



Construction



Skills Gap Analysis & Sector Strategies

*Commissioned by Workforce Central on behalf of
the Pierce County Workforce Development Council*

September 2016



EXECUTIVE SUMMARY

Background and Purpose

WorkForce Central (WFC) and the Pierce County Workforce Development Council (WDC) work closely together to support a strong economy by leading and overseeing our region's comprehensive workforce development system that prepares job seekers and workers with 21st century knowledge and skills required by businesses. WFC and WDC partner with leaders from the business community, philanthropic organizations, organized labor, education, government, community based organizations and other key stakeholders to shape and support workforce solutions.

Commissioned by WFC on behalf of the WDC, this study compares projected demand for specific occupations against labor supply to identify potential workforce gaps. This skills gap and sector strategy analysis, combined with feedback from industry stakeholders, will be used to plan for the changing needs of the industry and inform workforce preparation strategies. In addition, this study may be used to influence policy and investment decisions throughout and beyond the workforce development system.

Since 2010, Community Attributes Inc. (CAI) has produced multiple talent pipeline studies that examine various sectors. The studies compare projected demand for specific occupations against labor supply to identify potential workforce gaps.

Methods

Talent pipeline analysis draws from data published by the Washington State Employment Security Department (ESD), the Bureau of Labor Statistics (BLS) and the National Center for Education Statistics (NCES).

In addition to the talent pipeline analysis, in-depth interviews conducted with stakeholders in the construction industry inform findings. Interviews covered topics of hiring, recruiting, education and training as well as skills needs. Stakeholders interviewed included representatives from a variety of construction employers who provided a range of perspectives on the construction industry and “on-the-ground” realities.

Key Findings

Pierce County's construction industry is projected to grow 3.6 percent annually between 2013 and 2023. Overall the construction industry in Pierce County employs more than 24,460 workers. Statewide the construction industry employs almost 140,000. As one of Pierce County's fastest growing industries, construction is a key industry to focus

on within the county. More than 20,500 individuals work in core construction occupations.

Employment in core construction industry occupations is projected to grow 2.0 percent between 2018 and 2023, growing from 33,500 workers to more than 37,000 workers in 2023. **This represents net growth of 1,346 jobs per year.** Net growth equals new hires minus exiting workers.

The **Talent Pipeline Dashboard** (*page vii*) shows occupations in the construction industry grouped by education level required for entry ranked by average annual openings within the industry from 2018 to 2023. The minimum education required for entry is defined by the Bureau of Labor Statistics and is not meant to indicate the education requirement defined by individual employers. In some cases, the actual education required by regional employers may be higher than the minimum education level category, and existing workers may have less education than shown. Supply is composed of two elements: the entry of new graduates into the workforce and the existing talent pool of qualified unemployment insurance (UI) claimants actively seeking employment.

Some overall findings include the following:

- Construction industry stakeholders indicated that they expect to see high demand within their core occupations due to a strong pipeline of construction work in Pierce County coupled with anticipated retirements due to an aging workforce.
- Construction occupations are projected to experience strong growth between 2018 and 2023. Among the 51 core construction occupations, 24 are projected to see annual growth rates of 2.0 percent or greater. Those occupations projected to experience the strongest growth include electrician's helpers; fence erectors; electrical and electronics drafters; security and fire alarm systems installers; computer programmers; electricians; and telecommunications line installers and repairers.
- Overall supply among construction occupations in Pierce County is projected to be 2,502 local workers, of which 96 percent are unemployment insurance claimants whose previous occupation matches to a construction occupation. Total anticipated demand among these occupations is projected to be 1,008 openings annually. The combination of supply and demand leaves a total projected surplus of 1,493 local candidates. Stakeholder interviews indicate that although there may be a surplus of local candidates many of these candidates may not be considered to be qualified by local employers.
- Projected annual average openings within the Pierce County construction industry between 2018 and 2023 are greatest among

carpenters, construction laborers, construction managers and electricians.

- The construction industry does not have an adequate high school pipeline. Students are not exposed to construction and other skilled trades in high school and this impacts career path choices. Stakeholders indicate that they get a number of candidates who side tracked into careers in low paying retail or service industries before finding construction. The industry needs help promoting itself as a good option for all types of candidates, focusing on reaching youth more effectively.
- Apprenticeship and other on-the-job training programs are an essential part of the construction industry workforce system. Stakeholders representing these programs were experiencing challenges recruiting people into their programs. As the industry faces an increasing aging trend, stakeholders indicated that they have been expanding apprenticeship programs. However, this is a challenge given the low interest in the construction industry.

Some initial recommendations include the following:

- Develop systems to identify construction industry unemployment insurance claimants coming from occupations with high numbers, such as HVAC installers and repairers, construction laborers and carpenters. Develop assessments to determine: if they lack critical soft skills; basic understanding of job requirements; and/or are interested in continuing in their occupation. Design strategies to help them quickly return to work, boost soft skills or switch to an alternative occupation.
- Consider partnerships to expand programs with significant annual shortages.
- Concerns about the aging construction industry workforce were anecdotal, making the scope of the problem difficult to determine. Conduct future research to identify retirement projections for construction occupations.
- Develop updated recruiting materials and presentations targeted to high school and college students and share those materials with school guidance and career counselors throughout the county.
- Expand partnerships with high schools to seek funding aimed at increasing construction-related career and technical education.
- Partner with high school teachers to develop summer continuing education workshops that incorporate skilled trades into traditional high school courses. For example, applied math or physics lessons.

- Ensure adequate marketing of apprenticeship opportunities are occurring in high schools and WorkSource centers. If not, boost marketing and expand training opportunities for high school advisors and WorkSource case managers.

Pierce County Construction Talent Pipeline

On-the-Job Training

Annual Average Demand and Supply All Occupations by Education	Occupation Ranked by Annual Openings (2018-2023)	Employment		CAGR 2013-2023	Annual Demand and Supply, 2018-2023					
		2013	2023		Scale: 0 - 497 annual openings in sector	Demand	Supply	Gap		
<p>837 Demand, 2,326 Supply (38 Graduates, 2,289 UI Claims)</p>	1	Carpenters	4,286	5,798	3.1%	Demand	157	414	256	
						Supply	414			
		2	Construction Laborers	2,963	4,105	3.3%	Demand	132	404	272
						Supply	404			
		3	Electricians	1,772	2,425	3.2%	Demand	77	229	152
						Supply	229			
		4	Painters, Construction and Maintenance	1,799	2,404	2.9%	Demand	70	118	49
						Supply	118			
		5	First-Line Supervisors of Construction Trades and Extraction Workers	2,172	2,995	3.3%	Demand	69	86	16
						Supply	86			
		6	Roofers	1,010	1,543	4.3%	Demand	62	137	75
						Supply	137			
		7	Operating Engineers and Other Construction Equipment Operators	878	1,147	2.7%	Demand	34	232	198
						Supply	232			
		8	Plumbers, Pipefitters, and Steamfitters	822	1,090	2.9%	Demand	28	103	74
						Supply	103			
		9	Cement Masons and Concrete Finishers	511	770	4.2%	Demand	24	122	97
						Supply	122			
		10	Electrical Power-Line Installers and Repairers	471	580	2.1%	Demand	23	14	(9)
						Supply	14			
	11	Drywall and Ceiling Tile Installers	541	706	2.7%	Demand	17	64	47	
					Supply	64				
	12	Structural Iron and Steel Workers	223	333	4.1%	Demand	17	91	74	
					Supply	91				
	13	Telecommunications Line Installers and Repairers	331	447	3.0%	Demand	16	11	(6)	
					Supply	11				
	14	Security and Fire Alarm Systems Installers	246	342	3.3%	Demand	13	1	(13)	
					Supply	1				
	15	Fence Erectors	204	308	4.2%	Demand	13	7	(6)	
					Supply	7				
	16	Tapers	345	450	2.7%	Demand	11	12	1	
					Supply	12				
	17	Mobile Heavy Equipment Mechanics, Except Engines	548	618	1.2%	Demand	6	12	6	
					Supply	12				
	18	First-Line Supervisors of Mechanics, Installers, and Repairers	951	1,072	1.2%	Demand	6	3	(4)	
					Supply	3				
	19	Carpet Installers	219	277	2.4%	Demand	5	5	0	
					Supply	5				
	20	Insulation Workers, Floor, Ceiling, and Wall	128	170	2.9%	Demand	5	10	5	
					Supply	10				

Associate Degree or Postsecondary Award

Annual Average Demand and Supply All Occupations by Education	Occupation Ranked by Annual Openings (2018-2023)	Employment		CAGR 2013-2023	Annual Demand and Supply, 2018-2023					
		2013	2023		Scale: 0 - 50 annual openings in sector	Demand	Supply	Gap		
<p>38 Demand, 46 Supply (17 Graduates, 30 UI Claims)</p>	1	Heating, Air Conditioning, and Refrigeration Mechanics and Installers	770	1,039	3.0%	Demand	31	42	11	
						Supply	42			
		2	Electrical and Electronics Drafters	82	114	3.3%	Demand	3	1	(2)
						Supply	1			
		3	Architectural and Civil Drafters	186	219	1.6%	Demand	2	1	(2)
					Supply	1				
	4	Audio and Video Equipment Technicians	61	81	2.9%	Demand	2	3	1	
					Supply	3				
	5	Mechanical Drafters	117	139	1.7%	Demand	1	0	(1)	
					Supply	0				

Bachelor's Degree

Annual Average Demand and Supply All Occupations by Education	Occupation Ranked by Annual Openings (2018-2023)	Employment		CAGR 2013-2023	Annual Demand and Supply, 2018-2023					
		2013	2023		Scale: 0 - 102 annual openings in sector	Demand	Supply	Gap		
<p>133 Demand, 129 Supply (53 Graduates, 76 UI Claims)</p>	1	Construction Managers	1,976	2,722	3.3%	Demand	85	84	(1)	
						Supply	84			
		2	Cost Estimators	664	967	3.8%	Demand	37	37	(0)
						Supply	37			
		3	Computer Programmers	334	444	2.9%	Demand	7	2	(4)
					Supply	2				
	4	Architects, Except Landscape and Naval	354	417	1.7%	Demand	3	1	(2)	
					Supply	1				
	5	Health and Safety Engineers, Except Mining Safety Engineers and	37	48	2.6%	Demand	2	5	3	
					Supply	5				

Sources: Washington State Employment Security Department, 2014; Bureau of Labor Statistics, 2016; National Center for Education Statistics, 2016; Community Attributes Inc., 2016.

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INTRODUCTION

Background and Purpose

The construction industry was one of the hardest hit during the great recession between 2008 and 2010. Now during the period of post-recession recovery the construction industry is experiencing a strong resurgence across the region as a whole and in Pierce County specifically. The construction industry in Pierce County is projected to grow 3.6 percent annually between 2013 and 2023. This recovery is generating occupational growth within the industry. Through the skills gap analysis and strategies, WorkForce Central (WFC) can plan for the changing workforce needs of the construction industry in Pierce County.

Construction employment represents eight percent of total Pierce County employment. Although not the largest industry in Pierce County, it is relatively highly concentrated within the county compared to the state with a location quotient of 1.3. Employers in the industry include commercial and residential contractors as well as heavy construction and highway construction. A total of 24,460 people were employed in the construction industry as of 2013. Wages in the construction industry are higher than regional average wages, \$60,899 annually compared to a regional average wage of \$57,370 annually. Median wages in core construction occupations range between \$28,280 annually and \$119,070 annually. Out of 51 core occupations, 29 occupations have median wages higher than \$50,000 annually.

As one of Pierce County's core industries, a strong understanding of the demand, supply and employer perceptions will allow WFC and industry leaders to help address the workforce challenges of the future. Workforce professionals, educators and employers can use this information to help ensure Pierce County's workforce programs are providing the appropriate mix of training opportunities to meet the needs of the construction industry.

Methods

WorkForce Central serves employers and workers within Pierce County, which represents almost ten percent of Washington's total employment. CAI's analysis relies on data published by the state of Washington and federal agencies. Specifically, the following data sources form the foundation of the modeling:

- **Occupational estimates and forecasts from the Washington State Employment Security Department (ESD) and the Bureau of Labor Statistics.** This data provides current estimates and forecasted demand for occupations in Pierce County and associated educational requirements, as well as occupational wages.

Occupational forecasts include openings created by retirements and separations, in addition to openings created by newly created positions. For this reason, average annual openings are larger than the average of net jobs created over a period of time.

- **Washington unemployment insurance claims.** This data, also published by ESD, provides monthly unemployment claims and the previous occupations of the claimant by occupation code.
- **Educational attainment data from the National Center for Education Statistics' Integrated Postsecondary Education System (IPEDS).** IPEDS provides the number of graduates by educational program for Pierce County's higher education institutions, defined according to the Classification of Instructional Programs, as well as a table of equivalence used to match educational programs to occupations.

Subsequent sections explain the details and limits of this data. In general, this data provides measures of demand and supply for a geographic region (i.e., Pierce County). The occupations are defined in accordance with the Bureau of Labor Statistics Standard Occupational Classification system and industries are delineated using definitions from the North American Industry Classification System.

To help provide context to the data, and capture rapidly evolving factors affecting employment patterns, in-depth interviews were also conducted as a part of this detailed construction talent pipeline analysis. Interviews were conducted with key stakeholders within the construction industry, ranging from construction of buildings, both residential and commercial as well as highway construction, utility construction and more. These interviews were open-ended discussions and provided qualitative perspectives on workforce issues impacting the construction industry.

Organization of Report

- **Construction Industry Overview.** Provides an overview of the construction industry and the occupations that define the industry.
- **Demand Analysis.** Describes the composition of construction occupational demand in Pierce County.
- **Supply Analysis.** Breaks out the two elements of talent supply: new graduates entering the workforce and the existing pool of unemployment insurance claimants.
- **Supply and Demand.** Examines how local supply is expected to meet occupational demand in Pierce County.
- **Summary of Key Findings and Preliminary Recommendations.** Assesses in detail the results of the talent pipeline analysis and interview findings, focusing on key implications for Pierce County.

CONSTRUCTION INDUSTRY OVERVIEW

Assessing occupational gaps in an industry relies on a strict operational definition of which occupations compose that industry. Some occupations are present in nearly every industry and do not characterize the skills that define the industry specifically. Many administrative roles, for example, fit into this category. The first step in determining the core occupations that represent the primary set of skills within Pierce County's construction industry is developing an operable definition of the industry. The North American Industry Classification System (NAICS) groups industries in increasingly specific segments from the two-digit to the six-digit level. Construction is defined by all of the detailed industries falling within the broad 2-digit NAICS code 23, construction. (**Exhibit 1**)

Exhibit 1. Pierce County Construction NAICS by Employment, 2013¹

Four Digit NAICS	Description	Employment, 2013
2382	Building equipment contractors	5,340
2383	Building finishing contractors	4,110
2381	Building foundation and exterior contractors	3,240
2361	Residential building construction	3,160
2362	Nonresidential building construction	2,510
2371	Utility system construction	2,470
2389	Other specialty trade contractors	1,930
2373	Highway, street, and bridge construction	1,270
2379	Other heavy construction	280
2372	Land subdivision	150
Construction Industry Total		24,460

Sources: U.S. Bureau of Labor Statistics, 2016; Washington State Employment Security Department, 2016; Community Attributes Inc., 2016.

The construction industry employs almost 24,460 people in Pierce County. Pierce County's construction industry is primarily composed of employment in building equipment contractors, which represent 24 percent of industry employment. Between building equipment contractors, building finishing contractors, building foundation and exterior contractors, residential building construction and nonresidential building construction more than 18,360 construction workers are employed, representing more than 75 percent of total industry employment. (**Exhibit 1**)

¹ The data in this analysis represents a base year of 2013. Although some employment datasets now have data available for 2014 and 2015, base year 2013 is used throughout this report for consistency. The occupational projections that are the source for the demand analysis are developed by the Washington State Employment Security Department and are updated annually. However, the projections lag available employment data by a year, and at the time of this analysis the projections had not yet been updated to reflect 2014 base year projections.

As mentioned above, another method for defining the construction industry is to identify the core occupations that represent the primary skills within the industry. **Exhibits 2** and **3** lay out the core occupations that define Pierce County's construction industry. The process of assembling this list began with examining the structure of the occupation codes with employment within the construction industry. The Bureau of Labor Statistics defines occupations using the Standard Occupation Code system (SOC). These occupations have a two-digit prefix, grouping occupations of similar types, followed by a more detailed four-digit code, identifying each individual occupation. Occupations matching construction are first grouped by their concentration within the construction industry.

Occupations with fewer than 25 employees in the construction industry, or 15 percent concentration within the industry, are excluded from the analysis as they are not considered core jobs within the industry. The core occupations identified represent only a portion of total employment within the construction industry. These occupations are highlighted in **Exhibits 2** and **3** because they represent the core occupations that define employment within this industry. Overall employment within the construction industry includes employment in other occupations that are not core to the industry. Additionally, core construction occupations are also present in industries other than construction throughout Pierce County.

Exhibit 2. Construction and Extraction Occupations, Employment in Industry and Total Employment, Pierce County, 2013

SOC	Occupation	Employment in Industry ↓	Employment in Other Industries	Total Employment	Share in Industry
47-2031	Carpenters	3,947	339	4,286	92%
47-2061	Construction Laborers	2,341	622	2,963	79%
47-1011	Workers	1,711	461	2,172	79%
47-2141	Painters, Construction and Maintenance	1,588	211	1,799	88%
47-2111	Electricians	1,356	416	1,772	77%
47-2181	Roofers	1,010	0	1,010	100%
47-2073	Operating Engineers and Other Construction Equipment Operators	651	227	878	74%
47-2152	Plumbers, Pipefitters, and Steamfitters	648	174	822	79%
47-2081	Drywall and Ceiling Tile Installers	541	0	541	100%
47-2051	Cement Masons and Concrete Finishers	497	14	511	97%
47-2082	Tapers	345	0	345	100%
47-2221	Structural Iron and Steel Workers	222	1	223	100%
47-4031	Fence Erectors	176	28	204	86%
47-2041	Carpet Installers	129	90	219	59%
47-2131	Insulation Workers, Floor, Ceiling, and Wall	128	0	128	100%
47-2021	Brickmasons and Blockmasons	90	2	92	98%
47-2151	Pipelayers	89	35	124	72%
47-3013	Helpers--Electricians	77	0	77	100%
47-2211	Sheet Metal Workers	69	130	199	35%
47-2121	Glaziers	67	35	102	65%
47-5021	Earth Drillers, Except Oil and Gas	66	0	66	100%
47-2071	Paving, Surfacing, and Tamping Equipment Operators	66	16	82	80%
47-3015	Helpers--Pipelayers, Plumbers, Pipefitters, and Steamfitters	48	12	60	81%
47-2171	Reinforcing Iron and Rebar Workers	45	0	45	100%
47-4041	Hazardous Materials Removal Workers	45	135	180	25%
47-2161	Plasterers and Stucco Masons	28	0	28	100%
47-3014	Helpers--Painters, Paperhangers, Plasterers, and Stucco Masons	27	0	27	100%
47-4099	Construction and Related Workers, All Other	27	12	39	68%
47-2053	Terrazzo Workers and Finishers	26	0	26	100%
47-3012	Helpers--Carpenters	25	0	25	100%
Construction and Extraction Occupations Subtotal		16,086	2,959	19,045	84%

Sources: Washington State Employment Security Department, 2014; Community Attributes Inc., 2016.

Overall 78 percent of occupational employment is represented by construction and extraction occupations. A large portion of these occupations are highly concentrated within the construction industry. Among the 30 construction and extraction occupations, 12 are fully employed within the construction industry. An additional ten are more than 75 percent concentrated within the industry. Overall 84 percent of construction and extraction industry employment is concentrated within the construction industry. (**Exhibit 2**)

Exhibit 3. All Other Construction Occupations, Employment in Industry and Total Employment, Pierce County, 2013

Occupation	Employment in Industry ↓	Employment in Other Industries	Total Employment	Share in Industry
49-9021 Heating, Air Conditioning, and Refrigeration Mechanics and Installers	491	279	770	64%
49-9051 Electrical Power-Line Installers and Repairers	380	91	471	81%
49-9052 Telecommunications Line Installers and Repairers	255	76	331	77%
49-2098 Security and Fire Alarm Systems Installers	202	44	246	82%
49-1011 First-Line Supervisors of Mechanics, Installers, and Repairers	147	804	951	15%
49-3042 Mobile Heavy Equipment Mechanics, Except Engines	146	402	548	27%
49-9044 Millwrights	44	87	131	34%
49-9012 Control and Valve Installers and Repairers, Except Mechanical Door	27	11	38	70%
Installation, Maintenance, and Repair Occupations Subtotal	1,691	1,795	3,486	49%
17-3011 Architectural and Civil Drafters	83	103	186	44%
17-1011 Architects, Except Landscape and Naval	58	296	354	16%
17-3012 Electrical and Electronics Drafters	55	27	82	67%
17-2111 Health and Safety Engineers, Except Mining Safety Engineers and Inspectors	30	7	37	81%
17-3013 Mechanical Drafters	26	91	117	22%
Architecture and Engineering Occupations Subtotal	251	525	776	32%
51-4121 Welders, Cutters, Solderers, and Brazers	81	310	391	21%
51-2099 Assemblers and Fabricators, All Other	54	263	317	17%
Production Occupations Subtotal	135	573	708	19%
11-9021 Construction Managers	1,642	334	1,976	83%
13-1051 Cost Estimators	469	195	664	71%
15-1131 Computer Programmers	106	228	334	32%
33-9091 Crossing Guards	69	100	169	41%
43-3051 Payroll and Timekeeping Clerks	63	278	341	18%
27-4011 Audio and Video Equipment Technicians	34	27	61	56%
All Occupations	20,547	7,013	27,560	75%

Sources: Washington State Employment Security Department, 2014; Community Attributes Inc., 2016.

Beyond construction and extraction occupations core construction occupations include installation, maintenance, and repair occupations; architecture and engineering occupations; and production occupations. Among the 51 core construction occupations employment in Pierce County totals more than 27,500. Out of total occupational employment, more than 20,500 are employed in the construction industry, representing 75 percent of construction occupational employment. **(Exhibit 3)**

Exhibit 4. Construction Occupations Median Wage and 90th Percentile Wage, On-the-Job Training, Seattle-Tacoma-Bellevue MSA, 2014

SOC	Occupation	Employment in Industry	Median Wage ↓	90 th Percentile Wage
On-the-Job Training				
49-9051	Electrical Power-Line Installers and Repairers	380	\$85,310	\$104,090
47-2221	Structural Iron and Steel Workers	222	\$79,370	\$94,030
47-1011	First-Line Supervisors of Construction Trades and Extraction Workers	1,711	\$78,390	\$111,260
47-2111	Electricians	1,356	\$70,690	\$96,910
49-1011	First-Line Supervisors of Mechanics, Installers, and Repairers	147	\$70,620	\$104,200
47-5021	Earth Drillers, Except Oil and Gas	66	\$70,230	\$88,100
47-2021	Brickmasons and Blockmasons	90	\$67,350	\$86,520
49-9044	Millwrights	44	\$67,260	\$95,770
47-2073	Operating Engineers and Other Construction Equipment Operators	651	\$65,550	\$79,250
47-2152	Plumbers, Pipefitters, and Steamfitters	648	\$65,180	\$109,870
47-2171	Reinforcing Iron and Rebar Workers	45	\$63,000	\$87,010
49-9012	Control and Valve Installers and Repairers, Except Mechanical Door	27	\$59,420	\$86,670
47-2121	Glaziers	67	\$57,290	\$94,680
49-9052	Telecommunications Line Installers and Repairers	255	\$56,490	\$86,750
47-2151	Pipelayers	89	\$54,860	\$73,160
47-3015	Helpers--Pipelayers, Plumbers, Pipefitters, and Steamfitters	48	\$53,660	\$63,020
47-2071	Paving, Surfacing, and Tamping Equipment Operators	66	\$52,360	\$78,590
47-2031	Carpenters	3,947	\$51,410	\$79,390
49-3042	Mobile Heavy Equipment Mechanics, Except Engines	146	\$51,030	\$76,010
49-2098	Security and Fire Alarm Systems Installers	202	\$50,850	\$68,370
47-2211	Sheet Metal Workers	69	\$50,350	\$93,460
47-4041	Hazardous Materials Removal Workers	45	\$47,940	\$75,450
47-2082	Tapers	345	\$47,720	\$73,990
47-2081	Drywall and Ceiling Tile Installers	541	\$46,760	\$75,190
51-4121	Welders, Cutters, Solderers, and Brazers	81	\$45,820	\$66,020
43-3051	Payroll and Timekeeping Clerks	63	\$45,290	\$61,370
47-2181	Roofers	1,010	\$44,830	\$72,990
47-2131	Insulation Workers, Floor, Ceiling, and Wall	128	\$44,740	\$78,580
33-9091	Crossing Guards	69	\$43,710	\$60,220
47-2061	Construction Laborers	2,341	\$42,450	\$74,820
47-2051	Cement Masons and Concrete Finishers	497	\$41,100	\$73,820
47-2141	Painters, Construction and Maintenance	1,588	\$39,420	\$66,220
47-4099	Construction and Related Workers, All Other	27	\$38,800	\$60,660
47-4031	Fence Erectors	176	\$37,190	\$47,000
47-3014	Helpers--Painters, Paperhangers, Plasterers, and Stucco Masons	27	\$33,060	\$38,350
47-3013	Helpers--Electricians	77	\$32,530	\$54,010
47-2041	Carpet Installers	129	\$32,030	\$65,840
51-2099	Assemblers and Fabricators, All Other	54	\$28,360	\$50,270
47-3012	Helpers--Carpenters	25	\$28,280	\$50,220
47-2053	Terrazzo Workers and Finishers	26	*	*
47-2161	Plasterers and Stucco Masons	28	*	*

* indicates data is suppressed by the U.S. Bureau of Labor Statistics in order to comply with nondisclosure rules.

Due to data limitations median and 90th percentile wages are those for the matching occupation in the Seattle-Tacoma-Bellevue MSA and are used as a proxy for Pierce County wages by occupation given data limitations for occupational wage data for Pierce County alone.

Sources: U.S. Bureau of Labor Statistics, 2014; Washington State Employment Security Department, 2014; Community Attributes Inc., 2016.

On-the-job training, associate degree or postsecondary award and bachelor's degree are categories used to break core occupations into key groupings. These categories are based on Bureau of Labor Statistics minimum education required for entry. These education levels are set at a national level and may not be fully reflective of the hiring practices in Pierce County, or within individual companies. Additionally, actual openings for these occupations may have different requirements and the talent pool for these occupations may have different levels of education than indicated by the minimum educational level. These minimum education levels are used to group occupations by the relative level of training and education required for entry.

Data for **Exhibit 4** and **5** is only available for the metropolitan Seattle-Tacoma-Bellevue region. The construction industry pays high median wages within the Seattle-Tacoma-Bellevue MSA. Among the 41 core occupations that require a minimum of on-the-job training for entry, 21 of these occupations pay annual median wages greater than \$50,000. Additionally, 21 occupations also have 90th percentile wages greater than \$75,000 annually. (**Exhibit 4**)

Exhibit 5. Construction Occupations Median Wage and 90th Percentile Wage, Associate Degree or Postsecondary Award or Higher, Seattle-Tacoma-Bellevue MSA, 2014

	Occupation	Employment in Industry	Median Wage ↓	90th Percentile Wage
Associate degree or Postsecondary Award				
17-3013	Mechanical Drafters	26	\$76,170	\$106,480
49-9021	Heating, Air Conditioning, and Refrigeration Mechanics and Installers	491	\$59,500	\$96,000
17-3011	Architectural and Civil Drafters	83	\$57,880	\$78,090
27-4011	Audio and Video Equipment Technicians	34	\$47,350	\$83,000
17-3012	Electrical and Electronics Drafters	55 *	*	*
Bachelor's degree				
15-1131	Computer Programmers	106	\$119,070	\$168,610
11-9021	Construction Managers	1,642	\$95,390	\$148,470
17-2111	Health and Safety Engineers, Except Mining Safety Engineers and Inspectors	30	\$91,100	\$118,560
13-1051	Cost Estimators	469	\$71,960	\$108,470
17-1011	Architects, Except Landscape and Naval	58	\$70,630	\$112,790

* indicates that data is suppressed by the U.S. Bureau of Labor Statistics in order to comply with nondisclosure rules.

Due to data limitations median and 90th percentile wages are those for the matching occupation in the Seattle-Tacoma-Bellevue MSA, and are used as a proxy for Pierce County wages by occupation given data limitations for occupational wage data for Pierce County alone.

Sources: U.S. Bureau of Labor Statistics, 2014; Washington State Employment Security Department, 2014; Community Attributes Inc., 2016.

Associate degree or postsecondary award and bachelor's degree occupations have even higher median wages. In particular, bachelor's degree occupations have high median wages, including computer

programmers, construction managers and health and safety engineers, each with median wages in excess of \$90,000 annually. Construction stakeholders provided feedback that indicated that the industry is increasingly adopting technology, which is further confirmed in the data by the number of computer programmers employed within the construction industry. (**Exhibit 5**)

Exhibit 6. Comparative Average Wages, Pierce County and Seattle-Tacoma-Bellevue MSA, 2014

	Employment	Average Wage
Pierce County Construction Industry		
On-the-Job Training Occupations	17,554	\$56,282
Associate Degree or Postsecondary Award Occupations	688	\$62,838
Bachelor's Degree Occupations	2,305	\$95,422
Construction Industry Total	20,547	\$60,899
Seattle-Tacoma-Bellevue MSA	1,761,920	\$57,370

Due to data limitations median and 90th percentile wages are those for the matching occupation in the Seattle-Tacoma-Bellevue MSA, and are used as a proxy for Pierce County wages by occupation given data limitations for occupational wage data for Pierce County alone.

Sources: U.S. Bureau of Labor Statistics, 2014; Washington State Employment Security Department, 2014; Community Attributes Inc., 2016.

The average wage for Pierce County’s core construction occupations across the Seattle-Tacoma-Bellevue MSA geography is almost \$60,900 annually. Average wages within the industry educational groupings ranges between \$56,300 and \$95,400 annually. Overall the industry average wage is almost \$3,000 greater than the Seattle-Tacoma-Bellevue MSA regional average wage. (**Exhibit 6**)

Exhibit 7. Construction Occupational Employment in Other Industries by Industry, 2013

Industry	Construction Occupation Employment in Industry
Local government other	1,433
Federal government	587
Architectural and engineering services	494
Employment Services	401
Remediation and other waste services	310
Architectural and structural metals mfg	280
wholesalers	236
Other support services	176
Ship and boat building	160
Automotive repair and maintenance	157
Lessors of real estate	129
Education	128
Aerospace	123
State government other	121
Commercial machinery repair and maintenance	120
All Other Industries	2,157
Total	7,012

Sources: Washington State Employment Security Department, 2015; Community Attributes Inc., 2016.

Among construction occupations more than 7,000 workers are employed outside of the construction industry. The largest industry employing construction occupations other than construction is local government, followed by the federal government and architectural and engineering services. There are 15 industries that employ more than 100 people in core construction occupations. (**Exhibit 7**)

Exhibit 8. Construction Occupation Employment in Other Industries by Occupation, 2013

Occupation	Employment in Other Industries	Top Other Industry
First-Line Supervisors of Mechanics, Installers, and Repairers	804	Federal Government
Construction Laborers	622	Employment Services
First-Line Supervisors of Construction Trades and Extraction Workers	461	Local Government Other
Electricians	416	Local Government Other
Mobile Heavy Equipment Mechanics, Except Engines	402	Federal Government
Carpenters	339	Lessors of real estate
Construction Managers	334	Local Government Other
Welders, Cutters, Solderers, and Brazers	310	Ship and boat building
Architects, Except Landscape and Naval	296	Architectural and engineering services
Heating, Air Conditioning, and Refrigeration Mechanics and Installers	279	Hardware and plumbing merchant wholesalers
Payroll and Timekeeping Clerks	278	Federal Government
Assemblers and Fabricators, All Other	263	Warehousing and storage
Computer Programmers	228	Employment Services
Operating Engineers and Other Construction Equipment Operators	227	Local Government Other
Painters, Construction and Maintenance	211	Employment Services
Cost Estimators	195	Automotive repair and maintenance
Plumbers, Pipefitters, and Steamfitters	174	Local Government Other
Hazardous Materials Removal Workers	135	Remediation and other waste services
Sheet Metal Workers	130	Architectural and structural metals mfg.
Architectural and Civil Drafters	103	Architectural and engineering services
Crossing Guards	100	Other support services
All Other Occupations	707	
Total	7,013	

Sources: Washington State Employment Security Department, 2015; Community Attributes Inc., 2016.

No single occupation among the core construction industries makes up the bulk of occupational employment outside of the construction industry. First-line supervisors of mechanics, installers and repairers represent 11 percent of all construction occupation employment in other industries. The remaining 89 percent of occupational employment in other industries is dispersed among the other 50 core construction occupations. **(Exhibit 8)**

Construction employment is relatively highly concentrated within the construction industry. Beyond the construction industry, 7.8 percent of total employment in core construction occupations is concentrated within government sectors. Overall, 75 percent of core construction occupational employment is concentrated within the construction industry. Among core construction occupations more than 20,500 people are employed within the construction industry, an additional 2,141 people in construction occupations are employed by the government.

DEMAND ANALYSIS: PIERCE COUNTY CONSTRUCTION OCCUPATIONAL FORECASTS

Total demand² for occupations matching the workforce needs of construction³ in Pierce County is expected to be an average of 1,346 openings annually between 2018 and 2023. Among the 51 core construction occupations carpenters are projected to see the greatest number of annual openings, at 171 across the economy and 157 openings in the construction industry. Many core construction occupations are projected to see strong employment growth between 2018 and 2023, 24 out of 51 occupations are projected to see annual growth greater than 2.0 percent. Occupations expected to experience strong growth include fence erectors; security and fire alarm systems installers; computer programmers; electricians; and telecommunications line installers and repairers, each projected to grow more than 2.5 percent annually between 2018 and 2023. **(Exhibit 9)**

Overall, annual average openings within core construction occupations in the construction industry is projected to be 1,008 annually. Total employment within core construction industry is expected to grow 2.0 percent annually, stronger than the county's total expected employment growth rate of 1.4 percent. **(Exhibit 9)**

Construction industry stakeholders indicated that there is currently strong demand for construction occupations and they expect to see this demand increase over time. A strong pipeline of construction projects in Pierce County, coupled with an aging workforce, is fueling this demand. Although the industry is expecting to see continued strong growth, employment within the industry is often seasonal due to weather conditions. Seasonality in employment can pose challenges in recruiting workers.

Occupations used throughout the analysis are defined by the Bureau of Labor Statistics using a standardized code system. The code system allows for the analysis of data, however, the occupations defined may not capture some of the specializations that fall within each occupation. Additionally, the occupation title may not match the titles used by Pierce County employers.

² Total demand may be underestimated as it is represented by average annual openings. Average annual openings are calculated by the Employment Security Department based on projections of employment by occupation. The employment projections only represent the point of equilibrium between demand and supply and therefore do not account for unmet demand or unfilled jobs. As a result, total demand may be underestimated.

³ Total demand for occupations covers demand across all industries in Pierce County and includes but is not limited to the construction industry.

Exhibit 9. Pierce County Construction Occupational Demand per Year, 2018 and 2023

SOC	Occupation	Estimated Employment 2018	Estimated Employment 2023	Average Annual Openings ↓ (2018-2023)	Average Annual Openings in Industry (2018-2023)	Estimated Employment CAGR (2018-2023)
47-2031	Carpenters	5,274	5,798	171	157	1.9%
47-2061	Construction Laborers	3,691	4,105	167	132	2.1%
11-9021	Construction Managers	2,448	2,722	102	85	2.1%
47-2111	Electricians	2,137	2,425	101	77	2.6%
47-1011	First-Line Supervisors of Construction Trades and Extraction Workers	2,692	2,995	88	69	2.2%
47-2141	Painters, Construction and Maintenance	2,182	2,404	79	70	2.0%
47-2181	Roofers	1,382	1,543	62	62	2.2%
13-1051	Cost Estimators	857	967	53	37	2.4%
49-9021	Heating, Air Conditioning, and Refrigeration Mechanics and Installers	926	1,039	48	31	2.3%
47-2073	Operating Engineers and Other Construction Equipment Operators	1,047	1,147	46	34	1.8%
49-1011	First-Line Supervisors of Mechanics, Installers, and Repairers	1,019	1,072	41	6	1.0%
47-2152	Plumbers, Pipefitters, and Steamfitters	971	1,090	36	28	2.3%
49-9051	Electrical Power-Line Installers and Repairers	536	580	28	23	1.6%
47-2051	Cement Masons and Concrete Finishers	685	770	25	24	2.4%
49-3042	Mobile Heavy Equipment Mechanics, Except Engines	587	618	24	6	1.0%
49-9052	Telecommunications Line Installers and Repairers	395	447	21	16	2.5%
15-1131	Computer Programmers	391	444	21	7	2.6%
47-2081	Drywall and Ceiling Tile Installers	651	706	17	17	1.6%
47-2221	Structural Iron and Steel Workers	298	333	17	17	2.2%
49-2098	Security and Fire Alarm Systems Installers	301	342	16	13	2.6%
17-1011	Architects, Except Landscape and Naval	387	417	16	3	1.5%
47-4031	Fence Erectors	269	308	15	13	2.7%
51-4121	Welders, Cutters, Solderers, and Brazers	436	456	15	3	0.9%
43-3051	Payroll and Timekeeping Clerks	377	404	14	3	1.4%
51-2099	Assemblers and Fabricators, All Other	367	396	12	2	1.5%
47-2082	Tapers	415	450	11	11	1.6%
	All Other Occupations (25)	2,785	3,034	100	62	1.7%
	Total	33,506	37,012	1,346	1,008	2.0%

Sources: U.S. Bureau of Labor Statistics, 2014; Washington State Employment Security Department, 2014; Community Attributes Inc., 2016.

SUPPLY ANALYSIS: AVAILABILITY OF REGIONAL TALENT AND EMPLOYABLE WORKFORCE

The local workforce supply is primarily composed of two elements: the entry of new graduates into the available talent pool and the existing talent pool of qualified unemployed workers actively seeking employment. Qualified graduates are drawn from the National Center for Education Statistics' Integrated Postsecondary Education System (IPEDS) data via a match of Classification Instructional Program (CIP) codes to the appropriate SOC codes. These are totaled by occupation code, including duplicates, and are then adjusted down controlled to total occupational employment. Unemployment insurance claimants are organized by their most recently reported occupation (i.e. SOC codes) and represent the second element of supply. It is important to note that workers from outside Pierce County can fill talent gaps, but are not assessed in this analysis.

Local Graduates

IPEDS standardizes educational curriculum with CIP codes. Each CIP code can match to several SOC codes because graduates from the same program can be qualified to be employed in a variety of occupations and industries. Similarly, each occupation may draw on graduates from several relevant CIP codes. For example, graduates in pipefitting/pipefitter and sprinkler fitter programs may be qualified to work as plumbers, pipefitters and steamfitters as well as first-line supervisors of construction trades and extraction workers. The latter occupation also draws on graduates from plumbing technology/plumber programs (**Exhibit 10**).

Exhibit 10. Other Occupational Matches for Graduates Qualified to Work as Plumbers, Pipefitters and Steamfitters

CIP	Description	SOC	Description
46.0502	Pipefitting/Pipefitter and Sprinkler Fitter	47-2152	Plumbers, Pipefitters, and Steamfitters
46.0503	Plumbing Technology/Plumber.	47-1011	First-Line Supervisors of Construction Trades and Extraction Workers
46.0599	Plumbing and Related Water Supply Services, Other.	47-4071	Septic Tank Servicers and Sewer Pipe Cleaners

Sources: National Center for Education Statistics' Integrated Postsecondary Education System, 2014; Community Attributes Inc., 2016.

Accredited programs matching to one or more construction occupation(s) are summarized across educational institutions and programs located in the county in order to determine the number of graduates that will be able to fill forecasted annual openings within the construction industry in Pierce County.

Graduation data is tied to the primary location of the educational institution providing the accredited program. Therefore, institutions

located outside of Pierce County are not included as part of the local talent supply.

IPEDS data is only available through the 2013-2014 academic year. Because the majority of completions occur at the end of the spring semester, students who complete programs during the 2013-2014 academic year are most likely to seek employment in 2014. Completions data provides a snapshot of what educational programs are expected to look like in future years if current conditions do not change.

IPEDS data only captures information on people who complete programs in postsecondary schools. This means that high school graduates, many of whom may be appropriately qualified for certain positions, are not counted in this analysis. Industry stakeholders indicated a strong interest in improving high school student recruiting into construction programs, and a focus on improving and increasing technical education programs for high school students. Interviewees also indicated that the construction industry faces a public relations challenge. High school and college students do not often consider construction or other skilled trades when planning their careers.

Additionally, apprenticeships are not included among the graduate supply estimates. The primary feature of an apprenticeship program is on-the-job training. Therefore, these individuals are already counted among the individuals employed in the industry. If they were to be added to the talent pool calculations, they would be double-counted within the analysis.

Apprenticeship and other on-the-job training programs are an essential part of the construction industry workforce system. Stakeholders representing these programs indicated that they were expanding the size of their apprenticeship programs to accommodate growing demand as well as expected retirements.

In Pierce County 19 programs supply graduates qualified for core construction occupations. Among these programs just three supply more than 200 completions qualified for construction occupations annually. The top three programs are business administration and management with 285 local completions, business/commerce with 225 local completions and accounting technology/technician and bookkeeping with 223 completions. **(Exhibit 11)**

Exhibit 11. Total Graduates by CIP Codes that Match to One or More Construction Occupation(s), Pierce County, 2014

CIP	Description	Graduates
52.0201	Business Administration and Management, General	285
52.0101	Business/Commerce, General	225
52.0302	Accounting Technology/Technician and Bookkeeping	223
48.0508	Welding Technology/Welder	46
49.0202	Construction/Heavy Equipment/Earthmoving Equipment Operation	38
46.0401	Building/Property Maintenance	33
47.0201	Heating, Air Conditioning, Ventilation and Refrigeration Maintenance Technology/Technician	32
11.0201	Computer Programming/Programmer, General	25
11.0701	Computer Science	21
46.0201	Carpentry/Carpenter	19
14.1901	Mechanical Engineering	18
11.0803	Computer Graphics	17
52.2001	Construction Management	13
46.0302	Electrician	10
15.1301	Drafting and Design Technology/Technician, General	8
47.0103	Communications Systems Installation and Repair Technology	7
48.0506	Sheet Metal Technology/Sheetworking	6
10.0203	Recording Arts Technology/Technician	2
52.1201	Management Information Systems, General	1
Total		1,029

Sources: National Center for Education Statistics' Integrated Postsecondary Education System, 2014; Community Attributes Inc., 2016.

Examining the same completions by the institution from which they graduated shows the geographic source of qualified construction occupation candidates, and the institutions from which Pierce County residents graduate and move on to fill construction occupation openings. In total eight local institutions have completions that match to one or more construction occupation(s). Four local institutions have more than 100 annual completions, Tacoma Community College is the institution with the greatest number of annual completions with more than 360. Bates Technical College, Pierce College-Fort Steilacoom and Pacific Lutheran University each have more than 100 annual completions. In total Pierce County institutions have a total of 1,029 annual educational program completions that are in fields that match to one or more construction occupation(s). (**Exhibit 12**)

Exhibit 12. Pierce County's Educational Institutions by Graduates Qualified for Construction Occupations, 2014

Institution	Graduates Qualified for Construction Occupations
Tacoma Community College	365
Bates Technical College	149
Pierce College-Fort Steilacoom	143
Pacific Lutheran University	119
University of Puget Sound	87
Clover Park Technical College	78
University of Washington-Tacoma Campus	48
Pierce College-Puyallup	40
Total	1,029

Sources: National Center for Education Statistics' Integrated Postsecondary Education System, 2014; Community Attributes Inc., 2016.

In order to determine the number of potential graduates that are likely to fill occupations within Pierce County's construction industry, qualified graduates are totaled by every possible combination of CIP and SOC codes. Each combination is adjusted to match the ratio of occupational employment to total occupational employment for all possible occupations matching to relevant CIPs. This method results in an estimate of how many graduates could potentially be employed in each available occupation. Each estimate is adjusted to account for the approximate share of local graduates who obtain work locally after graduation by multiplying the estimates by a 70 percent local retention rate. Lastly, the number of graduates expected to seek work locally is adjusted again to account for the number of local graduates who can be reasonably expected to fill positions within the construction industry.

This approach yields a total of 263 graduates in 2014 who are qualified for the needs of the construction industry (**Exhibit 13**).

Some construction industry stakeholders also indicated that in some cases they have plenty of candidates overall, but lack qualified candidates. Many occupations within the industry require very specific skill sets, and industry stakeholders are finding that applicants are not fully qualified. Even in relatively unskilled occupations, stakeholders discussed that candidates often lacked necessary soft skills and familiarity with work expectations that hampered their retention once employed. The perception is that there is both an overall shortage as well as a shortage of qualified workers.

In 2014, educational institutions in Pierce County conferred degrees to 263 graduates in construction related occupations. Among these graduates, 184 are projected to stay in Pierce County. Of these 184 graduates qualified to work in construction occupations, 108 are expected to seek employment within the construction industry. Among all of the

occupations with projected graduates, construction managers and cost estimators are projected to have the greatest local graduate supply. Out of the 51 core construction occupations, 19 have projected supply from local graduates and the balance must recruit either experienced workers or graduates from outside the county. (**Exhibit 13**)

Exhibit 13. Construction Occupations by Total Graduates, Pierce County, 2014

SOC	Description	All Graduates	Graduates After 70% Retention	Graduates in Industry
47-1011	First-Line Supervisors of Construction Trades and Extraction Workers	37	26	20
43-3051	Payroll and Timekeeping Clerks	44	31	6
51-4121	Welders, Cutters, Solderers, and Brazers	23	16	3
47-2031	Carpenters	5	4	3
47-5021	Earth Drillers, Except Oil and Gas	2	1	1
47-2071	Paving, Surfacing, and Tamping Equipment Operators	2	1	1
47-2073	Operating Engineers and Other Construction Equipment Operators	2	1	1
49-2098	Security and Fire Alarm Systems Installers	1	1	1
49-9052	Telecommunications Line Installers and Repairers	1	1	1
47-2111	Electricians	1	1	1
47-2211	Sheet Metal Workers	0	0	0
	On-the-Job Training Subtotal	118	83	38
49-9021	Heating, Air Conditioning, and Refrigeration Mechanics and Installers	32	22	14
17-3012	Electrical and Electronics Drafters	2	1	1
17-3011	Architectural and Civil Drafters	2	1	1
27-4011	Audio and Video Equipment Technicians	1	1	0
17-3013	Mechanical Drafters	2	1	0
	Associate degree or Postsecondary Award Subtotal	39	27	17
11-9021	Construction Managers	46	32	27
13-1051	Cost Estimators	49	34	24
15-1131	Computer Programmers	11	8	2
	Bachelor's degree Subtotal	106	74	53
	Grand Total	263	184	108

Sources: National Center for Education Statistics' Integrated Postsecondary Education System, 2014; Community Attributes Inc., 2016.

Unemployment Insurance

The second key element of the local talent supply is the pool of unemployment insurance (UI) claimants whose previous occupations match those in Pierce County's core construction occupations. Due to nondisclosure rules, not all UI data is available for every SOC.

Overall, there are a total of 3,113 unemployment insurance claimants whose previous occupation was a core construction occupation. Of these UI claimants 2,394 are projected to seek work within the Pierce County construction industry. (**Exhibit 14**)

A total of 41 out of 51 core construction occupations have unemployment insurance claimants whose previous occupation matches to a core construction occupation. The majority of UI supply, almost 96 percent, is concentrated among occupations with a minimum educational

requirement of on-the-job training. Both carpenters and construction laborers are projected to have supply of more than 400 UI claimants annually. (Exhibit 14)

Exhibit 14. Unemployment Insurance Claimants by Previous SOC, Pierce County, 2014

SOC	Description	Total Qualified Unemployment Insurance Claimants	Unemployment Insurance Claimants in Sector ↓
47-2031	Carpenters	446	411
47-2061	Construction Laborers	511	404
47-2073	Operating Engineers and Other Construction Equipment Operators	311	231
47-2111	Electricians	299	229
47-2181	Roofers	137	137
47-2051	Cement Masons and Concrete Finishers	125	122
47-2141	Painters, Construction and Maintenance	134	118
47-2152	Plumbers, Pipefitters, and Steamfitters	130	103
47-2221	Structural Iron and Steel Workers	91	91
47-1011	First-Line Supervisors of Construction Trades and Extraction Workers	83	65
47-2081	Drywall and Ceiling Tile Installers	64	64
47-2021	Brickmasons and Blockmasons	34	33
47-2211	Sheet Metal Workers	95	33
47-2071	Paving, Surfacing, and Tamping Equipment Operators	32	26
47-2121	Glaziers	38	25
47-2151	Pipelayers	32	23
51-4121	Welders, Cutters, Solderers, and Brazers	92	19
47-4099	Construction and Related Workers, All Other	26	18
33-9091	Crossing Guards	35	14
49-9051	Electrical Power-Line Installers and Repairers	17	14
49-3042	Mobile Heavy Equipment Mechanics, Except Engines	46	12
47-2082	Tapers	12	12
47-2161	Plasterers and Stucco Masons	12	12
49-9052	Telecommunications Line Installers and Repairers	13	10
47-2131	Insulation Workers, Floor, Ceiling, and Wall	10	10
47-5021	Earth Drillers, Except Oil and Gas	8	8
51-2099	Assemblers and Fabricators, All Other	45	8
47-4031	Fence Erectors	8	7
47-3013	Helpers--Electricians	6	6
47-2171	Reinforcing Iron and Rebar Workers	6	6
47-2041	Carpet Installers	9	5
47-4041	Hazardous Materials Removal Workers	19	5
49-9044	Millwrights	13	4
49-1011	First-Line Supervisors of Mechanics, Installers, and Repairers	17	3
43-3051	Payroll and Timekeeping Clerks	13	2
	On-the-Job Training Subtotal	2,969	2,289
49-9021	Installers	43	27
27-4011	Audio and Video Equipment Technicians	4	2
	Associate degree or Postsecondary Award Subtotal	47	30
11-9021	Construction Managers	69	57
13-1051	Cost Estimators	18	13
17-2111	Health and Safety Engineers, Except Mining Safety Engineers and Inspectors	6	5
17-1011	Architects, Except Landscape and Naval	4	1
	Bachelor's degree Subtotal	97	76
	Grand Total	3,113	2,394

Sources: Washington State Employment Security Department, 2014; Community Attributes Inc., 2016.

Total supply is defined as the sum of local qualified graduates and qualified unemployment insurance claimants. Pierce County has a projected supply of 108 local graduates and 2,394 unemployment insurance claimants who can reasonably be expected to fill the needs of the construction industry within Pierce County. The sum of the two sources of supply leads to a total projected supply of 2,502 candidates. (Exhibit 15)

Exhibit 15. Total Talent Supply, Pierce County, 2014

Source of Supply	Qualified Workers
On-the-Job Training	38
Associate Degree or Postsecondary Award	17
Bachelor's Degree	53
Graduate Subtotal	108
Unemployment Insurance Claimants	2,394
Grand Total	2,502

Sources: National Center for Education Statistics' Integrated Postsecondary Education System, 2014; Washington State Employment Security Department, 2014; Community Attributes Inc., 2016.

SUPPLY AND DEMAND

The combined elements of expected supply and projected occupational demand yields a summary of annual occupational gaps within the construction industry. **Exhibits 16** and **17** summarize graduate supply, total demand, UI claimant supply, and the expected gaps for each construction occupation.

Construction industry stakeholders indicated that they expect to see high demand within their core occupations due to a strong pipeline of construction work in Pierce County coupled with anticipated retirements due to an aging workforce. They also mentioned that they are experiencing shortages in qualified candidates. In some cases, they receive plenty of applicants for open positions, however few are qualified.

A total of 41 out of 51 core construction occupations require a minimum of on-the-job training for entry. Within these occupations there is an expected supply of 38 local graduates and an additional supply of 2,289 UI claimants, totaling a supply of 2,326 workers. Demand among these occupations is projected to be 837 openings annually. The combination of supply and demand leads to an expected surplus of 1,489 qualified workers. However, none of the construction stakeholders interviewed described employment situations that reflected surpluses of labor. To the contrary, all employers reported difficulty hiring and stakeholders from Joint Apprenticeship Training Councils and Training Trusts claimed they had increased the size of their programs to meet current and future demand. Security and fire alarm installers are projected to have the largest shortage, at 13 open positions projected to go unfilled by local supply annually. Construction laborers are expected to have the largest surplus at an oversupply of 272 local workers (although again, the construction laborer employers and training fund disputed this surplus). (**Exhibit 16**)

Exhibit 16. Annual Supply and Demand, On-the-Job Training, Pierce County, 2018-2023

Occupation	Total Graduate Supply	Total Demand	Interim Gap	Total UI Claims Supply	Final Gap ↓
Security and Fire Alarm Systems Installers	1	13	(13)	0	(13)
Electrical Power-Line Installers and Repairers	0	23	(23)	14	(9)
Fence Erectors	0	13	(13)	7	(6)
Telecommunications Line Installers and Repairers	1	16	(16)	10	(6)
First-Line Supervisors of Mechanics, Installers, and Repairers	0	6	(6)	3	(4)
Helpers--Pipelayers, Plumbers, Pipefitters, and Steamfitters	0	2	(2)	0	(2)
Control and Valve Installers and Repairers, Except Mechanical Door	0	1	(1)	0	(1)
Terrazzo Workers and Finishers	0	1	(1)	0	(1)
Helpers--Painters, Paperhangers, Plasterers, and Stucco	0	1	(1)	0	(1)
Masons	0	1	(1)	0	(1)
Helpers--Carpenters	0	1	(1)	0	(1)
Carpet Installers	0	5	(5)	5	0
Tapers	0	11	(11)	12	1
Helpers--Electricians	0	4	(4)	6	2
Hazardous Materials Removal Workers	0	2	(2)	5	2
Millwrights	0	2	(2)	4	3
Reinforcing Iron and Rebar Workers	0	3	(3)	6	3
Insulation Workers, Floor, Ceiling, and Wall	0	5	(5)	10	5
Earth Drillers, Except Oil and Gas	1	4	(3)	8	5
Payroll and Timekeeping Clerks	6	3	3	2	5
Assemblers and Fabricators, All Other	0	2	(2)	8	6
Mobile Heavy Equipment Mechanics, Except Engines	0	6	(6)	12	6
Crossing Guards	0	3	(3)	14	11
Plasterers and Stucco Masons	0	0	0	12	12
Construction and Related Workers, All Other	0	1	(1)	18	16
First-Line Supervisors of Construction Trades and Extraction Workers	20	69	(49)	65	16
Welders, Cutters, Solderers, and Brazers	3	3	0	19	19
Pipelayers	0	3	(3)	23	20
Glaziers	0	5	(5)	25	20
Paving, Surfacing, and Tamping Equipment Operators	1	2	(0)	26	25
Brickmasons and Blockmasons	0	4	(4)	33	29
Sheet Metal Workers	0	3	(3)	33	30
Drywall and Ceiling Tile Installers	0	17	(17)	64	47
Painters, Construction and Maintenance	0	70	(70)	118	49
Structural Iron and Steel Workers	0	17	(17)	91	74
Plumbers, Pipefitters, and Steamfitters	0	28	(28)	103	74
Roofers	0	62	(62)	137	75
Cement Masons and Concrete Finishers	0	24	(24)	122	97
Electricians	1	77	(77)	229	152
Operating Engineers and Other Construction Equipment Operators	1	34	(33)	231	198
Carpenters	3	157	(154)	411	256
Construction Laborers	0	132	(132)	404	272
On-the-Job Training Subtotal	38	837	(799)	2,289	1,489

Sources: U.S. Bureau of Labor Statistics, 2014; Washington State Employment Security Department, 2014; National Center for Education Statistics' Integrated Postsecondary Education System, 2014; Community Attributes Inc., 2016.

Within the construction industry there are five occupations that require an associate degree or postsecondary award. There is an expected supply of 17 local graduates for these occupations, primarily concentrated among heating, air conditioning, and refrigeration mechanics and installers. This

supply is augmented by an additional 30 UI claimants, also concentrated among heating, air conditioning, and refrigeration mechanics and installers. Total supply among these five occupations is projected to be 46 workers annually. Forecasted annual demand among these occupations is projected to be 38 workers. The difference between supply and demand leads to an anticipated surplus of eight local candidates. Among these five occupations three are projected to have a small annual shortage, while the remaining two are projected to have a surplus. The largest surplus is projected to be among heating, air conditioning, and refrigeration mechanics and installers. However surplus talent among occupations such as heating, air conditioning, and refrigeration mechanics and installers may be hired outside of Pierce County. **(Exhibit 17)**

An examination of supply among occupations requiring a bachelor’s degree demonstrates 53 local graduates and an additional 76 UI claimants whose previous occupation matches to one of the five occupations requiring a bachelor’s degree for entry. Together these local candidates provide a projected talent supply of 129 local workers. The total projected demand among these five occupations is projected to be 133 workers annually. As such the expected talent shortage among bachelor’s degree occupations is anticipated to be four workers annually. **(Exhibit 17)**

Exhibit 17. Annual Supply and Demand, Associate Degree or Postsecondary Award and Higher, Pierce County, 2018-2023

Occupation	Total Graduate Supply	Total Demand	Interim Gap	Total UI Claims Supply	Final Gap ↓
Electrical and Electronics Drafters	1	3	(2)	0	(2)
Architectural and Civil Drafters	1	2	(2)	0	(2)
Mechanical Drafters	0	1	(1)	0	(1)
Audio and Video Equipment Technicians	0	2	(1)	2	1
Heating, Air Conditioning, and Refrigeration Mechanics and Installers	14	31	(16)	27	11
Associate degree or Postsecondary Award Subtotal	17	38	(21)	30	8
Computer Programmers	2	7	(4)	0	(4)
Architects, Except Landscape and Naval	0	3	(3)	1	(2)
Construction Managers	27	85	(58)	57	(1)
Cost Estimators	24	37	(13)	13	(0)
Health and Safety Engineers, Except Mining Safety Engineers and Inspectors	0	2	(2)	5	3
Bachelor's degree Subtotal	53	133	(80)	76	(4)
Grand Total	108	1,008	(901)	2,394	1,493

Sources: U.S. Bureau of Labor Statistics, 2014; Washington State Employment Security Department, 2014; National Center for Education Statistics’ Integrated Postsecondary Education System, 2014; Community Attributes Inc., 2016.

It is important to bear in mind not all occupations within an educational grouping are easily substitutable. A surplus in one occupation may not necessarily be countered by a shortage in another occupation. The skills required may not be the same between occupations. As such, a detailed account of the prospective supply and demand for each core occupation

can help organizations anticipate and plan for possible labor shortages and surpluses in the future.

Addressing surpluses among certain occupations includes examining other occupations in which workers could be qualified to work. The occupation with the largest surplus is construction laborers. Individuals qualified for this occupation may also seek work as cleaners of vehicles and equipment, terrazzo workers and finishers, and carpenter’s helpers all of which are expected to see shortages in talent supply both in the construction industry and across the region. (Exhibit 18)

Exhibit 18. Job Transferability for Construction Laborers

SOC	Occupation	Annual Construction Gap (2018-2023)	Annual Pierce County Gap (2018-2023)
47-2061	Construction laborers	272	344
53-7061	Cleaners of vehicles and equipment	(0)	(11)
47-2053	Terrazzo workers and finishers	(1)	(1)
47-3012	Helpers--carpenters	(1)	(1)
47-3014	Helpers--painters, paperhangers, plasterers, and stucco masons	(1)	(1)
47-5051	Rock splitters, quarry	0	0
47-5071	Roustabouts, oil and gas	0	0
47-3011	Helpers--brickmasons, blockmasons, stonemasons, and tile and marble setters	6	6
47-2151	Pipelayers	20	28
47-2071	Paving, surfacing, and tamping equipment operators	25	31
47-2051	Cement masons and concrete finishers	97	100

Sources: O*NET Resource Center, 2016; Community Attributes Inc., 2016.

Carpenters are also projected to have a large surplus in regional talent. However, interview feedback indicated that industry employers are experiencing shortages of labor. It is possible that many of the surplus candidates indicated in the data may not be considered qualified or hireable by local employers, or that they are seeking employment in a neighboring county. Those individuals seeking local employment, but not considered qualified by local employers may want to seek employment in an alternative occupation. These individuals may be qualified to work as fence erectors, terrazzo workers and finishers and carpenter’s helpers. (Exhibit 19)

Exhibit 19. Job Transferability for Carpenters

SOC	Occupation	Annual Construction Gap (2018-2023)	Annual Pierce County Gap (2018-2023)
47-2031	Carpenters	256	279
47-4031	Fence erectors	(6)	(7)
47-2053	Terrazzo workers and finishers	(1)	(1)
47-3012	Helpers--carpenters	(1)	(1)
47-2171	Reinforcing iron and rebar workers	3	3
51-4192	Layout workers, metal and plastic	0	4
47-2044	Tile and marble setters	4	6
47-2132	Insulation workers, mechanical	10	10
47-2021	Brickmasons and blockmasons	29	30
47-2081	Drywall and ceiling tile installers	47	47
47-2211	Sheet metal workers	30	87

Sources: O*NET Resource Center, 2016; Community Attributes Inc., 2016.

SUMMARY OF KEY FINDINGS AND PRELIMINARY RECOMMENDATIONS

Pierce County's construction industry is projected to have an annual supply of 2,502 local candidates between 2018 and 2023. Unemployment insurance claimants compose 96 percent of the supply. Stakeholder interviews indicate that although there may be a surplus of local candidates many of these candidates may not be considered to be qualified by local employers. (**Exhibit 20**)

Exhibit 20. Summary of Annual Pierce County Construction Talent Supply, 2018-2023

Projected Talent Supply (Annual)	
Unemployed	2,394
Newly-Trained Candidates	108

Sources: National Center for Education Statistics' Integrated Postsecondary Education System, 2014; Washington State Employment Security Department, 2014; Community Attributes Inc., 2016.

- *Recommendation* – Develop systems to identify construction industry UI claimants coming from occupations with high numbers, such as HVAC installers and repairers (est. 57 annually), construction laborers (est. 411 annually) and carpenters (est. 404 annually). Develop assessments to determine: if they lack critical soft skills; basic understanding of job requirements; and/or are interested in continuing in their occupation. Design strategies to help them quickly return to work, boost soft skills or switch to an alternative occupation.

Comparing local supply with forecasted annual demand of 1,008 openings, indicates a surplus of 1,493 local workers annually between 2018 and 2023. The surplus represents an estimated 7.3 percent of total core occupational employment in the construction industry. (**Exhibit 21**)

Exhibit 21. Summary of Annual Pierce County Construction Talent Supply and Demand, 2018-2023

Annual Surplus or (Shortage)	
Total Openings (Demand)	1,008
Total Supply	2,502
Surplus or (Shortage)	1,493

Sources: U.S. Bureau of Labor Statistics, 2014; Washington State Employment Security Department, 2014; Community Attributes Inc., 2016.

Although the overall talent pipeline indicates a surplus of qualified workers between 2018 and 2023, it is important to note that the data shows shortages among core construction occupations. Overall, 16

occupations have projected annual shortages. The largest shortages are among security and fire alarm systems installers and electrical power-line installers and repairers. Construction stakeholders shared concerns about the aging nature of their workforce and a lack of future supply pathways.

- *Recommendation* – Consider partnerships to expand programs with significant annual shortages.
- *Recommendation* – Concerns about the aging construction industry workforce were anecdotal, making the scope of the problem difficult to determine. Conduct future research to identify retirement projections for construction occupations.

The construction industry does not have an adequate high school pipeline. Students are not exposed to construction and other skilled trades in high school and this impacts career path choices. Rather, these high school graduates move into service, retail or professional services. Stakeholders indicated that they get a number of candidates who side tracked into these low paying jobs before finding construction. The industry needs help promoting itself as a good option for all types of candidates, focusing on reaching youth more effectively.

Apprenticeship and other on-the-job training programs are an essential part of the construction industry workforce system. Stakeholders representing these programs were experiencing challenges recruiting people into their programs. As the industry faces an increasing aging trend, stakeholders indicated that they have been expanding apprenticeship programs. However, this is a challenge given the low interest in the construction industry.

- *Recommendation* – Develop updated recruiting materials and presentations targeted to high school and college students and share those materials with school guidance and career counselors throughout the county.
- *Recommendation* – Expand partnerships with high schools to seek funding aimed at increasing construction-related career and technical education.
- *Recommendation* – Partner with high school teachers to develop summer continuing education workshops that incorporate skilled trades into traditional high school courses. For example, applied math or physics lessons.
- *Recommendation* – Modeled after successful programs in King County, consider opportunities to use Running Start dollars to help students seek dual enrollment in college workforce education programs.

- *Recommendation* – Ensure adequate marketing of apprenticeship opportunities are occurring in high schools and WorkSource centers. If not, boost marketing and expand training opportunities for high school advisors and WorkSource case managers.

Stakeholders indicated that the workforce system and employers need to communicate better. Employers feel that the process of engaging with workforce development organizations is cumbersome and the organizations do not have a strong understanding of the needs and demand of their occupations.

In the past WorkForce Central held a Construction Career Day, and also provided funding for Commercial Driver License (CDL) training programs. Both of these were positive interactions for industry employers. Stakeholders agreed that programs like this effectively foster relationships that benefit both employers and workers.

Training program stakeholders also indicated that they sometimes see a **lack of interest in investing in training from local employers.** Although many of the skills required in the industry are highly technical, employers often choose not to invest in training.

- *Recommendation* – Increase opportunities to create information sharing systems between employers and the workforce system. This may include re-launching the construction industry advisory panel, holding additional Construction Career Days, and/or assigning business services staff to develop concentrated expertise in the construction industry and then identify venues for them to share this information broadly with the workforce system.
- *Recommendation* – Seek opportunities to leverage public training dollars with private industry resources in partnership with local colleges, JATCs, and Training Funds as a means to create incentives for employers to invest in their employees. Collect and report data about the results of these efforts broadly.

Government construction projects often have hiring requirements to increase the diversity of the workforce funded through public dollars. These diversity requirements can be a challenge for some within the construction industry. Certain components of the industry have difficulty recruiting women and people of color.

- *Recommendation* - Construction industry professionals require help from the workforce system to identify effective programs that increase the diversity of their workforce. Seek opportunities to expand partnerships with organizations such as Apprenticeship and Non-traditional Employment for Women (ANEW) that increase pathways for women and minority Pierce County residents.

Stakeholders indicated that veterans and retiring military are a good option for recruitment. Joint Base Lewis-McChord (JBLM) has job fairs for transitioning military. **Employers in the construction industry have and are interested in continuing to foster relationships with JBLM in order to recruit the skilled people transitioning out of military service.** Additionally, stakeholders indicated that the apprenticeship and training programs are increasingly coordinating with JBLM to provide information about their programs to interested individuals transitioning to the private sector from the military.

- *Recommendation* – Continue supporting existing partnerships with JBLM and seek opportunities to expand the scale and effectiveness of these programs.