



Military & Defense



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, 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 military and defense 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 military and defense employers who provided a range of perspectives on the industry and "on-the-ground" realities.

Key Findings

Pierce County is home to Joint Base Lewis-McChord, which is home to more than 32,840 active duty military, 8,040 reservists and almost 9,200 civilian employees. **Total personnel stationed at JBLM are in excess of 50,000 as of 2015** according to the Department of Defense 2015 Base Structure Report. In addition to the strong contingent of military personnel, Pierce County also has a strong defense industry. In 2015

businesses in Pierce County received more than \$490 million in contracts from the Department of Defense, according to contract data available through the Office of Management and Budget.

The civilian military and defense industry is composed of a strong contingency of federal government employment. Pierce County's government industry is projected to grow 1.1 percent between 2018 and 2023. Additionally, government has a strong concentration within the county with a location quotient of 1.2.

Employment in core military and defense occupations is projected to grow 0.9 percent between 2018 and 2023, growing from more than 12,800 workers in 2018 to more than 13,400 workers in 2023. **This represents net growth of 407 workers annually.** Net growth equals new hires minus exiting workers.

The **Talent Pipeline Dashboard** (*page vii*) shows occupations in the military and defense 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:

- Pierce County's military and defense industry is projected to have an annual supply of 270 local candidates between 2018 and 2023. Comparing local supply with forecasted annual demand of 219 openings leaves a surplus of 51 local workers annually between 2018 and 2023.
- Although the overall talent pipeline indicates a surplus of qualified workers, it is largely driven by a surplus in just one occupation, natural science managers with 53 annual graduates. By and large, the majority of occupations in this industry are in balance with either a slight shortage or surplus. The occupation with the largest shortage of workers is physicians and surgeons.
- One important challenge for defense contractors is finding a supply of workers that both have the skills for an occupation and can pass the stringent criminal and financial background checks required for security clearance.

- Employers are willing to hire recent graduates, but stakeholders noted that some applicants had high expectations for working hours and are lacking in essential soft skills.
- Overall, stakeholders shared that the proximity to Joint Base Lewis McChord provides a strong source of talent supply for defense contractors. Other employers have open positions for which it is challenging to find local talent.
- Although retired military personnel often have the extensive experience within the highly skilled occupations required by defense contractors, they often lack required commercial certifications.

Some initial recommendations include the following:

- Develop a background check preparation tool for people interested in occupations for the military and defense field that guides people through the extensive detail and thoroughness common on military background checks.
- Develop a tool to help transitioning service members identify the certifications required for civilian employment. Provide information about how to acquire these certifications including required education, testing bodies and costs.
- Increase opportunities for transitioning service members to gain needed commercial certifications.

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Pierce County Military & Defense 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		Demand	Supply	Gap
	1 Business Operations Specialists, All Other	2,335	2,567	1.0%	Demand 26	Supply 5	(22)
	2 Information and Record Clerks, All Other	791	816	0.3%	Demand 17	Supply 0	(17)
	3 Mobile Heavy Equipment Mechanics, Except Engines	548	618	1.2%	Demand 16	Supply 31	15
	4 Healthcare Support Workers, All Other	678	750	1.0%	Demand 9	Supply 5	(5)
	5 Procurement Clerks	191	192	0.1%	Demand 9	Supply 4	(4)
	6 Purchasing Agents, Except Wholesale, Retail, and Farm Products	485	544	1.2%	Demand 7	Supply 4	(2)
	7 Human Resources Assistants, Except Payroll and Timekeeping	350	370	0.6%	Demand 5	Supply 0	(5)
	8 Motor Vehicle Operators, All Other	160	184	1.4%	Demand 2	Supply 2	0
	9 Plant and System Operators, All Other	58	59	0.2%	Demand 1	Supply 5	4

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		Demand	Supply	Gap
	1 Aircraft Mechanics and Service Technicians	303	307	0.1%	Demand 9	Supply 16	7
	2 Electrical and Electronics Repairers, Commercial and Industrial Equipment	171	194	1.3%	Demand 4	Supply 3	(1)
	3 Life, Physical, and Social Science Technicians, All Other	76	82	0.8%	Demand 3	Supply 0	(3)
	4 Air Traffic Controllers	45	44	-0.2%	Demand 2	Supply 0	(2)

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		Demand	Supply	Gap
	1 Management Analysts	1,180	1,507	2.5%	Demand 22	Supply 17	(5)
	2 Computer Occupations, All Other	414	406	-0.2%	Demand 7	Supply 14	7
	3 Tax Examiners and Collectors, and Revenue Agents	297	324	0.9%	Demand 7	Supply 3	(4)
	4 Logisticians	476	476	0.0%	Demand 6	Supply 12	5
	5 Social Workers, All Other	291	319	0.9%	Demand 5	Supply 9	3
	6 Budget Analysts	147	144	-0.2%	Demand 5	Supply 7	2
	7 Teachers and Instructors, All Other	349	380	0.9%	Demand 4	Supply 6	2
	8 Occupational Health and Safety Specialists	240	263	0.9%	Demand 3	Supply 3	(0)
	9 Engineers, All Other	164	172	0.5%	Demand 3	Supply 6	3
	10 Social Scientists and Related Workers, All Other	130	125	-0.4%	Demand 3	Supply 5	2

Master's Degree or Higher

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		Demand	Supply	Gap
	1 Physicians and Surgeons, All Other	751	842	1.2%	Demand 13	Supply 0	(13)
	2 Psychologists, All Other	226	220	-0.3%	Demand 6	Supply 22	16
	3 Dentists, All Other Specialists	84	90	0.7%	Demand 3	Supply 0	(3)
	4 Health Diagnosing and Treating Practitioners, All Other	205	223	0.8%	Demand 3	Supply 0	(3)

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

As home to Joint Base Lewis-McChord Pierce County has a strong military and defense industry, especially among federal government employment. The county also has a strong network of defense contractors, according to the Office of Management and Budget the Department of Defense issued more than \$490 million in contracts to Pierce County businesses in 2015. Finally, the county also acts as a pipeline for transitioning military into the civilian workforce. Many defense contractors in Pierce County hire former military workers. Through the skills gap analysis and strategies, WorkForce Central (WFC) can plan for the changing workforce needs of the military and defense industry in Pierce County.

Almost 33,000 active duty military personnel are stationed at JBLM as of 2015. This military employment is supported by a strong regional civilian government and defense industry. Overall more than 9,000 civilians are employed at JBLM. The military and defense industry is an important piece of the overall economy in Pierce County. A total of 12,814 workers are employed in core military and defense occupations. These occupations are projected to grow 0.9 percent annually between 2018 and 2023. Core military and defense occupations pay relatively high average wages throughout the region, with an average wage of \$70,252 annually. Occupations within the military and defense industry are highly diverse, as is the industry as a whole.

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 military and defense industry.

Methods

WorkForce Central serves employers and workers within Pierce County, representing 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 generated 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 by occupation across industries 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 military and defense talent pipeline analysis. Interviews were conducted with key stakeholders within the military and defense industry, ranging from federal government employment, to aerospace manufacturing, highway, street and bridge construction among many other defense related and support occupations.

Organization of Report

- **Military and Defense Industry Overview.** Provides an overview of the military and defense industry and the occupations that define the industry.
- **Demand Analysis.** Describes the composition of military and 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.

MILITARY & DEFENSE 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 and occupations that define the industry specifically. Many administrative roles, for example, fit into this category. The first step in determining the industry's core occupations 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. Military and defense in Pierce County is defined by a variety of industries.

Exhibit 1. Pierce County Military & Defense NAICS by Employment, 2013¹

Four Digit NAICS	Description	Employment, 2013
9991	Federal Government	12,460
Defense-Related Industries		
2382	Building equipment contractors	5,340
5617	Services to buildings and dwellings	4,220
3364	Aerospace	2,910
4244	Grocery and Related Product Wholesalers	2,560
2362	Nonresidential building construction	2,510
2371	Utility system construction	2,470
5413	Architectural and engineering services	1,790
5616	Investigation and security services	1,420
5419	Other professional and technical services	1,420
5415	Computer systems design and related services	1,390
3261	Plastics product manufacturing	1,380
2373	Highway, street, and bridge construction	1,270
3241	Petroleum & Coal Prod.	570
8113	Commercial machinery repair and maintenance	490
3399	Other miscellaneous manufacturing	420
3327	Machine shops and threaded product mfg.	380
3366	Ship and boat building	370
5621	Waste collection	350
2211	Power generation and supply	240
3149	Other textile product mills	200
4881	Support activities for air transportation	180
5324	Machinery and equipment rental and leasing	160
5417	Scientific research and development services	140
3329	Other fabricated metal product manufacturing	110
3345	Electronic instrument manufacturing	80
Military & Defense Industry Total		44,830

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

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

Firstly, the military and defense industry is composed of employment by the federal government of more than 12,460 in Pierce County. The military in Pierce County is supported by a strong network of defense-related industries. These industries include construction, building services, aerospace, grocery and related product wholesalers, utility system construction, architectural and engineering services and much more. More than 32,000 people in Pierce County are employed in industries related to defense. (**Exhibit 1**)

Defense-related industries were determined based on an analysis of Department of Defense (DOD) contracts issued to Pierce County businesses, obtained through the Office of Management and Budget. Industries that are considered to be defense-related are industries that received more than one percent of total DOD contract value in Pierce County or received more than 50 contracts in 2015.

Another method for defining the military and defense 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 military and defense industry. The process of assembling this list began with examining the structure of the occupation codes with employment within the military and defense 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 military and defense are first grouped by their concentration within the military and defense industry.

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

occupational employment and 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.

Exhibit 2. Business and Financial Operations Occupations, Office and Administrative Support Occupations, Installation, Maintenance and Repair Occupations and Healthcare Practitioners and Technical Occupations, Employment in Industry and Total Employment, Pierce County, 2013

SOC	Occupation	Employment in Industry	Employment in Other Industries	Total Employment	Share in Industry
13-1199	Business Operations Specialists, All Other	985	1,350	2,335	42%
13-1111	Management Analysts	575	605	1,180	49%
13-1081	Logisticians	371	105	476	78%
13-1023	Purchasing Agents, Except Wholesale, Retail, and Farm Products	218	267	485	45%
13-2081	Tax Examiners and Collectors, and Revenue Agents	139	158	297	47%
13-2031	Budget Analysts	112	35	147	76%
	Business and Financial Operations Occupations Subtotal	2,400	2,520	4,920	49%
43-4199	Information and Record Clerks, All Other	543	248	791	69%
43-3061	Procurement Clerks	153	38	191	80%
43-4161	Human Resources Assistants, Except Payroll and Timekeeping	151	199	350	43%
43-4061	Eligibility Interviewers, Government Programs	37	112	149	25%
43-9022	Word Processors and Typists	18	36	54	34%
	Office and Administrative Support Occupations Subtotal	902	633	1,535	59%
49-3042	Mobile Heavy Equipment Mechanics, Except Engines	369	179	548	67%
49-3011	Aircraft Mechanics and Service Technicians	303	0	303	100%
49-2094	Electrical and Electronics Repairers, Commercial and Industrial Equipment	100	71	171	59%
49-9069	Precision Instrument and Equipment Repairers, All Other	23	0	23	100%
49-2091	Avionics Technicians	22	0	22	100%
	Installation, Maintenance, and Repair Occupations Subtotal	817	250	1,067	77%
29-1069	Physicians and Surgeons, All Other	303	448	751	40%
29-1199	Health Diagnosing and Treating Practitioners, All Other	85	120	205	41%
29-1029	Dentists, All Other Specialists	84	0	84	100%
29-9011	Occupational Health and Safety Specialists	76	164	240	31%
29-2091	Orthotists and Prosthetists	26	22	48	55%
	Healthcare Practitioners and Technical Occupations Subtotal	573	755	1,328	43%

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

The military and defense industry is a highly diverse industry and the occupations that represent the core skills of the industry are equally diverse. Business and financial operations occupations represent 40 percent of core military and defense occupation employment. Among all occupations business operations specialists, all other represent 19 percent of total military and defense occupation employment. Management analysts also have high total employment among all military and defense occupations. (Exhibit 2)

Exhibit 3. All Other Military & Defense Occupations, Employment in Industry and Total Employment, Pierce County, 2013

Occupation	Employment in Industry ↓	Employment in Other Industries	Total Employment	Share in Industry
19-3039 Psychologists, All Other	210	16	226	93%
19-3099 Social Scientists and Related Workers, All Other	124	6	130	96%
19-4099 Life, Physical, and Social Science Technicians, All Other	65	11	76	85%
19-1022 Microbiologists	28	0	28	100%
19-4021 Biological Technicians	28	33	60	46%
19-2043 Hydrologists	25	21	46	55%
19-2099 Physical Scientists, All Other	15	1	16	91%
Life, Physical, and Social Science Occupations Subtotal	495	87	582	85%
25-3099 Teachers and Instructors, All Other	137	212	349	39%
25-9099 Education, Training, and Library Workers, All Other	68	188	256	27%
Education, Training, and Library Occupations Subtotal	206	399	605	34%
53-2011 Airline Pilots, Copilots, and Flight Engineers	56	0	56	100%
53-3099 Motor Vehicle Operators, All Other	46	114	160	29%
53-2021 Air Traffic Controllers	45	0	45	100%
53-2022 Airfield Operations Specialists	15	0	15	100%
Transportation and Material Moving Occupations Subtotal	162	114	276	59%
17-2199 Engineers, All Other	103	62	164	63%
17-3029 Engineering Technicians, Except Drafters, All Other	50	8	58	86%
Architecture and Engineering Occupations Subtotal	153	70	222	69%
23-2099 Legal Support Workers, All Other	46	64	110	42%
23-1021 Administrative Law Judges, Adjudicators, and Hearing Officers	12	28	40	29%
Legal Occupations Subtotal	58	92	150	39%
27-1019 Artists and Related Workers, All Other	30	4	34	89%
27-4099 Media and Communication Equipment Workers, All Other	24	1	25	96%
Arts, Design, Entertainment, Sports and Media Occupations Subtotal	54	5	59	92%
11-9121 Natural Sciences Managers	17	14	31	54%
11-9039 Education Administrators, All Other	16	15	31	52%
Management Occupations Subtotal	33	29	62	53%
15-1199 Computer Occupations, All Other	368	46	414	89%
31-9099 Healthcare Support Workers, All Other	255	423	678	38%
21-1029 Social Workers, All Other	159	132	291	55%
51-8099 Plant and System Operators, All Other	26	32	58	44%
All Occupations	6,661	5,586	12,247	54%

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

Other occupations represented within the military and defense industry include life, physical and social science occupations; education, training and library occupations; transportation and material moving occupations; architecture and engineering occupations; legal occupations; arts, design, entertainment, sports and media occupations and management occupations. Overall 54 percent of military and defense occupation employment is concentrated within the industry. This indicates a high degree of cross-over between the military and defense industry and other Pierce County industries. **(Exhibit 3)**

A variety of occupations are fully concentrated within the military and defense industry. These occupations include aircraft mechanics and service technicians; precision instrument and equipment repairers; avionics technicians; dentists; microbiologists; airline pilots, copilots, and

flight engineers; air traffic controllers; and airfield operations specialists. (Exhibits 2 and 3)

Although active duty military personnel are an important part of the military and defense industry in Pierce County there is no data available on the occupational breakouts of active duty personnel. Thus all analysis throughout the talent pipeline is focused on civilian occupations that represent the core to the military and defense industry.

Exhibit 4. Military & Defense Occupations Median Wage and 90th Percentile Wage, On-the-Job Training and Associate Degree or Postsecondary Award, Seattle-Tacoma-Bellevue MSA, 2014

SOC	Occupation	Employment in Industry	Median Wage ↓	90th Percentile Wage
On-the-Job Training				
13-1199	Business Operations Specialists, All Other	985	\$70,590	\$119,830
13-1023	Purchasing Agents, Except Wholesale, Retail, and Farm Products	218	\$70,570	\$107,850
27-4099	Media and Communication Equipment Workers, All Other	24	\$61,860	\$96,970
27-1019	Artists and Related Workers, All Other	30	\$61,340	\$87,880
51-8099	Plant and System Operators, All Other	26	\$60,500	\$71,400
23-2099	Legal Support Workers, All Other	46	\$57,410	\$91,860
49-3042	Mobile Heavy Equipment Mechanics, Except Engines	369	\$51,030	\$76,010
43-4061	Eligibility Interviewers, Government Programs	37	\$49,390	\$58,970
43-9022	Word Processors and Typists	18	\$48,560	\$73,530
43-3061	Procurement Clerks	153	\$43,880	\$56,150
43-4161	Human Resources Assistants, Except Payroll and Timekeeping	151	\$42,060	\$56,310
53-2022	Airfield Operations Specialists	15	\$41,730	\$109,820
43-4199	Information and Record Clerks, All Other	543	\$39,790	\$53,640
31-9099	Healthcare Support Workers, All Other	255	\$37,330	\$50,170
53-3099	Motor Vehicle Operators, All Other	46 *	*	*
49-9069	Precision Instrument and Equipment Repairers, All Other	23 *	*	*
Associate degree or Postsecondary Award				
53-2021	Air Traffic Controllers	45	\$119,130	\$162,220
17-3029	Engineering Technicians, Except Drafters, All Other	50	\$70,640	\$97,140
49-2094	Electrical and Electronics Repairers, Commercial and Industrial Equipment	100	\$69,570	\$96,230
19-4099	Life, Physical, and Social Science Technicians, All Other	65	\$50,510	\$73,160
49-3011	Aircraft Mechanics and Service Technicians	303 *	*	*
49-2091	Avionics Technicians	22 *	*	*

* 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, bachelor’s degree and master’s degree or higher 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.

Among the 46 core military and defense occupations 22 fall within the on-the-job training and associate degree or postsecondary award categories. Of these 22 occupations 11 pay median wages of more than \$50,000 annually. Air traffic controllers earn more than \$119,100 annually, and the top ten percent of earners within the occupation earn \$162,200 annually. (Exhibit 4)

Exhibit 5. Military & Defense Occupations Median Wage and 90th Percentile Wage, Bachelor’s Degree or Higher, Seattle-Tacoma-Bellevue MSA, 2014

SOC	Occupation	Employment in Industry	Median Wage ↓	90th Percentile Wage
Bachelor's degree				
11-9121	Natural Sciences Managers	17	\$148,530 *	
19-2099	Physical Scientists, All Other	15	\$102,870	\$135,460
13-1111	Management Analysts	575	\$97,060	\$156,550
17-2199	Engineers, All Other	103	\$83,540	\$140,380
29-9011	Occupational Health and Safety Specialists	76	\$80,770	\$109,590
13-2031	Budget Analysts	112	\$75,900	\$114,030
11-9039	Education Administrators, All Other	16	\$72,390	\$108,050
15-1199	Computer Occupations, All Other	368	\$68,040	\$114,630
19-3099	Social Scientists and Related Workers, All Other	124	\$67,610	\$96,400
19-1022	Microbiologists	28	\$66,000	\$108,220
21-1029	Social Workers, All Other	159	\$63,820	\$81,570
13-2081	Tax Examiners and Collectors, and Revenue Agents	139	\$48,940	\$81,570
25-9099	Education, Training, and Library Workers, All Other	68	\$48,840	\$75,310
19-4021	Biological Technicians	28	\$44,210	\$65,270
13-1081	Logisticians	371 *		*
25-3099	Teachers and Instructors, All Other	137 *		*
53-2011	Airline Pilots, Copilots, and Flight Engineers	56 *		*
Master's degree or higher				
29-1029	Dentists, All Other Specialists	84	\$176,130 *	
19-2043	Hydrologists	25	\$97,820	\$135,490
19-3039	Psychologists, All Other	210	\$95,430	\$118,730
23-1021	Administrative Law Judges, Adjudicators, and Hearing Officers	12	\$94,060	\$166,980
29-1199	Health Diagnosing and Treating Practitioners, All Other	85	\$77,850	\$110,240
29-2091	Orthotists and Prosthetists	26	\$59,800	\$97,860
29-1069	Physicians and Surgeons, All Other	303 *		*

* 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.

Occupations requiring a bachelor’s degree and master’s degree or higher have even higher median wages. The highest paying occupation is dentists, all other specialties, which have median wages greater than \$176,000 annually. Among these occupations 17 pay median wages higher than \$50,000 annually. (**Exhibit 5**)

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

	Employment	Average Wage
Pierce County Military & Defense Industry		
On-the-Job Training Occupations	2,940	\$57,997
Associate Degree or Postsecondary Award Occupations	585	\$73,620
Bachelor's Degree Occupations	2,391	\$80,266
Master's Degree or Higher Occupations	745	\$106,461
Military & Defense Industry Total	6,661	\$70,252
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 across Pierce County’s military and defense industries are more than \$70,250 annually. The average wages based on education level groupings range between \$57,997 annually to \$106,461 annually at the master’s degree or higher grouping. These occupations have high average wages across the industry compared to the regional average wage across the Seattle-Tacoma-Bellevue MSA of \$57,370 annually. (**Exhibit 6**)

Exhibit 7. Military & Defense Occupational Employment in Other Industries by Occupation, 2013

Industry	Military & Defense Occupation Employment in Industry
Education	881
Local government other	590
General medical and surgical hospitals	530
State government other	520
Offices of physicians	428
Insurance carriers	214
Outpatient care centers services	213
Religious organizations	180
Individual and family services	171
Other support services	128
Professional and similar organizations	104
Office administrative services	101
Support activities for water transportation	98
Facilities support services	96
Computer and peripheral equipment mfg	90
Legal services	71
Employment Services	63
All Other Industries	53
Total	1,067
	5,598

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

Almost 5,600 workers employed in military and defense occupations are employed in industries other than the military and defense industry. This employment is spread across a variety of industries. The most common industry in which military and defense occupations are employed other than military and defense is education. This is followed by local government and general medical and surgical hospitals. (**Exhibit 7**)

Exhibit 8. Military & Defense Occupation Employment in Other Industries by Industry, 2013

Occupation	Employment in Other Industries	Top Other Industry
Business Operations Specialists, All Other	1,350	Education
Management Analysts	605	Local Government Other
Physicians and Surgeons, All Other	448	Offices of physicians
Healthcare Support Workers, All Other	423	General medical and surgical hospitals
Purchasing Agents, Except Wholesale, Retail, and Farm Products	267	Local Government Other
Information and Record Clerks, All Other	248	Other support services
Teachers and Instructors, All Other	212	Education
Human Resources Assistants, Except Payroll and Timekeeping	199	Offices of physicians
Education, Training, and Library Workers, All Other	188	Education
Mobile Heavy Equipment Mechanics, Except Engines	179	Local Government Other
Occupational Health and Safety Specialists	164	General medical and surgical hospitals
Tax Examiners and Collectors, and Revenue Agents	158	State Government Other
Social Workers, All Other	132	Individual and family services
Health Diagnosing and Treating Practitioners, All Other	120	General medical and surgical hospitals
Motor Vehicle Operators, All Other	114	Support activities for water transportation
Eligibility Interviewers, Government Programs	112	State Government Other
Logisticians	105	Facilities support services
All Other Occupations	562	
Total	5,586	

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

Business operations specialists, all other represent the single largest share of military and defense occupation employment in other industries. Management analysts also have a large portion of employment in other industries. Together these two occupations employ more than 1,950 people in other industries, which is 35 percent of total employment in other industries. **(Exhibit 8)**

DEMAND ANALYSIS: PIERCE COUNTY MILITARY & DEFENSE OCCUPATIONAL FORECASTS

Between 2018 and 2023 there will be an average of 407 openings annually for military and defense² occupations in Pierce County. Among the 46 core military and defense occupations, business operations specialists, all other is projected to see the greatest number of annual openings, at 62 across the county and 26 openings in the military and defense industry. Many core military and defense occupations are projected to see growth between 2018 and 2023. Dentists, all other specialists are projected to see the strongest growth among core occupations, at 2.2 percent annually. Natural science managers are also projected to see strong growth at 1.7 percent annually. Other occupations with the highest projected annual openings (more than 20 each across Pierce County and more than 15 in industry) include: management analysts; physicians and surgeons, all other; information and record clerks, all other; healthcare support workers, all other; and mobile heavy equipment mechanics, except engines. **(Exhibit 9)**

Overall, annual average openings within core military and defense occupations in the military and defense industry is projected to be 219 annually. Total employment within core military and defense industry is expected to grow 0.9 percent annually. **(Exhibit 9)**

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.

²Total demand, or annual openings, for occupations covers demand across all industries in Pierce County and includes but is not limited to the military and defense industry. 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.

Exhibit 9. Pierce County Military & Defense 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)
13-1199	Business Operations Specialists, All Other	2,444	2,567	62	26	1.0%
13-1111	Management Analysts	1,412	1,507	45	22	1.3%
29-1069	Physicians and Surgeons, All Other	787	842	32	13	1.4%
43-4199	Information and Record Clerks, All Other	789	816	25	17	0.7%
31-9099	Healthcare Support Workers, All Other	707	750	24	9	1.2%
49-3042	Mobile Heavy Equipment Mechanics, Except Engines	587	618	24	16	1.0%
13-1023	Purchasing Agents, Except Wholesale, Retail, and Farm Products	517	544	15	7	1.0%
13-2081	Tax Examiners and Collectors, and Revenue Agents	309	324	14	7	1.0%
43-4161	Human Resources Assistants, Except Payroll and Timekeeping	357	370	12	5	0.7%
29-9011	Occupational Health and Safety Specialists	251	263	11	3	0.9%
43-3061	Procurement Clerks	188	192	11	9	0.4%
25-3099	Teachers and Instructors, All Other	361	380	10	4	1.0%
21-1029	Social Workers, All Other	303	319	10	5	1.0%
49-3011	Aircraft Mechanics and Service Technicians	307	307	9	9	0.0%
13-1081	Logisticians	471	476	8	6	0.2%
15-1199	Computer Occupations, All Other	400	406	8	7	0.3%
29-1199	Health Diagnosing and Treating Practitioners, All Other	211	223	7	3	1.1%
53-3099	Motor Vehicle Operators, All Other	175	184	7	2	1.0%
13-2031	Budget Analysts	142	144	7	5	0.3%
25-9099	Education, Training, and Library Workers, All Other	263	277	6	2	1.0%
49-2094	Electrical and Electronics Repairers, Commercial and Industrial Equipment	183	194	6	4	1.2%
19-3039	Psychologists, All Other	218	220	6	6	0.2%
43-4061	Eligibility Interviewers, Government Programs	152	158	5	1	0.8%
17-2199	Engineers, All Other	165	172	5	3	0.8%
	All Other Occupations (22)	1,115	1,155	38	28	0.7%
	Total	12,814	13,408	407	219	0.9%

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 may 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 agricultural mechanics and equipment/machine technology programs may be qualified to work as mobile heavy equipment mechanics, except engines as well as aircraft mechanics and service technicians (dependent on licensure requirements) (Exhibit 10).

Exhibit 10. Other Occupational Matches for Graduates Qualified to Work as Mobile Heavy Equipment Mechanics, Except Engines

CIP	Description	SOC	Description
1.0205	Agricultural Mechanics and Equipment/Machine Technology.	49-3042	Mobile Heavy Equipment Mechanics, Except Engines
47.0302	Heavy Equipment Maintenance Technology/Technician.	49-3011	Aircraft Mechanics and Service Technicians
		49-3041	Farm Equipment Mechanics and Service Technicians
		49-3043	Rail Car Repairers

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

Accredited programs matching to one or more military and defense 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 military and defense 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.

A total of 32 programs supply graduates qualified for core military and defense occupations. Among these programs seven supply more than 100 completions qualified for military and defense occupations annually. The three largest programs in the county are business administration and management, psychology and business/commerce, each with more than 225 local completions. (**Exhibit 11**)

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

CIP	Description	Graduates
52.0201	Business Administration and Management, General	285
42.0101	Psychology, General	283
52.0101	Business/Commerce, General	225
11.0101	Computer and Information Sciences, General	187
26.0101	Biology/Biological Sciences, General	132
52.0301	Accounting	110
45.9999	Social Sciences, Other	103
44.0701	Social Work	91
52.0801	Finance, General	41
27.0101	Mathematics, General	41
52.0408	General Office Occupations and Clerical Services	40
40.0101	Physical Sciences	34
40.0801	Physics, General	29
40.0501	Chemistry, General	28
22.0302	Legal Assistant/Paralegal	26
15.0401	Biomedical Technology/Technician	22
30.0101	Biological and Physical Sciences	22
11.0701	Computer Science	21
50.0702	Fine/Studio Arts, General	21
15.0101	Architectural Engineering Technology/Technician	20
40.0601	Geology/Earth Science, General	16
52.0213	Organizational Leadership	15
47.0105	Industrial Electronics Technology/Technician	12
26.0202	Biochemistry	12
30.1501	Science, Technology and Society	11
15.0701	Occupational Safety and Health Technology/Technician	7
13.0401	Educational Leadership and Administration, General	7
11.0301	Data Processing and Data Processing Technology/Technician	6
49.0102	Airline/Commercial/Professional Pilot and Flight Crew	6
41.0101	Biology Technician/Biotechnology Laboratory Technician	4
52.0304	Accounting and Finance	2
51.2706	Medical Informatics	1
	Total	1,860

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 military and defense

occupation candidates, and the institutions from which Pierce County residents graduate and move on to fill military and defense occupation openings. In total ten local institutions have completions that match to one or more military and defense occupation(s). Among these institutions the University of Washington-Tacoma Campus produces 37 percent (or 692) of all matching completions. Pacific Lutheran University is the next largest source of local graduates at 21 percent (or 396) of total qualified graduates. **(Exhibit 12)**

Exhibit 12. Pierce County’s Educational Institutions by Graduates Qualified for Military & Defense Occupations, 2014

Institution	Graduates Qualified for Military & Defense Occupations
University of Washington-Tacoma Campus	692
Pacific Lutheran University	396
University of Puget Sound	269
Tacoma Community College	212
Pierce College-Fort Steilacoom	150
Pierce College-Puyallup	60
Bates Technical College	38
Clover Park Technical College	26
Faith Evangelical College & Seminary	15
Everest College-Tacoma	2
Total	1,860

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 military and defense 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 military and defense industry.

This approach yields a total of 359 graduates in 2014 who are qualified for the needs of the military and defense industry. **(Exhibit 13)**

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.

Not surprisingly, stakeholders indicated that overall the military is a strong source of talent supply for the military and defense industry. They found that applicants for their jobs were well matched to the job description, indicating that a high quality labor match system occurred within the military (although they were unaware of how this occurs). Additionally, employers in the defense industry have found that individuals from the military often have experience and skills within the specialized occupations for which they hire.

IPEDS data in addition to not capturing high school students also does not capture transitioning military personnel. As there is no data source that indicates how active duty military transition into the civilian workforce annually, or how to match their military occupations to the standardized SOC codes. Stakeholders indicate that these personnel are an important source of talent supply. For this reason, supply stated here may be undercounted.

In 2014, educational institutions in Pierce County conferred degrees to 359 graduates in military and defense occupations, 251 of which are projected to stay in Pierce County. Of these 251 graduates who stay in the county, 161 graduates are expected to seek employment within the military and defense industry. Among the 46 core military and defense occupations 19 have local graduates qualified to work within the occupation and 18 have graduates expected to work within the industry. Natural science managers are projected to have the largest supply of local graduates, followed by psychologists and engineering technicians.
(Exhibit 13)

Exhibit 13. Military & Defense Occupations by Total Graduates, Pierce County, 2014

SOC	Description	All Graduates	Graduates After 70% Retention	Graduates in Industry ↓
43-3061	Procurement Clerks	8	6	4
23-2099	Legal Support Workers, All Other	9	6	3
43-9022	Word Processors and Typists	8	6	2
27-1019	Artists and Related Workers, All Other	3	2	2
	On-the-Job Training Subtotal	28	20	11
17-3029	Engineering Technicians, Except Drafters, All Other	34	24	21
49-2094	Electrical and Electronics Repairers, Commercial and Industrial Equipment	7	5	3
	Associate degree or Postsecondary Award Subtotal	41	29	23
11-9121	Natural Sciences Managers	141	99	53
15-1199	Computer Occupations, All Other	23	16	14
13-1111	Management Analysts	39	27	13
13-2031	Budget Analysts	14	10	7
19-3099	Social Scientists and Related Workers, All Other	8	6	5
53-2011	Airline Pilots, Copilots, and Flight Engineers	4	3	3
13-2081	Tax Examiners and Collectors, and Revenue Agents	8	6	3
21-1029	Social Workers, All Other	6	4	2
29-9011	Occupational Health and Safety Specialists	7	5	2
19-4021	Biological Technicians	4	3	1
11-9039	Education Administrators, All Other	2	1	1
	Bachelor's degree Subtotal	256	179	105
19-3039	Psychologists, All Other	33	23	22
19-2043	Hydrologists	1	1	0
	Master's degree of higher Subtotal	34	24	22
	Grand Total	359	251	161

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 military and defense industry. Due to nondisclosure rules, not all UI data is available for every SOC.

Overall, there are a total of 189 UI claimants whose previous occupation was a core military and defense occupation. Of these UI claimants, 109 are projected to seek work within the Pierce County military and defense industry. (**Exhibit 14**)

UI claimants are qualified to fill a total of 15 out of 46 core military and defense occupations. Among core military and defense industry occupations mobile heavy equipment mechanics, except engines have the highest supply of unemployment insurance claimants. Logisticians and aircraft mechanics and service technicians also have UI claimant supply within the industry of more than ten. (**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 ↓
49-3042	Mobile Heavy Equipment Mechanics, Except Engines	46	31
51-8099	Plant and System Operators, All Other	12	5
13-1199	Business Operations Specialists, All Other	11	5
31-9099	Healthcare Support Workers, All Other	12	5
13-1023	Purchasing Agents, Except Wholesale, Retail, and Farm Products	10	4
53-3099	Motor Vehicle Operators, All Other	8	2
43-4061	Eligibility Interviewers, Government Programs	5	1
	On-the-Job Training Subtotal	104	53
49-3011	Aircraft Mechanics and Service Technicians	16	16
49-2091	Avionics Technicians	4	4
	Associate degree or Postsecondary Award Subtotal	20	20
13-1081	Logisticians	15	12
21-1029	Social Workers, All Other	12	7
25-3099	Teachers and Instructors, All Other	15	6
17-2199	Engineers, All Other	9	6
13-1111	Management Analysts	8	4
29-9011	Occupational Health and Safety Specialists	6	2
	Bachelor's degree Subtotal	65	36
	Grand Total	189	109

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

Total supply is defined as the sum of local qualified graduates and qualified UI claimants. Pierce County has a projected supply of 161 local graduates and 109 unemployment insurance claimants who can reasonably be expected to fill the needs of the military and defense industry within Pierce County. The sum of the two sources of supply leads to a total projected supply of 270 candidates. **(Exhibit 15)**

Employers in the military and defense industry are seeing a trend of decreasing supply among candidates with technical training, such as associate degrees. Students have been pushed away from the technical degree path. Compounding this is a national trend in retirements among the experienced individuals working in the occupations that require these types of degrees. One example of this is Air Traffic Controllers, an occupation that provides excellent wages and benefits, but is seeing an increase in retirements and a decrease in qualified applicants.

Exhibit 15. Total Talent Supply, Pierce County, 2014

Source of Supply	Qualified Workers
On-the-Job Training	11
Associate Degree or Postsecondary Award	23
Bachelor's Degree	105
Master's Degree or Higher	22
Graduate Subtotal	161
Unemployment Insurance Claimants	109
Grand Total	270

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 military and defense industry. **Exhibits 16** and **17** summarize graduate supply, total demand, UI claimant supply and the expected gaps for each military and defense occupation.

A total of 16 out of 46 occupations require a minimum of on-the-job training for entry. Within these occupations there is an expected supply of 64 local workers, including 53 UI claimants and 11 local graduates. Demand among these occupations is projected to be 98 workers annually. The combination of supply and demand leads to an expected shortage of 34 qualified workers. Occupations with the largest gaps include business operations specialists, all other (with a shortage of 22 annually) and information and record clerks, all other (17 annually). These shortages are offset by a relatively high number of UI claimants for mobile heavy equipment mechanics, except engines (31 annual claimants).

In contrast, associate degree or postsecondary award positions are expected to see a surplus of 24 local workers. The data indicates an oversupply of graduates qualified to work as engineering technicians, except drafters, all other (21 graduates annually, but only two positions open annually). Among these two groupings of occupations, two have expected significant shortages (more than five annual openings) of local workers annually. Of the rest, 17 have either a shortage or oversupply of five positions or less. (**Exhibit 16**)

Exhibit 16. Annual Supply and Demand, On-the-Job Training and Associate Degree or Postsecondary Award, Pierce County, 2018-2023

Occupation	Total Graduate Supply	Total Demand	Interim Gap	Total UI Claims Supply	Final Gap ↓
Business Operations Specialists, All Other	0	26	(26)	5	(22)
Information and Record Clerks, All Other	0	17	(17)	0	(17)
Human Resources Assistants, Except Payroll and Timekeeping	0	5	(5)	0	(5)
Healthcare Support Workers, All Other	0	9	(9)	5	(5)
Procurement Clerks	4	9	(4)	0	(4)
Purchasing Agents, Except Wholesale, Retail, and Farm Products	0	7	(7)	4	(2)
Precision Instrument and Equipment Repairers, All Other	0	1	(1)	0	(1)
Airfield Operations Specialists	0	1	(1)	0	(1)
Media and Communication Equipment Workers, All Other	0	0	0	0	0
Eligibility Interviewers, Government Programs	0	1	(1)	1	0
Motor Vehicle Operators, All Other	0	2	(2)	2	0
Artists and Related Workers, All Other	2	1	1	0	1
Legal Support Workers, All Other	3	1	1	0	1
Word Processors and Typists	2	0	2	0	2
Plant and System Operators, All Other	0	1	(1)	5	4
Mobile Heavy Equipment Mechanics, Except Engines	0	16	(16)	31	15
On-the-Job Training Subtotal	11	98	(87)	53	(34)
Life, Physical, and Social Science Technicians, All Other	0	3	(3)	0	(3)
Air Traffic Controllers	0	2	(2)	0	(2)
Electrical and Electronics Repairers, Commercial and Industrial Equipment	3	4	(1)	0	(1)
Avionics Technicians	0	0	0	4	4
Aircraft Mechanics and Service Technicians	0	9	(9)	16	7
Engineering Technicians, Except Drafters, All Other	21	2	19	0	19
Associate degree or Postsecondary Award Subtotal	23	20	4	20	24

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.

There are 17 occupations that require a bachelor's degree for entry have a projected supply of 105 local graduates and 36 UI claimants. Demand among these occupations is projected to be 74 openings annually. Overall, this leads to a projected surplus of 66 workers annually. However, the majority of this surplus is concentrated in natural science managers with an annual graduate supply of 53 and a total demand of only one position. computer occupations, all other also appears to have a slight oversupply of seven positions annually. The balance of 15 occupations range between a slight shortage to a slight oversupply (of five positions either way). Among the seven occupations requiring a master's degree or higher for entry, five are healthcare occupations and five are projected to have minor shortages in supply. There are significant shortages for physicians and surgeons, all other (16 per year). Local universities are producing 22 graduates qualified for psychologists, all other jobs, with only six annual openings. (**Exhibit 17**)

One major challenge for defense contractors is finding a supply of workers that both have the skills for an occupation and can pass the stringent background checks required for security clearance. These

background checks cover criminal and financial history and have extremely strict requirements. One stakeholder noted that they lose about 50 percent of applicants for openings based on failure to pass the background check. Due to the sensitive work being done by some defense contractors, employees must have security clearance to work on defense projects.

Additionally, although retired military personnel often have the extensive experience within the highly skilled occupations required by defense contractors, they often lack the required commercial certifications. For example, the military trains personnel to work in aircraft and powerplant maintenance; however, they do not require or provide Aircraft and Powerplant licensure for their personnel. Private sector employers will sometimes provide reimbursement to their employees who simply need to pass a test to receive certification. Stakeholders mentioned that it would be of benefit for employees, especially transitioning military, if there were readily available resources identifying the professional certifications required for occupations in the commercial sector and how to get these certifications.

Exhibit 17. Annual Supply and Demand, Bachelor's Degree and Higher, Pierce County, 2018-2023

Occupation	Total Graduate Supply	Total Demand	Interim Gap	Total UI Claims Supply	Final Gap ↓
Management Analysts	13	22	(9)	4	(5)
Tax Examiners and Collectors, and Revenue Agents	3	7	(4)	0	(4)
Education, Training, and Library Workers, All Other	0	2	(2)	0	(2)
Microbiologists	0	1	(1)	0	(1)
Physical Scientists, All Other	0	1	(1)	0	(1)
Biological Technicians	1	1	(0)	0	(0)
Occupational Health and Safety Specialists	2	3	(2)	2	(0)
Education Administrators, All Other	1	1	0	0	0
Airline Pilots, Copilots, and Flight Engineers	3	2	1	0	1
Teachers and Instructors, All Other	0	4	(4)	6	2
Budget Analysts	7	5	2	0	2
Social Scientists and Related Workers, All Other	5	3	2	0	2
Engineers, All Other	0	3	(3)	6	3
Social Workers, All Other	2	5	(3)	7	3
Logisticians	0	6	(6)	12	5
Computer Occupations, All Other	14	7	7	0	7
Natural Sciences Managers	53	1	52	0	52
Bachelor's degree Subtotal	105	74	31	36	66
Physicians and Surgeons, All Other	0	13	(13)	0	(13)
Dentists, All Other Specialists	0	3	(3)	0	(3)
Health Diagnosing and Treating Practitioners, All Other	0	3	(3)	0	(3)
Hydrologists	0	2	(1)	0	(1)
Orthotists and Prosthetists	0	1	(1)	0	(1)
Administrative Law Judges, Adjudicators, and Hearing Officers	0	0	(0)	0	(0)
Psychologists, All Other	22	6	16	0	16
Master's degree or higher Subtotal	22	27	(6)	-	(6)
Grand Total	161	219	(58)	109	51

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 primary 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 natural science managers. Individuals qualified for this occupation may also seek work as soil and plant scientists, postsecondary chemistry teachers, and physical scientists, all of which are expected to see shortages in talent supply across the region.

Exhibit 18. Job Transferability for Natural Science Managers

SOC	Occupation	Annual Military & Defense Gap (2018-2023)	Annual Pierce County Gap (2018-2023)
11-9121	Natural sciences managers	53	98
19-1013	Soil and plant scientists	(0)	(5)
25-1052	Chemistry teachers, postsecondary	0	(1)
19-2099	Physical scientists, all other	(1)	(1)
19-1023	Zoologists and wildlife biologists	(0)	(1)
19-1031	Conservation scientists	(0)	(1)
19-2032	Materials scientists	0	0
19-1011	Animal scientists	0	0
25-1043	Forestry and conservation science teachers, postsecondary	0	0
19-2041	Environmental scientists and specialists, including health	2	11

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

Engineering technicians, except drafters, all others are also projected to see surpluses in talent in the military and defense industry. Workers qualified for this occupation may seek alternative employment as industrial machinery mechanics, industrial engineers, medical equipment repairers or petroleum pump system operators, refinery operators and gaugers. Additionally, an occupation that is experiencing a surplus in one occupation may be experiencing shortages in other industries.

Exhibit 19. Job Transferability for Engineering Technicians, Except Drafter, All Other

SOC	Occupation	Annual Military & Defense Gap (2018-2023)	Annual Pierce County Gap (2018-2023)
17-3029	Engineering technicians, except drafters, all other	19	22
49-9041	Industrial machinery mechanics	(11)	(32)
17-2112	Industrial engineers	(6)	(8)
49-9062	Medical equipment repairers	0	(7)
51-8093	Petroleum pump system operators, refinery operators, and gaugers	(5)	(5)
51-9012	Separating, filtering, clarifying, precipitating, and still machine setters, operators, and tenders	0	(4)
51-8021	Stationary engineers and boiler operators	(1)	(3)
17-2072	Electronics engineers, except computer	(0)	(2)
49-2094	Electrical and electronics repairers, commercial and industrial equipment	(1)	(1)
49-2021	Radio, cellular, and tower equipment installers and repairs	1	1
51-4012	Computer numerically controlled machine tool programmers, metal and plastic	1	2

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

SUMMARY OF KEY FINDINGS AND PRELIMINARY RECOMMENDATIONS

Pierce County’s military and defense industry is projected to have an annual supply of 270 local candidates between 2018 and 2023. This supply is split between unemployment insurance claimants whose previous occupation matches to a core construction occupation and newly trained candidates. (Exhibit 20)

Exhibit 20. Summary of Annual Pierce County Military & Defense Talent Supply, 2018-2023

Projected Talent Supply (Annual)	
Unemployed	109
Newly-Trained Candidates	161

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

Comparing local supply with forecasted annual demand of 219 openings leaves a surplus of 51 local workers annually between 2018 and 2023 (Exhibit 21). This surplus represents almost one percent of total core occupation employment in the industry. Although the overall talent pipeline indicates a surplus of qualified workers, the surplus is largely driven by a surplus of just one occupation, natural science managers with 53 annual graduates and only one annual job opening. There is also a surplus of psychologists, all other with 22 annual graduates and only six openings.

By and large, the majority of occupations in this industry are in balance with a slight shortage or a slight surplus. The occupation with the largest deficit is physicians and surgeons, all other with an annual gap of 13 positions (reflecting a broader shortage of physicians across Washington State).

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

Annual Surplus or (Shortage)	
Total Openings (Demand)	219
Total Supply	270
Surplus or (Shortage)	51

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

One major challenge for defense contractors is finding a supply of workers that both have the skills for an occupation and can pass the stringent background checks required for security clearance. These

background checks cover criminal and financial history and have extremely strict requirements. One stakeholder noted that they lose about 50 percent of applicants for openings based on failure to pass the background check. Due to the sensitive work being done by some defense contractors, employees must have security clearance to work on defense projects.

Employers are willing to hire recent graduates, but stakeholders noted that some applicants had high expectations for working hours and are lacking in essential soft skills. The defense industry is highly diverse and although many employers work traditional eight hour days, other employers require 24/7 staffing. New hires must be willing to work a variety of shifts and hours.

- *Recommendation* - It would be of benefit for the workforce system to have a strong understanding of the requirements for passing a background check, in addition to the industry and occupational skills required for the open positions. Develop a background check preparation tool for people interested in occupations for the military and defense field that guides people through the extensive detail and thoroughness common on military background checks.

Location can be a boon and a challenge for defense contractors. For some contractors the proximity to JBLM is of benefit in recruiting and hiring, due to the prevalence of transitioning military that are uniquely qualified for their positions.

Other employers have open positions for which it is challenging to find local talent. For example, one stakeholder noted that they are forced to recruit from Texas for some jobs due to higher industry concentration. This makes recruiting experienced workers a challenge because of the cost of living differences between Texas and Washington.

Overall, the military is a strong source of talent supply for defense contractors. Individuals transitioning out of military service have access to excellent services through the military to find local job postings and industry information. Additionally, employers in the defense industry have found that individuals from the military often have experience and skills within the specialized occupations for which they hire.

Although retired military personnel often have the extensive experience within the highly skilled occupations required by defense contractors, they often lack required commercial certifications. For example, the military trains personnel in aircraft and powerplant maintenance; however, they do not require or provide Aircraft and Powerplant licensure for their personnel. Private sector employers will sometimes provide reimbursement to their employees who simply need to pass a test to receive certification. Stakeholders mentioned that it

would be of benefit for employees, especially transitioning military, if there were readily available resources identifying the professional certifications required for occupations in the commercial sector and how to get these certifications.

- *Recommendation* – Develop a tool to help transitioning service members identify the certifications required for civilian employment. Provide information about how to acquire these certifications including required education, testing bodies and costs.
- *Recommendation* – Increase opportunities for transitioning service members to gain needed commercial certifications. This includes expanding competency-based preparation programs as well as resources to help pay for training and certification exams.