SR 520 Bridge Quarterly Traffic Engineering Report and Revised Traffic and Gross Revenue Forecast

September 24, 2012 – FINAL DRAFT

Introduction

CDM Smith was contracted by the Washington State Department of Transportation (WSDOT) for traffic and revenue services for the SR 520 bridge project. One of the products of that effort was an investment grade traffic and revenue study published August 29, 2011 that was used in bond financing. The study produced annual gross revenue estimates from an assumed start of tolling of January 1, 2012 through 2056.

The investment grade study included a comprehensive assessment of all factors affecting bridge usage under toll conditions. Some of the most important factors were overall cross-lake vehicle demand, toll rates on the bridge, availability and characteristics of bridge alternatives, potential user's tradeoff between the toll cost and the time savings of using the bridge versus alternatives (value of time), and the number of toll accounts established by the potential user population. The number of toll accounts established by the potential user population is important to bridge usage reflected in the number of transactions because the toll structure includes an additional charge for non-account holders (pay by mail users) making it more expensive for them to cross the bridge and more likely to divert to other routes. Conversely, account holders pay a lower toll and are less likely to divert to other routes. Thus a higher proportion of account holding users will result in more transactions. The effect on revenue is in opposite directions: pay by mail users pay a higher toll but divert more while account users pay a lower toll but divert less. Thus, the magnitude of toll accounts established is less important for revenue and as such is not a main revenue driver.

Tolling commenced on the bridge December 29, 2011. This report documents the first update of the traffic and revenue estimates based primarily on the actual tolling experience in the first six months of 2012. This update also included an update of forecasted population and employment. Future levels of population and employment in the bridge market area are important because they are an indication of cross-lake demand as well as a determinant of highway congestion levels influencing the attractiveness of alternatives to the SR 520 bridge. This update assumed the same future toll rate structure as that assumed in the original investment grade study.

Tolling Experience

Six months of actual tolling experience, January through June 2012, was available to inform the update. The results of actual tolling experience are a valuable benchmark to help evaluate and adjust the long term revenue estimates. However, six months is not enough time to fully ascertain all aspects of what future tolling performance might be. Travelers need time to become aware of all options and adjust accordingly. Although users of the bridge may be aware of the toll rates when they use the bridge, because the facility is all electronic they do not experience the instantaneous feedback that a cash payment provides. For non account users it can be several weeks after initial usage when they first see a bill.

Also, the initial reporting system has the primary goal of processing transactions for the purpose of collecting revenue. As time passes the reporting system will produce reports specifically structured to aid in evaluating forecast performance. The toll reports available for this update included only limited transaction reports. No revenue reports were available at a level that comparisons with forecast could be made.

Our overall conclusion was the results of the tolling experience to date did not reveal anything that suggested any major change to the previous forecast. However, fine tuning adjustments were made when the tolling data presented a clear picture of the need.

Report Organization

This report covers:

- Description of data available from first six months of tolling experience
- Review of tolling performance with key comparisons to the Investment Grade (IG) forecast
- Revised economic forecast overview including comparisons to IG economic forecast (the full economic forecast memo is included as an appendix to this document)
- Adjustments made to toll modeling and forecasting to account for performance to date, revised economics, and configuration changes
- Revised investment grade traffic and revenue forecast including comparison to original IG forecast

Tolling Data Available

The primary tolling data available for review from WSDOT is based on reports from the transactions posted by the roadway toll equipment. This data includes transactions by toll period, class, and limited payment type (transponder versus photo toll) for the entirety of January through June 2012. This data has certain limitations including: unstable information primarily in the first three months of tolling due to weather related issues with tolling equipment calibration, fluctuations in travel demand due to the new tolling, bridge closures due to construction, and reprocessing of transactions, particularly vehicle class. Data also included monthly estimates of the breakout of payment proportions for all payment types (transponder vs. pay by plate vs. pay by mail).

As with any new tolling system, the reports available are limited at this time. However, additional reporting detail levels are expected to be available in the future, such as forecast-comparable gross revenue, time and day divided payment proportions by all payment types, and information similar to the equipment level reports reprocessed to account for adjustments including unreadable plates, toll exempt vehicles, corrected classifications, and corrected payment types.

Review of Tolling Performance

Using data provided by WSDOT, CDM Smith examined the toll performance of SR 520 for January through June, 2012. Facility usage (including total transactions, weekday and weekend traffic), method of payment, traffic by time period, cross-lake traffic, and vehicle classifications were reviewed.

Facility Usage

Table 1 illustrates the differences between total monthly forecast transactions and results available from tolling equipment. The actual performance exceeded the forecast by 13.4% during the six month period. However, the reported transactions do not include adjustments for exempt vehicles and later post processing by the customer service center as noted earlier. So, some small additional reduction in the difference would be expected when these adjustments are made.

Table 1 – SR 520 FY 2012 Total Transactions Forecast and Preliminary Results

Month	Forecast*	Reported		Variance
January	1,410,000	1,316,000	(1)	-6.7%
February	1,311,000	1,544,000	(2)	17.8%
March	1,494,000	1,735,000	(3)	16.1%
April	1,447,000	1,629,000	(4)	12.6%
May	1,473,000	1,854,000		25.9%
June	1,524,000	1,740,000	(5)	14.2%
Jan-Jun	8,659,000	9,818,000		13.4%

* August 2011 Investment Grade Forecast - Includes four full weekend closures spread evenly over Jan-Jun 2012

(1) Weekend closure 1/14 - 1/15, major snow storm 1/16 to 1/20

(2) Weekend closure 2/25 - 2/26

(3) Weekend closure 3/10 - 3/11

(4) Weekend closure 4/28 - 4/29

(5) Weekend Closure 6/2 - 6/3

Source: WSDOT Toll Transaction Reports provided to CDM Smith, CDM Smith Quarterly Forecast Review June 2012

Table 2 shows the differences in average weekday and average weekend day traffic. (Adjustments were made to account for bridge closure weekends and major holidays to provide comparable data.) As expected from the total transactions, the average weekday and weekend traffic are higher than the IG forecast. Weekday transactions are running about 13% above forecast and weekend transactions are running about 33% above forecast.

Usage of the bridge in FY 2012 is higher than what was forecasted in the IG study for both weekdays and weekends. If the six months reported transaction were extrapolated out for a full twelve months the total would be slightly less than 20 million. The IG study estimated about 21 million transactions in FY 2014 so the usage results so far could be thought of as running almost two years ahead of pace.

Table 2 – SR 520 FY 2012 Forecast vs. Actual Average Weekday and Weekend Transactions

Weekdays			
	IG Forecast	Actual	Variance (1)
Jan-Jun	56,408	63,863	13%
Weekend Days (3)			
	IG Forecast	Actual (2)	Variance
Jan-Jun	28,173	37,355	33%

(1) If Weekdays Jan. 16 to Jan. 20 were removed due to snow storm, variance would be +16%

(2) Weekends where SR520 was closed were removed to provide direct comparison

(3) Major Holidays (New Years and Memorial Day) falling on a weekday were factored into weekend results

Source: Toll Transaction Reports provided to CDM Smith, CDM Smith IG Forecast and related data

Method of Payment

The next review is the payment classification proportion. This is important because users who are pre-paid account based (transponder or pay by plate) pay a significantly lower toll than pay by mail patrons. The estimated breakdown of the payment types was provided on a monthly basis as shown in Table 6.

Table 3 – SR 520 FY 2012 Monthly Payment Shares

	Transponder	Pay by Plate	Total Account Based	Total Pay By Mail*	Total
Jan	69.9%	8.2%	78.1%	21.9%	100.0%
Feb	72.8%	7.2%	80.0%	20.0%	100.0%
Mar	73.0%	8.1%	81.0%	19.0%	100.0%
Apr	72.2%	9.0%	81.3%	18.7%	100.0%
May	70.5%	10.4%	80.9%	19.1%	100.0%
Jun	69.7%	11.1%	80.7%	19.3%	100.0%
Jan-Jun	71.4%	9.1%	80.5%	19.5%	100.0%

* Includes short term account transactions, which amount to less than 1% of all toll transactions.

Source: Payment breakout provided to CDM Smith by WSDOT

The IG study concluded a total of 72% Account Based and 28% Pay by Mail was likely. Table 3 indicates that the number of Account Based transactions is much higher at almost 81%, and those users pay a lower toll. Consequently, the higher number of transactions as noted above seems likely. The data in Table 3 also indicate a high penetration of account based transactions when compared to other toll facilities, which could imply the ramp-up effects of users joining the account program after tolling began was small.

Table 4 provides a breakout of transponder vs. photo transactions using the raw lane level data summaries. Of note, peak hour payment share, particularly in the morning, is very high. After processing (where some photo transactions might become transponder transactions due to transponder misreads), the transponder shares would likely be slightly higher. This data also indicates peak period traffic is likely stabilizing particularly in terms of payment share.

Table 4 – SR 520 FY 2012 Toll Period Payment Shares

Weekdays		
Toll Period	**Transponder**	**Photo***
05:00-05:59	78%	22%
06:00-06:59	81%	19%
07:00-08:59	79%	21%
09:00-09:59	75%	25%
10:00-13:59	66%	34%
14:00-14:59	66%	34%
15:00-17:59	72%	28%
18:00-18:59	74%	26%
19:00-20:59	71%	29%
21:00-22:59	67%	33%
Total	72%	28%
Weekends		
Toll Period	**Transponder**	**Photo***
05:00-07:59	68%	32%
08:00-10:59	65%	35%
11:00-17:59	62%	38%
18:00-20:59	62%	38%
21:00-22:59	63%	37%
Total	63%	37%

*includes all lane level photo transactions including registered plates

Source: WSDOT Toll Transaction Reports provided to CDM Smith

Traffic by Time Period

Traffic performance under tolling by time period was examined. The time periods used are the time periods of the toll rates. Each time period reviewed has a single toll rate. Table 5 shows the share of investment grade transactions per weekday toll period assumed prior to accounting for time shifting versus actual experience to date. The final IG study results were adjusted to account for some peak travelers to shift their trip to before or after the peak when toll rates are lower. The share of weekday transactions of total daily toll period transactions in January through June 2012 have followed the Investment Grade unadjusted forecast amounts closely. Consequently, there is no evidence of people shifting their trips out of the peak period to pay lower tolls.

Table 5 SR 520 FY2012 Weekday Traffic by Toll Period Shares

Toll Period	IG Unadjusted	Jan-Jun Observed
05:00-05:59	1%	1%
06:00-06:59	3%	4%
07:00-08:59	18%	17%
09:00-09:59	7%	7%
10:00-13:59	22%	20%
14:00-14:59	6%	6%
15:00-17:59	24%	24%
18:00-18:59	6%	8%
19:00-20:59	7%	8%
21:00-22:59	6%	5%
Total	100%	100%

Source: Toll Transaction Reports provided to CDM Smith, CDM Smith IG Forecast and related data

Cross Lake Traffic

This section compares cross lake traffic on SR 520 and I-90 in the pre and post tolling periods. Table 6 shows that overall total traffic on SR 520 has dropped about 38 to 40% from 2010 and 2011 levels. A comparable figure is the IG forecast predicted drop of about 48% in average annual daily traffic which is the average drop for all days of the year, including weekends and construction closures. I-90 traffic grew by about 14% in the post tolling period over the pre tolling period. Note that traffic changes by toll period vary, with less overall traffic reduction during peak periods. Also, the total cross lake traffic on the combination of SR 520 and I-90 has dropped by 8 to 9%. These results are consistent with what was expected in the IG analysis.

Table 6 Comparison of SR 520 and I-90 Cross-lake Travel Pre and Post Tolling

	2010			2011			2012		
	SR 520	I-90	Total	SR 520	I-90	Total	SR 520	I-90	Total
Jan	2,858,130	3,637,006	6,495,136	2,889,847	3,720,130	6,609,977	1,634,998	4,290,334	5,925,332
Feb	2,713,308	3,476,044	6,189,352	2,632,197	3,417,522	6,049,719	1,705,124	4,194,309	5,899,433
Mar	3,067,761	3,947,718	7,015,479	3,025,997	3,876,989	6,902,986	1,872,476	4,482,560	6,355,036
Apr	2,994,405	3,837,064	6,831,469	2,907,055	3,840,478	6,747,533	1,781,029	4,358,328	6,139,357
May	3,027,169	3,936,956	6,964,125	2,979,347	4,001,694	6,981,041	1,926,200	4,501,185	6,427,385
Jun	3,232,855	4,027,251	7,260,106	2,982,005	4,153,978	7,135,984	1,894,293	4,419,808	6,314,101
Jan-Jun	17,893,628	22,862,039	40,755,667	17,416,448	23,010,791	40,427,240	10,814,121	26,246,523	37,060,644

	SR 520		Total Cross Lake	
	2012 vs. 2010	2012 vs. 2011	2012 vs. 2010	2012 vs. 2011
Jan	-43%	-43%	-9%	-10%
Feb	-37%	-35%	-5%	-2%
Mar	-39%	-38%	-9%	-8%
Apr	-41%	-39%	-10%	-9%
May	-36%	-35%	-8%	-8%
Jun	-41%	-36%	-13%	-12%
Jan-Jun	-40%	-38%	-9%	-8%

*Note 2010 and 2011 data were slightly adjusted for weekend closures and some major snow storms. 2012 was adjusted for January snow storm and all weekend closures.

Source: WSDOT Traffic Counters, WSDOT Data Analysis, and CDM Smith Analysis

Vehicle Classification

Finally, vehicle toll classification was reviewed. Table 7 indicates in the early months of tolling the number of six or more axle vehicles was very high, compared to the total three or more axles. WSDOT has indicated there were classification problems with the tolling equipment in the start of tolling and classification was also affected by rain. By April, the pattern changed significantly perhaps as a result of correcting some of these issues.

Table 7 – SR 520 FY 2012 Transactions by Reported Class

Transactions						
	2 Axle	3 Axle	4 Axle	5 Axle	6+ Axle	Total
Jan	1,291,528	14,031	861	1,434	8,593	1,316,447
Feb	1,511,351	15,723	867	1,625	13,966	1,543,532
Mar	1,703,860	17,280	1,290	1,678	11,135	1,735,243
Apr	1,603,825	17,591	1,270	1,550	4,445	1,628,681
May	1,828,872	19,258	1,342	1,787	2,731	1,853,990
Jun	1,716,424	18,729	1,461	1,547	2,008	1,740,169
TOTAL	9,655,860	102,612	7,091	9,621	42,878	9,818,062
Proportions (% of Total)						
	2 Axle	3 Axle	4 Axle	5 Axle	6+ Axle	Total
Jan	98.1%	1.1%	0.1%	0.1%	0.7%	100.0%
Feb	97.9%	1.0%	0.1%	0.1%	0.9%	100.0%
Mar	98.2%	1.0%	0.1%	0.1%	0.6%	100.0%
Apr	98.5%	1.1%	0.1%	0.1%	0.3%	100.0%
May	98.6%	1.0%	0.1%	0.1%	0.1%	100.0%
Jun	98.6%	1.1%	0.1%	0.1%	0.1%	100.0%
TOTAL	98.3%	1.0%	0.1%	0.1%	0.4%	100.0%

*Includes tolled periods only (5 AM to 11 PM)

Source: WSDOT Toll Transaction Reports provided to CDM Smith

The original forecast indicated that 4.8% of the transactions would be for three or more axle vehicles (excluding transit exempt vehicles) whereas to date, only 1.6% (including transit exempt vehicles) have been recorded. The observed percentage of trucks is exceedingly low for any type of major route. There is a higher proportion of high axle vehicles in the observed toll data than in the forecast. Lower overall truck percentage but higher axle trucks have an opposing effect on revenue. With the limited data showing such a low truck percentage and the higher axle counts of observed trucks along with instability in the lane classifications during the beginning of tolling, it was decided to make no traffic and revenue adjustment until additional and more conclusive data was available.

Revised Economic Forecast Overview

CDM Smith employed Community Attributes Inc (CAI) to provide an updated independent economic forecast. CAI is the same firm who provided the forecasts for the IG Study. (CAI has provided a detailed report which is included as appendix A of this report.)

The analysis follows a method similar to those used in the original investment grade study for projecting employment and population. The approach allocates countywide forecasts published by Conway Pedersen Economics through 2022 and post 2022 by applying county growth rates from Moody's Economy.com. The analysis then utilizes local area employment data, real estate trends, and

anticipated real estate development to allocate the countywide forecasts to smaller geographic areas in the corridor.

Two key notes are important in the economic forecast comparisons. First, a variation to this update is that the smallest geographic unit in the forecast models use Forecast Analysis Zones (FAZs), in lieu of the smaller Traffic Analysis Zone (TAZ) employed for the IG forecast. This change reflects restrictions on data access enforced by the Washington State Employment Security Department. Consequently, the actual economic forecast below county level included in the IG report is not directly comparable. Instead, revised sub-area results are provided here and in Appendix A for appropriate comparisons. Second, CAI's 2010 and 2012 forecasts include total jobs, excluding Construction and Resources jobs which are excluded for travel demand modeling applications, given the variability in worksites for workers in these industries. "Total jobs" refers to custom estimates which include proprietors and other workers not included among the other definitions. Where possible, data were adjusted so direct comparisons can be made and consequently employment forecasts in this forecast are total jobs, excluding Construction and Resources jobs, unless otherwise noted.

The forecasts of employment and population within the SR 520 corridor were updated in August 2012 to reflect current economic forecasts, projected development in Seattle and Eastside King County communities, and current market conditions such as office occupancy rates and housing unit absorption trends. The forecasts benefit from newly released population and employment data from Washington State Office of Financial Management (OFM), Washington State Employment Security Department (ESD), the Puget Sound Regional Council (PSRC), and the US Census. CAI produced base year SR 520 corridor estimates for 2010, 2011, and 2012, drawing from these current data.

Table 8 shows the IG and revised employment forecast for the SR 520 corridor. Overall, King County performed about the same as expected in 2010 and slightly better in 2011. On a sub area basis, Kirkland performed much better while Redmond performed worse. In 2016 and 2020, King County is forecast to perform slightly worse than the IG forecast with Seattle and Kirkland performing better and Bellevue and Redmond performing worse. For 2030 and 2040, King County is forecast to perform worse than the IG forecast at about -6.5% in 2030 and -3.1% in 2040. Within the County, Seattle, Kirkland, and Redmond are forecast to perform better, but the lower expected growth in Bellevue counteracts these gains somewhat. Overall, for 2016 and 2020, the change in growth in Seattle outweighs the decline in growth on the eastside, showing some optimism for growth in the SR 520 corridor, but not for King County in total.

Table 9 shows the IG and revised population forecast for the SR 520 corridor. Overall, King County performed slightly better in 2010 and 2011 when compared to the IG forecast. In 2016, King County population is forecasted to be slightly higher than the IG forecast driven mostly by positive changes in Seattle, but lessened by negative changes in Bellevue and Redmond. For 2020, 2030, and 2040, King County population is forecasted to continue this trend in being higher than the IG forecast, but tapering down to nearly no change in the forecast by 2040. Over these years, Seattle shows quite a bit higher forecast while Bellevue shows quite a bit lower forecast. Overall, the increase in the Seattle forecast exceeds the decline in the eastside forecast.

Table 8 CAI 2012 Employment Forecasts Comparison 2010-2040

Employment by Area	2010	2011	2012	2013	2016	2020	2030	2040
CAI 2012 Draft Forecast								
Major Cities								
Seattle	483,141	496,298	510,254	519,356	547,339	581,040	619,751	717,333
Bellevue	126,993	130,186	134,092	137,345	147,261	158,707	169,784	201,778
Kirkland	31,086	32,160	33,265	33,656	36,807	38,521	45,305	53,804
Redmond	84,888	87,684	89,874	92,700	98,680	105,231	127,996	156,367
Eastside	242,967	250,030	257,231	263,701	282,748	302,459	343,085	411,949
King County	**1,140,409**	**1,163,507**	**1,193,495**	**1,219,542**	**1,284,554**	**1,353,442**	**1,434,425**	**1,657,612**
Region	**1,774,152**	**1,801,138**	**1,846,853**	**1,882,927**	**1,988,609**	**2,098,307**	**2,232,244**	**2,543,864**
CAI 2010 Investment Grade Forecast								
Major Cities								
Seattle	478,457	486,640	n/a	n/a	535,426	562,503	610,575	661,110
Bellevue	128,124	130,401	n/a	n/a	149,496	160,025	186,648	201,903
Kirkland	29,141	30,185	n/a	n/a	35,401	38,173	43,594	48,722
Redmond	91,639	93,290	n/a	n/a	106,656	114,198	126,791	136,031
Eastside	248,904	253,876	n/a	n/a	291,553	312,396	357,033	386,656
King County	**1,140,075**	**1,158,682**	**n/a**	**n/a**	**1,289,163**	**1,364,007**	**1,533,837**	**1,710,218**
Region	**1,770,033**	**1,794,635**	**n/a**	**n/a**	**1,996,518**	**2,115,533**	**2,393,202**	**2,700,104**
Percentage Differences								
Major Cities								
Seattle	1.0%	2.0%	n/a	n/a	2.2%	3.3%	1.5%	8.5%
Bellevue	-0.9%	-0.2%	n/a	n/a	-1.5%	-0.8%	-9.0%	-0.1%
Kirkland	6.7%	6.5%	n/a	n/a	4.0%	0.9%	3.9%	10.4%
Redmond	-7.4%	-6.0%	n/a	n/a	-7.5%	-7.9%	1.0%	14.9%
Eastside	-2.4%	-1.5%	n/a	n/a	-3.0%	-3.2%	-3.9%	6.5%
King County	**0.0%**	**0.4%**	**n/a**	**n/a**	**-0.4%**	**-0.8%**	**-6.5%**	**-3.1%**
Region	**0.2%**	**0.4%**	**n/a**	**n/a**	**-0.4%**	**-0.8%**	**-6.7%**	**-5.8%**
Absolute Differences								
Major Cities								
Seattle	4,684	9,658	n/a	n/a	11,913	18,537	9,176	56,223
Bellevue	(1,131)	(215)	n/a	n/a	(2,235)	(1,318)	(16,864)	(125)
Kirkland	1,945	1,975	n/a	n/a	1,406	348	1,711	5,082
Redmond	(6,751)	(5,606)	n/a	n/a	(7,976)	(8,967)	1,205	20,336
Eastside	(5,937)	(3,846)	n/a	n/a	(8,805)	(9,937)	(13,948)	25,293
King County	**334**	**4,825**	**n/a**	**n/a**	**(4,609)**	**(10,565)**	**(99,412)**	**(52,606)**
Region	**4,119**	**6,503**	**n/a**	**n/a**	**(7,909)**	**(17,226)**	**(160,958)**	**(156,240)**

Notes: Major differences in employment forecasts between the CAI 2010 forecasts and the CAI 2012 updated forecasts are explained by (1) updated baseline employment data by small areas (FAZs), which explains most of the variation among cities, and (2) updated county forecasts from Conway Pedersen Economics, which accounts for countywide differences (lower forecasts). Source: Community Attributes, Washington State Employment Security Department

Table 9 CAI 2012 Population Forecasts by Corridor Subarea 2010-2040

Population by Area	2010	2011	2012	2013	2016	2020	2030	2040
CAI 2012 Draft Forecast								
Major Cities								
Seattle	588,477	591,957	599,567	611,661	641,013	660,658	699,770	744,567
Bellevue	128,941	129,991	131,567	132,512	135,179	139,321	154,129	167,868
Kirkland	47,389	47,586	48,149	48,564	49,171	50,678	53,961	55,877
Redmond	72,056	73,104	73,898	74,509	76,122	78,454	84,930	92,034
Eastside	248,386	250,682	253,614	255,586	260,471	268,453	293,020	315,779
King County	**1,931,249**	**1,942,600**	**1,962,353**	**1,981,474**	**2,028,551**	**2,090,718**	**2,243,448**	**2,403,849**
Region	**3,690,942**	**3,715,650**	**3,762,599**	**3,813,524**	**3,936,315**	**4,102,748**	**4,480,582**	**4,908,224**
CAI 2010 Investment Grade Forecast								
Major Cities								
Seattle	588,121	594,344	n/a	n/a	617,151	629,825	667,322	712,437
Bellevue	129,361	130,822	n/a	n/a	140,330	148,410	174,605	191,639
Kirkland	46,559	47,045	n/a	n/a	48,787	49,748	52,785	54,661
Redmond	73,832	74,763	n/a	n/a	77,425	79,574	85,896	93,177
Eastside	249,752	252,630	n/a	n/a	266,542	277,732	313,286	339,477
King County	**1,919,638**	**1,935,671**	**n/a**	**n/a**	**2,012,235**	**2,069,234**	**2,229,163**	**2,395,720**
Region	**3,683,712**	**3,709,529**	**n/a**	**n/a**	**3,915,994**	**4,082,238**	**4,471,673**	**4,908,064**
Percentage Differences								
Major Cities								
Seattle	0.1%	-0.4%	n/a	n/a	3.9%	4.9%	4.9%	4.5%
Bellevue	-0.3%	-0.6%	n/a	n/a	-3.7%	-6.1%	-11.7%	-12.4%
Kirkland	1.8%	1.2%	n/a	n/a	0.8%	1.9%	2.2%	2.2%
Redmond	-2.4%	-2.2%	n/a	n/a	-1.7%	-1.4%	-1.1%	-1.2%
Eastside	-0.5%	-0.8%	n/a	n/a	-2.3%	-3.3%	-6.5%	-7.0%
King County	**0.6%**	**0.4%**	**n/a**	**n/a**	**0.8%**	**1.0%**	**0.6%**	**0.3%**
Region	**0.2%**	**0.2%**	**n/a**	**n/a**	**0.5%**	**0.5%**	**0.2%**	**0.0%**
Absolute Differences								
Major Cities								
Seattle	356	(2,387)	n/a	n/a	23,862	30,833	32,448	32,130
Bellevue	(420)	(831)	n/a	n/a	(5,151)	(9,089)	(20,476)	(23,771)
Kirkland	830	541	n/a	n/a	384	930	1,176	1,216
Redmond	(1,776)	(1,659)	n/a	n/a	(1,303)	(1,120)	(966)	(1,143)
Eastside	(1,366)	(1,948)	n/a	n/a	(6,071)	(9,279)	(20,266)	(23,698)
King County	**11,611**	**6,929**	**n/a**	**n/a**	**16,316**	**21,484**	**14,285**	**8,129**
Region	**7,230**	**6,121**	**n/a**	**n/a**	**20,321**	**20,510**	**8,909**	**160**

Notes: The major differences between CAI 2010 forecasts and the CAI 2012 forecasts are explained by (1) updated development pipeline data from Dupre + Scott, which show significant increases in multifamily development permits for Seattle and only modest increases for Eastside cities, as well as (2) slightly higher countywide population forecasts from Conway Pedersen Economics. Source: Community Attributes, Washington State Office of Financial Management, U.S. Census 2010.

Adjustments Made to Toll Modeling and Traffic and Revenue Forecasting

The revised forecast utilized the travel demand toll model and model processing tools developed for the IG forecast but included information to account for key changes. The travel demand toll model was modified to reflect the change in the socioeconomic forecasting. The change in socioeconomic forecast resulted in slightly higher demand in the early years up to FY 2020 and lower demand beyond FY 2020. Trip tables were factored to reflect the change in the updated socioeconomic forecast. The travel demand toll model was also modified to reflect the shift in payment types from approximately 72% account based transactions to approximately 81% account-based transactions for the initial model year (FY2012). For later model years, the account-based transactions were increased such that the same 87% account-based in 2031 was reached as was assumed in the IG study. The differences in toll classification from the IG study to the limited experience to date as noted earlier was studied and it was determined there was not enough information and not enough significant effect to make a change to the assumed classification proportions. As indicated earlier, total cross lake trips on SR 520 and I-90 have decreased in 2012 over their 2010 and 2011 counterparts on a par with the assumed trip suppression in the IG study. Consequently, the assumed trip suppression system in the toll model from the IG report was continued in the new forecast.

Other than the specific changes noted above the model was run with the exact same assumptions as the IG study. In particular the same toll rates and value of time assumptions as the IG study were used. The IG study assumed a toll increase of approximately 2.5% on July 1, 2012. This toll increase occurred as planned. The new forecast assumes the same toll increases as the IG study which includes additional approximately 2.5% toll increases on July 1 of 2013, 2014, and 2015 as well as an approximately 15% increase on July 1, 2016. The new forecast, like the IG forecast, assumes the new bridge opens on July 1, 2016.

In summary, the travel demand toll model was run with changes to the economic forecast base and a shift in payment type proportions. The toll classification proportions, trip suppression, toll rates, values of time, and new bridge opening dates for the new bridge were kept the same as the IG study.

The travel demand toll model, which covers average weekday travel, was re-run for the same model years as the IG study: FY 2012, FY 2016, FY 2017, FY 2024, and FY 2030. The results for years between model years are determined by interpolation. Adjustments to account for changes in weekend performance, time shifting, ramp-up, closures and annualization of revenue streams were made in post processing of model results as described below.

As noted above, it appears weekends are performing well above the IG forecast at 33% additional weekend average day transactions. However, there is still very limited experience with weekend results and the greater number of infrequent users on weekends will take longer for definite patterns to form. Consequently, the weekend transaction forecast was raised approximately 8% for FY2012, and FY 2016, 6% for FY 2024, and 3% for FY 2031. This scaled adjustment is smaller than the limited experience to date. As weekends were already expected to grow in the IG forecast the adjustment is scaled back over time. Not taking full account of the weekend results to date is a conservative approach which we feel is prudent given the limited time weekend users have had to adjust to the tolling.

Based on Stated Preference Survey results, up to 20 percent time shifting of trips away from peak periods and high toll rates was applied to the model output in the IG traffic and revenue calculations. However, as noted above, very little change in the proportion of toll period traffic to daily traffic has

been seen between the IG model without time shifting and the actual experience to date. Given the limited amount of experience to date, the time shifting was reduced to up to 10 percent of trips away from peak periods in the new forecast.

A ramp-up cut-back was assumed in the IG study to account for patrons getting used to tolling and regional traffic sorting out changes once tolling was implemented. A 5% cut was assumed in FY 2012 and a 3% cut in FY 2013. However, given that the account-based transaction proportion to date is running near well established toll roads elsewhere in the country, it is appropriate to remove the ramp-up factor for FY 2013. The revised forecast does not include any ramp-up factors.

The IG forecast assumed a particular set of full weekend closures of the SR 520 bridge due to construction. A revised construction schedule was obtained and incorporated into the forecast. The number of weekend closures has increased from 11 to 17 in the timeframe of the new forecast, primarily to accommodate the west end bridge connector described below. The original assumption was: full weekend closure of SR 520 from the Montlake Interchange to I-405 including the tolled section will occur four times in the last half of FY 2012, five times in FY 2013, four times in FY 2014, and two times in FY 2015. In fact, five weekend closures happened in the last half of FY 2012. The new forecast assumes seven closures in FY 2013, three closures in FY 2014, five closures in FY 2015, and one closure each in FY 2016 and FY 2017. It is assumed closures will be from 11 PM on Friday to 5 AM on Monday. (There have also been limited duration closures of the bridge due to opening the main span for tall vessels. The gross to net revenue calculations, performed by others, will discuss these closures and assumed affect on net revenues.)

The IG study assumed the new SR 520 bridge would open in FY 2017 and carry three lanes (two general purpose and one HOV) to the west end of the new bridge only where a choke point at the transition to the existing two lanes per direction would occur. However, WSDOT is now planning to complete a three lane westbound west end bridge connector shortly after the main span is expected to open with three lanes in each direction. This connector and reconfiguration of the current four lane connector will result in three lanes in each direction to the Montlake Boulevard interchange and eliminate the choke point assumed in the IG study at the west end of the main span. Testing during development of the IG Study suggests to us that very only a very small increase in traffic and gross revenue can be expected with this improvement. Consequently, adjustments were not made to the new forecast for this change in configuration, which is a conservative assumption.

The expansion of the model year information to annual streams utilized an interpolation and extrapolation methodology for the IG forecast. For the revised forecast, a similar approach has been used. The results of traffic and revenue for model years FY 2012, FY 2016, FY 2017, FY 2024, and FY 2030 were interpolated and extrapolated to get annual forecast traffic and revenue including FY 2013 and FY 2014. The FY 2012 actual toll performance was used to derive an additional FY 2013 and FY 2014 forecast based on expected growth. Since there was limited tolling experience and data available at the time of the new forecast, the FY 2013 and FY 2014 forecasts were blended – combining the interpolated forecast from the toll model and the growth from experience-to-date forecast. Consequently both the effects of the experience to date and the more conservative model results are taken into account.

A summary of the changes and their effect between the updated results and the IG results are as follows:

- Socioeconomic forecast increases revenue slightly in the early years and reduces revenue up to three percent in the later years

- Faster and larger participation in Account Based program decreases revenue slightly in early years but effect is even further reduced as time passes and has no effect beyond FY 2030
- Increased weekend usage increases revenue a small amount, about 700,000 per year, the effect decreases over time
- Decreased assumption about peak spreading in response to tolls increases revenue a small amount
- Elimination of ramp increases revenue in FY 2013, no effect in any other year
- Changed weekend closure schedule decreases revenue very slightly in FY 2013, FY 2015, FY 2016 and FY 2017, increases revenue very slightly in FY 2016
- Expansion to three lanes per direction of the section from the west end of the new bridge to Montlake would increase revenue very slightly but this was not included in our results

Revised Investment Grade Traffic and Revenue Forecast

Taking into account the toll experience to date, revised independent economic forecast, and revised bridge configuration assumptions including closures, the methodology outlined above was used to generate FY2013 through FY2056 transaction and gross toll revenue forecasts. Table 10 shows the SR 520 Annual Traffic and Gross Revenue Updated Forecast with a comparison to the August 2011 Investment Grade forecast.

For the pre-completion tolling (FY2013 through FY2016) the revised forecast shows more transactions starting at about 3.7% in FY2013 and declining to below 1% more transactions by FY2016. Revenue also increased for FY2013 by 1.3%, FY 2014 by 0.5%, and little increase or slight decrease for FY 2015 and FY 2016. From FY 2017 to FY 2021, transactions are forecast to start 2.3% higher and then slowly this increase fades to only 0.9% in FY 2021. Revenues likewise show higher amounts, but smaller, given the overall shifts in account based transactions applied to the new forecast. These increases start at about 1.7% in FY 2017 and decline to 0.3% by FY 2021. From FY 2022 and beyond, the forecast transactions are lower than the IG forecast, reaching a maximum low of 4.1% less in FY 2031, and then moderating to 3.3% less by the end of the forecast period. Revenue shows a similar but smaller pattern, reaching a maximum low of 3.4% less and then moderating to 2.6% at the end of the forecast period.

Overall, the new forecast does not represent a major shift in expected transactions and revenue for SR 520.

Conclusion and Future Considerations

Our examination of the tolling experience on SR 520 for the first six months of 2012 and an updated study area socioeconomic forecast resulted in updated traffic and revenue forecasts as presented herein. These updated results are our best professional estimate of future traffic and revenue on the facility. These updated results represent minor changes to the traffic and revenue results presented in our August 2011 Investment Grade Study.

The forecast presented herein is based on only six months of tolling experience which is not enough time to fully ascertain all aspects of what future tolling performance might be. Future updates will benefit from additional tolling experience and enhanced reports. In particular the development of

actual gross toll revenue reports will be extremely useful. All aspects of usage will be continually monitored with particular emphasis on weekend usage and vehicle classification.

Table 10 SR 520 Annual Traffic and Gross Revenue Updated Forecast with IG Comparison

Fiscal Year	Revenue (millions of year of collection dollars)			Transactions (millions)		
	Updated	IG*	Change	Updated	IG*	Change
2013	$ 62.59	$ 61.81	1.3%	19.682	18.973	3.7%
2014	69.74	69.39	0.5%	21.423	20.968	2.2%
2015	75.18	75.51	-0.4%	22.542	22.455	0.4%
2016	81.98	81.92	0.1%	24.101	23.960	0.6%
2017	89.16	87.64	1.7%	24.155	23.618	2.3%
2018	91.23	89.83	1.6%	24.998	24.475	2.1%
2019	93.12	92.08	1.1%	25.766	25.333	1.7%
2020	95.06	94.39	0.7%	26.532	26.190	1.3%
2021	97.02	96.76	0.3%	27.300	27.048	0.9%
2022	99.04	99.18	-0.1%	28.066	27.905	0.6%
2023	101.09	101.67	-0.6%	28.834	28.763	0.2%
2024	103.18	104.21	-1.0%	29.600	29.620	-0.1%
2025	104.95	106.36	-1.3%	30.047	30.263	-0.7%
2026	106.75	108.55	-1.7%	30.495	30.906	-1.3%
2027	108.56	110.78	-2.0%	30.942	31.549	-1.9%
2028	110.41	113.06	-2.3%	31.389	32.192	-2.5%
2029	112.27	115.38	-2.7%	31.836	32.835	-3.0%
2030	114.17	117.74	-3.0%	32.284	33.478	-3.6%
2031	116.08	120.15	-3.4%	32.731	34.121	-4.1%
2032	118.39	122.52	-3.4%	33.398	34.804	-4.0%
2033	120.51	124.66	-3.3%	34.007	35.427	-4.0%
2034	122.41	126.57	-3.3%	34.557	35.986	-4.0%
2035	124.08	128.26	-3.3%	35.043	36.481	-3.9%
2036	125.52	129.71	-3.2%	35.465	36.907	-3.9%
2037	126.73	130.90	-3.2%	35.819	37.264	-3.9%
2038	127.70	131.86	-3.2%	36.107	37.551	-3.8%
2039	128.42	132.56	-3.1%	36.325	37.765	-3.8%
2040	128.89	133.00	-3.1%	36.473	37.907	-3.8%
2041	129.37	133.45	-3.1%	36.624	38.049	-3.7%
2042	129.85	133.90	-3.0%	36.773	38.192	-3.7%
2043	130.33	134.35	-3.0%	36.925	38.336	-3.7%
2044	130.81	134.80	-3.0%	37.076	38.480	-3.6%
2045	131.30	135.25	-2.9%	37.228	38.625	-3.6%
2046	131.79	135.71	-2.9%	37.382	38.771	-3.6%
2047	132.28	136.17	-2.9%	37.536	38.918	-3.6%
2048	132.78	136.62	-2.8%	37.690	39.064	-3.5%
2049	133.27	137.09	-2.8%	37.845	39.213	-3.5%
2050	133.77	137.55	-2.7%	38.002	39.361	-3.5%
2051	134.27	138.02	-2.7%	38.159	39.509	-3.4%
2052	134.77	138.49	-2.7%	38.317	39.659	-3.4%
2053	135.28	138.95	-2.6%	38.475	39.810	-3.4%
2054	135.79	139.43	-2.6%	38.634	39.961	-3.3%
2055	136.30	139.90	-2.6%	38.795	40.113	-3.3%
2056	136.81	140.38	-2.5%	38.955	40.265	-3.3%

* Investment grade forecast presented in the August 29, 2011 report "SR 520 Bridge Investment Grade Traffic and Revenue Study Floating Bridge and Eastside Project"

Source: CDM Smith

Disclaimer

Current accepted professional practices and procedures were used in the development of these traffic and revenue forecasts. However, as with any forecast of the future, it should be understood that there may be differences between forecasted and actual results caused by events and circumstances beyond the control of the forecasters. In formulating its forecasts, CDM Smith has reasonably relied upon the accuracy and completeness of all of the information provided (both written and oral) by respective local and state agencies. Publicly available and obtained material has neither been independently verified, nor does CDM Smith assume responsibility for verifying such information. CDM Smith has relied upon the reasonable assurances of the independent parties that they are not aware of any facts that would make such information misleading.

CDM Smith has made qualitative judgments related to several key variables within the analysis used to develop the traffic and revenue forecasts that must be considered as a whole; therefore selecting portions of any individual results without consideration of the intent of the whole may create a misleading or incomplete view of the results and the underlying methodologies used to obtain the results. CDM Smith gives no opinion as to the value or merit to partial information extracted from the report.

All estimates and projections reported herein are based on CDM Smith's experience and judgment and on a review of independent third party projections and information obtained from multiple state and local agencies. These estimates and projections may not be indicative of actual or future values, and are therefore subject to substantial uncertainty. Future developments cannot be predicted with certainty, and may affect the estimates or projections expressed in the report, such that CDM Smith does not specifically guarantee or warrant any estimate or projections contained within this report.

While CDM Smith believes that some of the projections or other forward-looking statements contained within the report are based on reasonable assumptions as of the date in the report, such forward looking statements involve risks and uncertainties that may cause actual results to differ materially from the results predicted. Therefore, following the date of this report, CDM Smith will take no responsibility or assume any obligation to advise of changes that may affect its assumptions contained within the report, as they pertain to: socioeconomic and demographic forecasts, proposed residential or commercial land use development project, and/or potential improvements to the regional transportation network.

Appendix A

Employment and Population Projections for SR 520 Corridor

Community Attributes Inc, September 24, 2012

Employment and Population Projections for Washington SR 520 Corridor

Reflecting 2012 updated regional forecasts, new baseline employment estimates for cities, and new development pipeline data for cities.

September 24, 2012

Prepared for:

CDM Smith

Prepared by:

cai community attributes inc

Community Attributes tells data rich stories about communities that are important to decision-makers.

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CONTENTS

INTRODUCTION

Background and Purpose

This report describes forecasts of employment and population within the SR 520 corridor. These forecasts were updated in August 2012 to reflect current economic forecasts, projected development in Seattle and Eastside King County communities, and current market conditions such as office occupancy rates and housing unit absorption trends. The report presents the analytic methods, newly updated countywide forecasts and local area forecasts, and a comparison of the updated forecasts to alternative forecasts and CAI 2010 forecasts.

CAI produced base year estimates for 2010, 2011 and 2012, drawing from current data published by State and regional government agencies and data providers. Forecasts include employment and population forecasts for 2013, 2016, 2020, 2030 and 2040, driven by data and published forecasts explained in the following section.

Methods

The analysis follows methods similar to those used in past years related to projecting employment and population along the SR 520 corridor. The approach allocates growth attributable to countywide forecasts published by other economists and organizations that maintain and update econometric models for King County and Washington State. The analysis utilizes local area employment data, real estate trends, and anticipated real estate development to allocate the countywide forecasts to small areas along the corridor. Documentation in Appendix A provides additional details related to this 2012 update.

Updated Base Years. Newly released 2010 and 2011 population and employment data provide updated baselines for the revised forecasts. The forecasts benefit from newly released population and employment data from Washington State Office of Financial Management (OFM), Washington State Employment Security Department (ESD), the Puget Sound Regional Council (PSRC) and the US Census. The CAI 2010 update relied on 2008 and 2009 data as the most up-to-date for the baseline years for forecasts.

County Forecasts. The new forecasts include two scenarios. One relies on a combination of countywide forecasts of population and employment from Conway Pedersen Economics and Moody's Economy.com. Conway Pedersen's published forecasts run through 2022. CAI's 2030 and 2040 forecasts draw from countywide growth rates forecasted by Moody's for those periods, applied to CAI's 2020 detailed forecasts driven by Conway Pedersen countywide forecasts.

The other scenario relies on employment forecasts provided by Washington State Department of Transportation (WSDOT). Both scenarios are described in greater detail in subsequent sections. Additional King County forecasts published by ESD are provided for comparison.

Small Areas. An important variation to this update is that the smallest geographic unit in the forecast models use Forecast Analysis Zones (FAZs), in lieu of the smaller Traffic Analysis Zones (TAZ) employed in years past. This change reflects restrictions on data access enforced by the Washington State Employment Security Department. This variation results in challenges when comparing new to past forecasts within the corridor; the FAZ boundaries may only approximate the TAZ boundaries used in past studies for subareas analyzed. Direct comparisons to the CAI 2010 forecast which compensate for these differences are provided in this report. For more detail on comparing CAI 2012 forecasts with CAI 2010 forecasts, see Appendix A: Methods and Documentation.

Forecasts by FAZs reflect allocation of the countywide forecasts. The allocations utilize information and data analyzed regarding real estate conditions (occupancy rates), development pipeline projections (provided by private vendors, such as Dupre + Scott for apartment data, as well as municipalities along the corridor) and economic events reported in local media (such as Amazon.com absorption plans for South Lake Union and development plans for the Bel-Red Road area in Bellevue).

Employment Data. Employment can be quantified using varying types of employment definitions. CAI's 2010 and 2012 forecasts include total jobs, excluding Construction and Resources jobs. Construction and Resources are excluded for travel demand modeling application, given the variability in worksites for workers in these industries. "Total jobs" refers to custom estimates required to adjust the wage and salary worker data reported by government agencies, and the employees covered by state unemployment insurance (reported in some data sets by ESD and PSRC) to include proprietors and other workers not included among the other definitions. Variations in forecasts create difficulties when comparing forecasts. Data included in this report are total jobs, excluding Construction and Resources jobs, and are comparable unless otherwise noted.

Organization of Report

This report is organized into two sections: Countywide Forecasts and Comparisons and Subarea Forecast Updates.

Countywide Forecasts and Comparisons. This section compares the results of CAI 2012 employment and population forecasts, CAI 2010 forecast, WSDOT 2012 forecasts and ESD 2012 forecasts.

Subarea Forecast Updates. This section shows a comparison of the CAI 2012 forecasts to the CAI 2010 forecasts, including a comparison of smaller areas within the corridor.

KING COUNTY FORECASTS AND COMPARISONS

Forecast Scenarios

This report presents two updated forecast scenarios for comparison to forecasts presented in 2010. Base year data are common to both forecast scenarios. CAI updated a 2011 base year population and employment estimates by forecast analysis zone (FAZs, used by the PSRC for their published small area forecasts and for development of their traffic analysis zones forecasts for travel demand modeling). The base year estimates utilize 2011 population and employment estimates from PSRC by Census Tract, which were then converted to FAZ estimates. Additional modifications included adjusting employment estimates to exclude Construction and Resources Jobs and to add in estimates of work-based trip makers (workers) that are excluded from employment data used by Washington State Employment Security Department and PSRC. Both scenarios utilize real estate market data (vacancies, absorption trends and development pipelines in key areas) and employment news (employers reporting major expansions, moves or reductions) in their forecast.

The forecasts are based on growth rates derived from countywide applied to population and employment baseline data. The two scenarios are labeled throughout the report, and described in the following sections.

CAI 2012

The CAI 2012 scenario represents CAI's independent judgment of a recommended forecast to serve travel demand modeling, given the limits to the project scope. This scenario relies on independent forecasts produced by Conway Pedersen Economics for 2012 through 2020 for countywide population and employment growth rates (published in May 2012 by Conway Pedersen Economics). The scenario draws from forecasts of King County employment growth rates for 2020 through 2040 from Moody's Economy.com, published in 2010. The analysis allocates the Moody's forecasts to sectors based on sector shares of forecasts through 2020.

Population growth from 2020 to 2040 in this scenario relies on growth rates for this period forecasted by Puget Sound Regional Council, published in 2006. The population growth rates published in 2006 for 2020 to 2040 are consistent with Conway Pedersen 2012 population forecasts from 2016 to 2022. This consistency supported the use of existing PSRC forecasts, so new forecasts were sought. This remains consistent with prior forecasts submitted by CAI for SR 520 analysis.

WSDOT 2012

This scenario responds to WSDOT's request that CAI's also produce a forecast consistent with State adopted employment forecasts provided by WSDOT through 2040. The WSDOT 2012 scenario only applies to employment, and uses countywide growth rates applied to 2011 baseline data.

Jobs

Countywide employment forecasts are presented in **Exhibits 1 and 2** below to highlight differing assessments of future growth. The two CAI forecasts are of the same units, meaning they exclude Construction and Resources jobs altogether, and include estimates of "total" jobs (wage and salary employment adjusted upward by roughly 10% to account for proprietors and others left out of state-published employment data; adjusted for travel demand modeling purposes).

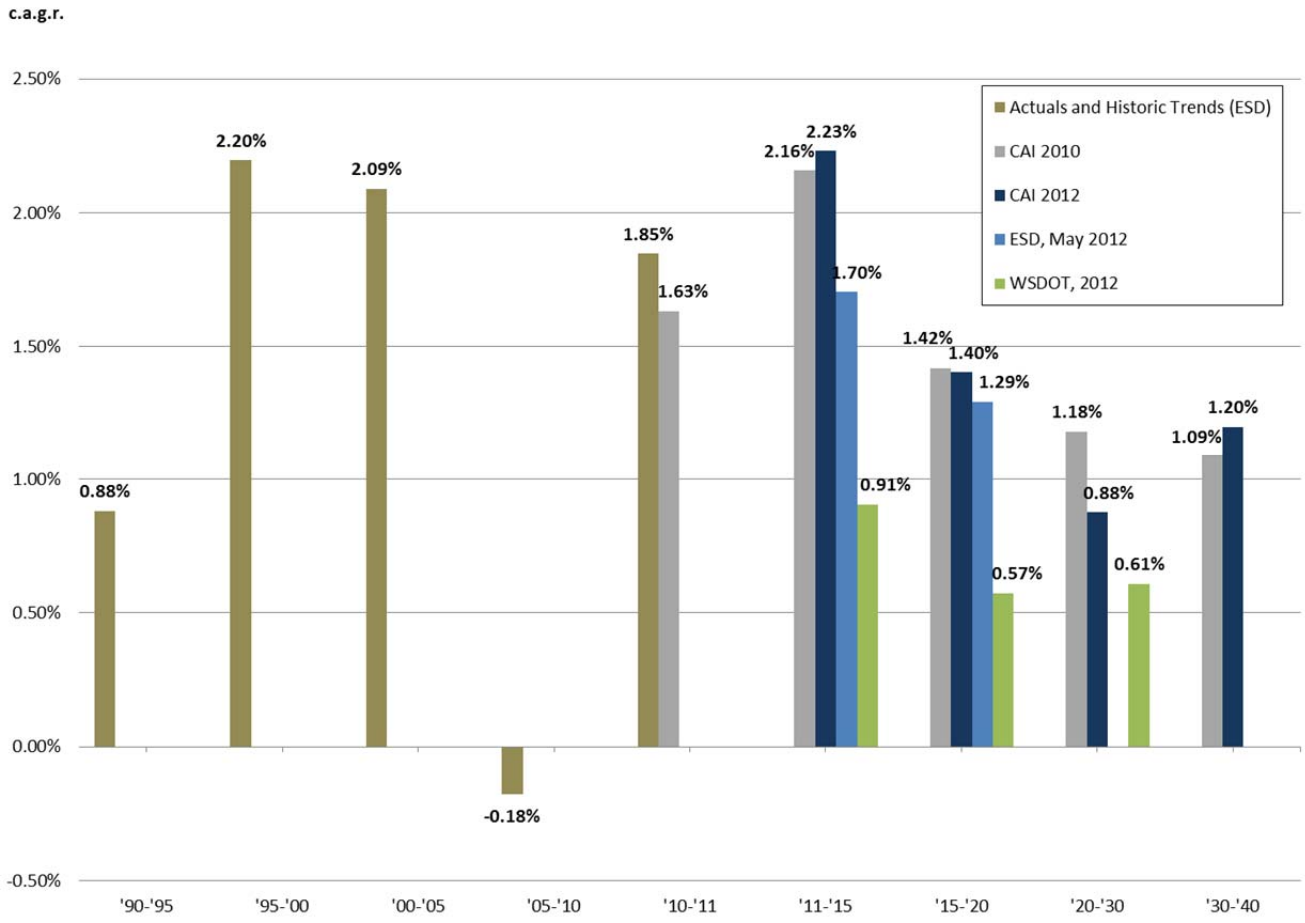
Exhibit 1. King County Employment, 2010-2040

King County Employment Forecasts	2010	2011	2012	2013	2016	2020	2030	2040
CAI 2010[1]	1,140,100	1,158,700			1,289,200	1,364,000	1,533,800	1,710,200
CAI 2012[1]	1,140,409	1,163,507	1,193,495	1,219,542	1,284,554	1,353,442	1,519,364	1,800,294
WSDOT 2012[2]	1,116,613	1,149,126	1,157,276	1,170,373	1,200,885	1,228,657	1,303,818	
ESD 2012[3]		1,154,125				1,316,800		
Absolute Deltas from CAI 2010 (rounded to 100s)								
CAI 2012	300	4,800			(4,600)	(10,600)	(14,400)	90,100
% Deltas from CAI 2010								
CAI 2012	0.0%	0.4%			-0.4%	-0.8%	-0.9%	5.3%

[1]CAI 2010 and CAI 2012 forecasts count Total Employment; excludes Construction and Resource jobs.
[2,3]Includes all sectors for Covered Employment only
Source: Community Attributes, Washington State Department of Transportation, Washington State Employment Security Department, 2012.

Compound annual growth rates (cagrs), shown in **Exhibit 2**, are the best way to understand the differences among the four forecasts featured in this analysis. Cagrs of the four forecasts normalize the forecasts for comparing differing views of future employment growth.

Exhibit 2. Historic Trends and Alternative Forecasts Comparisons
King County Employment, Compound Annual Growth Rates, 1990 – 2040



Source: Community Attributes, Washington State Department of Transportation, Washington State Employment Security Department, 2012.

Note: Growth rates shown above for CAI 2012, WSDOT 2012, and ESD 2012 include construction and resources jobs.

Population

King County population forecasts from our 2010 forecasts are compared to the CAI 2012 forecasts (**Exhibit 3**). Population forecasts for the County are higher in 2012 than they were in 2010. Washington State OFMs forecasts are similar to Conway Pedersen's through 2020, but slightly lower than Moody's forecasts from 2020 through 2040.

Exhibit 3. King County Population Forecasts, 2010-2040

King County Population Forecast	2010	2011	2012	2013	2016	2020	2030	2040
CAI 2010	1,919,638	1,935,671			2,012,235	2,069,234	2,229,163	2,395,720
CAI 2012	1,931,249	1,948,639	1,962,353	1,981,474	2,028,551	2,090,718	2,243,448	2,403,849
OFM 2012[1]	1,931,249	1,947,556	1,963,862	1,980,169	2,031,620	2,108,814	2,277,160	2,418,850
Absolute Deltas from CAI 2010 (rounded to 100s)								
CAI 2012	11,600	29,000	42,700	61,800	108,900	171,100	323,800	484,200
OFM 2012	11,600	27,900	44,200	60,500	112,000	189,200	357,500	499,200
% Deltas from CAI 2010								
CAI 2012	0.6%	1.5%	2.2%	3.2%	5.7%	8.9%	16.9%	25.2%
OFM 2012	0.6%	1.5%	2.3%	3.2%	5.8%	9.9%	18.6%	26.0%

[1]OFM estimates 2011-2013 derived using interpolation
Source: Community Attributes, Washington State Office of Financial Management, U.S. Census 2010.

SUBAREA FORECAST UPDATES

Updated forecasts for subareas within the corridor are presented below, focusing on Seattle, Bellevue, Kirkland and Redmond, with subtotals for these three major Eastside King County cities.

Jobs

The CAI 2012 forecast is presented in **Exhibits 4** and **5. Exhibit 4** compares the CAI 2010 forecasts to CAI 2012 forecasts (based on Conway Pedersen Economics and Moody's). **Exhibit 5** compares CAI 2010 forecasts to WSDOT-Based 2012 forecasts. Compound annual growth rate (c.a.g.r.) comparisons between these forecasts and the CAI 2010 forecast are presented in **Exhibit 6** and **Exhibit 7**.

Population

Exhibit 8 presents the population forecasts results and comparisons, following the same methods as produced in 2010 forecasts, reflecting updated population forecasts from Conway Pedersen Economics. Compound annual growth rate comparisons between this forecast and the CAI 2010 forecast are presented in **Exhibit 9** and **Exhibit 10**.

Exhibit 4. CAI 2012 Employment Forecast Comparison by Corridor Subareas, 2010 - 2040

	2010	2011	2012	2013	2016	2020	2030	2040
CAI 2012								
Major Cities								
Seattle	483,141	496,298	510,254	519,356	547,339	581,040	619,751	717,333
Bellevue	126,993	130,186	134,092	137,345	147,261	158,707	169,784	201,778
Kirkland	31,086	32,160	33,265	33,656	36,807	38,521	45,305	53,804
Redmond	84,888	87,684	89,874	92,700	98,680	105,231	127,996	156,367
Eastside	242,967	250,030	257,231	263,701	282,748	302,459	343,085	411,949
King County	**1,140,409**	**1,163,507**	**1,193,495**	**1,219,542**	**1,284,554**	**1,353,442**	**1,434,425**	**1,657,612**
Region	**1,774,152**	**1,801,138**	**1,846,853**	**1,882,927**	**1,988,609**	**2,098,307**	**2,232,244**	**2,543,864**
CAI 2010								
Major Cities								
Seattle	478,457	486,640	n/a	n/a	535,426	562,503	610,575	661,110
Bellevue	128,124	130,401	n/a	n/a	149,496	160,025	186,648	201,903
Kirkland	29,141	30,185	n/a	n/a	35,401	38,173	43,594	48,722
Redmond	91,639	93,290	n/a	n/a	106,656	114,198	126,791	136,031
Eastside	248,904	253,876	n/a	n/a	291,553	312,396	357,033	386,656
King County	**1,140,075**	**1,158,682**	**n/a**	**n/a**	**1,289,163**	**1,364,007**	**1,533,837**	**1,710,218**
Region	**1,770,033**	**1,794,635**	**n/a**	**n/a**	**1,996,518**	**2,115,533**	**2,393,202**	**2,700,104**
Percentage Delta								
Major Cities								
Seattle	1.0%	2.0%	n/a	n/a	2.2%	3.3%	1.5%	8.5%
Bellevue	-0.9%	-0.2%	n/a	n/a	-1.5%	-0.8%	-9.0%	-0.1%
Kirkland	6.7%	6.5%	n/a	n/a	4.0%	0.9%	3.9%	10.4%
Redmond	-7.4%	-6.0%	n/a	n/a	-7.5%	-7.9%	1.0%	14.9%
Eastside	-2.4%	-1.5%	n/a	n/a	-3.0%	-3.2%	-3.9%	6.5%
King County	**0.0%**	**0.4%**	**n/a**	**n/a**	**-0.4%**	**-0.8%**	**-6.5%**	**-3.1%**
Region	**0.2%**	**0.4%**	**n/a**	**n/a**	**-0.4%**	**-0.8%**	**-6.7%**	**-5.8%**
Employment Delta								
Major Cities								
Seattle	4,684	9,658	n/a	n/a	11,913	18,537	9,176	56,223
Bellevue	(1,131)	(215)	n/a	n/a	(2,235)	(1,318)	(16,864)	(125)
Kirkland	1,945	1,975	n/a	n/a	1,406	348	1,711	5,082
Redmond	(6,751)	(5,606)	n/a	n/a	(7,976)	(8,967)	1,205	20,336
Eastside	(5,937)	(3,846)	n/a	n/a	(8,805)	(9,937)	(13,948)	25,293
King County	**334**	**4,825**	**n/a**	**n/a**	**(4,609)**	**(10,565)**	**(99,412)**	**(52,606)**
Region	**4,119**	**6,503**	**n/a**	**n/a**	**(7,909)**	**(17,226)**	**(160,958)**	**(156,240)**

Source: Community Attributes, Washington State Department of Transportation, Washington State Employment Security Department, 2012.

Exhibit 5. WSDOT-Based 2012 Employment Forecasts Comparison

	2010	2011	2012	2013	2016	2020	2030	2040
WSDOT 2012								
Major Cities								
Seattle	483,141	496,298	510,254	514,434	532,066	553,479	569,033	584,297
Bellevue	126,993	130,186	134,092	136,043	143,183	151,260	164,300	167,639
Kirkland	31,086	32,160	33,265	33,337	35,815	36,702	40,259	42,944
Redmond	84,888	87,684	89,874	91,822	95,926	100,214	105,432	107,384
Eastside	242,967	250,030	257,230	261,202	274,923	288,177	309,991	317,967
King County	**1,140,409**	**1,163,507**	**1,193,495**	**1,207,984**	**1,248,758**	**1,289,008**	**1,367,861**	**1,441,093**
Region	**1,725,597**	**1,752,583**	**1,798,464**	**1,818,082**	**1,873,592**	**1,927,598**	**2,070,659**	**2,224,719**
CAI 2010								
Major Cities								
Seattle	478,457	486,640	n/a	n/a	535,426	562,503	610,575	661,110
Bellevue	128,124	130,401	n/a	n/a	149,496	160,025	186,648	201,903
Kirkland	29,141	30,185	n/a	n/a	35,401	38,173	43,594	48,722
Redmond	91,639	93,290	n/a	n/a	106,656	114,198	126,791	136,031
Eastside	248,904	253,876	n/a	n/a	291,553	312,396	357,033	386,656
King County	**1,140,075**	**1,158,682**	**n/a**	**n/a**	**1,289,163**	**1,364,007**	**1,533,837**	**1,710,218**
Region	**1,770,033**	**1,794,635**	**n/a**	**n/a**	**1,996,518**	**2,115,533**	**2,393,202**	**2,700,104**
Percentage Delta								
Major Cities								
Seattle	1.0%	2.0%	n/a	n/a	-0.6%	-1.6%	-6.8%	-11.6%
Bellevue	-0.9%	-0.2%	n/a	n/a	-4.2%	-5.5%	-12.0%	-17.0%
Kirkland	6.7%	6.5%	n/a	n/a	1.2%	-3.9%	-7.7%	-11.9%
Redmond	-7.4%	-6.0%	n/a	n/a	-10.1%	-12.2%	-16.8%	-21.1%
Eastside	-2.4%	-1.5%	n/a	n/a	-5.7%	-7.8%	-13.2%	-17.8%
King County	**0.0%**	**0.4%**	**n/a**	**n/a**	**-3.1%**	**-5.5%**	**-10.8%**	**-15.7%**
Region	**0.2%**	**0.4%**	**n/a**	**n/a**	**-3.8%**	**-6.7%**	**-11.5%**	**-15.7%**
Employment Delta								
Major Cities								
Seattle	4,684	9,658	n/a	n/a	(3,360)	(9,024)	(41,542)	(76,813)
Bellevue	(1,131)	(215)	n/a	n/a	(6,313)	(8,765)	(22,348)	(34,264)
Kirkland	1,945	1,975	n/a	n/a	414	(1,471)	(3,335)	(5,778)
Redmond	(6,751)	(5,606)	n/a	n/a	(10,730)	(13,984)	(21,359)	(28,647)
Eastside	(5,937)	(3,846)	n/a	n/a	(16,630)	(24,219)	(47,042)	(68,689)
King County	**334**	**4,825**	**n/a**	**n/a**	**(40,405)**	**(74,999)**	**(165,976)**	**(269,125)**
Region	**4,119**	**6,503**	**n/a**	**n/a**	**(76,562)**	**(142,393)**	**(274,167)**	**(423,230)**

Source: Community Attributes, Washington State Department of Transportation, Washington State Employment Security Department, 2012.

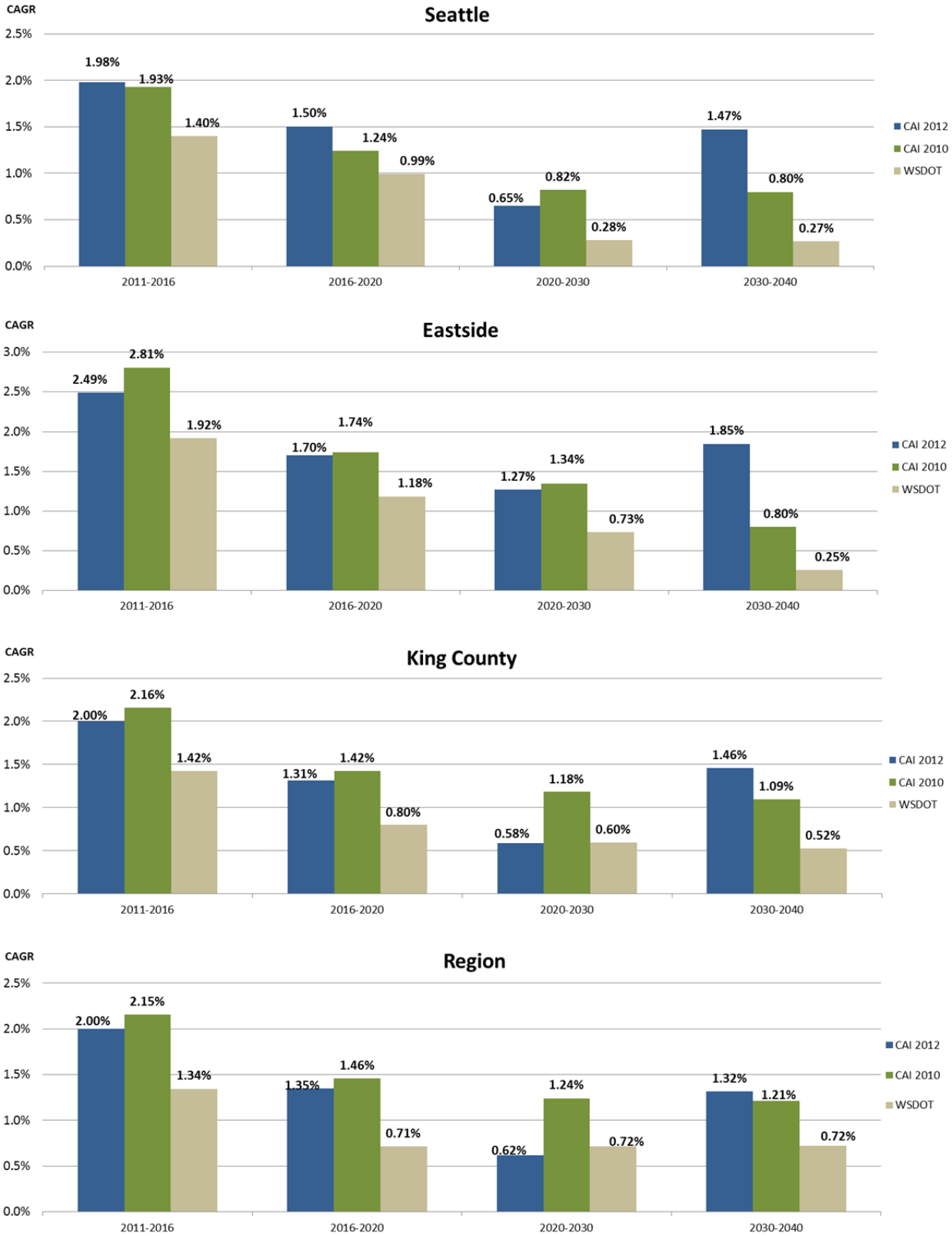
Notes: Major differences in employment forecasts between the CAI 2010 forecasts and the CAI 2012 updated forecasts are explained by (1) updated baseline employment data by small areas (FAZs), which explains most of the variation among cities, and (2) by updated forecasts from Conway Pedersen Economics, which accounts for countywide differences (lower forecasts).

Exhibit 6. Employment Forecast Annual Growth Rate Comparisons (c.a.g.r.), 2010-2040

	2010-2011	2011-2016	2016-2020	2020-2030	2030-2040
CAI 2012					
Major Cities					
Seattle	2.7%	2.0%	1.5%	0.6%	1.5%
Bellevue	2.5%	2.5%	1.9%	0.7%	1.7%
Kirkland	3.5%	2.7%	1.1%	1.6%	1.7%
Redmond	3.3%	2.4%	1.6%	2.0%	2.0%
Eastside	2.9%	2.5%	1.7%	1.3%	1.8%
King County	**2.0%**	**2.0%**	**1.3%**	**0.6%**	**1.5%**
Region	**1.5%**	**2.0%**	**1.4%**	**0.6%**	**1.3%**
CAI 2010					
Major Cities					
Seattle	1.7%	1.9%	1.2%	0.8%	0.8%
Bellevue	1.8%	2.8%	1.7%	1.6%	0.8%
Kirkland	3.6%	3.2%	1.9%	1.3%	1.1%
Redmond	1.8%	2.7%	1.7%	1.1%	0.7%
Eastside	2.0%	2.8%	1.7%	1.3%	0.8%
King County	**1.6%**	**2.2%**	**1.4%**	**1.2%**	**1.1%**
Region	**1.4%**	**2.2%**	**1.5%**	**1.2%**	**1.2%**
WSDOT					
Major Cities					
Seattle	2.7%	1.4%	1.0%	0.3%	0.3%
Bellevue	2.5%	1.9%	1.4%	0.8%	0.2%
Kirkland	3.5%	2.2%	0.6%	0.9%	0.6%
Redmond	3.3%	1.8%	1.1%	0.5%	0.2%
Eastside	2.9%	1.9%	1.2%	0.7%	0.3%
King County	**2.0%**	**1.4%**	**0.8%**	**0.6%**	**0.5%**
Region	**1.6%**	**1.3%**	**0.7%**	**0.7%**	**0.7%**

Source: Community Attributes, Washington State Department of Transportation, Washington State Employment Security Department, 2012.

Exhibit 7. Employment Compound Annual Growth Rate Comparisons



Source: Community Attributes, Washington State Department of Transportation, Washington State Employment Security Department, 2012.

Exhibit 8. Population Forecasts by Corridor Subarea, 2010-2040

CAI 2012	2010	2011	2012	2013	2016	2020	2030	2040
Major Cities								
Seattle	588,477	591,957	599,567	611,661	641,013	660,658	699,770	744,567
Bellevue	128,941	129,991	131,567	132,512	135,179	139,321	154,129	167,868
Kirkland	47,389	47,586	48,149	48,564	49,171	50,678	53,961	55,877
Redmond	72,056	73,104	73,898	74,509	76,122	78,454	84,930	92,034
Eastside	248,386	250,682	253,614	255,586	260,471	268,453	293,020	315,779
King County	**1,931,249**	**1,942,600**	**1,962,353**	**1,981,474**	**2,028,551**	**2,090,718**	**2,243,448**	**2,403,849**
Region	**3,690,942**	**3,715,650**	**3,762,599**	**3,813,524**	**3,936,315**	**4,102,748**	**4,480,582**	**4,908,224**
CAI 2010								
Major Cities								
Seattle	588,121	594,344	n/a	n/a	617,151	629,825	667,322	712,437
Bellevue	129,361	130,822	n/a	n/a	140,330	148,410	174,605	191,639
Kirkland	46,559	47,045	n/a	n/a	48,787	49,748	52,785	54,661
Redmond	73,832	74,763	n/a	n/a	77,425	79,574	85,896	93,177
Eastside	249,752	252,630	n/a	n/a	266,542	277,732	313,286	339,477
King County	**1,919,638**	**1,935,671**	**n/a**	**n/a**	**2,012,235**	**2,069,234**	**2,229,163**	**2,395,720**
Region	**3,683,712**	**3,709,529**	**n/a**	**n/a**	**3,915,994**	**4,082,238**	**4,471,673**	**4,908,064**
Percentage Delta								
Major Cities								
Seattle	0.1%	-0.4%	n/a	n/a	3.9%	4.9%	4.9%	4.5%
Bellevue	-0.3%	-0.6%	n/a	n/a	-3.7%	-6.1%	-11.7%	-12.4%
Kirkland	1.8%	1.2%	n/a	n/a	0.8%	1.9%	2.2%	2.2%
Redmond	-2.4%	-2.2%	n/a	n/a	-1.7%	-1.4%	-1.1%	-1.2%
Eastside	-0.5%	-0.8%	n/a	n/a	-2.3%	-3.3%	-6.5%	-7.0%
King County	**0.6%**	**0.4%**	**n/a**	**n/a**	**0.8%**	**1.0%**	**0.6%**	**0.3%**
Region	**0.2%**	**0.2%**	**n/a**	**n/a**	**0.5%**	**0.5%**	**0.2%**	**0.0%**
Population Delta								
Major Cities								
Seattle	356	(2,387)	n/a	n/a	23,862	30,833	32,448	32,130
Bellevue	(420)	(831)	n/a	n/a	(5,151)	(9,089)	(20,476)	(23,771)
Kirkland	830	541	n/a	n/a	384	930	1,176	1,216
Redmond	(1,776)	(1,659)	n/a	n/a	(1,303)	(1,120)	(966)	(1,143)
Eastside	(1,366)	(1,948)	n/a	n/a	(6,071)	(9,279)	(20,266)	(23,698)
King County	**11,611**	**6,929**	**n/a**	**n/a**	**16,316**	**21,484**	**14,285**	**8,129**
Region	**7,230**	**6,121**	**n/a**	**n/a**	**20,321**	**20,510**	**8,909**	**160**

Source: Community Attributes, Washington State Office of Financial Management, U.S. Census 2010.

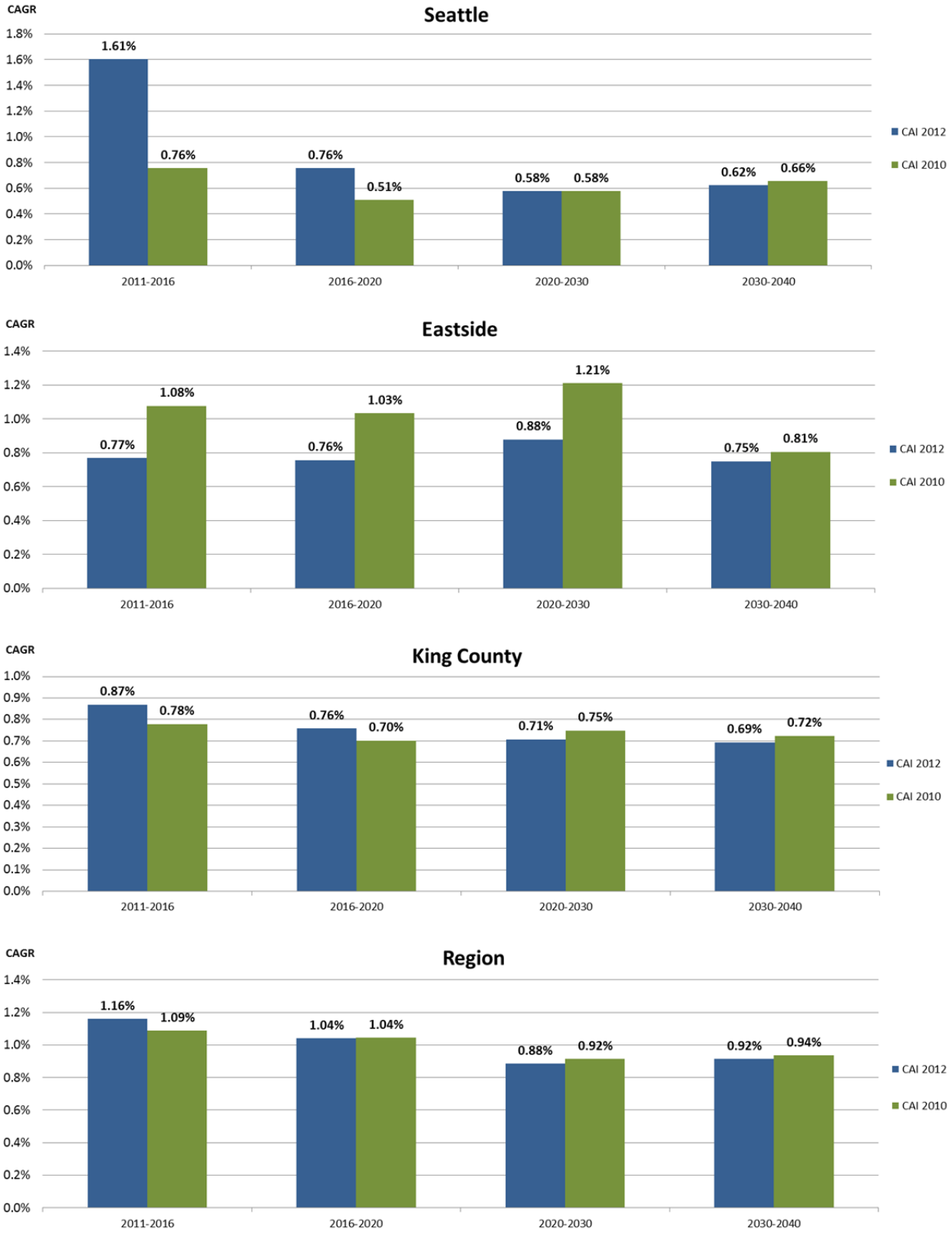
Notes: The major differences between CAI 2010 forecasts and the CAI 2012 forecasts are explained by (1) updated development pipeline data from Dupre + Scott, which show significant increases in multifamily development permits for Seattle and only modest increases for Eastside cities, as well as (2) slightly higher countywide population forecasts from Conway Pedersen Economics.

Exhibit 9. Population Forecast Growth Rate Comparisons (c.a.g.r.), 2010-2040

	2010-2011	2011-2016	2016-2020	2020-2030	2030-2040
CAI 2012					
Major Cities					
Seattle	0.6%	1.6%	0.8%	0.6%	0.6%
Bellevue	0.8%	0.8%	0.8%	1.0%	0.9%
Kirkland	0.4%	0.7%	0.8%	0.6%	0.3%
Redmond	1.5%	0.8%	0.8%	0.8%	0.8%
Eastside	0.9%	0.8%	0.8%	0.9%	0.8%
King County	**0.6%**	**0.9%**	**0.8%**	**0.7%**	**0.7%**
Region	**0.7%**	**1.2%**	**1.0%**	**0.9%**	**0.9%**
CAI 2010					
Major Cities					
Seattle	1.1%	0.8%	0.5%	0.6%	0.7%
Bellevue	1.1%	1.4%	1.4%	1.6%	0.9%
Kirkland	1.0%	0.7%	0.5%	0.6%	0.3%
Redmond	1.3%	0.7%	0.7%	0.8%	0.8%
Eastside	1.2%	1.1%	1.0%	1.2%	0.8%
King County	**0.8%**	**0.8%**	**0.7%**	**0.7%**	**0.7%**
Region	**0.7%**	**1.1%**	**1.0%**	**0.9%**	**0.9%**

Source: Community Attributes, Washington State Office of Financial Management, U.S. Census 2010.

Exhibit 10. Population Compound Annual Growth Rate Comparisons



Source: Community Attributes, Washington State Office of Financial Management, U.S. Census 2010.

APPENDIX A: METHODS AND DOCUMENTATION

This section introduces the methods used to project population and employment for the 2012 update. The section is organized as follows:

- Data Geography
- Baseline Data Methods
- Projection Methods
- Development Pipeline

Data Geography

Existing geographic descriptors for available baseline data determined the geographic level of analysis in this and previous CAI forecasts. The study presents results at the Forecast Analysis Zone (FAZ) level, and aggregates summary data at the four-county region of King, Kitsap, Pierce and Snohomish County level, individual county level, and city level. Previous CAI estimates of population and employment projections analyzed data at the Traffic Analysis Zone (TAZ) level, a subdivision of FAZs.

Due to limited data availability at the TAZ level, this analysis aggregated data up to the FAZ level when necessary. FAZs wholly encompass one or more TAZs, and share exact boundaries. Aggregation has no impact on region-wide comparisons with previous CAI studies that include complete FAZs. However, smaller subareas such as city or other sub-county groupings that may split a single FAZ require further interpretation when comparing this to previous CAI analyses. These considerations are described further in "Comparing Forecasts to Previous Studies" later in this section.

Population Data Geography

Baseline Washington State Office of Financial Management (OFM) population data are reported at the census Block Group level, which have been aggregated and approximated to FAZs using GIS and published TAZ-to-FAZ crosswalks.

Employment Data Geography

The most recent PSRC employment data are reported at the census tract level. Employment estimates were aggregated to FAZs using GIS and published TAZ-to-FAZ crosswalks.

Comparing Forecasts to Previous Studies

Because data are aggregated up to FAZs in this analysis, total employment data from past CAI studies cannot be directly compared with results from this study. This restriction applies to all previous CAI studies because they use subarea groupings based on TAZs instead of FAZs.

This distinction applies to any estimates and projections for custom geographies below the county-wide level. In this analysis, this refers to all city and city-based

groupings (Seattle, Bellevue, Redmond, Kirkland, and the combination Eastside). For this reason, any comparisons to CAI data published in 2010 have been regrouped to match geographies defined in this update. Comparisons are included in the final analysis for reference.

Baseline Data Methods

The datasets used to initialize population and employment projections come from a variety of sources. This section describes the baseline data and methods used to normalize them for projection analysis.

Population Baseline Data

Population baseline data were collected from Washington State Office of Financial Management (OFM), which provides Census 2010 and OFM 2011 estimates used in this study. The data are provided at the block-group geographic level, and are aggregated to FAZ level using GIS software for analysis.

In addition to OFM base estimates, PSRC's 2006 population forecast provides the most recent estimates available for income-based population distributions. PSRC data also provide estimates of the percent of population residing in multi-family dwellings. Analysis used these PSRC estimates, applying them to OFM baseline data and projections derived from them.

Employment Baseline Data

Employment baseline data were drawn from PSRC's Covered Employment estimates. Sector-level data are defined by PSRC, based on the North American Industry Classification System (NAICS). This analysis presents data under all PSRC-defined sectors except Construction/Resources.

A number of steps are required to convert PSRC baseline estimates into FAZ level estimates. First, linear interpolation estimated suppressed data categories. Next, individual adjustments corrected obvious errors resulting from interpolation. Employment was then factored up from Covered Employment to Total Employment. Finally, data were aggregated from the census tract to FAZ geographic level. These steps are described in more detail in the following sections.

PSRC Data Interpolation

Due to data access restrictions enforced by the Washington State Employment Security Department (ESD), employment data compiled by PSRC from ESD include a significant amount of suppressed data at the census tract by sector level (the only level available for 2011 baseline data).

Aggregate tract employment, however, is almost entirely unsuppressed. Where individual sectors reported suppressed figures, estimates were derived for each by subtracting the known employment from total tract employment, and distributing

the remainder jobs equally among the suppressed sectors. In nearly all cases, this resulted in a smoothing of employment estimates by tract.

Individual Adjustments to Census Tracts

In only a few cases, the method for estimating suppressed employment required individual changes to sectors and census tracts. For example, Redmond reported suppressed data in FIRES sectors and Construction/Resources, with a remainder of nearly 45,000 jobs, presumably attributable to Microsoft. Using the averaging method previously described, these jobs were shared equally between these two sectors. Removal of Construction/Resources estimates in this analysis led to a significant loss of jobs in Redmond when comparing to 2010 estimates. This discrepancy was corrected manually based on information about local employment in Redmond, as well as a small selection in other cities.

Employment Factors

PSRC reports employment from Covered Employment estimates or employment counts based on unemployment insurance eligibility. Those ineligible for unemployment insurance are not included in available PSRC datasets for this analysis. To account for this, PSRC provided sector and region-based factors, adjusting estimates upward so as to include employees not eligible for unemployment insurance, as well as sole-proprietors and non-employer data.

Geographic Aggregation

The most recent PSRC employment data for 2011 were reported at the census tract level. Aggregation to FAZ was the last step in preparing baseline data for projections. A combination of GIS and TAZ-to-FAZ crosswalks were used for this process.

Forecast Methods

Drawing from baseline data, CAI used a several sources to estimate future growth rates (average over one year; compound average over multiple years).

For the population forecast, a combination of Conway Pedersen forecasts and PSRC population forecasts were used to determine growth rates for future years.

For the employment forecast, two methods were used. The primary method combines Conway Pedersen forecast growth and Moody's Analytics forecast growth. For comparison purposes, the second method uses forecast growth provided by the Washington State Department of Transportation.

For both population and employment, a review of the upcoming development pipeline for residential and commercial space was taken into consideration. Each of the methods is described in detail in the following sections.

Population Forecast

The Conway Pederson forecast through 2020, released in June 2012, is the driver of CAI population projections for the period between 2012 and 2020. Conway Pedersen reports yearly estimates and projections for King, Kitsap, Pierce and Snohomish counties. Average annual growth rates (and compound annual growth rates for multi-year periods) were calculated from this forecast and applied on a county-wide basis to baseline data. This process was repeated through 2020.

For the years 2020 to 2040, the only available data were PSRC population forecasts published in 2006. Similar to the procedure for the Conway Pedersen forecast, CAI forecasts were derived using the compound annual growth rates from PSRC population projections for the periods 2020 to 2030, and 2030 to 2040. Data resolution from the PSRC population forecast is much higher than the Conway Pedersen forecast; individual growth rates for each FAZ were calculated and applied through the 2020 to 2040 period.

Employment Forecast

For the employment forecast, a more nuanced process was used to project employment than for population. Estimates for 2012 rely on the most recent ESD reported QCEW employment data, while Conway Pederson forecast data are used for the period between 2012 and 2020. Finally, the Moody's Analytics forecast published in 2010 drives the CAI forecast from 2020 to 2030, and 2030 to 2040.

For 2012 estimates, ESD-reported employment for the most recent months of 2012 were used to determine actual growth rates based on Quarterly Census of Employment and Wage (QCEW) data collected by the Bureau of Labor Statistics and localized by ESD. Because State QCEW data are not reported with explicit NAICS coding, and different counties are reported at different levels of aggregation, some sector alignment was necessary to improve comparison between QCEW employment and the sectors in the PSRC baseline data. After alignment, average annual growth rates for 2012 were applied to 2011 baseline estimates to determine the final 2012 output estimates.

For years between 2012 and 2020, growth rates derived from the Conway Pedersen employment forecast were applied to previous years to find employment projections. The Conway Pedersen forecast provides sector-level detail for the four-county region, as well as total employment by county through 2020. However, no projections are given for each county by sector. A combination of the projections was used to estimate growth rates by county and sector. Total employment growth by county was derived as a share of the four-county regional growth, and used to distribute sector-only growth rates by county. These were then applied to each year to find employment projections through 2020.

For the periods 2020 to 2030 and 2030 to 2040, Moody's Analytics forecast was used. Moody's forecast provided total employment forecasts through 2040 for

King County only. Sector-specific growth rates were calculated by finding the share of Moody's King County growth to Conway's region-wide growth times the Conway estimate for sector-specific region-wide growth. The result are estimates King County growth for each sector, based on Moody's underlying projection methods. As the only available data for the 2020-2040 period, these growth factors were applied to all employment projections, regardless of county.

An alternative scenario was developed to accommodate different source forecast data. The alternative in this study draws on WSDOT forecasts for all projected years. Growth rates were derived from the WSDOT forecast and applied to baseline data to find projections.

Development Pipeline

In addition to growth scenarios, this analysis depends on information about future developments to assist in predicting the distribution of population and jobs in and around the SR520 corridor. The development pipeline analysis estimated hypothetical population and employment projections for specific developments listed in local planning news sources, city websites, and economic development organizations, which were then applied as population and employment weights to final CAI forecasts.

Pipeline Data

This section describes the data collection and normalization methods for the development pipeline analysis.

Multifamily Development Data. Multifamily development data are based on the most up to date Dupre + Scott Apartment Advisors Apartment Development Report, which was released in March 2012 and updated in July 2012. Data collected include development name, total units, address, developer, and anticipated completion data where available.

Commercial Development Data. Commercial development data were compiled from the following resources:

- Seattle Daily Journal of Commerce (DJC) archives were reviewed for all office developments reported in the last five years. All developments reported to be in the permitting stages and estimated to still be underway were included. The Seattle Times and Puget Sound Business Journal were also referenced.

- A review of Seattle building permit data dating back to 2009 was conducted, cross-referenced with other sources for verification.

- The 2012 Downtown Seattle Development Guide published by the Downtown Seattle Association (DSA) was reviewed. This source includes all major hotel, condo, office and retail developments within South Lake Union, Downtown, First Hill, Capitol Hill and Pioneer Square/SODO.

Data are based on Seattle building permit records and other research conducted by DSA staff.

- Development reports/summaries issued by the Cities of Kirkland, Bellevue and Redmond were used to supplement data compiled from the Seattle DJC. All office, hotel and major retail components of a project were included in the development pipeline.

Assignment to FAZ. All data were assigned an address and geocoded to their specific location using GIS. Each project was then matched with FAZs.

Pipeline Distribution

Before integrating the development pipeline into the analysis, assumptions about completion dates, absorption, and commercial space per job were made to inform the most probable growth scenarios in the SR520 corridor. After accounting for these factors, pipeline estimates were distributed among FAZs to estimate overall development impacts on population and employment projections. These steps are described in detail in this section.

Completion dates. Estimated completion dates were determined using data provided. For residential developments, dates were provided to the month. For commercial developments, dates were estimated to the 6-month period.

Absorption. This analysis modeled absorption to represent the lagged time for which residents and businesses occupy new developments after their completion. For residential developments, absorption was assumed to be 75% in the year completed, and 100% in the second complete year. For commercial developments, absorption was modeled at a slower rate of 50% for the first year after completion, 75% for the second year, and 100% for the third. For both residential and commercial developments, April 1 was used as the cutoff date for a development to be considered complete in that year.

Commercial Space per Job. For commercial developments, data were provided in square foot terms. To estimate jobs per square foot, a factor of 400 square feet for office jobs and 300 square feet per retail job was assumed. Jobs per development were adjusted to reflect total square footage of space dedicated to office and retail uses in mixed use scenarios.

Applying the Development Pipeline. The results of the development pipeline analysis provided hypothetical population and job counts for each proposed development for the years completed. The results of the analysis were then applied to yearly projections as population and employment weights. These weights redistribute population and employment estimates toward areas with a high probability of new development while controlling region-wide totals to their original projections.

APPENDIX B: UPDATED FORECASTS

Forecasts presented earlier in the report were provided to CDMSmith in mid-August to meet schedule constraints. Subsequent improvements to Conway-Moody's employment forecast scenarios were completed in September. The revised forecasts are reflected in the following tables. Related improvements include model refinements and application of sector-specific growth forecasts from Moody's region-wide data (2030 and 2040).

Exhibit B-1: Updated CAI 2012 Forecast, King County, 2010-2040

CAI 2012 Draft	2010	2011	2012	2013	2016	2020	2030	2040
Major Cities								
Seattle	483,141	496,298	510,254	519,356	547,339	581,040	653,626	776,683
Bellevue	126,993	130,186	134,092	137,345	147,261	158,707	183,354	222,603
Kirkland	31,086	32,160	33,265	33,656	36,807	38,521	43,341	51,472
Redmond	84,888	87,684	89,874	92,700	98,680	105,231	122,446	149,588
Eastside	242,967	250,030	257,230	263,701	282,747	302,459	349,141	423,662
King County	**1,140,409**	**1,163,507**	**1,193,495**	**1,219,542**	**1,284,554**	**1,353,442**	**1,519,364**	**1,800,294**
Region	**1,774,152**	**1,801,138**	**1,846,853**	**1,882,927**	**1,988,609**	**2,098,307**	**2,324,862**	**2,723,585**
CAI 2010								
Major Cities								
Seattle	478,457	486,640	n/a	n/a	535,426	562,503	610,575	661,110
Bellevue	128,124	130,401	n/a	n/a	149,496	160,025	186,648	201,903
Kirkland	29,141	30,185	n/a	n/a	35,401	38,173	43,594	48,722
Redmond	91,639	93,290	n/a	n/a	106,656	114,198	126,791	136,031
Eastside	248,904	253,876	n/a	n/a	291,553	312,396	357,033	386,656
King County	**1,140,075**	**1,158,682**	**n/a**	**n/a**	**1,289,163**	**1,364,007**	**1,533,837**	**1,710,218**
Region	**1,770,033**	**1,794,635**	**n/a**	**n/a**	**1,996,518**	**2,115,533**	**2,393,202**	**2,700,104**
Percentage Delta								
Major Cities								
Seattle	1.0%	2.0%	n/a	n/a	2.2%	3.3%	7.1%	17.5%
Bellevue	-0.9%	-0.2%	n/a	n/a	-1.5%	-0.8%	-1.8%	10.3%
Kirkland	6.7%	6.5%	n/a	n/a	4.0%	0.9%	-0.6%	5.6%
Redmond	-7.4%	-6.0%	n/a	n/a	-7.5%	-7.9%	-3.4%	10.0%
Eastside	-2.4%	-1.5%	n/a	n/a	-3.0%	-3.2%	-2.2%	9.6%
King County	**0.0%**	**0.4%**	**n/a**	**n/a**	**-0.4%**	**-0.8%**	**-0.9%**	**5.3%**
Region	**0.2%**	**0.4%**	**n/a**	**n/a**	**-0.4%**	**-0.8%**	**-2.9%**	**0.9%**
Employment Delta								
Major Cities								
Seattle	4,684	9,658	n/a	n/a	11,913	18,537	43,051	115,573
Bellevue	(1,131)	(215)	n/a	n/a	(2,235)	(1,318)	(3,294)	20,700
Kirkland	1,945	1,975	n/a	n/a	1,406	348	(253)	2,750
Redmond	(6,751)	(5,606)	n/a	n/a	(7,976)	(8,967)	(4,345)	13,557
Eastside	(5,937)	(3,846)	n/a	n/a	(8,806)	(9,937)	(7,892)	37,006
King County	**334**	**4,825**	**n/a**	**n/a**	**(4,609)**	**(10,565)**	**(14,473)**	**90,076**
Region	**4,119**	**6,503**	**n/a**	**n/a**	**(7,909)**	**(17,226)**	**(68,340)**	**23,481**