 and 2020. Out of all the corridor cities, Seattle has by far the highest share of non-family households, at 57 percent. Notably, the share of non-family households in the North corridor cities of Lynnwood, Everett, Mountlake Terrace and Shoreline has grown consistently over the past two decades, now at 41 percent for all four cities combined.

Small households composed of one or two persons make up the majority of households in PSRC rail corridor cities. In the 16 corridor cities combined, 68 percent of households have just one or two persons, significantly higher than the share of small households in the four-county region (62 percent) and in the nation as a whole (60 percent).

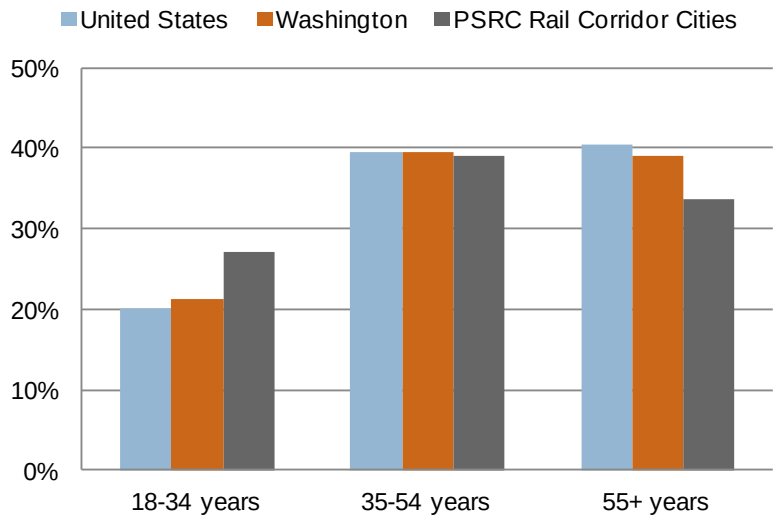
The overall share of small households within PSRC rail corridor cities has remained constant over the past two decades; however, the concentration of small households has increased in certain locations and decreased in others. The trends in household size parallel the trends for non-family households, with Seattle and the North Corridor cities having the smallest households. Seattle has an exceptionally large share of small households, with 75 percent of households having only one or two persons. The North Corridor cities have a slightly greater share of small households than the cities in the East and South Corridors, and this share has been increasing over the past decade.

The South and East corridor cities show trends toward larger household sizes, which is generally less favorable to residential transit-oriented growth. Between 1990 and 2000, the East Corridor cities of Redmond and Bellevue experienced an increase in the share of one- and two- person households. In the most recent decade, however, the share of small households decreased while the share of households with three or more people increased significantly. This trend suggests that young people who moved to the East Corridor in the 1990s started to have families in the 2000s. In the South Corridor cities, with the exception of Tacoma and Federal Way, the share of three or more person households has increased over the past two decades.

The cities in the PSRC rail corridor contain a significantly higher share of young households than the state or the nation as a whole (Figure 15). Householders between the ages of 18 and 34 account for 27 percent of households in the corridor cities, compared to 20 percent nationally. This suggests that young people are attracted to the jobs, amenities and lifestyle offered by cities in the central Puget Sound. The corridor cities with the highest shares of householders between the age of 18 and 34 are Fife (36 percent), Redmond (32 percent) and Seattle (31 percent).

As the Baby Boomers age, the share of householders over age 55 is increasing in all corridor cities as well as in the region as a whole. While householders between the ages of 35 and 54 account for the largest share of households in PSRC corridor cities (39 percent), the share of householders aged 55 and older increased by 5 percent between 2000 and 2010.

Figure 15. Distribution of Householders by Age of Householder



Source: U.S. Census; Strategic Economics, 2012.

Household tenure

With 48 percent of households renting their homes, the Puget Sound rail corridor cities have a significantly higher share of renter households than the region (38 percent) and the nation as a whole (35 percent). Although the East Corridor cities have the lowest share of renter households out of all four corridors, this share has increased by 3 percent over the past decade. In the same period, the share of renters increased by 1 percent in the North Corridor cities and remained fairly constant in Seattle and the South Corridor cities.

Income distribution

Inflation-adjusted median incomes increased over the past decade in the East Corridor and in Seattle, but decreased in the North and South Corridor cities. The variation between cities reflects the uneven effects of the recession throughout the region, with the more affluent, tech-driven East Corridor faring much better than the rest of the region. Citywide median incomes are highest in the East Corridor cities of Mercer Island, Redmond and Bellevue, and lowest in the South Corridor cities of Tukwila and Tacoma and in the North Corridor cities of Lynnwood and Everett. Because of the divergence in citywide trends over the past decade, the inflation-adjusted median household income for all corridor cities combined stayed constant**.** In 2000, the corridor cities household median income was $59,900 in 2010 dollars; by 2010, it had increased slightly to $60,600.

In the past decade, the share of very low income households increased in all corridors, and the share of low income households increased in most corridor cities. In 2000, 11 percent of households in the 16 corridor cities earned 0 to 30% of area median income (AMI). By 2010, this share had risen to 14 percent, with 3 percent increases in the North and South Corridor, and 1 to 2 percent increases in the East Corridor and Seattle. The East Corridor cities have significantly lower share of households in the lowest two income brackets, with only 15 percent of households in these two categories, compared to a 25 to 30 percent share in Seattle and the North and South Corridor cities.

Summary and Implications for TOD Demand

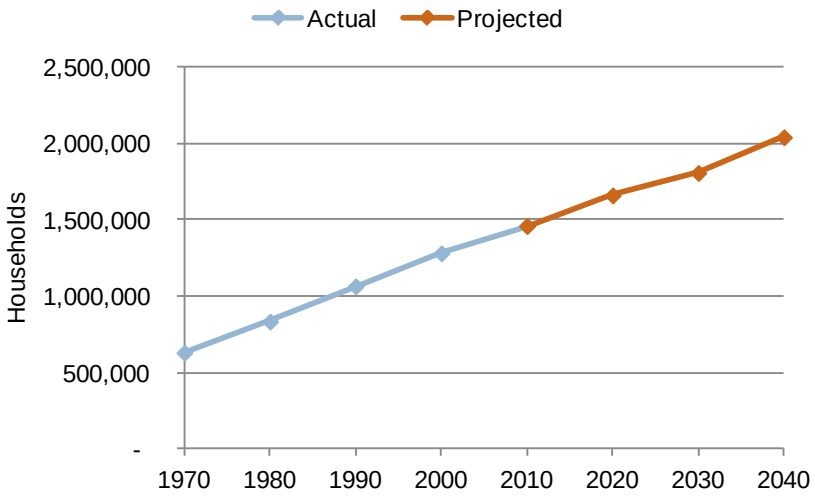
In general, the demographic patterns evident in the PSRC rail corridor are likely to translate into demand for housing near transit. The corridor cities have a higher share of small, non-family and young households than the region and the nation as a whole. Households with these characteristics are currently most concentrated in Seattle, and also represent a growing share of the North Corridor cities; it is in these corridors where the greatest TOD demand may be expected. While household size in the East Corridor has increased recently, the high share of high income, young households, and increasing share of renters suggests strong potential demand for transit-oriented housing as well. The South Corridor encompasses cities with a range of demographics, but is generally characterized by increasing household size, a high share of renter households, and falling incomes in the most recent decade. TOD demand in this corridor is likely to be concentrated in Southeast Seattle and Downtown Tacoma.

Regional picture

This subsection presents PSRC's regional household growth forecast for the next three decades, from the 2012 PSRC Regional Economic Forecast. These projections, which also serve as the regional control totals from the UrbanSim model, were a key input to Strategic Economics' residential demand projections in the transit corridor.

PSRC forecasts a total of 580,000 households to be added to the four-county region between 2010 and 2040, increasing the number of households from under 1.5 million to over 2.0 million. Strong household growth is projected for the current decade, with the number of households is projected to grow by 199,600 households or 14 percent. Growth is projected to slow down to 9 percent over the ten year period from 2020 to 2030, with only 147,000 households added to the region. From 2030 to 2040, the rate of growth is expected to recover to 13 percent, with the addition of 233,400 households over the decade. The variation in household growth by decade tracks the regional employment projections, which also suggest a dip in growth from 2020 to 2030.

Figure 16. Regional household growth, 1970-2040



Source: PSRC, 2012; Strategic Economics, 2012

The Puget Sound is home to large numbers of households that match the demographics associated with transit-oriented living. Out of the 1.5 million households in the region in 2010, 62 percent (896,000) were households of only one or two persons. 37 percent or 543,000 households in the region are non-family households. Even among family households, there are 378,000 households consisting of married couples without children. Young households, identified by those with a householder under the age of 35, represent 22 percent of households (326,000 households).

Methodology overview

Strategic Economics' approach to housing demand in the PSRC transit shed focuses on new households, deriving transit shed demand as a share of the region's household growth. Thus, demand for TOD housing depends on both overall growth in the region and the share of regional households who want to live near transit. The latter can be thought of as the transit shed household capture rate, and is shaped by a combination of factors, including the geographic extent of the transit shed, local and regional demographic trends, location and growth of job centers, and household preferences.

The "status quo growth scenario" assumes that future demand for housing in the transit shed will be consistent with the share of regional households who currently live in the existing and potential station areas. This implies that the expansion of the light rail network throughout the region will neither increase nor decrease the share of households who want to live in the transit shed.

In the "transit-oriented growth scenario," future demand for housing in the transit shed is greater than the transit shed's current share of households, based on the premise that the expansion of the light rail network will result in increased demand for housing near transit. Specifically, increased access to employment centers is expected to be a major factor in residential demand, based on prior research from CTOD and Strategic Economics' analysis of peer systems elsewhere in the U.S. As described in Section II, a one percent increase in the transit shed's share of regional employment roughly corresponds to a 0.5 percent increase in the transit shed's share of households. Based on this finding, Strategic Economics increased the transit shed's capture rate of new households in proportion to the increase in projected employment capture rate for the same decade.

For each forecast decade, housing demand was distributed among the corridors based on a residential market strength index for individual stations. The index used is a composite of demographic, market and employment indicators, adapted from the version used in the *Puget Sound Region TOD Market Study* to include projected employment for each corridor. Some of the indicators, such as current housing inventory and household density, are related to existing development. Therefore, even though these are demand-driven forecasts, supply-side factors have some influence on the distribution of demand among the corridors.

Projections

Figure 17 summarizes the projected TOD housing demand by corridor for each forecast decade and scenario. As noted for the employment growth projections, these numbers reflect housing demand only in station areas that comprise the transit shed in the given forecast decade. Housing demand is assumed to exist outside the transit shed as well, but is not captured in the table. For example, although there will be housing demand in the future station areas of the East Corridor between 2010-2020, no demand is listed for the East Corridor for 2010-2020 because the East Corridor stations will not be part of the transit shed until the forecast decade 2020-2030.

Figure 17. Projected housing demand by corridor

Corridor	2010-20 Demand		2020-30 Demand		2030-40 I-5 Demand		2030-40-SR99 Demand	
	Status Quo Growth	Transit-Oriented Growth	Status Quo Growth	Transit-Oriented Growth	Status Quo Growth	Transit-Oriented Growth	Status Quo Growth	Transit-Oriented Growth
North	2,000	4,600	3,400	10,700	6,000	15,200	6,200	16,300
Downtown Seattle	4,800	11,100	3,300	10,400	5,000	12,700	5,000	13,000
East	n/a	n/a	2,100	6,800	3,800	9,600	3,700	9,800
South	2,700	6,100	1,900	6,000	3,300	8,400	3,300	8,600
Total	**9,500**	**21,900**	**10,800**	**33,900**	**18,100**	**45,900**	**18,200**	**47,600**

Note: Numbers may not sum due to rounding.

Source: Strategic Economics, 2012

2010 to 2020

Total Demand

In the current decade of system expansion, TOD housing demand will remain concentrated towards the center of the transit network, in Downtown Seattle and Capitol Hill. As of 2010, the combined half-mile buffers around the existing and potential stations in the phase of expansion contained 69,400 households, corresponding to 4.8 percent of the regions households. Keeping the capture rate constant, we project demand for 9,500 housing units throughout the transit shed in this decade. In the transit-oriented growth scenario, we increase housing demand throughout the transit shed to 21,900 units, corresponding to 11 percent of regional household growth.

Distribution of Demand by Corridor

The distribution of demand among the transit corridors, based on residential market strength indicators, is identical for the two scenarios. Over 50 percent of TOD housing demand is expected to be in Downtown Seattle, where we project demand for 4,800 units in the status quo growth scenario and 11,100 units in the transit-oriented growth scenario. The fact that there are currently 25- and 40-story towers in the pipeline near the International District and Westlake stations respectively corroborates the high demand projected for the current decade. Households seeking an urban, transit-rich environment will continue to flock to Downtown Seattle.

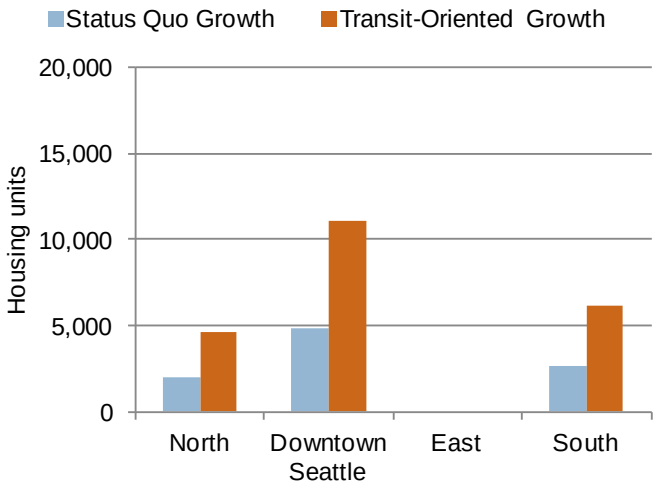
Based on the strength of the housing market in the Capitol Hill station area, we project that there will be demand for 2,000 to 4,600 units in the North corridor. Although this may seem like a lot of demand for two station areas, the numbers are borne out by evidence of several large projects underway. According to the *Daily Journal of Commerce*, developers are already moving forward with projects that would add over 600 apartment units within 3 blocks of the station.[27]

In the South Corridor, we project demand for 2,700 to 6,100 housing units. Although the TOD demand allocation for this corridor is larger in absolute number than for the North Corridor, it is distributed

[27] Surdyke, Scott. "The key to Successful TODs lies in taller buildings," The Daily Journal, June 28, 2012, http://www.djc.com/news/re/12042418.html?action=get&id=12042418&printmode=true).

throughout a much larger geographic area containing 14 stations. Relative to Downtown Seattle and Capitol Hill, the South Corridor station areas will see weaker TOD housing demand overall, with stronger demand in Southeast Seattle and Downtown Tacoma.

Figure 18. Projected 2010-20 housing demand by corridor



Source: Strategic Economics, 2012

2020 to 2030

Total Demand

In the decade between 2020 and 2030, the transit shed is assumed to grow significantly as the light rail network expands to the east and to the north. As of 2010, the combined half-mile buffers around the existing and potential stations in the phase of expansion contained 107,000 households, corresponding to 7.3 percent of the regions households. Regional growth and therefore regional housing demand is expected to slow relative to the previous decade, however. The result is that, even with the increased capture rate of 7.3 percent, demand for housing in the status quo growth scenario is not projected to be significantly higher than in the previous decade, at 10,800 units, just 1,300 units more than for the 2010-20.

In the transit-oriented growth scenario, projected demand for housing increases to 33,900 units. This represents 23 percent of regional household growth from 2020 to 2030, resulting in an overall household capture rate of 9.3 percent by the end of the decade, comparable to peer systems with similar employment capture rates.

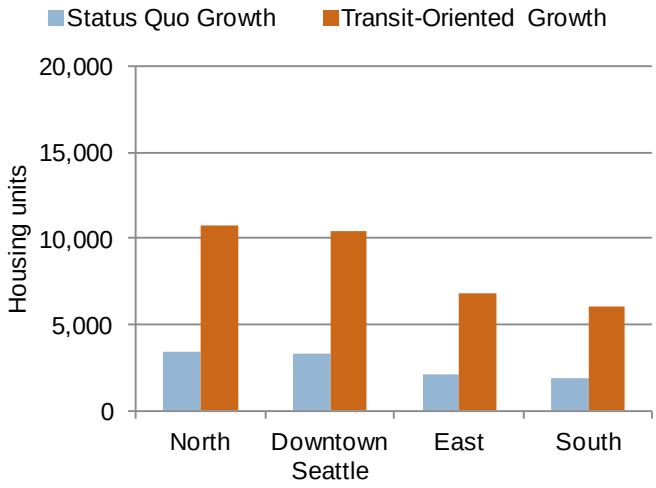
Distribution

With the expansion of the transit network, housing demand will be more distributed among the corridors than in the previous decade. The much expanded North Corridor as a whole will increase in its share of the region's TOD demand, particularly with the addition of the Brooklyn, Roosevelt and Northgate stations. The North Corridor demand is projected to be 3,400 units in the status quo growth scenario, and 10,700 units in the more aggressive transit-oriented growth scenario. This demand is slightly greater than that projected for Downtown Seattle (3,300 to 10,400 units), although it is spread out over a larger geographic region, extending as far north as Lynwood.

Projected demand for the East Corridor ranges from 2,100 to 6,800 units. The degree to which TOD demand will be distributed between Downtown Seattle and the East Corridor stations once the East Corridor joins the transit network is currently uncertain. Continued growth in tech sector employment is likely to attract young, high-income workers seeking a more walkable, transit-rich lifestyle; in this case, the demand for TOD in the East Corridor could be towards the upper end of the range projected here or even higher. If more compact, successful transit-oriented development occurs, it's possible that the East Corridor could attract households that would otherwise choose to live in Downtown Seattle. On the other hand, the diverse mix of cultural activity and detail of urban form and architectural character prevalent in dense, older urban neighborhoods and attractive to the new creative class, may prove challenging to simulate. . With increased connectivity to the rest of the region, young tech employees may choose to live in Downtown Seattle and Capitol Hill and commute to the East Corridor for work, as many currently do without the convenience of light rail (see Appendix D for maps of Eastside job center commute sheds).

These demand estimates assume that the South Corridor will add one station, Highline CC, between 2020 and 2030, with the Tacoma portion of the corridor still isolated from the rest of the network. Projected demand ranges between 1,900 to 6,000 housing units, with demand likely concentrated in Southeast Seattle and Downtown Tacoma.

Figure 19. Projected 2020-30 housing demand by corridor



Source: Strategic Economics, 2012

2030 to 2040

Total Demand

For the 2030 to 2040 demand estimates, the light rail network is assumed to be complete, consisting of 50 stations from Everett in the north to Tacoma in the south. TOD housing demand is projected separately for both the I-5 and SR-99 alignments because the demographics, land uses and market conditions vary slightly depending on which four stations between Lynnwood and Everett are included in the transit shed.

It is important to note that these demand-driven estimates are limited in their ability to capture certain differences between the two North Corridor alignments. For example, these estimates do not consider

potential barriers to circulation, such as the Interstate highway, which takes up a large portion of developable land within the I-5 alignment's transit shed and which may prevent this alignment from capturing household growth. The SR-99 alignment, in contrast, has a more fine-grained urban form that may be more amenable to capturing future residential growth. These differences in built form, and other supply factors, could more strongly affect the growth potential of the two alignments than is reflected in these estimates.

As of 2010, the 2040 transit shed with the I-5 alignment in the North Corridor contained 112,535 households, corresponding to 7.7 percent of the region's households. If the transit shed captures this same share of demand from new households in the region, there will be demand for 18,100 units throughout the transit network. The 2040 transit shed with the SR-99 alignment contained approximately 1,100 more households, at 113,643, corresponding to 7.8 percent of the region's households. Applying this capture rate to new household growth results in a projected demand of 18,200 housing units.

The difference in TOD potential of the I-5 and SR-99 alignments becomes evident in the transit-oriented growth scenario, in which the higher concentration of employment in the SR-99 transit shed helps to drive increased residential TOD demand. Projected demand is 45,900 units for the 2040 transit shed with the I-5 alignment and 47,600 units for the transit shed with the SR-99 alignment. These differences are due primarily to employment factors rather than supply-side factors such as urban form and zoning, which were not included in the model.

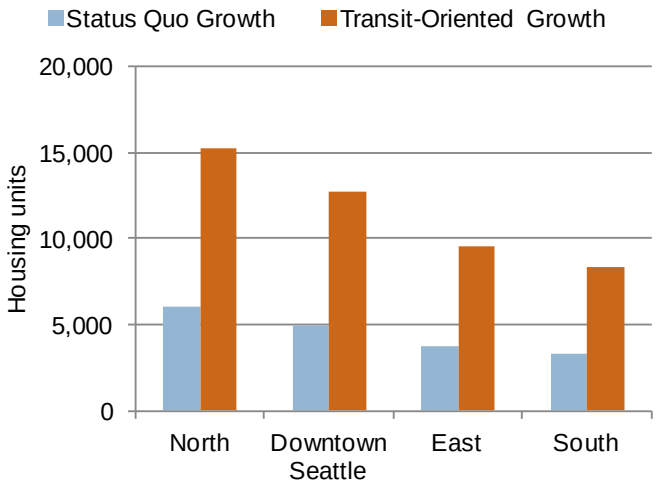
Distribution

The North Corridor's large geographic extent and inclusion of strong TOD markets from Capitol Hill to Northgate combine to result in high corridor-wide TOD demand in both the I-5 and SR-99 alignments. Projected demand ranges from 6,000 to 15,200 units for the I-5 alignment and 6,200 to 16,300 units for the SR-99 alignment. Although the majority of demand is expected to be in the southern portion of the corridor, the choice of alignment does affect the overall TOD potential in the transit shed, with the additional employment in the SR-99 alignment helping to boost capture rates not only in the North Corridor, but also in Downtown Seattle and in the East and South Corridors.

The urban lifestyle and high concentration of job opportunities will continue to make Downtown Seattle attractive to households, especially young, non-family households, with demand for TOD ranging from 5,000 to 12,700 units with the I-5 alignment and reaching 13,000 in the transit-oriented growth scenario with the SR-99 alignment.

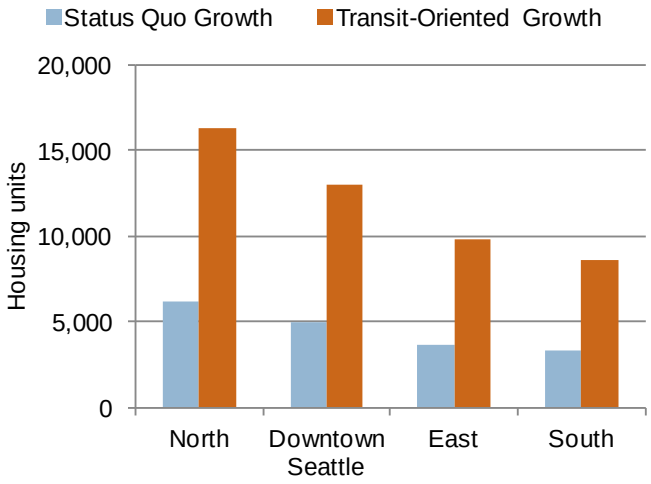
East Corridor demand is projected from 3,300 to 8,400 units with the I-5 alignment, reaching 8,600 units with the SR-99 alignment. Although the East Corridor has strong employment and income indicators, TOD housing demand estimates are constrained by the existing built environment which is primarily single-family residential and low-rise. Based on strong market conditions, suitable demographics and signs of upcoming development activity, significant changes in household density and urban amenities could take place over the next few decades in this corridor.

Figure 20. Projected 2030-40 housing demand by corridor, I-5 alignment



Source: Strategic Economics, 2012

Figure 21. Projected 2030-40 housing demand by corridor, SR-99 alignment



Source: Strategic Economics, 2012

Affordable TOD Demand Estimates

To provide insight into demand for affordable housing in proximity to transit, Strategic Economics further segmented residential demand projections by income level for all transit sheds and forecast decades.

The income categories used in this analysis are defined relative to regional area median income (AMI), and correspond to categories typically used for affordable housing allocation: less than 30% of AMI, 30%-50% of AMI, and 50%-80% of AMI.

Methodology overview

These demand forecasts assume that the current distribution of households across income brackets will remain the same in future decades. Because the income brackets are defined relative to AMI, this assumption still allows the possibility that median income itself will rise or fall.

Compared to regional income distributions, the transit shed income distribution is likely to be skewed towards lower income households. National research on transit systems throughout the U.S. has found that low- and moderate-income households are often concentrated in transit sheds, because lower income households are more likely to value proximity to transit and to seek multi-family housing typically found in more central areas.[28]

Figure 22 shows the expected share of transit shed households in the three income brackets of interest compared to the share of regional households in these income brackets. Appendix B provides details on the method for deriving the transit shed shares shown in this table.

Figure 22. Share of households in lower income brackets

Income bracket	Income range in 2010	Share of regional households	Expected share of transit shed households
< 30% AMI	< $19,520	12%	20%
30-50% AMI	$19,520 - $32,534	11%	14%
50-80% AMI	$32,534 - $52,055	18%	18%

Source: U.S. Census, American Community Survey, 2005-10; Strategic Economics, 2012

Projections

Figure 23 shows projected household demand by income level for each stage of system expansion and for both transit shed alignments. The share of households in each category remains constant for each forecast decade; however, as the transit system expands and the number of total households captured by the transit shed increases, demand from lower-income households also increases proportionally.

Figure 23. Income segmented demand

Income level	Share	2010-20 Demand		2020-30 Demand		2030-40/I-5 Demand		2030-40/SR99 Demand	
		Status Quo Growth	Transit-Oriented Growth	Status Quo Growth	Transit-Oriented Growth	Status Quo Growth	Transit-Oriented Growth	Status Quo Growth	Transit-Oriented Growth
All		**9,521**	**21,877**	**10,785**	**33,924**	**18,056**	**45,914**	**18,234**	**47,602**
0-30% AMI	20%	1,936	4,448	2,193	6,898	3,671	9,336	3,707	9,679
30-50% AMI	14%	1,374	3,158	1,557	4,897	2,606	6,628	2,632	6,872
50-80% AMI	18%	1,667	3,831	1,889	5,940	3,162	8,040	3,193	8,335

Source: Strategic Economics, 2012

[28] Center for Transit-Oriented Development, *Hidden in Plain Sight: Capturing the Demand for Housing Near Transit*, September 2004, http://www.reconnectingamerica.org/resource-center/books-and-reports/2004/hidden-in-plain-sight-capturing-the-demand-for-housing-near-transit/.

Deriving future demand for affordable housing from employment forecasts

The preceding segmentation of TOD housing demand by income bracket is based on the existing distribution of regional households across these income brackets. While the overall TOD housing demand method and distribution of demand among the corridors is influenced by employment projections, the income segmentation is not. In this section, we outline an alternate method that uses employment growth as the basis for estimating future demand for affordable housing. This method has previously been used in an analysis prepared for the Association of Bay Area Governments (ABAG) in California.[29] The Puget Sound Regional Council may wish to pursue this kind of analysis in the future.

The rationale behind this method is that employment determines household incomes, which in turn determine demand for affordable housing. As acknowledged throughout Section III of this report, some industry sectors will experience more job growth than others over the next few decades. These employment trends will affect the types of jobs available in the region, with different occupations associated with different wage levels.

The basic steps of this method are as follows:

- Based on occupational staffing patterns, translate industry job growth for a given geographic area into a set of occupations within each industry.
- Link occupations to wages.
- Translate wages into household income using an assumption about the number of workers per household.

Because this method is based on job projections, which are typically provided for a relatively large geographic area such as the county or region, the resulting income projections are initially obtained for the same geographic area. To estimate affordable housing demand for smaller geographies, the overall demand at the county or regional level would then need to be distributed to cities or station areas based on another set of assumptions about how demand in the cities or station areas relates to demand in the county or region. For more details on this method and its application, please refer to the ABAG analysis cited above.

[29] Chapple, Karen. "Evaluating the Effects of Projected Job Growth on Housing Demand," March 2012, http://www.onebayarea.org/pdf/KC_Effects_of_Projected_Job_Growth_on_Housing.pdf

V. CONCLUSION

This report estimates employment growth and demand for housing in the PSRC rail corridors over the next three decades. Informed by regional projections, employment and demographic trends, national TOD research and existing development patterns, the projections encompass a range of possible growth outcomes. In the conservative "status quo" scenario, the expansion of the light rail network does not induce additional transit-related growth, but the transit shed would continue to capture a proportional share of new employment and household growth. In the transit-oriented growth scenarios, we project that the light rail corridors will capture a higher share of future employment and population growth due to increasing demand for transit-rich locations.

The fundamental insight informing the employment projections is that growth of transit-oriented employment depends on job growth in industries where firms prefer to agglomerate in transit-rich locations. In the Puget Sound region, such industries, such as information services, are expected to be a major source of employment growth, and thus will be a driver of commercial TOD demand. Residential TOD demand is based on a variety of factors, including access to employment, demographic patterns and household preferences. The strong presence of small, young and non-family households in the transit corridor is likely to translate into TOD demand, while the aging Baby Boomer generation may also contribute to additional TOD demand.

In addition to the broader economic conditions and demographic factors that shape demand, local jurisdictions and regional actors can foster transit-oriented growth by ensuring that opportunity sites in transit station areas are able to reach their potential, through appropriate zoning policy, infrastructure investment, and emphasis on urban form that supports compact, walkable environments. Station siting decisions will also be critically important in determining the potential of a station area to capture job growth and housing demand.

APPENDIX A – COMMERCIAL TOD METHODOLOGY

This Appendix describes the technical details of the employment growth estimates for the PSRC rail corridor. For illustration purposes, the calculations are shown for the decade 2020 to 2030.

Status Quo Growth Scenario

Step 1 – Transit Shed Capture Rates by Sector
Using 2010 employment data, calculate the transit shed's existing capture rate by sector. (See Figure A-1.)

Figure A-1. Calculation of Transit Shed Capture Rate based on 2010 employment data

NAICS	PSRC Forecast Sector	Regional jobs in 2010	2020 transit shed jobs in 2010	Capture rate In 2010
11	Natural Resources & Mining	4,760	157	3%
21	Natural Resources & Mining	671	3	0%
22	Utilities	2,128	28	1%
23	Construction	75,722	7,089	9%
31	Manufacturing	17,515	3,061	17%
32	Manufacturing	22,371	1,110	5%
33	Manufacturing	125,202	3,260	3%
42	Wholesale	69,729	8,186	12%
44	Retail	107,174	13,794	13%
45	Retail	63,583	9,564	15%
48	Transportation, Warehousing	39,637	12,106	31%
49	Transportation, Warehousing	12,163	621	5%
51	Information Services	86,450	46,602	54%
52	Financial Services	57,769	25,287	44%
53	Financial Services	30,152	7,275	24%
54	Professional & Business Services	105,652	39,718	38%
55	Professional & Business Services	24,684	10,781	44%
56	Professional & Business Services	55,428	11,402	21%
61	Education Services	22,995	3,204	14%
62	Health & Social Services	181,855	32,753	18%
71	Other Services	26,858	4,594	17%
72	Food Services & Drinking Places	126,767	31,109	25%
81	Other Services	71,357	11,104	16%
Ed	Public Education	116,243	30,131	26%
Gv	Government	165,549	39,332	24%
Total		**1,612,414**	**352,271**	**21.8%**

Source: PSRC, 2012; Strategic Economics, 2012

Step 2 – Regional Growth By Sector
Calculate regional growth by sector for the decade of interest using projections from the PSRC Regional Economic Forecast. See columns 2, 3 and 4 in Figure A-2.

PSRC's projections were provided in terms of 16 sectors that largely correspond to two digit NAICS codes. For ease of calculation, Strategic Economics used these same sectors for projection calculations. Appendix C provides a correspondence table between PSRC's 16 sectors, NAICS codes, and Strategic Economics' sector definitions.

Step 3 – Transit shed job growth by sector
Multiply regional job growth by sector by 2010 capture rates for the transit shed, to arrive at transit shed job growth by sector for the decade (column 6 in Figure A-2).

Figure A-2. Calculation of regional and transit shed job growth by sector

Job growth from 2020 to 2030

Forecast Sector	2020	2030	2020-30	2010 Capture Rate	2020-2030 transit shed job growth
Natural Resources & Mining	1,903	1,921	18	3%	1
Construction	101,963	99,541	-2,422	9%	-227
Manufacturing	188,796	182,649	-6,147	5%	-277
Wholesale	94,029	109,335	15,306	12%	1,797
Retail	214,991	251,926	36,935	14%	5,052
Transportation, Warehousing	62,011	64,470	2,459	25%	604
Utilities	3,080	3,037	-43	1%	-1
Information Services	116,059	138,852	22,793	54%	12,287
Financial Services	102,789	110,803	8,014	37%	2,968
Professional & Business Services	340,921	399,072	58,151	33%	19,377
Food Services & Drinking Places	134,921	145,047	10,126	25%	2,485
Education Services	40,059	51,521	11,462	14%	1,597
Health & Social Services	253,167	311,314	58,147	18%	10,473
Other Services	116,487	115,823	-664	16%	-106
Government	191,616	195,251	3,635	24%	864
Public Education	128,442	137,016	8,574	26%	2,222
Total	**2,091,234**	**2,317,578**	**226,344**		**59,117**

Step 5 – Transit shed total job growth
Sum transit shed job growth by sector to arrive at the total employment growth for the transit shed (column 6, bottom row in Figure A-1). This growth needs to be distributed among the corridors.

Step 6 – Existing corridor employment distributions by sector
Using 2010 employment data, calculate each corridor's share of transit shed employment by sector. See columns 3, 5, 7 and 9 in Figure A-3.

Step 7: Projected corridor employment distributions by sector
Multiply transit shed job growth by each corridor's share of 2010 jobs in that sector to arrive at the number of new jobs in each sector by corridor. See columns 4, 6, 8 and 10 in Figure A-3.

Figure A-3. Corridor distributions by sector for 2020-2030 growth estimates

Forecast Sector	Transit shed job growth	Downtown Seattle		North Corridor		East Corridor		South Corridor	
		Share of 2010 Jobs	New jobs	Share of 2010 Jobs	New jobs	Share of 2010 Jobs	New jobs	Share of 2010 Jobs	New jobs
Natural Resources & Mining	1	97%	1	0%	0	1%	0	2%	0
Construction	-227	20%	-46	12%	-28	42%	-95	26%	-58
Manufacturing	-277	21%	-59	6%	-16	40%	-110	33%	-91
Wholesale	1,797	25%	446	4%	81	41%	741	29%	529
Retail	5,052	27%	1,387	25%	1,277	36%	1,802	12%	586
Transportation, Warehousing	604	14%	86	1%	6	4%	23	81%	490
Utilities	-1	96%	-1	0%	0	4%	0	0%	0
Information Services	12,287	13%	1,559	2%	279	84%	10,324	1%	125
Financial Services	2,968	51%	1,510	10%	290	25%	749	14%	419
Prof & Business Svcs	19,377	51%	9,848	6%	1,177	28%	5,393	15%	2,959
Food Svcs & Drinking Places	2,485	43%	1,072	18%	451	21%	522	18%	440
Education Services	1,597	31%	489	37%	597	24%	388	8%	122
Health & Social Services	10,473	32%	3,348	20%	2,076	29%	3,053	19%	1,996
Other Services	-106	46%	-49	14%	-15	15%	-16	24%	-26
Government	864	73%	628	3%	28	6%	52	18%	156
Public Education	2,222	0%	6	89%	1,985	1%	32	9%	200
Total	**59,117**	**36%**	**20,226**	**17%**	**8,187**	**30%**	**22,858**	**17%**	**7,846**

Step 8. Calculate total employment growth by corridor.
Sum the projected employment by sector for each corridor to arrive at a total employment growth projection for each corridor. See bottom row of Figure A-3.

Although the projection methodology calculated growth by sector, the report only publishes projections for all sectors combined. Using sectoral differences in transit shed capture rate and geographic distribution among the corridors helps to arrive at more accurate projection results and allows insights into the trends that are shaping employment growth; however, these detailed forecasts by sector are not intended to be published.

Adjustments for 2020 Transit-Oriented Growth Scenario

The method for the transit-oriented growth scenario is largely the same as the method described above, with a few key adjustments.

The rationale for the 2020 transit-oriented growth scenario was to add TOD growth in Downtown Seattle, where recent and pipeline activity strongly indicates further intensification and employment growth near transit. The key calculations are described below.

A. Obtain pipeline estimate for new office space in Downtown Seattle. (Row 2 in Figure A-4 below). This figure includes 3.3 million square feet planned for Amazon in Denny Triangle.
B. Reduce the pipeline estimate by a certain factor to account for projects that will not come to fruition. Conservatively, use a reduction factor of 50%. (Rows 3 and 4 in Figure A-4.)
C. Divide the pipeline office estimate by the expected square feet per employee to arrive at additional employment growth implied by pipeline development. Conservatively, employee density was assumed to be 250 square feet per employee.[30] (Rows 5 and 6 in Figure A-4.)
D. Distribute additional TOD employment among the sectors of Retail, Information Services, Financial Services and Professional Business Services by splitting half of the new jobs between Retail and Information Services, then dividing the remaining fifty percent of jobs between Information Services, Financial Services and Professional and Business Services. (Figure A-5.)
E. Add additional TOD employment to the Downtown Seattle TOD growth scenario. Employment growth for other corridors remains the same.

Figure A-4. Calculation of additional TOD employment for Downtown Seattle 2020 TOD growth scenario

Item	Amount	Units	Source
Pipeline office estimate for Downtown / Denny Triangle	6,678,621	sq ft	Seattle Department of Planning & Development, June 2012
Reduction factor due to not all projects coming to fruition	50%		SE assumption
Remaining office development in pipeline	3,339,311	sq ft	
Employee density	250	sq ft / employee	Erin Pflum, UW Evans School report, 2004
Total additional employment growth	**13,357**	**employees**	

Source: Strategic Economics, 2012

Figure A-5. Distribution of Downtown / Denny Triangle new employment

Sector	Share	Jobs
Retail	25%	3,339
Information services	42%	5,566
Financial services	17%	2,226
Professional and business services	17%	2,226

Source: Strategic Economics, 2012

2030 and 2040 Transit-Oriented Growth Scenarios

For the ensuing decades of growth, additional TOD growth was modeled by boosting the capture rates in Retail, Information Services, Financial Services and Professional Business Services for the transit

[30] Pflum, Erin. Employment Density in the Puget Sound Region. University of Washington Daniel J. Evans School of Public Affairs, 2004. http://evans.washington.edu/files/Pflum_2004.pdf

shed as a whole by the same percentage by which the capture rates were boosted for the 2020 transit-oriented growth scenario. These percentage boosts are shown in Figure A-6.

Figure A-6. Boost in forecast sector capture rate for 2030 and 2040 TOD growth

Forecast Sector	Boost in capture rate
Retail	9%
Information Services	20%
Financial Services	19%
Professional & Business Services	2%

Source: Strategic Economics, 2012

APPENDIX B – RESIDENTIAL METHODOLOGY

This Appendix describes the technical details of the residential demand projections for the PSRC rail corridor.

Status Quo Growth Scenario

Step 1 – Transit Shed Household Capture Rates

Using Census 2010 data, calculate the number of households in each transit shed geography. Divide these figures by the regional number of households to arrive at each transit shed's existing capture rate. (See Figure B-1.)

Regional households in 2010: 1,454,695

Figure B-1. Transit shed household capture rate

	2020 Transit Shed	2030 Transit Shed	2040/I-5 Transit Shed	2040/SR-99 Transit Shed
Transit shed households (2010)	69,401	106,730	112,535	113,643
Existing household capture rate	4.8%	7.3%	7.7%	7.8%

Source: U.S. Census, 2010; PSRC, 2012; Strategic Economics, 2012

Step 2 – Regional Household Growth
Calculate regional household growth for each decade of interest using projections from the PSRC Regional Macroeconomic Forecast. (Row 2 in Figure B-2)

Step 3 – Transit Shed Household Growth
Multiply regional household growth by 2010 household capture rates for each transit shed, to arrive at transit shed household job growth for each decade. (Row 4 in Figure B-2)

Figure B-2. Transit shed household growth

	2010-20	**2020-30**	**2030-40/I-5**	**2030-40/SR99**
Regional hh growth	199,569	147,000	233,400	233,400
Capture rate	4.8%	7.3%	7.7%	7.8%
Transit shed share of household growth	**9,521**	**10,785**	**18,056**	**18,234**

Source: PSRC, 2012; Strategic Economics, 2012

Step 4 – Adjust Residential Market Strength Index

Adapt the residential market strength index to incorporate employment growth projections for each corridor. Because there is a different set of employment growth projections for each decade, the adapted index has four different index scores for each station area, one for each decade of expansion and for the two North Corridor alignments. See the Puget Sound Region TOD Market Study, Section III, for more details on the index calculation methodology.

Adjusted weightings used for these projections are shown in Figure B-3. An excerpt of index scores for 12 of the 54 total station areas is shown in Figure B-4.

Figure B-3. Indicator weightings for adjusted market strength index

Indicator		Weight
Existing Development		
Household Density		0%
Current Inventory		10%
	Subtotal	**10%**
Household Income/Size		
Household Income		7.5%
Household Size		7.5%
	Subtotal	**15%**
Market Indicators		
Planned and Proposed Units		5%
Number of Home Sales		5%
Average Rent		10%
Vacancy Rate		5%
Sales Price (condo)		5%
	Subtotal	**30%**
Employment Indicators		
Commute to Major Employment Centers		25%
Employment Density		2.5%
Change in Employment Density		2.5%
Projected Employment Growth		15%
	Subtotal	**45%**
Total		**100%**

Source: Strategic Economics, 2012

Figure B-4. Excerpt of Residential Market Strength Index for 12 of 54 station areas

Station Area	2020	2030	2040/I-5	2040/SR-99
Int'l Dist Station	0.7171	0.6999	0.6983	0.6984
Pioneer Square Station	0.7488	0.7315	0.7300	0.7300
University Street	0.8030	0.7857	0.7842	0.7842
Westlake Station	0.8461	0.8288	0.8273	0.8273
SODO	0.4277	0.4201	0.4302	0.4302
Stadium Station	0.4774	0.4698	0.4799	0.4799
Beacon Hill	0.4940	0.4864	0.4965	0.4965
Columbia City	0.4591	0.4515	0.4616	0.4616
Mt Baker	0.4874	0.4797	0.4899	0.4899
Othello	0.4289	0.4212	0.4314	0.4314
Rainier Beach Station	0.4123	0.4046	0.4148	0.4148
Convention Center Tacoma	0.3543	0.3466	0.3568	0.3568

Source: Strategic Economics, 2012

Step 5 – Group overlapping station areas

Because some station areas overlap with each other, assigning demand to each station area based on individual index scores would result in repeated allocations of household demand to the same geographic area. To address this issue, form groups from overlapping station areas into groups. Calculate the average index score for all stations in each group for each forecast decade and transit shed alignment. (Figure B-5.)

Figure B-5. Groups of overlapping stations and average index calculations

Station Group	Corridor	# Stations	2020 Index	2030 Index	2040 I-5 Index	2040 SR-99 Index
Downtown Seattle	DS	4	0.78	0.76	0.76	0.76
SE Seattle	S	4	0.47	0.46	0.47	0.47
Downtown Tacoma	S	5	0.35	0.35	0.36	0.36
Bellevue	E	5	0.00	0.68	0.68	0.68
Overlake	E	2	0.00	0.71	0.71	0.71
Redmond	E	2	0.00	0.00	0.67	0.67

Source: Strategic Economics, 2012

Step 5 – Control for Variation in Capacity

To address the fact that the groups of stations have different land areas than the individual station areas, calculate a hybrid index score by multiplying the index score for each group or station area by a "capacity measure." This capacity measure is the total land area of the station area (503 acres) or station group, multiplied by the household density for the station area or group.

Step 6 – Distribute Household Growth By Station Area and Station Group

Calculate each station area or station group's share of transit shed household growth by dividing the hybrid index score for each station/group by the sum of all scores. Obtain household demand by multiplying total transit shed household growth by each station or group's share. (Columns 7 and 8 in Figure B-6)

Figure B-6. Example of household growth distribution for 2020-2030

Station / Group	Corridor	# Stations	Area	Density	2030 Index	2030 share of new hh	2020-30 new hh
Downtown Seattle	DS	4	1127	19.10	0.76	31%	3,321
SE Seattle	S	4	1582	3.21	0.46	4%	478
Columbia City	S	1	503	4.65	0.45	2%	214
Othello	S	1	503	6.00	0.42	2%	258
Rainier Beach	S	1	503	3.03	0.40	1%	125
Tukwila	S	1	503	4.37	0.33	1%	145
SeaTac Airport	S	1	503	4.63	0.31	1%	148
Downtown Tacoma	S	5	1435	3.91	0.35	4%	395
S. 200th St.	S	1	503	2.37	0.31	1%	76
Cap Hill Station	N	1	503	20.00	0.70	13%	1,436
UW Stadium	N	1	503	0.57	0.53	0%	31
Rainier Station	E	1	503	5.22	0.59	3%	314
Mercer Island	E	1	503	5.22	0.59	3%	316
South Bellevue	E	1	503	1.01	0.63	1%	64
Bellevue	E	5	1714	5.15	0.68	11%	1,208
Overlake	E	2	864	1.98	0.71	2%	246
Lynnwood	N	1	503	2.00	0.37	1%	75
Mountlake Terrace	N	1	503	2.31	0.38	1%	90
NE 145th St.	N	1	503	3.16	0.48	1%	153
NE 185th St.	N	1	503	2.75	0.39	1%	108
Northgate	N	1	503	6.78	0.52	3%	361
Roosevelt	N	1	503	8.75	0.57	5%	507
Brooklyn	N	1	503	13.22	0.48	6%	650
Highline CC Station	S	1	503	1.85	0.35	1%	66
Redmond	E	2	901	2.88	0.00	0%	0
Everett Station	N	1	503	3.45	0.00	0%	0
Airport Rd.	N	1	503	4.90	0.00	0%	0
Alderwood Mall	N	1	503	0.85	0.00	0%	0
Ash Way P&R	N	1	503	1.51	0.00	0%	0
Boeing	N	1	503	0.01	0.00	0%	0
Everett Mall	N	1	503	3.17	0.00	0%	0
International/Cherry	N	1	503	4.40	0.00	0%	0
Lincoln Way	N	1	503	4.44	0.00	0%	0
Mariner	N	1	503	5.16	0.00	0%	0
Redondo (272nd)	S	1	503	3.24	0.00	0%	0
Fed Way TC	S	1	503	2.19	0.00	0%	0
Fife	S	1	503	1.38	0.00	0%	0
S. 348th	S	1	503	0.13	0.00	0%	0
Total		**54**				**100%**	**10,785**

Source: Strategic Economics, 2012

Step 7 – Calculate Household Growth by Corridor

Sum the household demand by the station areas and station groups in each corridor to obtain household demand by corridor for each decade.

Although the projection methodology calculates demand by station area and station group, the report publishes projections for the corridor as a whole. Using the market strength index for each station enables more nuanced projection results and allows insights into the trends that are shaping household demand; however, these detailed forecasts by station area are not intended to be published.

Figure B-7. Aggregated household growth by corridor for all decades

Corridor	2010-20 new hh	2020-30 new hh	2030-40/I5 new hh	2030-40/SR99 new hh
North	2,012	3,412	5,990	6,236
Downtown Seattle	4,839	3,321	4,999	4,971
East	0	2,147	3,771	3,750
South	2,670	1,904	3,296	3,277
Total	**9,521**	**10,785**	**18,056**	**18,234**

Source: Strategic Economics, 2012

Transit Oriented Growth Scenario

The overall methodology for the transit-oriented growth scenario projections of housing demand is similar to the status quo methodology described above, with the key difference being the capture rate used to determine the overall housing demand for the transit shed as a whole.

The transit-oriented growth scenario models increasing demand for residential TOD by increasing the transit shed's household capture rates above 2010 rates. To determine the appropriate increase in capture rate, Strategic Economics analyzed peer systems elsewhere in the U.S. (Figure B-8.)

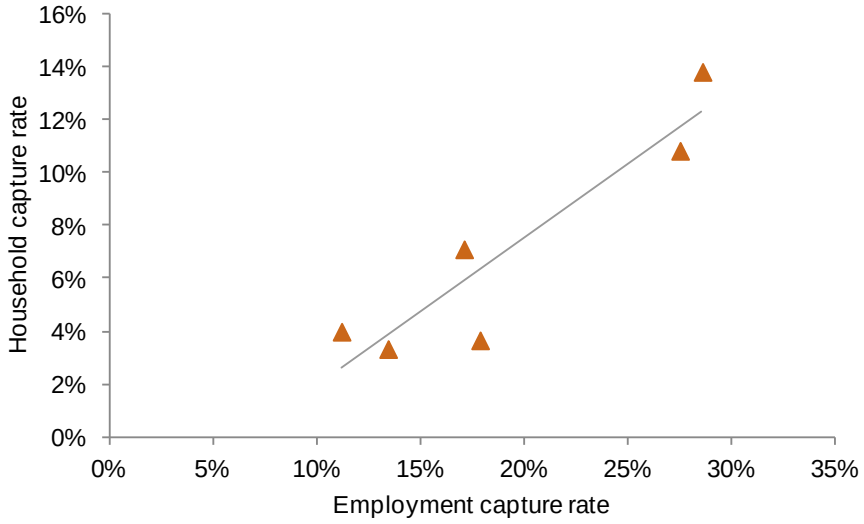
Figure B-8. List of peer transit systems for comparison and analysis

Region	System	# Stations	Regional jobs	Regional households	Transit shed capture rates	
					Employment	Households
Pittsburgh	PAT Light Rail	64	1,058,237	972,914	11%	4.0%
Baltimore	MTA Light Rail	35	1,189,641	1,038,765	13%	3.3%
San Diego	MTS Light Rail	54	1,192,937	1,086,865	17%	7.1%
Denver	RTD Light Rail	36	1,316,818	1,101,774	18%	3.7%
Portland	TriMet Light Rail	85	799,813	651,264	29%	13.8%
San Francisco	BART	44	1,836,318	1,524,150	27%	10.8%

Source: CTOD, 2012; Strategic Economics, 2012

Confirming the expectation that employment access influences residential demand, Strategic Economics found a strong correlation between transit shed employment capture rate and transit shed household capture rate. Figure B-9 demonstrates this correlation. A one percent increase in employment capture rate corresponds to a roughly 0.5 percent increase in household capture rate.

Figure B-9. Scatterplot of peer system household and employment capture rates



Source: CTOD, 2012; Strategic Economics, 2012

While some of the correlation in capture rates could be attributed to the fact that larger systems simply capture more of all types of development, review of the PSRC transit shed employment and household capture rates in 2010 shows that, even as employment capture rates increase as the system geography expands, the household capture rates remain lower than what is observed in peer systems (Figure B-10). One explanation for this is that in established peer system, household demand and supply has had time to be shaped by employment access. This suggests that the Puget Sound transit shed household capture rate will increase over the course of the next few decades as the system expands.

Figure B-10. Puget Sound employment and household capture rates

	2020 Transit Shed	2030 Transit Shed	2040/I-5 Transit Shed	2040/SR-99 Transit Shed
2010 employment capture rate	14.2%	22.8%	26.0%	26.5%
2010 household capture rate	4.8%	7.3%	7.7%	7.8%

Source: PSRC, 2012; Strategic Economics, 2012

To calculate the additional residential TOD demand for each decade, Strategic Economics compared the projected employment capture rate for 2020 to the peer systems and determined that an appropriate TOD growth capture rate would be 5.5 percent of all households. For future decades, Strategic Economics calculated the change in projected employment capture rate from the transit-oriented growth scenario from the previous decade (Rows 1 and 2 of Figure B-11), and the corresponding increase in household capture rate was obtained by dividing the employment capture rate change by two (Rows 4 and 5 of Figure B-11).

The additional number of households that would be need to be added to the transit shed in each decade was then estimated through a sequence of calculations that consider growth inside and outside of the transit shed in the prior decades (Rows 6-14 of Figure B-11). The capture rate of household growth in

each decade (Row 15) is significantly higher than the overall target capture rate (Row 5) of all households.

Figure B-11. Calculation of additional TOD demand

	2010-2020	2020-2030	2030-2040/I-5	2030-2040/SR-99
Projected employment capture rate	14.9%	23.3%	26.6%	26.9%
Increase in employment capture rate		8.4%	3.3%	3.6%
Increase in household capture rate		4.2%	1.7%	1.8%
Boosted capture rate	5.50%	9.28%	11.35%	11.50%
Regional households	1,659,600	1,806,600	2,040,000	2,040,000
Total households needed in transit shed	91,278	167,652	231,540	234,600
Households in transit shed as of 2010	69,401	106,730	112,535	113,643
Additional households needed by forecast year	21,877	60,922	119,005	120,957
Households added in 2010-20 decade based on 2010 capture rate	9,521	14,642	15,439	15,591
Add'l TOD households added in 2010-20 decade	12,356	12,356	12,356	12,356
Households added in 2020-30 decade based on 2010 capture rate			11,372	11,484
Add'l TOD households added in 2020-30 decade			33,924	33,924
Add'l households needed in this decade		33,924	45,914	47,602
Req'd capture rate of new growth	11%	23%	19.7%	20.4%

Source: PSRC, 2012; Strategic Economics, 2012

The rest of the steps in the calculation of residential demand are the same as for the status quo growth scenario.

Income Segmentation Methodology

Distribution of regional households by income level

Step 1. Area Median Income for the Four-County Region
Using county-level 2005-10 five-year estimates from the American Community Survey, Strategic Economics assigned a weight to each county based on its share of regional households. The result is a

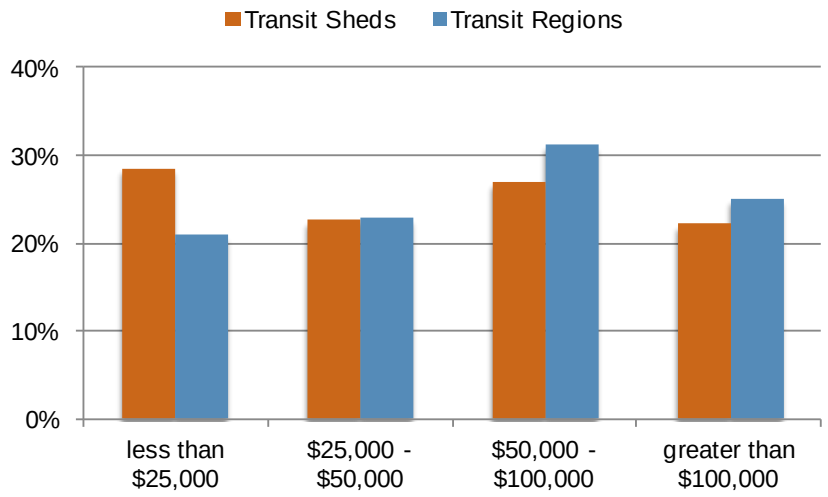
weighted average of household median income in the four counties. Based on this data, AMI was calculated to be $65,068 in 2010 dollars.

Step 2. Income Distribution for Four-County Region
The number of households in each income bracket by county was calculated by converting ACS income categories to the percentage-of-AMI income categories. The county-level results were summed to arrive at the share of households in each income bracket.

Distribution of transit shed households by income level

According to data on income distributions of households in fixed guideway transit sheds across the U.S., 28 percent of households in transit sheds earn below $25,000, compared to just 20 percent of households in regions surrounding these transit systems. (Figure B-12)

Figure B-12 Income distribution of households in transit sheds vs. transit regions.



Source: CTOD, 2012; Strategic Economics, 2012

Based on this finding, Strategic Economics boosted the transit shed share of households relative to the regional share of households in the three income brackets of interest by the amounts shown in Figure B-13. Based on income ranges from 2005-10 ACS data, 42 percent of households in the 30-50% AMI category are estimated to have incomes below $25,000; hence the boost in share is 42 percent of 8 percent, which equals 3.4 percent.

Figure B-13. Share of households in lower income brackets

Income bracket	Income range in 2010	Share of regional households	Boost to regional household share	Share of transit shed households
< 30% AMI	< $19,520	12%	8%	20%
30-50% AMI	$19,520 - $32,534	11%	3.4%	14%
50-80% AMI	$32,534 - $52,055	18%	0%	18%

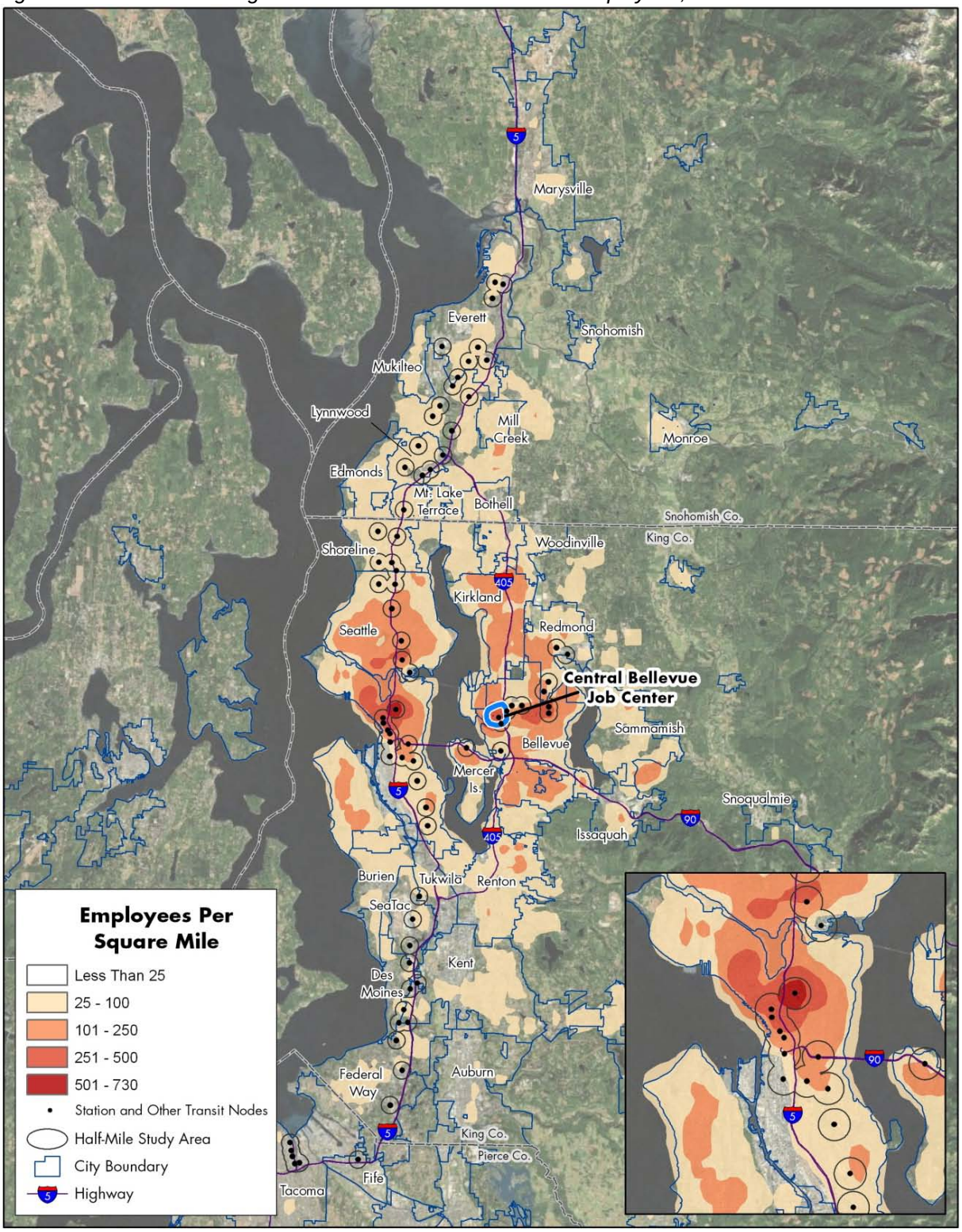
Source: U.S. Census, American Community Survey 5-year estimates, 2005-10; Strategic Economics, 2012

APPENDIX C – INDUSTRY CLASSIFICATIONS

NAICS	PSRC published forecast sectors (11)	PSRC detailed forecast sectors (16)	Strategic Economics Sectors
11	Resource & Mining	Natural Resources & Mining	Natural Resources
21	Resource & Mining	Natural Resources & Mining	Natural Resources
22	Trans., Ware., & Util.	Utilities	Other
23	Construction	Construction	Other
31	Manufacturing	Manufacturing	PDR
32	Manufacturing	Manufacturing	PDR
33	Manufacturing	Manufacturing	PDR
42	Wholesale & Retail	Wholesale	PDR
44	Wholesale & Retail	Retail	Retail
45	Wholesale & Retail	Retail	Retail
48	Trans., Ware., & Util.	Transportation, Warehousing	PDR
49	Trans., Ware., & Util.	Transportation, Warehousing	PDR
51	Information Services	Information Services	Knowledge-Based
52	Financial Services	Financial Services	Knowledge-Based
53	Financial Services	Financial Services	Knowledge-Based
54	Prof. Bus. Services	Prof. Bus. Services	Knowledge-Based
55	Prof. Bus. Services	Prof. Bus. Services	Knowledge-Based
56	Prof. Bus. Services	Prof. Bus. Services	Other
61	Other services	Education Services	Education and Medical
62	Health services	Health & Social Services	Education and Medical
71	Other services	Other Services	Entertainment
72	Other services	Food Services & Drinking Places	Entertainment
81	Other services	Other Services	Government
Ed	Other services	Public Education	Education and Medical
Gv	Government	Government	Government

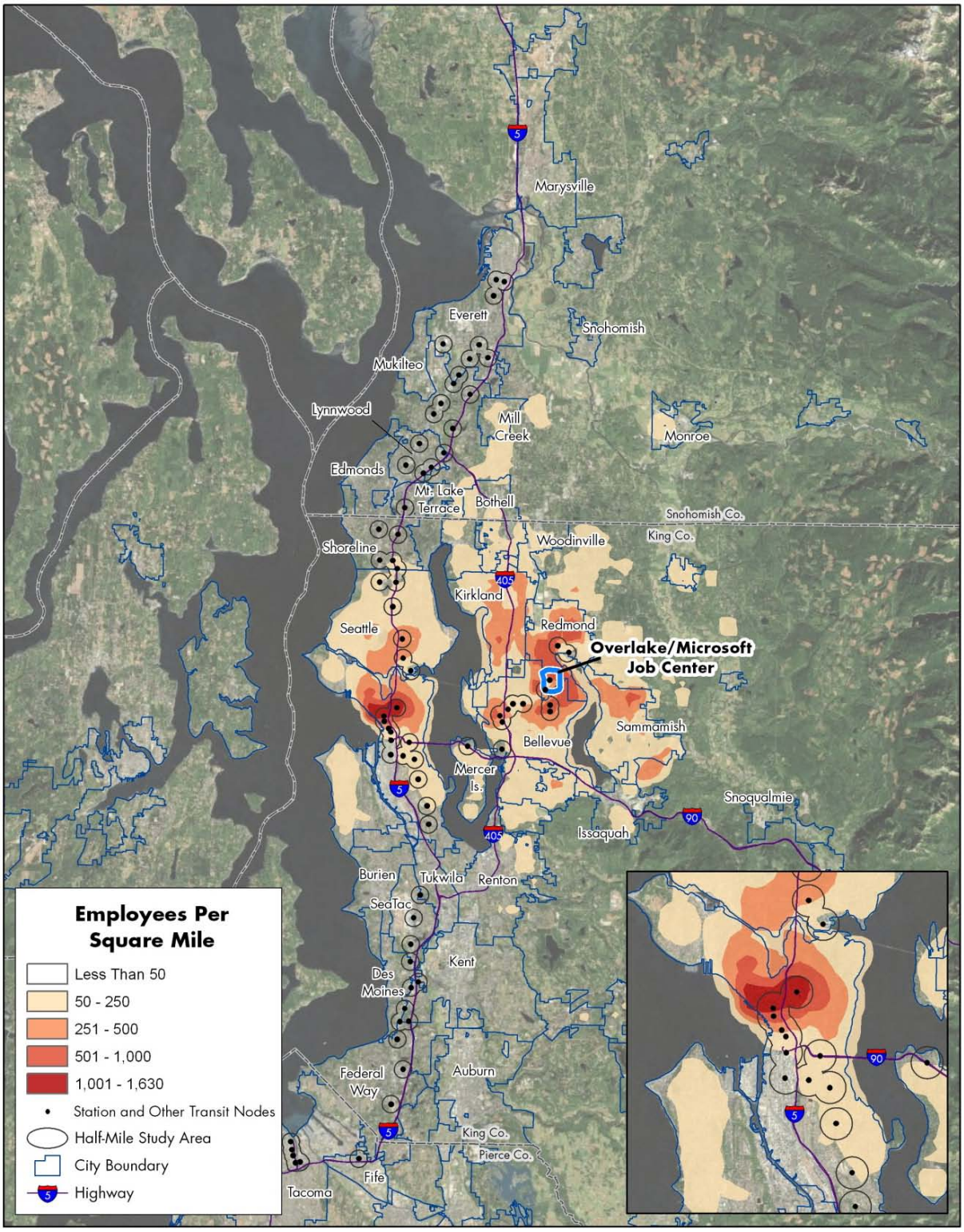
APPENDIX D – EASTSIDE JOB CENTER COMMUTE SHEDS

Figure D-1. Residential Origin of Central Bellevue Job Center Employees, 2009



Source: Longitudinal Employer Household Dynamics, 2009; PSRC, 2012; Strategic Economics, 2012

Figure D-2. Residential Origin of Overlake/Microsoft Job Center Employees, 2009



Source: Longitudinal Employer Household Dynamics, 2009; PSRC, 2012; Strategic Economics, 2012

Gardner Economics

APPENDIX E - COMMENTARY ON THE 2012 REGIONAL ECONOMIC FORECAST RESULTS & THE FACTORS INFLUENCING REGIONAL GROWTH PATTERNS

Prepared for:

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August 1, 2012

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Furthering the objectives as set out in the scope of work, as approved by Strategic Economics and the Puget Sound Regional Council, Gardner Economics has prepared a discussion of the findings of the work product created by Strategic Economics that addresses the Regional Economic Forecast Results. Additionally, we have prepared a commentary on the trends that are, or will be, influencing residential and commercial development along the potential light rail alignments that span the tri-county Puget Sound region.

Documents that were considered before preparing this memorandum are as follows:

1. Preliminary 2012 Regional Economic Forecast Results (2.21.12);
2. PSRC Draft Market Study – Section III;
3. Employment data provided by the Washington State Employment Securities Department; and
4. Forecasts provided by the *Puget Sound Economic Forecaster*.

INTRODUCTION

Any long-term forecast is inherently speculative as, for the better part, it relies on historic trend to predict future movements. That said, predictable external influences, such as the introduction of a major mass transit infrastructure, allow for a certain amount of implied predictability.

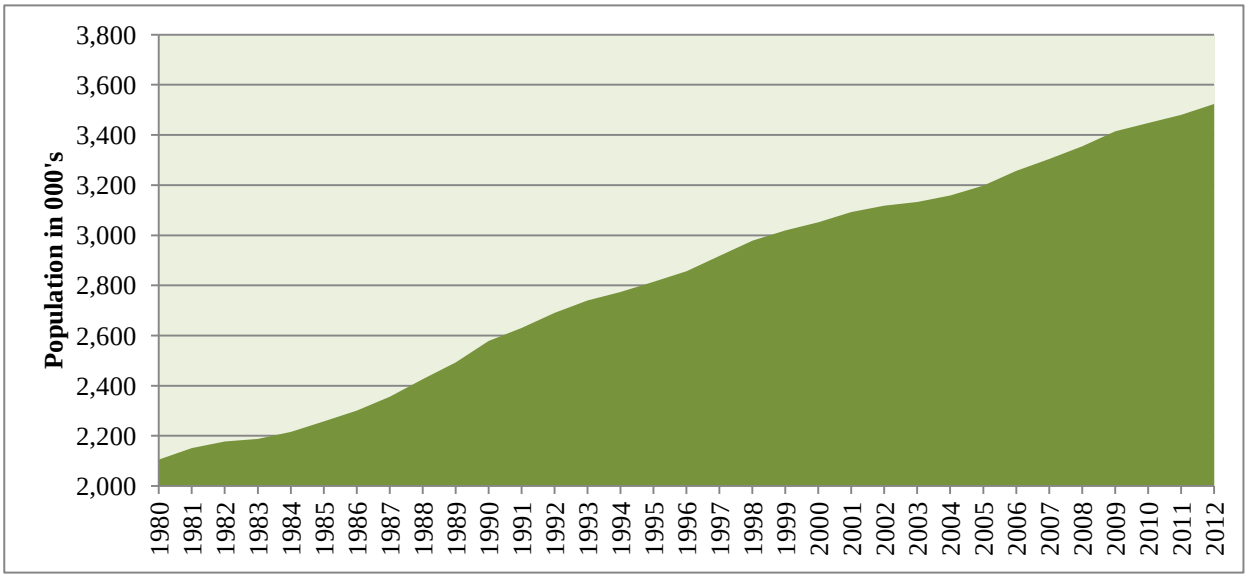
In effect, it therefore becomes easier to suggest the direction of growth patterns but it is still difficult to predict the scale of movement from one area to another.

This paper looks to comment on the work that has preceded it as well as to offer opinions as to the expected growth trends in aggregate, as well as to provide a rational argument to support the conjecture that the potential station areas will capture a larger than normal market share given the introduction of additional mass transit options.

CENTRAL PUGET SOUND POPULATION GROWTH PATTERNS & FORECASTS

FIGURE 1 below shows population for the region as prepared by Messrs. Conway Pederson and represents a combination of population trends in the tri-county region from 1980 to 2012. As can be seen, the residential population of the area has been growing but a closer look at the numbers suggests that the rate of growth has actually been slowing. The average annual growth rate in the 1980' was estimated at 2.1%, which then dropped to 1.9% in the 1990's, and to 1.2% in the last decade.

FIGURE 1: CENTRAL PUGET SOUND AREA POPULATION GROWTH – 1980 – 2012



SOURCE: Puget Sound Economic Forecaster

One might reasonably expect that population growth would have been stunted in the last decade as a function of the "Great Recession" but this does not explain the slowing of population in earlier decades. One might speculate that the slowing in population growth may, to some degree, have been attributable to the implementation of the 1990 Growth Management Act which delineated areas where residential development could occur.

That said, we would note that the growth rates shown in the three-county are did exceed those of the United States as a whole through the same period.

A more detailed analysis of growth patterns by separating out the three representative counties also provides us with some interesting insights.

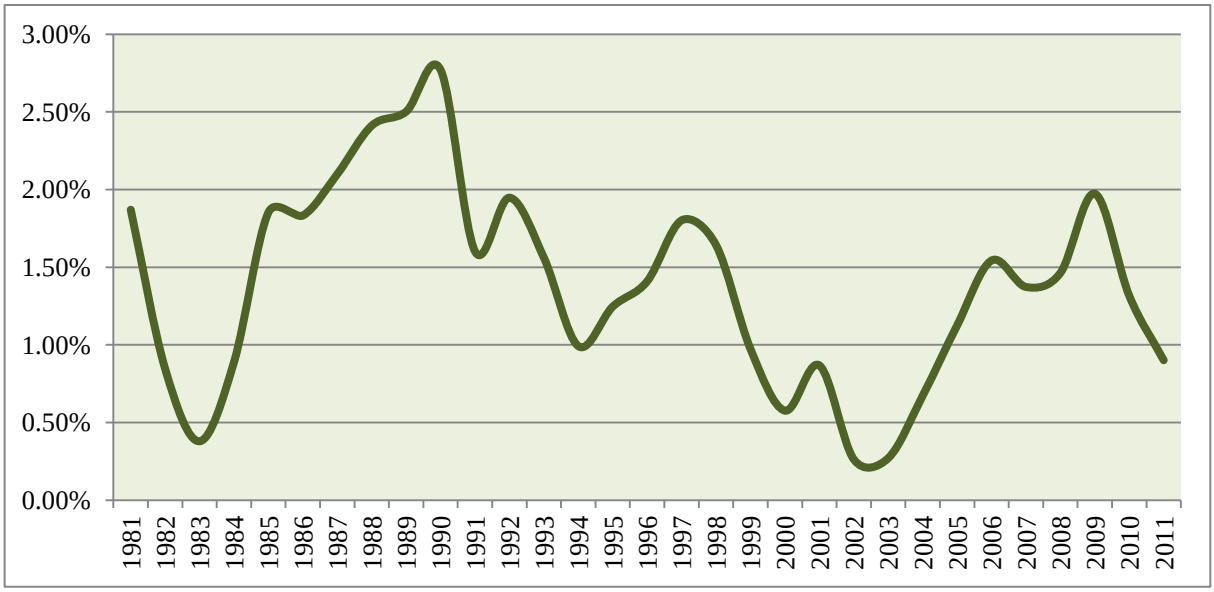
King County

King County is the largest area in terms of population (also the largest at 2,307 square miles).

In as much as the population of the area has increased by over 53 percent between 1980 and 2011 the rate of growth has not been equal. As the chart below demonstrates, the area saw rapid growth in the 1980's, followed by a decline through the following decade. The buoyant real estate market that occurred in the last decade boosted population but the area saw a drop in the rate of growth over the past two years – likely attributable to the 2008-2010 recession.

FIGURE 2: KING COUNTY ANNUAL POPULATION GROWTH: 1980 - 2011

SOURCE: Puget Sound Economic Forecaster

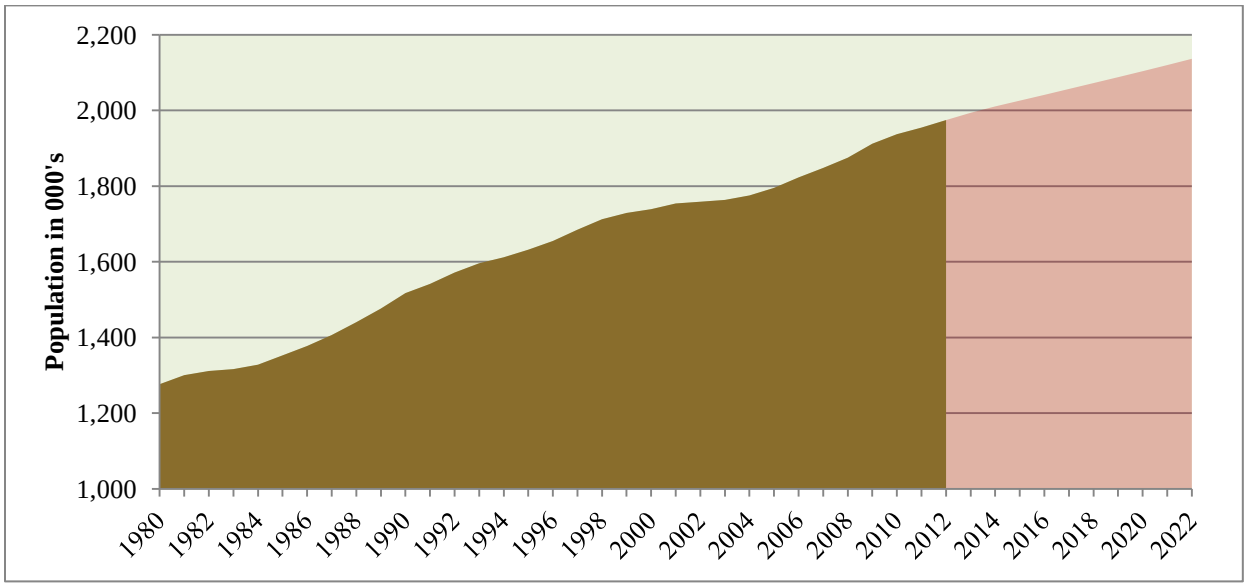


When we compare and contrast the growth rates between the three counties, it is clear that King County has shown the greatest rate of growth during the second half of the last decade when compared to its neighboring counties to the North and South – although on a percentage basis it was exceeded by both its neighboring counties when looking across the entire decade.

We would suggest that this was due to affordability issues in King County when compared to its neighbors. We will discuss housing affordability later within this analysis.

Looking forward, data suggests that the county will continue to grow and that the rate of growth will be lower than the neighboring counties. We believe that this assumes that there is a status quo relative to land uses and transportation options. This is likely to change should alternative transportation measure be adopted as we would contend that population growth will start to concentrate along transit corridors and that proximity to King County's job centers will attract residents.

FIGURE 3: KING COUNTY ANNUAL POPULATION CHANGE & FORECAST: 1980 – 2021



SOURCE: Puget Sound Economic Forecaster

The forecast shown above calls for growth rates averaging 0.8% annually over the next 10-years. Such a growth rate is significantly below that of the other two counties but, in absolute numbers, the county is expected to see an additional 181,000 residents or just over 15,000 annually.

As we move forward, we would also add that the market will continue to be influenced by the growth in the so called *Echo Boomers*. State estimates[31] suggest that population growth in the 25-34 age cohort will be 12.7 percent between 2010 and 2040. We would contend that this the annual age in population in the 17-22 age cohort will likely show a propensity for multifamily accommodations that would be conducive to living within station areas.

Pierce County

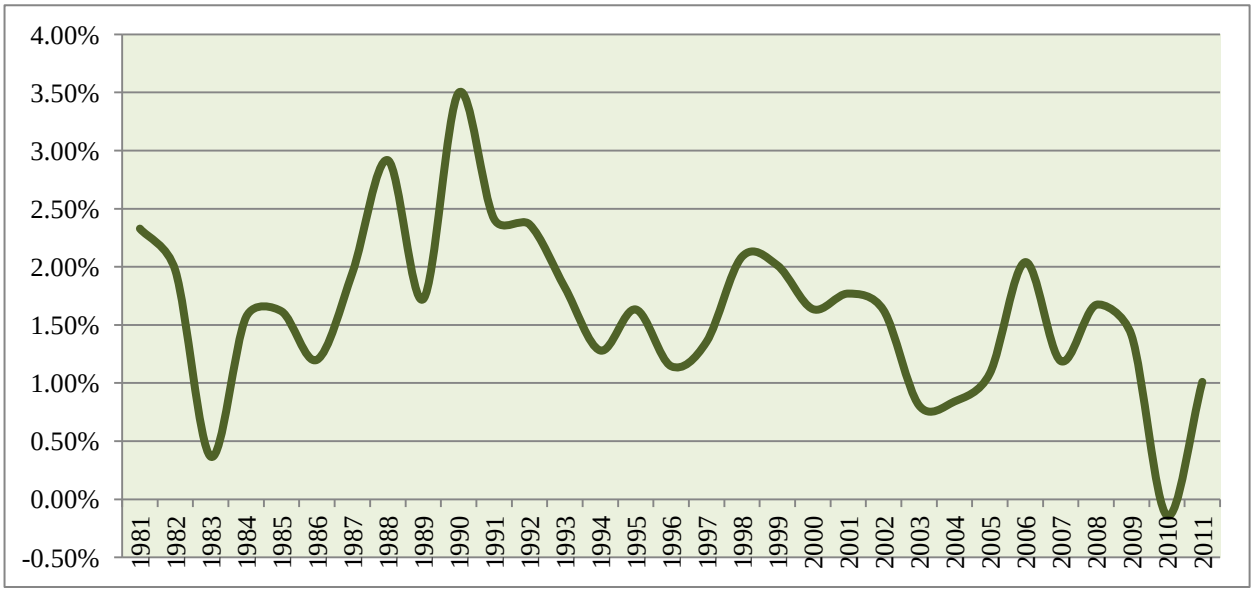
[31] http://www.ofm.wa.gov/pop/stfc/stfc2011/stfc_2011.pdf

Pierce County is the second largest county in terms of population and also the second largest in terms of size at 1,806 square miles.

The county population increased by 63% between 1980 and 2010 but, along within its neighboring counties, the rate of increase has slowed but has still shown double digit gains every decade since 1980.

As the chart below demonstrates, the area saw a rapid rate of growth in the 1980's, followed by a decline through the following decade. The buoyant real estate market that occurred in the last decade briefly boosted population but the area saw a drop in the rate of growth between 2008 and 2010 – likely attributable to the 2008-2010 recession. The county has, however, recovered some of the out-migration since then.

FIGURE 4: PIERCE COUNTY ANNUAL POPULATION GROWTH: 1980 - 2011

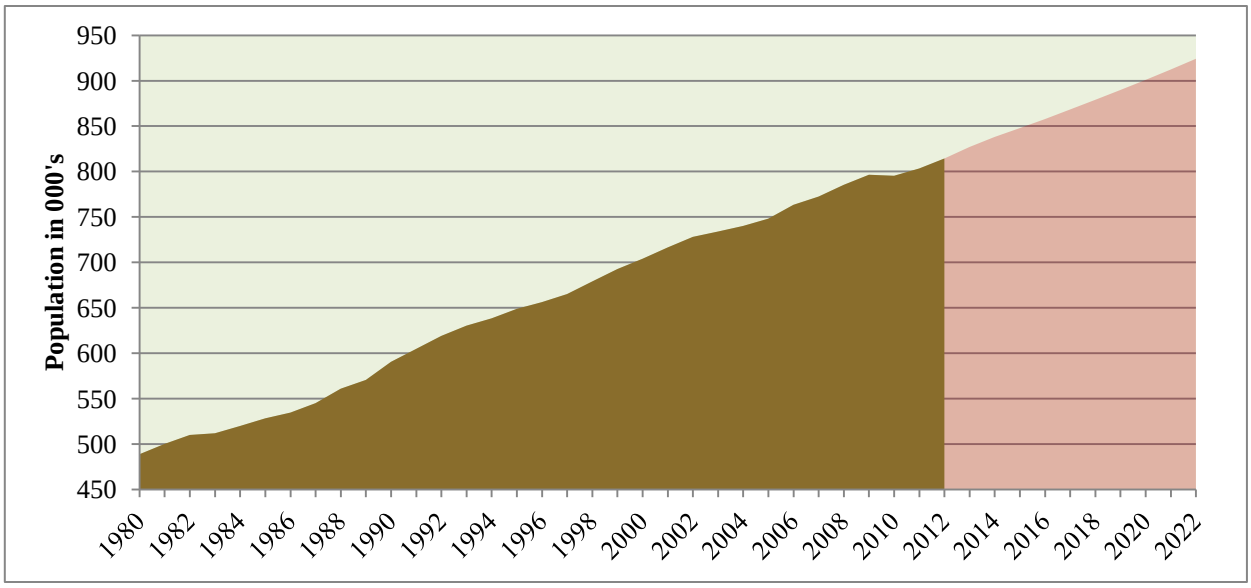


SOURCE: Puget Sound Economic Forecaster

When we start to consider forecasted growth Pierce County over the next 10-year period, we note that Pierce County is expected to grow at an average annual rate of 1.28%; in the mid-range between King and Snohomish counties.

The chart on the following page demonstrates historic and forecasted population.

FIGURE 5: PIERCE COUNTY ANNUAL POPULATION CHANGE & FORECAST: 1980 – 2021



SOURCE: Puget Sound Economic Forecaster

Population growth is as much a function of land supply as it is employment growth. The Pierce County market, although not having an unlimited supply of land, is well positioned for growth given the large tracts that are available (there are two sizable master planned communities in the county that are preparing to start development).

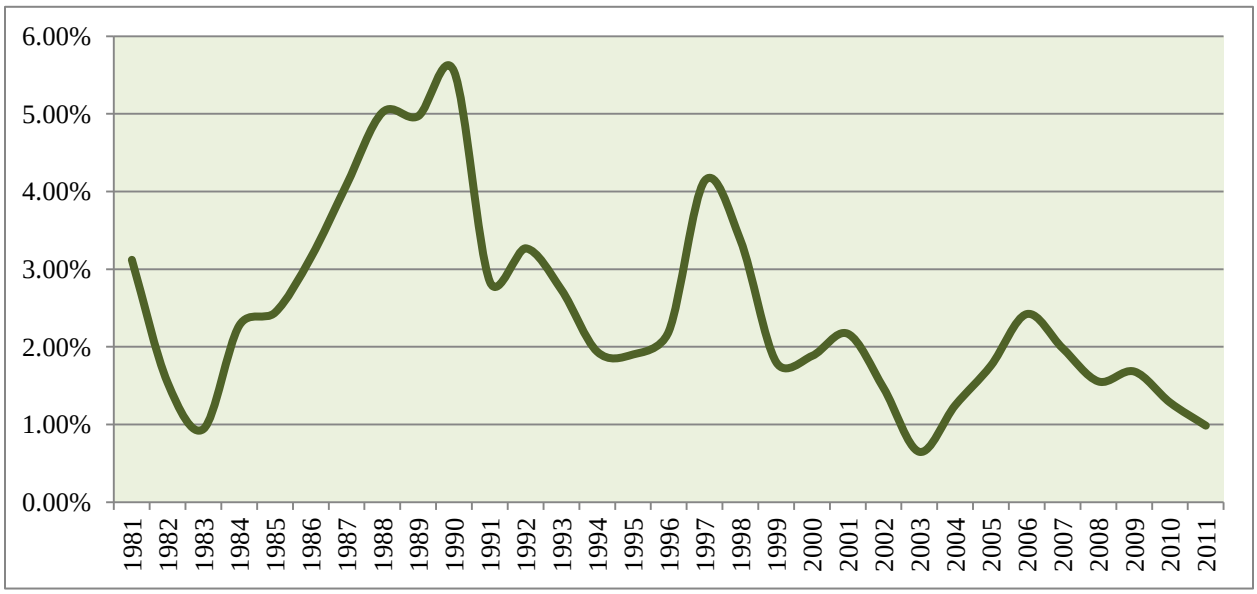
That said, local economic growth has not recovered from the recession and, if the jobs are available in King County, and the transit options remain limited, this rate of growth may not be sustainable.

Housing prices have played their part in the observed population gains. This too has been dampened with the bursting of the housing bubble as declining home prices closer the major job centers has encouraged a recent demographic shift. This is likely, however, to be temporary as values are stabilizing in the core employment centers which will push population further out as shelter become less affordable again.

Snohomish County

Snohomish County saw a rapid increase in population growth in the 1980's, primarily as a function of expansion in the aerospace industry, has slowed down its rate of growth and shows that the buildup of the housing bubble had a pronounced effect on population with a rapid increase in the early 200's followed by a period of deflation starting in 2008 and has not shown signs of a recovery to date.

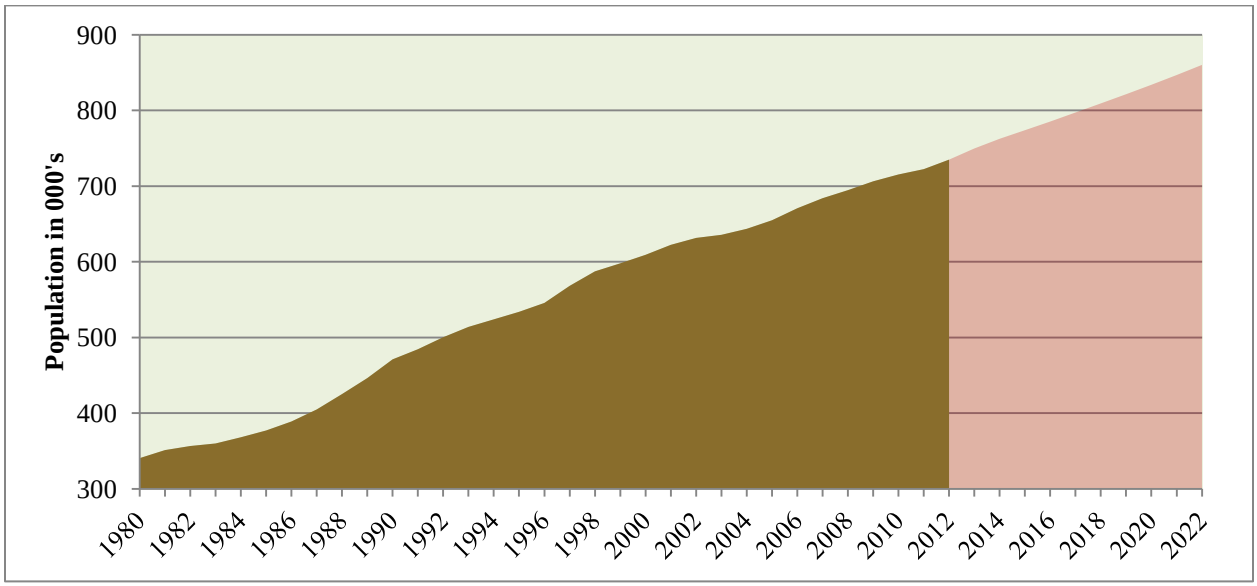
FIGURE 6: SNOHOMISH COUNTY ANNUAL POPULATION GROWTH: 1980 - 2011



SOURCE: Puget Sound Economic Forecaster

Looking forward, we note that projections for the next 10-year period suggest that the population will grow at an average rate of 1.6% through 2022 – lower than average annual job gains for the same period. Again we feel that this can be considered to be a conservative rate as it assumes a *status quo* and that there will be no plans to enhance or encourage additional growth.

FIGURE 7: SNOHOMISH COUNTY ANNUAL POPULATION CHANGE & FORECAST: 1980 – 2021



SOURCE: Puget Sound Economic Forecaster

KEY FINDINGS

In aggregate, the tri-county region has seen rarely seen a decline in its population. In fact, the tri-county area has only seen two years where aggregated population has declined and this was totally attributable to the Boeing crash in the early 1970's. Specific counties, however, have seen occasional years where population growth has been negative but, again, this has been a function of specific economic impacts rather than a general trend.

Between 1980 and 2011 the population of the tri-county region has outpaced U.S. growth 1.7% to 1.03%.

CENTRAL PUGET SOUND EMPLOYMENT GROWTH PATTERNS & FORECASTS

Data has been provided to us by the Puget Sound Regional Council who have recently updated their employment forecasts for the 4-county area.

FIGURE 8: 4-COUNTY EMPLOYMENT FORECASTS

	2000	2010	2020	2030	2040	2000-2010	2010-2020	2020-2030	2030-2040	2010-2040
Natural Resources & Mining	2,690	2,079	1,903	1,921	2,091	-22.7%	-8.5%	0.9%	8.8%	0.6%
Construction	103,256	86,204	101,963	99,541	125,972	-16.5%	18.3%	-2.4%	26.6%	46.1%
Aerospace Manfacturing	77,725	72,401	77,450	77,506	75,387	-6.8%	7.0%	0.1%	-2.7%	4.1%
Durable Manufacturing	83,211	57,275	71,427	67,965	89,684	-31.2%	24.7%	-4.8%	32.0%	56.6%
Nondurable Manufacturing	47,018	33,040	39,919	37,178	41,069	-29.7%	20.8%	-6.9%	10.5%	24.3%
Wholesale	83,189	78,709	94,029	109,335	125,784	-5.4%	19.5%	16.3%	15.0%	59.8%
Retail	189,677	178,725	214,991	251,926	296,478	-5.8%	20.3%	17.2%	17.7%	65.9%
Transportation, Warehousing	62,672	55,253	62,011	64,470	70,848	-11.8%	12.2%	4.0%	9.9%	28.2%
Utilities	2,399	3,285	3,080	3,037	2,812	36.9%	-6.2%	-1.4%	-7.4%	-14.4%
Information Services	80,910	88,894	116,059	138,852	178,350	9.9%	30.6%	19.6%	28.4%	100.6%
Financial Services	102,866	91,070	102,789	110,803	128,795	-11.5%	12.9%	7.8%	16.2%	41.4%
Professional & Business Services	226,870	229,350	340,921	399,072	518,911	1.1%	48.6%	17.1%	30.0%	126.3%
Food Services & Drinking Places	108,512	117,431	134,921	145,047	171,097	8.2%	14.9%	7.5%	18.0%	45.7%
Education Services	26,455	29,388	40,059	51,521	65,060	11.1%	36.3%	28.6%	26.3%	121.4%
Health & Social Services	148,811	191,591	253,167	311,314	348,406	28.7%	32.1%	23.0%	11.9%	81.8%
Other Services	105,165	112,643	116,487	115,823	120,183	7.1%	3.4%	-0.6%	3.8%	6.7%
Government	153,483	177,133	191,616	195,251	203,039	15.4%	8.2%	1.9%	4.0%	14.6%
Public Education	109,236	116,133	128,442	137,016	147,395	6.3%	10.6%	6.7%	7.6%	26.9%

SOURCE: Puget Sound Regional Council & Gardner Economics

As can be seen from the above table, the region was fairly evenly split when it came to employment gains versus losses during the past decade (2000-2010). This is actually not surprising as the survey period encompassed two recessions that both hit the region hard relative to employment changes.

Going forward, between 2010 and 2040, all sectors are expected to see improving employment with the exception of *Utilities* which is expected to lose over 14% of its employment base.

The greatest improvement in the current decade is expected to be within the *Professional & Business Services* sector with a 48.6% gain. This is then followed by *Education Services* (36.3%), *Health & Social Services* (32.1%) and *Information Services* (30.6%).

The only declines expected are in the very small *Natural Resource & Mining* sector (-8.5%) and the *Utilities* sector (-6.2%).

When we compare this forecast to that created by Messrs. Conway Pederson we note that many similarities but also some discrepancies. Of particular interest is the near-term forecast for the *Construction* sector that suggests growth of 18.8% while the Conway Peterson data is showing a 36% growth rate. Forecasts for growth in *Wholesale & Retail Trade* are higher in the PSRC forecast than the Conway Peterson report, as is growth in the *Information* sector (30.6% versus 18%).

In aggregate, however, the 10-year forecasts are generally alike.

In order to open a discussion relative to tri-county area that is the focus of proposed transit oriented development, GARDNER ECONOMICS took the same industry sectors that are shown above to calculate how the individual component counties fared when compared to the larger region as well as to compare them to national statistics.

As the table below demonstrates, employment growth between 2000 and 2010 in the tri-county region was extremely close for a majority of the component sectors with the exception of *Natural Resources & Mining* and *Utilities* – which were dramatically lower in the 3-county area – and *Durable Manufacturing* which, although having lost jobs during the same period, did not lose as many.

FIGURE 9: PERCENTAGE CHANGE IN COVERED EMPLOYMENT 2000-2010

	2000 - 2010					
	4-County Area	Tri County Area	King County	Snohomish County	Pierce County	U.S.
Natural Resources & Mining	-22.7%	-58.6%	-62.6%	-65.0%	-35.8%	17.7%
Construction	-16.5%	-16.8%	-25.3%	-6.9%	8.1%	-18.7%
Aerospace Manfacturing	-6.8%	-7.3%	-21.3%	17.5%		-7.5%
Durable Manufacturing	-31.2%	-18.6%	-28.0%	1.8%		-35.1%
Non-Durable Manufacturing	-29.7%	-30.4%	-30.9%	-27.3%		-30.1%
Wholesale	-5.4%	-5.2%	-11.5%	35.7%	12.8%	-8.1%
Retail	-5.8%	-6.6%	-13.1%	8.7%	5.8%	-5.5%
Transportation, Warehousing	-11.8%	-18.3%	-20.6%	21.4%		-5.0%
Utilities	36.9%	-27.5%	-26.8%	-40.8%		-8.4%
Information Services	9.9%	10.4%	11.4%	23.7%	-22.4%	-25.4%
Financial Services	-11.5%	-10.4%	-12.7%	14.3%	-15.0%	-0.5%
Professional & Business Services	1.1%	0.1%	-5.6%	34.9%	29.2%	0.4%
Food Services & Drinking Places	8.2%	8.1%	6.6%	19.4%	4.8%	14.5%
Education Services	11.1%	20.4%	7.1%	52.2%	-22.4%	32.0%
Health & Social Services	28.7%	26.6%	28.7%	38.6%	6.3%	28.8%
Other Services	7.1%	9.3%	5.3%	12.7%	21.2%	3.2%
Government	15.4%	12.0%	8.6%	21.0%	16.5%	8.2%
Public Education	6.3%					32.0%

SOURCE: Puget Sound Regional Council & Gardner Economics

It should be noted that we were unable to separate out *Public Education* from *Education Services* and data for Pierce County excludes *Aerospace* (a function of limited activity in that area), and that a few other sectors were also not represented in Washington State Employment Securities Department data. Overall, however, we feel that this still provides a strong representation of the presence of major industry sectors in the different counties.

When comparing the component counties to the United States as a whole, it is clear that the local market did not create the volume of jobs in the last decade as seen nationally. Again we would attribute this to the particularly severe recession that hit our market in the early 2000's which took far longer to recover from than the U.S. as a whole.

Where the region did see employment growth, however, the sectors that improved are worthy of comment. The first of these was the *Information* sector where the region grew by 9.9% versus a net loss

of 25.4% nationally. The *Construction* sector increased at a modest rate but still above that of the U.S. and the *Durable Manufacturing* sector, although losing jobs, did not lose as many as the U.S. as a whole.

Where the region lagged most in growth was in *Education Services*, *Financial Services* and *Natural Resources/Mining*.

When we look at the data at a county level, there were additional surprises as Snohomish County fared better than its neighboring counties – when compared to the U.S. as a whole – in every area baring *Mining* and *Utilities* when compared to the U.S. average. In Pierce County, 12 out of 17 industry sectors demonstrated a better employment situation between 2000 and 2010 than the U.S. Slower growth, however was, somewhat counter intuitively, found in King County where there were just four industry sectors that demonstrated a better situation than the U.S. between 2000 and 2010.

These sectors were *Durable Manufacturing*, *Information Services*, *Other Services* and *Government*.

We would contend that this is a function of the 2001-3 recession that hit the central Puget Sound, specifically King County, very hard and should not be construed as a precursor to lower growth rates in the core central Puget Sound County going forward.

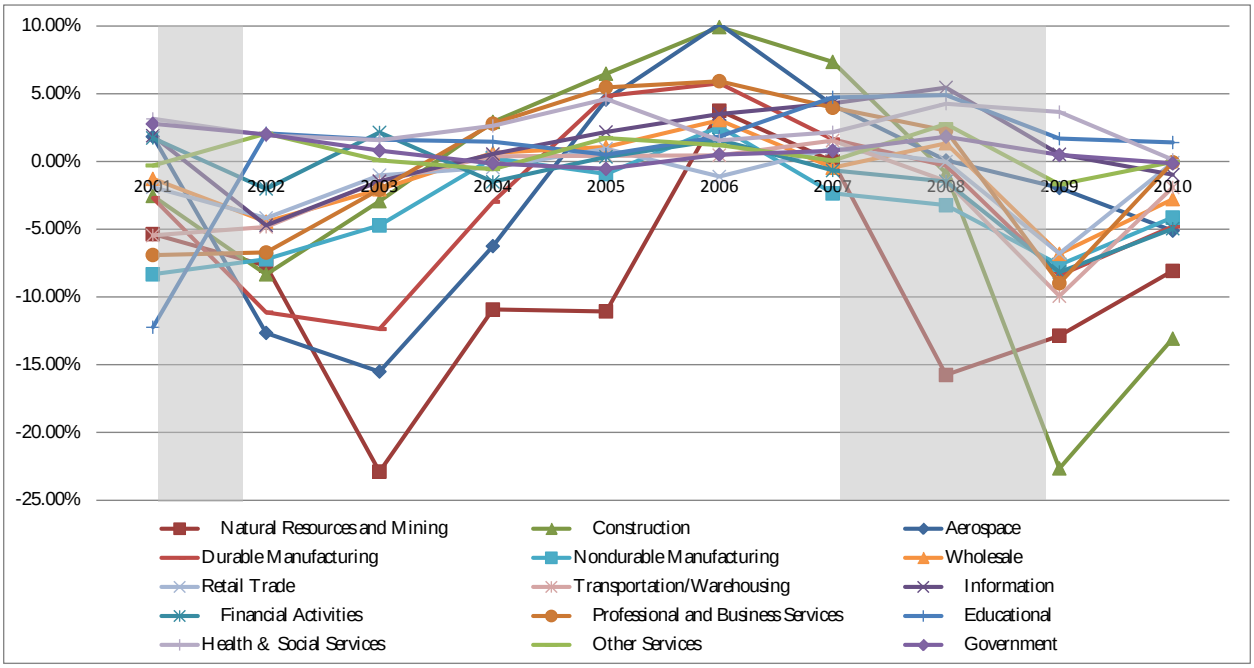
The following section will look at the three counties individually to assess their positive and negative attributes as this may affect demand for commercial spaces proximate to TOD's.

King County

As the chart below demonstrates, although the United States formally came out of recession in November of 2001, King County did not see any form of recovery until into 2004. (The shaded areas represent periods of recession).

Between 2000 and 2010, there were only a few select sectors that actually gained in overall employment. That said, they represent important sectors that, interestingly, may have a propensity to locate close to TOD's. The *Health & Social Services* sector grew by 29%, the *Information* sector by 11%, *Government* expanded by 9% and *Educational Services* and *Food & Drinking Places* both expanded by 7%. The *Other Services* sector rounds out the expanding sectors with a 5% increase.

FIGURE 10: ANNUAL PERCENTAGE CHANGE IN COVERED EMPLOYMENT IN KING COUNTY
2000-2010



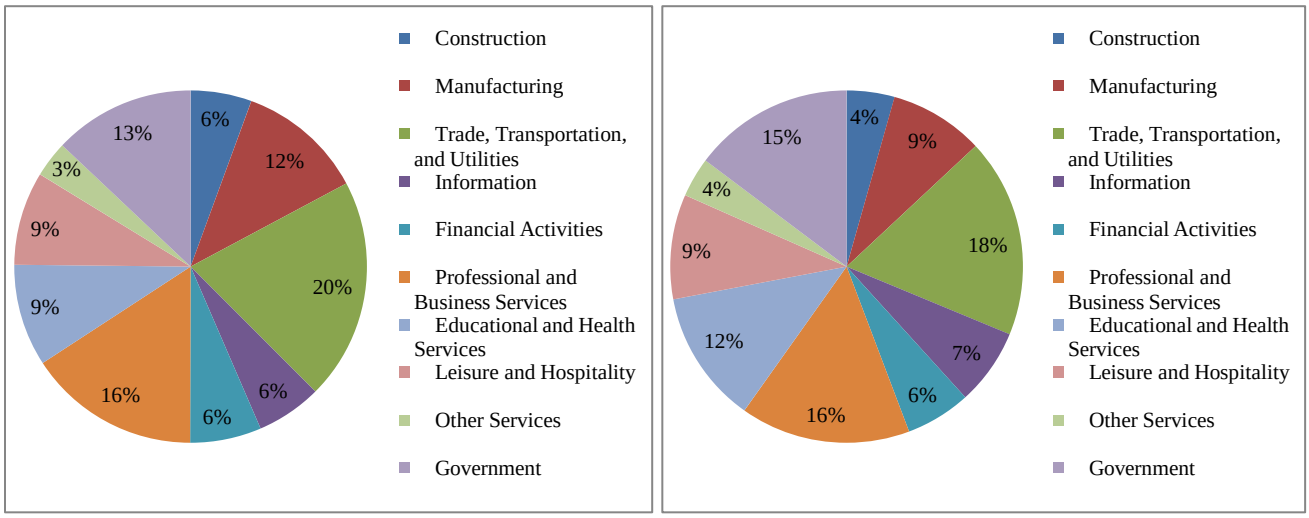
SOURCE: Washington State Employment Securities Department & Gardner Economics

When we look at the more commonly utilized NAICS codes for employment sectors we see that the overall share of jobs shifted between 2000 and 2010. The most pronounced increase in market share of overall jobs came in the *Education & Health Services* sector which increased from 9.4% total share to 12.2%. There are additional improvements in *Government* (13% to 14.7%), *Leisure & Hospitality* (8.6% to 9.6%) and *Information* (6% to 7%).

Offsetting these increases were declining shares in overall employment in *Manufacturing* (11.6% to 8.7), *Trade, Transportation & Utilities* (20.3% to 18.2) and *Construction* (5.6% to 4.4%).

FIGURE 11: PERCENTAGE CHANGE IN OVERALL SHARE OF COVERED EMPLOYMENT

KING COUNTY 2000-2010



As we move forward, we anticipate that we will see further bifurcation in terms of the makeup of industry clusters and that knowledge based industries will continue to take a larger market share. We note from an article published by the P.S.R.C. in 2009[32] that, between 2000 and 2008, although there was growth within the defined regional growth centers, it was usurped by growth outside of these centers. Much of this can be explained by the disproportionate amount of employment within the centers versus outside of them, and that the impact of the early 2000's recession, together with the onset of the 2008 recession, skews the figures.

That said, we would contend that King County still has a competitive edge over the neighboring counties to the South and North and that economic growth can be maintained relative to its neighbors provided employers see benefits to being located in King County as opposed to its neighbors. We will discuss this later within this text.

We forecast that the county will increase its job base by an annual average of 2.3% which is marginally higher than seen in Snohomish County and well above that of Pierce County. When we consider that the county is likely to see a disproportionate increase in growth in the *Information* and *Professional & Business Services* sectors, relative to the neighboring counties, we would suggest that this growth is likely to assisting in gains in other, non-related, industries as they have a high multiplier effect[33]

These growth industries have a propensity to locate close to transit options which bodes well for development around the potential light rail stations.

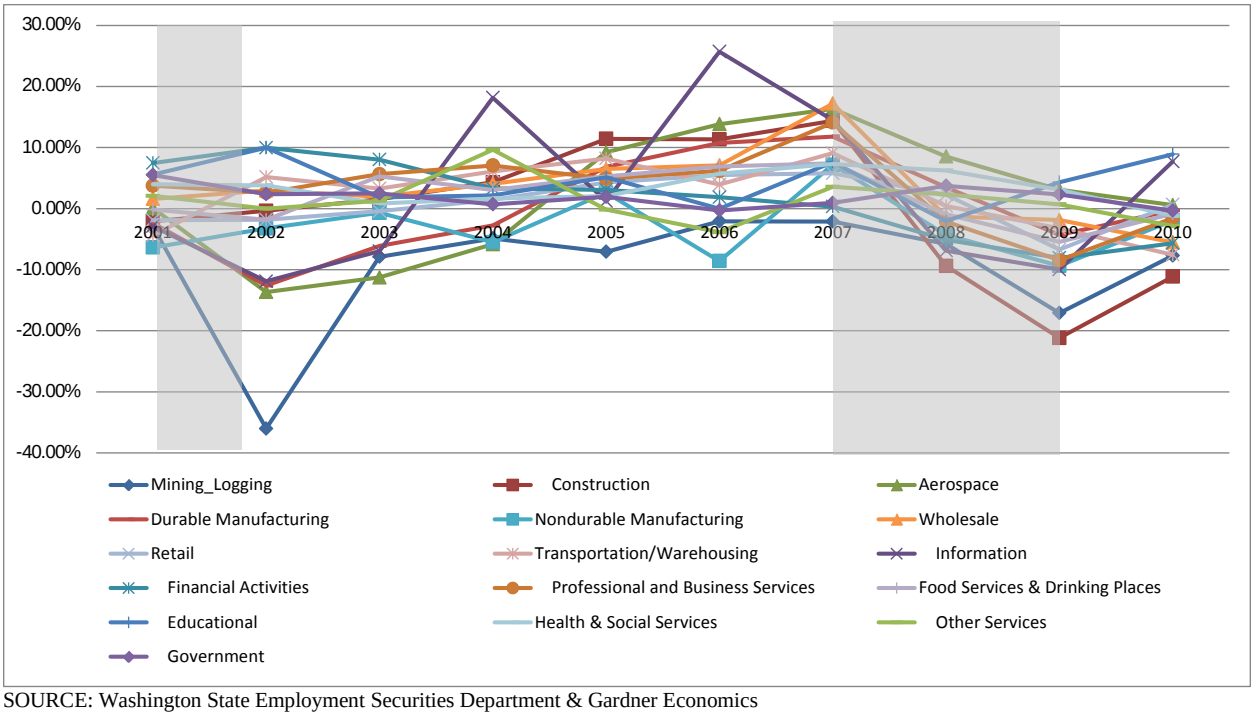
[32] Puget Sound Trends – Employment in Regional Growth Centers, 2000-2008

[33] The Multiplier Effect can best be described as the indirect and induced employment gains that are garnered from one additional job in a chosen industry.

Snohomish County

Snohomish County did not suffer the major swings in employment declines through the recession of the early 2000's and started to show improvement in its employment situation in 2009. As the chart below demonstrates, when excluding the volatile construction sector, employment has been on the upswing.

FIGURE 12: ANNUAL PERCENTAGE CHANGE IN COVERED EMPLOYMENT IN SNOHOMISH COUNTY 2000-2010



SOURCE: Washington State Employment Securities Department & Gardner Economics

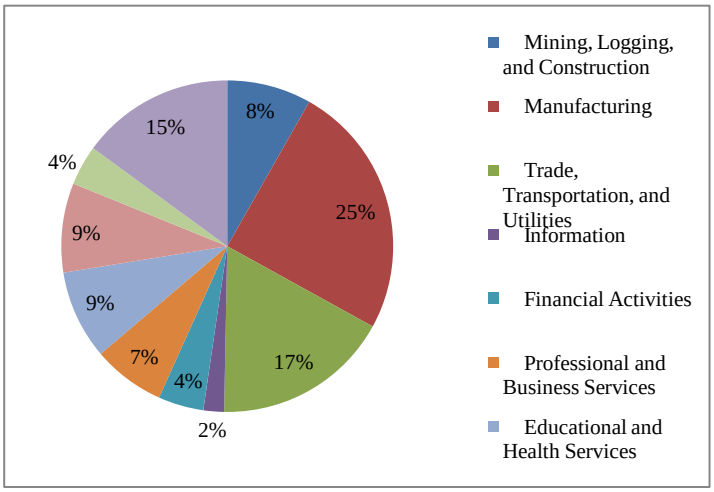
Growth in the last decade was led by *Education* (52.2%), *Wholesale Trade* (35.7%), *Health & Social Services* (38.6%), and *Professional & Business Services* (34.9%). There were also gains seen in *Transportation*, *Information*, *Financial Activities*, *Other Services* and *Government*. In fact, employment was less in just four sectors – *Mining/Logging*, *Non-durable manufacturing*, *Utilities* and *Construction*.

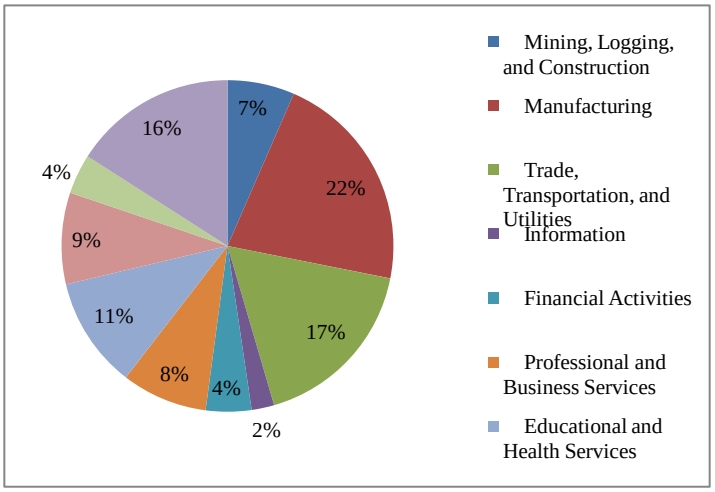
As can be seen on the following page, there was a shift in employment concentration within the County between 2000 and 2010. The sectors that gained the most in overall share were *Education & Health Services*, *Professional & Business Services*, and *Government*.

The most pronounced net negatives relative to share of employment in *Manufacturing*, and *Construction*.

That said, we anticipate that *Manufacturing* will make a comeback along with the *Trade, Transportation* & Utilities sector. Manufacturing has a high multiplier effect while *T,T& U* has a medium multiplier effect.

FIGURE 13: PERCENTAGE CHANGE IN OVERALL SHARE OF COVERED EMPLOYMENT SNOHOMISH COUNTY 2000-2010





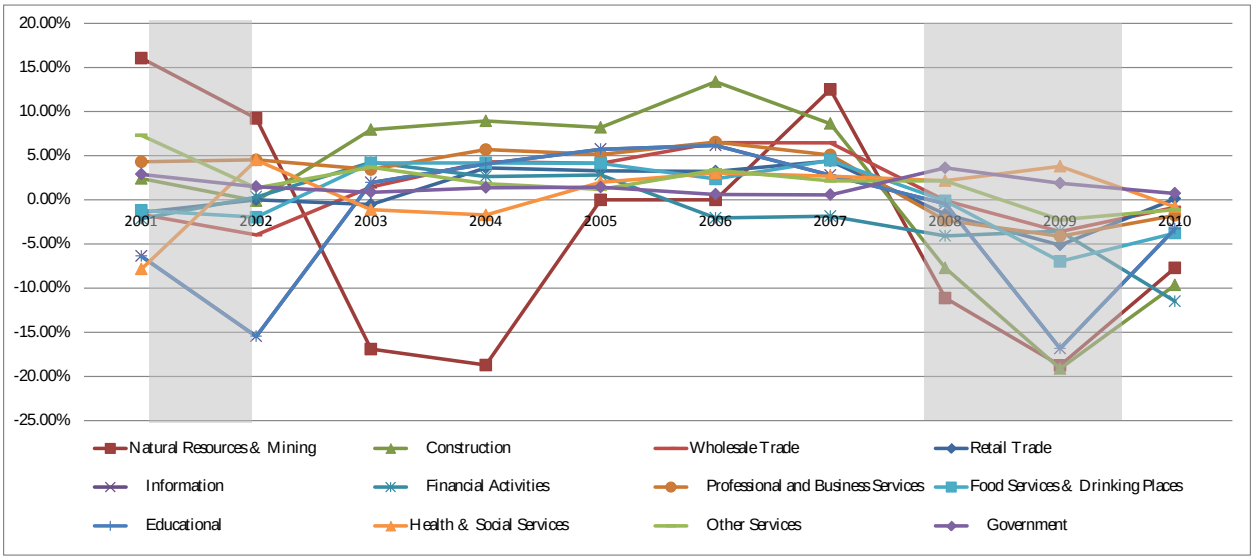
The forecasted annual rate of growth over the forthcoming 10 year period is 2.2%; just shy of King County.

Again, we would contend that, should the ratio of improvement in the County match that of the region, it is possible that the county could see a fairly large increase in TOD oriented businesses.

Pierce County

The Pierce County area did not follow its neighbors to the north when it comes to the change in employment over the past decade.

FIGURE 14: ANNUAL PERCENTAGE CHANGE IN COVERED EMPLOYMENT IN PIERCE COUNTY 2000-2010



SOURCE: Washington State Employment Securities Department & Gardner Economics

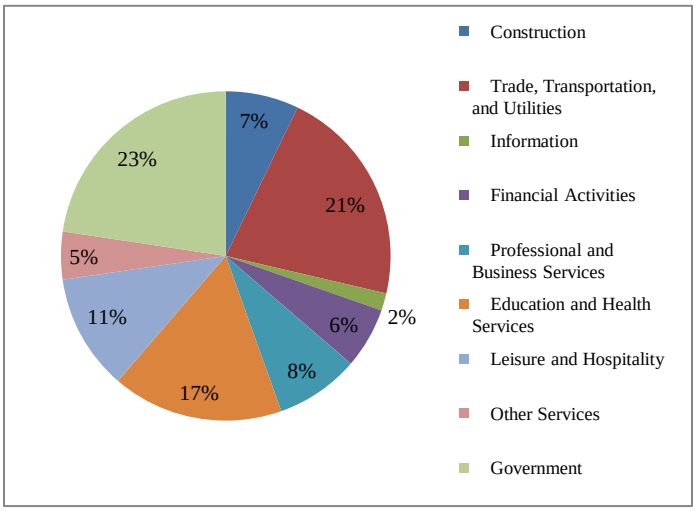
Although the Pierce County area has seen modest recovery in its employment base, it appears to be lagging its neighbors to the North.

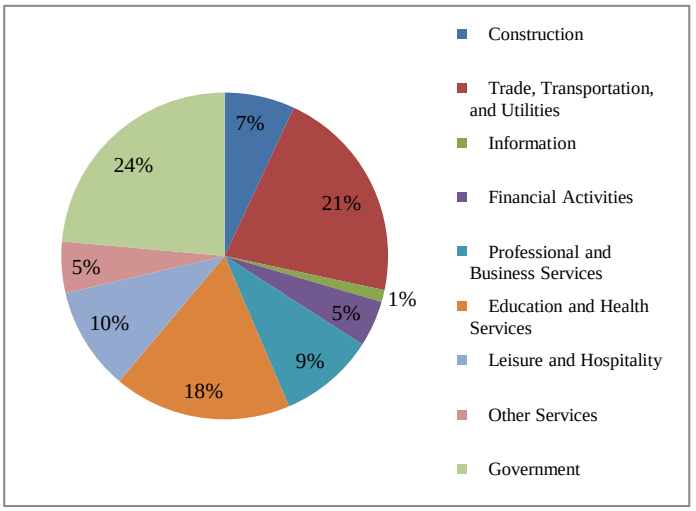
However, there was improvement seen in several sectors that included *Other Services* (21.2%), *Government* (16.5%), *Professional & Business Services* (29.2%) and *Wholesale Trade* (12.8%).

Job losses through the decade were most pronounced in *Natural Resources*, *Information*, *Financial Activities*, and *Education*.

As the chart on the following page demonstrates, the share of employment between 2000 and 2010 did not shift in the same manner as its neighboring counties. The *Professional & Business Services* sector did increase its share from 8.2% to 9.5% and there was marginal improvement in *Government* and the *Other Services* sectors. All other sectors saw their share of covered employment decline.

FIGURE 15: PERCENTAGE CHANGE IN OVERALL SHARE OF COVERED EMPLOYMENT PIERCE COUNTY 2000-2010





Going forward, we anticipate that the Pierce County market will likely lag the rest of the region in its rate of employment growth averaging 1.5% employment growth annually over the next 10-year period.

We would contend that Pierce County will not likely see extensive commercial development along the potential alignments that run through the county in the near-term. Job migration between counties – i.e. where people live and work in separate counties – will likely lead to residential development along the alignment before commercial development occurs.

FACTORS INFLUENCING REGIONAL GROWTH PATTERNS.

The previous section addresses historic changes in employment growth patterns within the tri-county area. The results were not surprising but do suggest that recent employment growth within industry clusters that have a propensity for locations close to transit oriented developments – in concert with the projections for continued growth in these sectors – bodes well for the future of TOD's in our region.

The Puget Sound region is known nationally as an area where innovation is rife. This has been shown before in the aerospace and software industries to name just two.

With anticipated growth of over 100% in the *Information Services*, *Professional & Business Services* and *Education Services* sectors between 2010 and 2040, the influence of these key areas cannot be underestimated.

Many businesses now consider their employees ability to get swiftly and safely to their workplaces to be more important now than ever before. For the better part, gone are the days when businesses location decisions are based purely on locations within the major job centers.

The effect of this can be seen both in the location of residential development, as well as in the commercial environment.

From a residential perspective, we have not only seen the emergence of dense development forms close to existing job centers, but also along transit lines that are already in situ. From a commercial perspective, we have seen extensive campuses developed in Redmond and the Bothell technology corridor[34] that are proximate to residential populations.

Going forward, plans for the development of a major mixed use project in East Bellevue – within an area to be known as the Spring District[35] – are ongoing. The location of this development will be within the shadow of one of the potential light rail stations. In the urban environs, one must point to the South Lake Union sub-market of Seattle as one that has seen dramatic growth in residential, as well as commercial, development over the past several years.

If, as we expect, there is disproportionate growth in knowledge based industries in our area, their effects on development patterns will be pronounced. As businesses understand the need for staff to have easy access to their workplaces, they will increasingly choose locations that are either close to residential development, or ones that offer easy access (by way of mass transit) to it.

From a development perspective, there are other unique factors to consider. First of which is the availability of appropriately zoned land that is proximate to mass transit options. We are likely to see less in the way of commercial development occurring within station areas that can currently be described as oriented toward residential dwellings. This, therefore, suggests that commercial development will likely garner traction in existing mixed-use locations or areas that are currently underutilized.

34 The Technology Corridor : what can account for the Technology Corridor's phenomenal success in these competitive times? The Corridor, 1988.
http://futureofbothell.com/pdf/Bothell_Collateral_and_RFQ_051710.pdf

35 http://www.thespringdistrict.com/

From a locational standpoint, there have been few areas that have grown exponentially outside of the core business locations. The exceptions to this, however, can be seen along the Bothell Technology corridor and at the Microsoft campus in Redmond. Development of these campuses was, to a great degree, a function of land availability, land price, and its proximity to residential neighborhoods.

Specifically of note, in the case of the Bothell corridor is the symbiosis that is generated from businesses that are alike to one another and who choose to locate close to one another. This is somewhat less obvious in Redmond but the same principals apply.

Organic growth in businesses that choose to occupy spaces that are along the potential transit lines, will likely garner interest from other associated businesses.

We would contend that development of additional efficient mass transit options in the region will attract both residential and commercial development to it.

What makes a location desirable for development of commercial spaces?

Employers look to locations that offer out of business hours benefits as well as the traditional day-to-day needs of employees. Key to these are housing and retail options. Employment centers and residential development are not mutually exclusive – but they can be. For example, locations where there is more modestly priced housing can attract buyers/renters who are willing to live in a location that is removed from their places of work as long as access to the workplace is adequate. Businesses, however, are becoming less likely to feel obligated to be present within urban locations (e.g. C.B.D's) depending on their own core functions i.e. *Professional & Business Services* companies still rely on being close to business centers whereas support service organizations do not.

As we focus on the potential for employment growth along the potential transit corridors, we would contend that employers, and therefore the developers that deliver product to meet business' needs, will continue to look favorably on locations that offer convenient access for their employees. As stated previously, we anticipate that several business sectors, which had previously relied on being within traditional business districts given commuting requirements, will likely look favorably on other locations that offer the same conveniences.

Additionally, land values outside of traditional business districts are lower than their more urban counterparts. As such, development cost, and therefore, rents can be more favorable to the tenant. We would contend that growth sectors will see this as an additional benefit.

As with the residential discussion that was presented in a previous paper, we believe that, in as much as the development community will see the positive attributes relative to demand for commercial spaces that are proximate to advanced mass transit options, they are likely to wait to see tangible evidence as to the commencement of the lines before they commit to any form of construction activity.

CONCLUSIONS

We anticipate that the tri-county area will see employment growth from the center out with King County and Snohomish County fairly equal in terms of percentage growth rates. We anticipate that these two counties will see increasing employment in knowledge based industries who do not necessarily have a need for a "downtown" presence and who will look favorably toward locations that are outside of the traditional business centers but with the proviso that access for employees is satisfactory.

As the types of businesses that choose the Puget Sound continues to evolve, we anticipate that the traditional status-quo will start to decline and that ex-urban locations will start to take a greater share of commercial development. This will have a "knock-on" effect that will then start to drive retail development to cater to the population – both residents as well as employees.

Predicted growth in office-using sectors is positive and, assuming that the forecasts are correct, we believe that commercial development along the potential transit lines will become a pattern that will start to occur, to a limited degree, in the current decade, but that we will see more development coming on-line starting in 2020.

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