FREDERICK COUNTY
HIGHER EDUCATION NEEDS ASSESSMENT

FINAL REPORT

Submitted to:

MHEC
MARYLAND HIGHER EDUCATION COMMISSION

and the

FREDERICK REGIONAL HIGHER EDUCATION ADVISORY BOARD

Submitted by:

MGT
OF AMERICA, INC.

June 19, 2014

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1.0 INTRODUCTION

In accordance with Chapter 375 of the Acts of 2013 (House Bill 527, entitled "Frederick Regional Higher Education Advisory Board") and funding provided in the fiscal 2014 budget, the Maryland Higher Education Commission (MHEC), on behalf of the Frederick Regional Higher Education Advisory Board, engaged MGT of America, Inc., a national education planning and research firm, to conduct a study of higher education needs and capacity in the local region. This introductory chapter provides a brief overview of that study.

The remaining chapters and appendices present data, findings and conclusions that are intended to inform planning decisions of MHEC and the Advisory Board related to potential development of a regional higher education center in Frederick County.

1.1 STUDY BACKGROUND

Despite Frederick County being home to three higher education institutions, thoughts of expanding local access to college education, particularly at the post-baccalaureate level and STEM related disciplines has been a long-standing discussion among business and community leaders.

The Major Employer Group (MEG) of the Frederick County Chamber of Commerce convened a meeting of interested parties in December of 2007 at which time the vision of a local higher education center was explored. A subsequent meeting with MHEC representatives led to a BRAC-related report calling for an education needs assessment of the area surrounding Ft. Detrick. Eventually, funds were provided by the University System of Maryland and SAIC-Frederick, Inc. to conduct the needs assessment study, with a report issued at the end of 2010.

As a result, the MEG identified five priority courses not currently offered by local institutions. An invitation to submit academic program proposals was sent to all public and private colleges and universities in Maryland. The response was a call for a more quantitative needs assessment study to determine program demand.

In 2012, Governor O'Malley pledged to support funding for such a study and establish the Frederick Regional Higher Education Advisory Board (15 members). As mentioned above, HB527 passed in 2013 and funds were designated for the current 2014 needs assessment study, the focus of this report.

1.2 STUDY OBJECTIVES

MHEC on behalf of the Frederick Advisory Board, defined a scope of work for the needs assessment to determine the following:

- Need for postsecondary education programs at all levels (associate through doctoral degrees);
- Existing availability of programs locally;
- Potential for a local higher education center to support joint commercial/federal – university graduate programs;

- Contribution of such a center to statewide economic, workforce and education priorities;
- "Best practices" derived from similar regional centers in Maryland.

1.3 PRIOR RESEARCH AND INITIATIVES

At the outset of this needs assessment study, MHEC and Advisory Board members, along with the Frederick County Chamber of Commerce identified several key local and statewide studies, reports and initiatives that have influenced the pursuit of establishing a regional higher education center in Frederick County. These included:

- University System of Maryland 2011 report: *Higher Education Demand Survey and Needs Analysis for Frederick County.*
- Maryland Federal Facilities Advisory Board's *2013 Strategic Business Plan: Supporting Maryland's Federal Facilities.*
- MHEC's *Maryland Ready: 2013-2017 Maryland State Plan for Postsecondary Education.*
- Frederick County, Business Development and Retention, Target Industry Focus.

1.4 REPORT OUTLINE

The needs assessment report that follows is presented in the following sequence of five additional chapters:

2.0 Market Review --- depicts population, education and employment characteristics, data points and trends of the defined market encompassing all of Frederick County, the primary service area for a potential regional higher education center. This data sets the stage for access and delivery issues that will focus plans for a new center, as they illustrate potential attendees and subsequent barriers that must be addressed, as well as key points of opportunity.

3.0 Stakeholder Input --- summarizes qualitative commentary provided by major employers, local educators, and community leaders in Frederick County, including expressed program needs and gaps, along with common points of interest. It also identifies issues and concerns faced by the community and the state for planning, establishing and sustaining a regional higher education center in this locale. The chapter also summarizes aggregate responses to a surveyed purposeful sample of local employers regarding current and future education and training needs of employees and job seekers.

4.0 Indicators of Program Needs --- utilizing qualitative interview findings and quantitative survey data collected during this study, combined with Maryland Department of Labor, Licensing and Regulation (DLLR) occupational openings projections, academic programs of need are identified by degree level. Further, identified needs are cross-referenced with current academic program inventories from local institutions to identify gaps.

5.0 Maryland Regional Higher Education Centers --- as requested in the study scope of work, information and input was collected from each of the eight existing regional higher education centers across the state. This section reports key points of interest to the Frederick Advisory Board on issues of governance, operations, program selection, delivery, best practices and lessons learned.

6.0 Conclusions --- offers key findings and conclusions of the consultant team based upon the information and data compiled in previous sections of the report, our understanding and assessment of

the current situation in Frederick County, and our experience advising academic and community leaders in similar situations and circumstances seeking to; improve local access to postsecondary education and training opportunities, maintain an appropriately skilled local workforce, and contribute to regional competitive readiness and long-term economic stability.

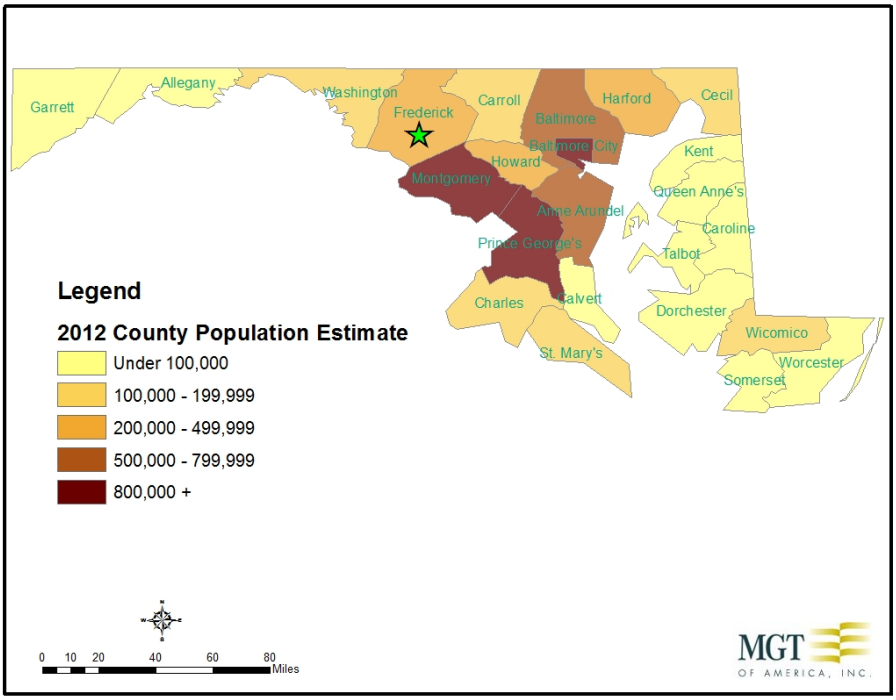
2.0 MARKET REVIEW

In any academic needs study, one must first have a reasonable understanding of the current population features of the geographic market of concern. Each data element provides insight into the factors that may help or hinder desired and targeted educational needs, barriers and access opportunities which impact a skilled workforce. For Frederick County, our analysis starts with basic data on county population counts and demographics, continues with growth rate and projections, along with educational attainment, education participation and pipeline (k-12) indicators. A summary of major local postsecondary education providers and their respective enrollment patterns is offered to understand accessible local capacity. Finally, this chapter concludes with several current informational points on employment figures, industry sector distribution, and employee residence location and work commute destination.

2.1 POPULATION TRENDS AND PROJECTIONS

Frederick County ranks 8th in total population among Maryland's 24 county jurisdictions (includes Baltimore City). **Exhibit 2-1** displays the location of Frederick County and its estimated 2012 population relative to other counties in Maryland.

EXHIBIT 2-1
2012 POPULATION ESTIMATES, MARYLAND AND FREDERICK COUNTY



Source: ArcView GIS depictions of geographies. Population estimates from U.S. Census.

In 2012, Maryland's population reached near 5.9 million, while the population of Frederick County was approximately 240,000, as shown in **Exhibit 2-2**. Frederick County constitutes approximately 4.0% of the state population. The breakdown by gender is similar in both geographies, with women comprising slightly more than half of the population.

EXHIBIT 2-2
2012 POPULATION BY GENDER
FOR MARYLAND AND FREDERICK COUNTY

	Maryland		Frederick County	
	#	%	#	%
Male	2,849,291	48%	118,567	49%
Female	3,035,272	52%	121,015	51%
TOTAL	**5,884,563**	**100%**	**239,582**	**100%**

Source: U.S. Census Bureau, 2012 American Community Survey 1-Year Estimates.

Exhibit 2-3 provides the population of Maryland and Frederick County by age groupings. As with the breakdown by gender, the proportions of the population within each group are similar. Approximately 13% of Frederick County residents are between the ages of 15 and 24, the traditional pipeline age for college enrollment.

EXHIBIT 2-3
2012 POPULATION BY AGE

	Maryland		Frederick County	
	#	%	#	%
Under 15 years	1,110,821	19%	47,651	20%
15 to 19 years	394,552	7%	17,179	7%
20 to 24 years	407,055	7%	14,592	6%
25 to 34 years	801,626	14%	27,976	12%
35-54	1,670,838	28%	74,065	31%
55-64	736,990	13%	29,275	12%
65 and over	762,681	13%	28,844	12%
TOTAL	**5,884,563**	**100%**	**239,582**	**100%**

Source: U.S. Census Bureau, 2012 American Community Survey 1-Year Estimates.

The Maryland Department of Planning projects that the population of Frederick County will grow 23% between 2010 and 2025, as shown in **Exhibit 2-4**. During the same time period the population of the state is projected to grow 11%. The agency estimates that the population of Frederick County will grow at more than twice the rate of the state between 2000 and 2025 (47% and 21%, respectively).

EXHIBIT 2-4
POPULATION ESTIMATES AND PROJECTIONS
THROUGH 2025

	Maryland	Frederick County
2000 Census	5,296,486	195,277
2010 Census	5,773,552	233,385
2015	5,962,000	247,350
2020	6,216,150	267,650
2025	6,428,250	286,950
Growth 2000-2010	477,066	38,108
% Growth 2000-2010	9%	20%
Growth 2010-2025	654,698	53,565
% Growth 2010-2025	11%	23%
Growth 2000-2025	1,131,764	91,673
% Growth 2000-2025	21%	47%

Source: Maryland Department of Planning, 2013.

Compared to other Maryland counties, Frederick ranked 8th in population size in 2010, but is projected to up to move to 7th by 2025. Frederick is anticipated to rank 3rd in population rate of growth between 2010 and 2025 significantly exceeding the state rate (see **Exhibit 2-5**).

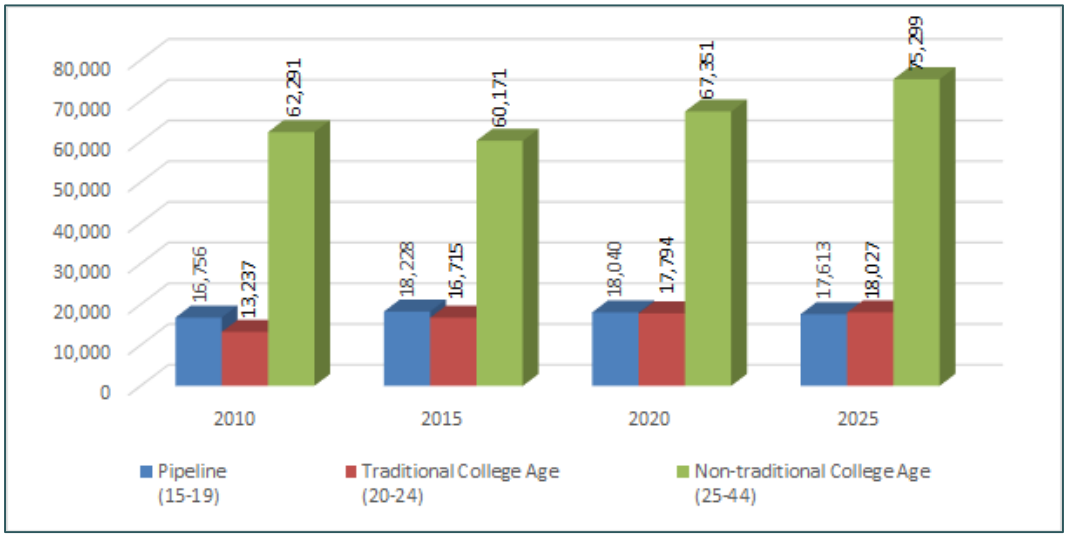
EXHIBIT 2-5
PROJECTED POPULATION CHANGE
THROUGH 2025

	Maryland		Frederick County	
	#	%	#	%
2010-2015	188,448	3.3%	13,965	6.0%
2015-2020	254,150	4.3%	20,300	8.2%
2020-2025	212,100	3.4%	19,300	7.2%

Source: Maryland Department of Planning, 2013.

Population projections by age groupings are displayed in **Exhibit 2-6**. As shown, the typical postsecondary education pipeline group (age 15-19) is projected to grow by 5% over the 15 year period. The college-going traditional age group (20-24) is projected to grow significantly by 36%, while the 25-44 age cohort is projected to grow 21% by 2025.

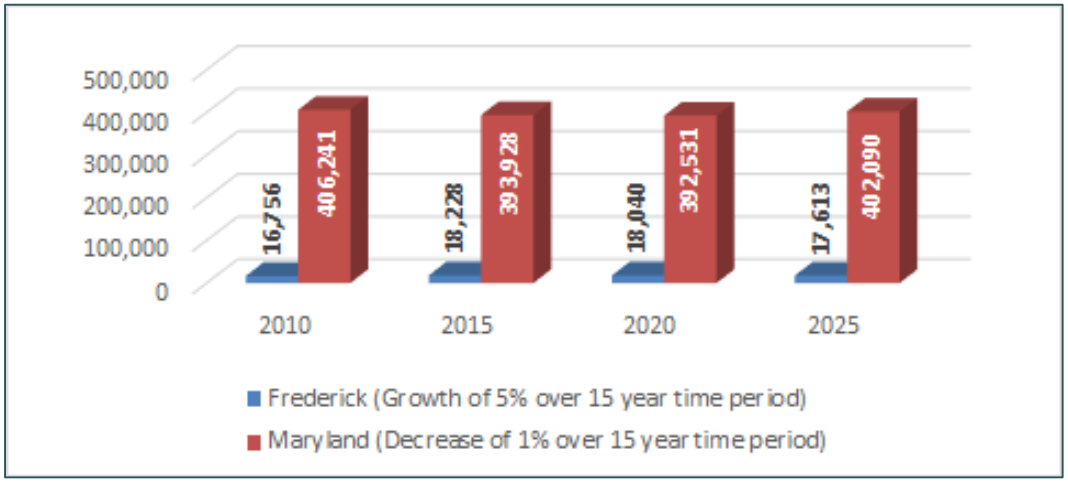
EXHIBIT 2-6
FREDERICK COUNTY PIPELINE AND
COLLEGE-AGE POPULATION GROWTH THROUGH 2025



Source: Maryland Department of Planning, 2013.

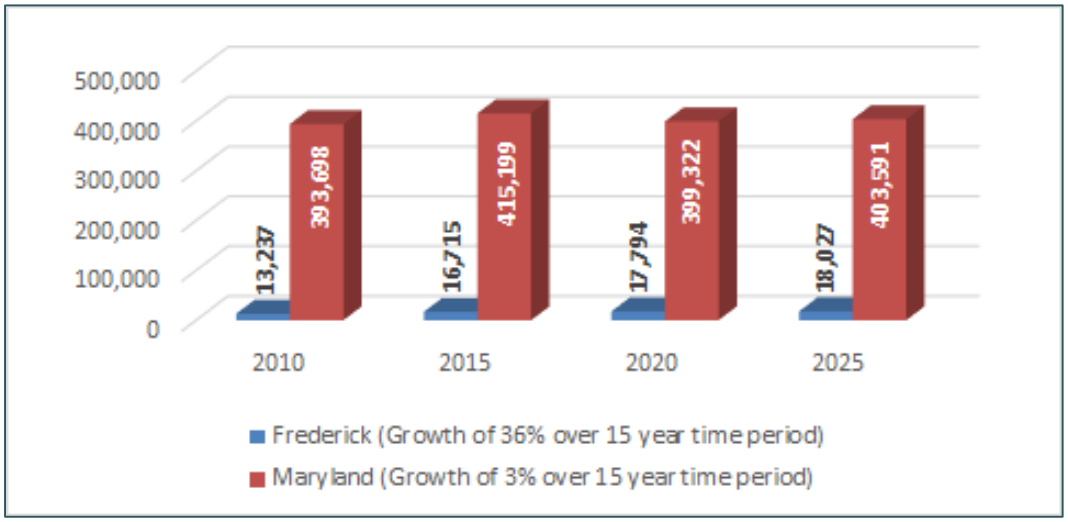
The projected population growth by age groupings for both Frederick County and the state of Maryland are shown in **Exhibits 2-7** through **2-9**. As shown, the population of Frederick County is projected to grow at a higher rate than the state as a whole in each age category.

EXHIBIT 2-7
AGE 15-19 POPULATION GROWTH
THROUGH 2025



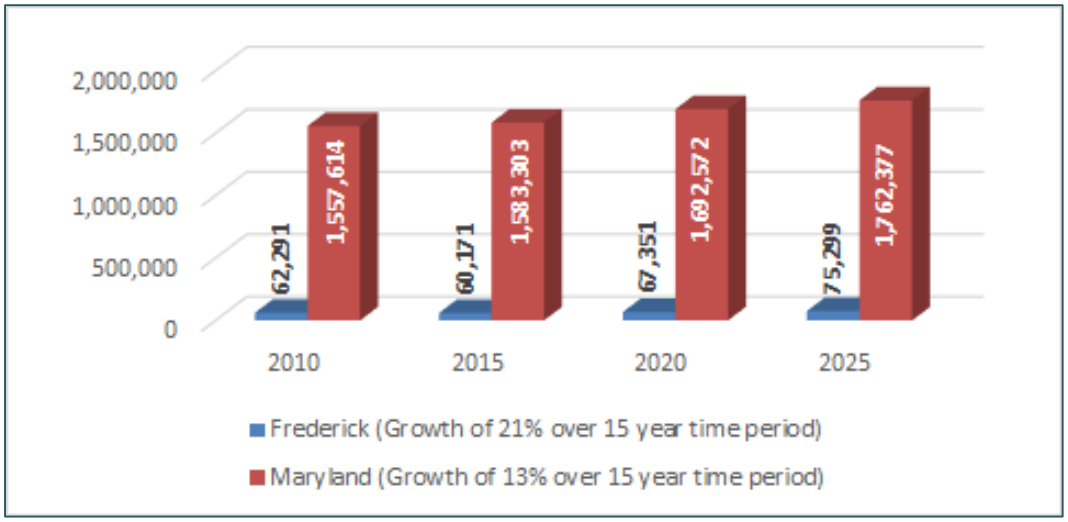
Source: Maryland Department of Planning, 2013.

EXHIBIT 2-8
AGE 20-24 POPULATION GROWTH
THROUGH 2025



Source: Maryland Department of Planning, 2013.

EXHIBIT 2-9
AGE 24-44 POPULATION GROWTH
THROUGH 2025



Source: Maryland Department of Planning, 2013.

2.2 EDUCATIONAL PROFILE OF THE SERVICE AREA

Approximately 11% of the population aged 18 and over in both Maryland and Frederick County are enrolled in some level of college or graduate school, as shown in **Exhibit 2-10**.

EXHIBIT 2-10
2012 EDUCATIONAL PARTICIPATION
POPULATION AGED 18 AND OVER

	Maryland		Frederick County	
	#	%	#	%
Enrolled in college or graduate school	504,121	11.1%	19,773	10.9%
Population 18 years and over	4,541,628	100.0%	181,402	100.0%

Source: U.S. Census Bureau, 2012 American Community Survey 1-Year Estimates.

As shown in **Exhibit 2-11**, a slightly larger proportion of the population aged 18 to 24 in Frederick County is enrolled in college or graduate school as compared to Maryland (48% and 45%, respectively).

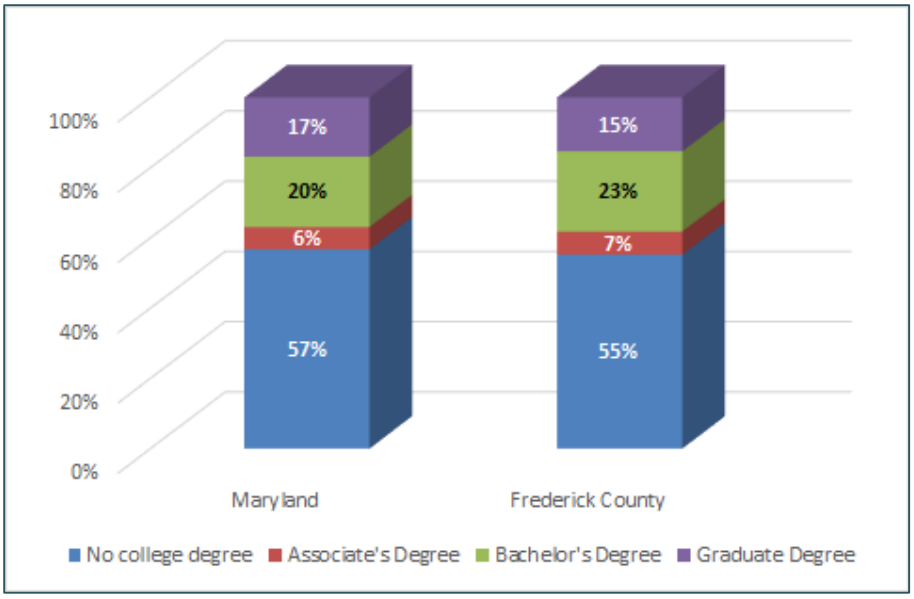
EXHIBIT 2-11
2012 EDUCATIONAL PARTICIPATION
POPULATION AGED 18-24

	Maryland	Frederick County
	#	#
Population 18-24 years	569,493	21,242
Enrolled in college or graduate school	44.7%	48.0%

Source: U.S. Census Bureau, 2012 American Community Survey 1-Year Estimates.

Exhibit 2-12 displays visually the educational attainment of the population 25 and older of Maryland and Frederick County in 2012.

EXHIBIT 2-12
2012 EDUCATIONAL ATTAINMENT
POPULATION AGE 25 AND OLDER

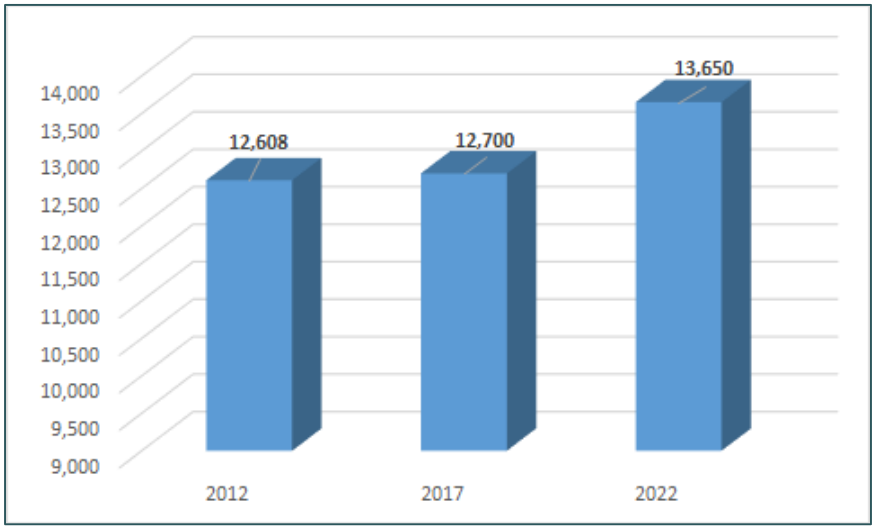


Source: U.S. Census Bureau, 2012 American Community Survey 1-Year Estimates.

2.3 HIGH SCHOOL ENROLLMENT AND GRADUATION TRENDS

Public high school enrollments in Frederick County are projected to increase by more than 1,000 students by 2022 – an increase of 8.3% from 2012, as shown in **Exhibit 2-13**.

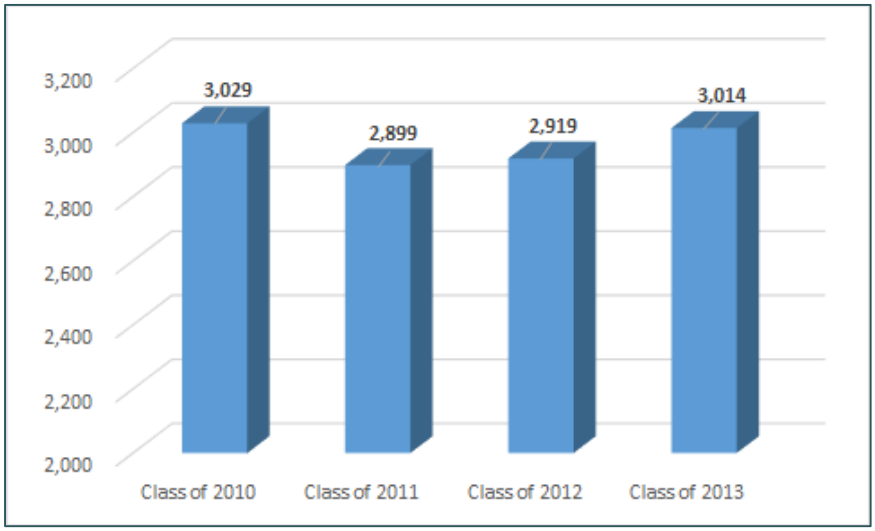
EXHIBIT 2-13
ENROLLMENT TRENDS AND PROJECTIONS
FOR PUBLIC HIGH SCHOOLS IN FREDERICK COUNTY
2012 THROUGH 2018



Source: Maryland Department of Planning, 2009.

Graduation counts in Frederick County have fluctuated over the last four years, resulting in a slight decrease in the number of diplomas earned since 2010, but recently are trending higher (see **Exhibit 2-14**). The county public school system awarded more than 3,000 high school diplomas in 2013.

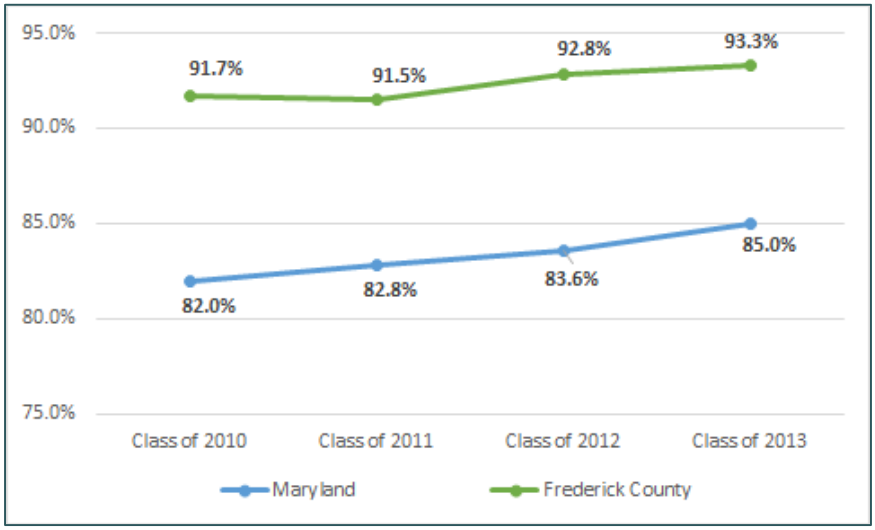
EXHIBIT 2-14
GRADUATION COUNTS (DIPLOMAS EARNED) FOR PUBLIC HIGH SCHOOLS IN FREDERICK COUNTY,
2010 THROUGH 2013



Source: Maryland State Department of Education, February 2014.

As shown in **Exhibit 2-15**, Frederick County students earn high school diplomas at a higher rate than the state of Maryland (graduation rate exceeded 93% in 2013 from Frederick public schools as compared to an 85% rate statewide).

EXHIBIT 2-15
GRADUATION RATES FOR PUBLIC HIGH SCHOOLS
IN MARYLAND AND FREDERICK COUNTY
2010 THROUGH 2013



Source: Maryland State Department of Education, February 2014.

2.4 LOCAL POSTSECONDARY PROVIDERS

Frederick County continues to maintain a strong base of college educated residents in the workforce largely due to the presence of local higher education institutions. Three local colleges are available to residents and employers in Frederick County to pursue higher education: Frederick Community College, Hood College, and Mount St. Mary's University. A brief description of each local institution is presented below:

Frederick Community College

In its 57-year history, Frederick Community College (FCC) has grown from 77 students to more than 17,000 students registered in academic, continuing education and workforce development divisions. The 94 acre campus is located in Frederick on Opossumtown Pike.

FCC is part of the Maryland Community College system and offers an extensive array of terminal and transfer associate degrees, and has established a series of 2+2 articulation agreements to allow its graduates access and easier transition to a four-year baccalaureate degree in state. In addition, the college offers a significant number of continuing education and training

opportunities for citizens of the county and the local and commuter workforce. They also provide customized corporate training services. In 2009 FCC opened the Monroe Center (Monroe Ave.) focusing on training in the culinary arts, hospitality, and building trades. In 2012, FCC entered into a partnership with Carroll Community College and Howard Community College to open the Mt. Airy College Center for Health Care Education with a shared focused solely on allied health professions.

Located within the City of Frederick on a 50-acre campus, Hood College was founded May 12, 1893, the date of the first meeting of the board of directors, who at that time established The Woman's College of Frederick, now known as Hood College. In Fall 2013, the private institution enrolled nearly 2,400 students, more than half of them undergraduates, in addition to approximately 1,000 students seeking master's degrees, certificates or certifications.

Approximately 79% of Hood students are from the State of Maryland and roughly 47% are from Frederick County. The college offers a liberal arts focus combined with professional programs through 30 plus academic majors (27 distinct concentrations) and 44 minors for undergraduates, including those directly related to prominent employment sectors of the County. Hood College master's degree programs include 15 distinct degrees, 8 post-baccalaureate certificates and a master's level certification in educational leadership. The college has developed a variety of collaborative arrangements with both public and private sector employers involving both faculty and students.

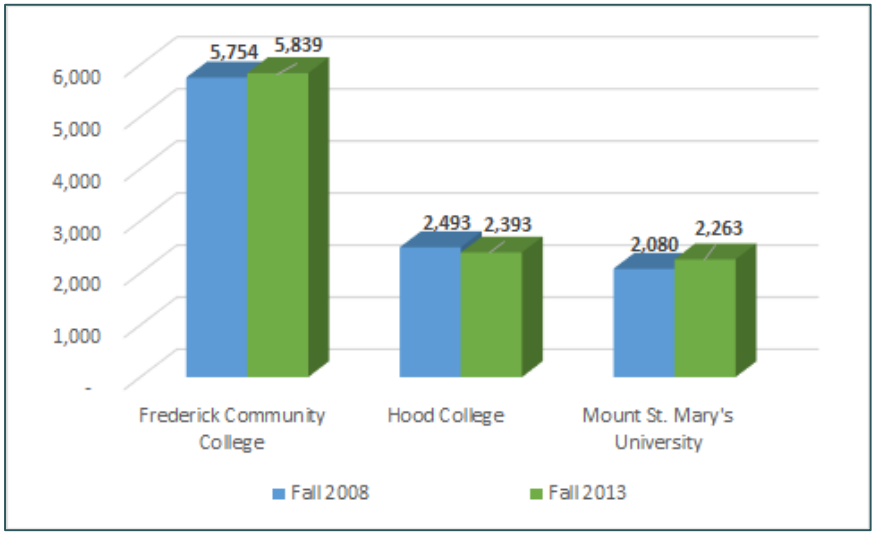
Established in 1808, Mount St. Mary's University is a private, coed college affiliated with the Catholic Church. The 1,400 acre main campus is located in Emmitsburg in north Frederick County near the Pennsylvania border. With a total enrollment of more than 2,200, the university serves more than 1,630 undergraduate students and nearly 350 graduate students in addition to those enrolled in the seminary. The University offers a broad mix of 35 undergraduate majors and seven master's programs (including an MBA).

Additionally, since 1999 Mount St. Mary's has operated a satellite campus in Frederick located in the I-270 Technology Park. It primarily serves working adults offering evening and weekend classes in an accelerated format. Available programs include four baccalaureate degrees, six full master's degrees and five master's level certificates, the latter focused on specific needs of local employers.

A listing of programs available at each institution by level is provided in **Appendix A**. Enrollment and degree award trend data for each institution are shown in **Exhibit 2-16** through **Exhibit 2-19**.

As expected, Frederick Community College (FCC) has the largest enrollment of the three local institutions, as shown in **Exhibit 2-16**. Enrollments at FCC and Mount St. Mary's have increased since 2008 (1.5% and 8.8%, respectively), while Hood College enrollments decreased slightly during the same time period (4%).

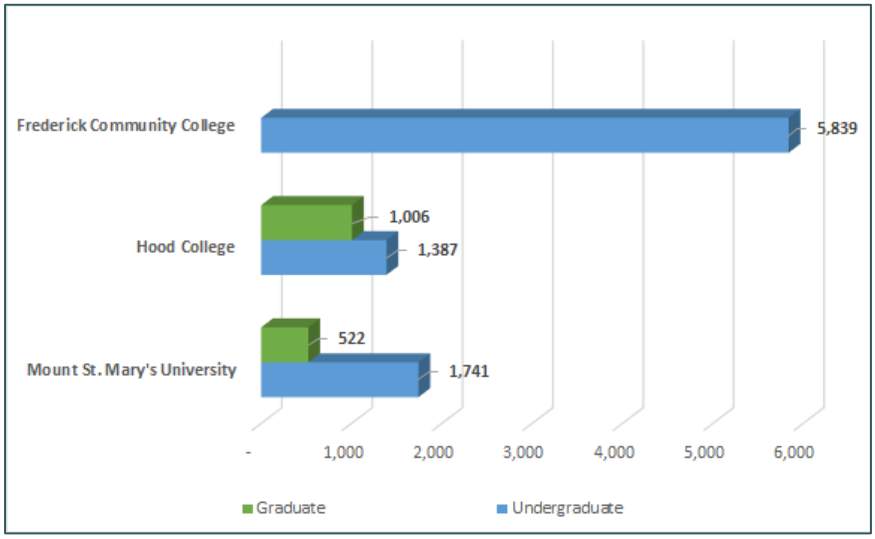
EXHIBIT 2-16
POSTSECONDARY ENROLLMENTS BY PROVIDER
FALL 2008 AND FALL 2013



Source: FCC, Hood College, and Mount St. Mary's University, 2014.

FCC enrolls undergraduate students for their first two years only. Of the other two local institutions, Mount St. Mary's enrolls more undergraduate students (1,741), while Hood College enrolls more graduate students (1,006), as shown in **Exhibit 2-17**.

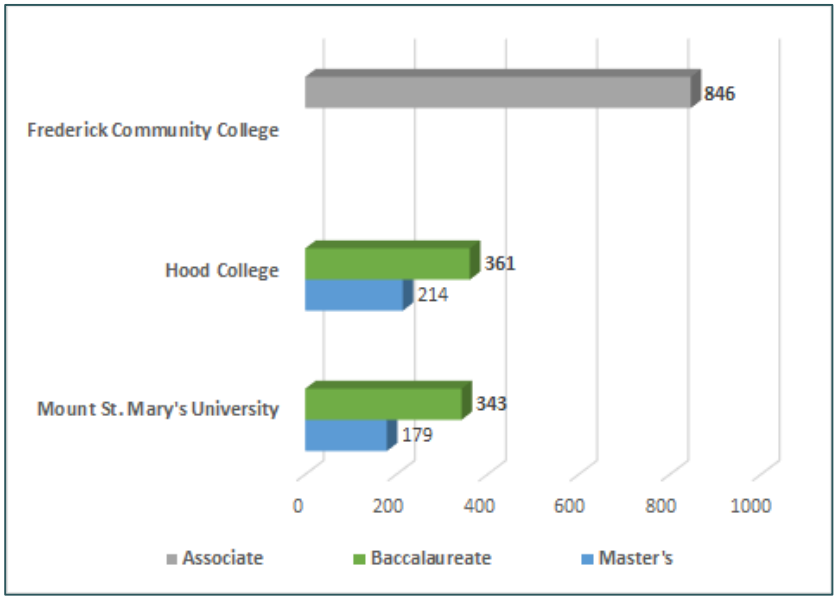
EXHIBIT 2-17
POSTSECONDARY ENROLLMENTS BY PROVIDER AND LEVEL
FALL 2013



Source: FCC, Hood College, and Mount St. Mary's University, 2014.

Among the local higher education providers, FCC awarded the most degrees in 2012, granting nearly 850 associate degrees as shown in **Exhibit 2-18,** preparing recipients for transfer to a four-year institution or entry into the local workforce. Mount St. Mary's and Hood College awarded 522 and 575 degrees, respectively, in 2012, the majority of which were baccalaureate degrees.

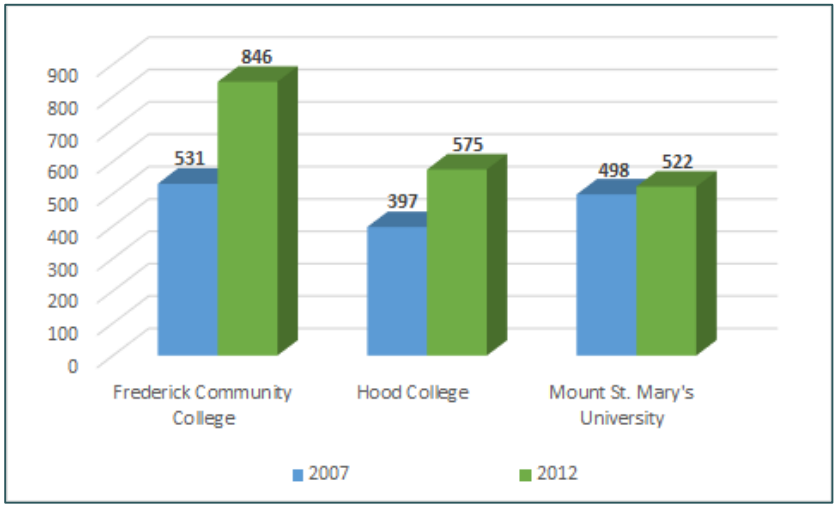
EXHIBIT 2-18
2012 DEGREES AWARDED BY PROVIDER AND LEVEL



Source: FCC, Hood College, and Mount St. Mary's University, 2014.

Exhibit 2-19 compares the total degrees awarded by the three local providers in 2007 versus 2012. While all three institutions increased the number of degrees awarded over the time period shown, FCC awarded nearly 60% more degrees in 2012 than in 2007, while Hood College awarded 45% more degrees. Mount St. Mary's increased awards granted by 5% over the same time period.

EXHIBIT 2-19
TOTAL AWARDS BY PROVIDER
2007 AND 2012 ACADEMIC YEARS

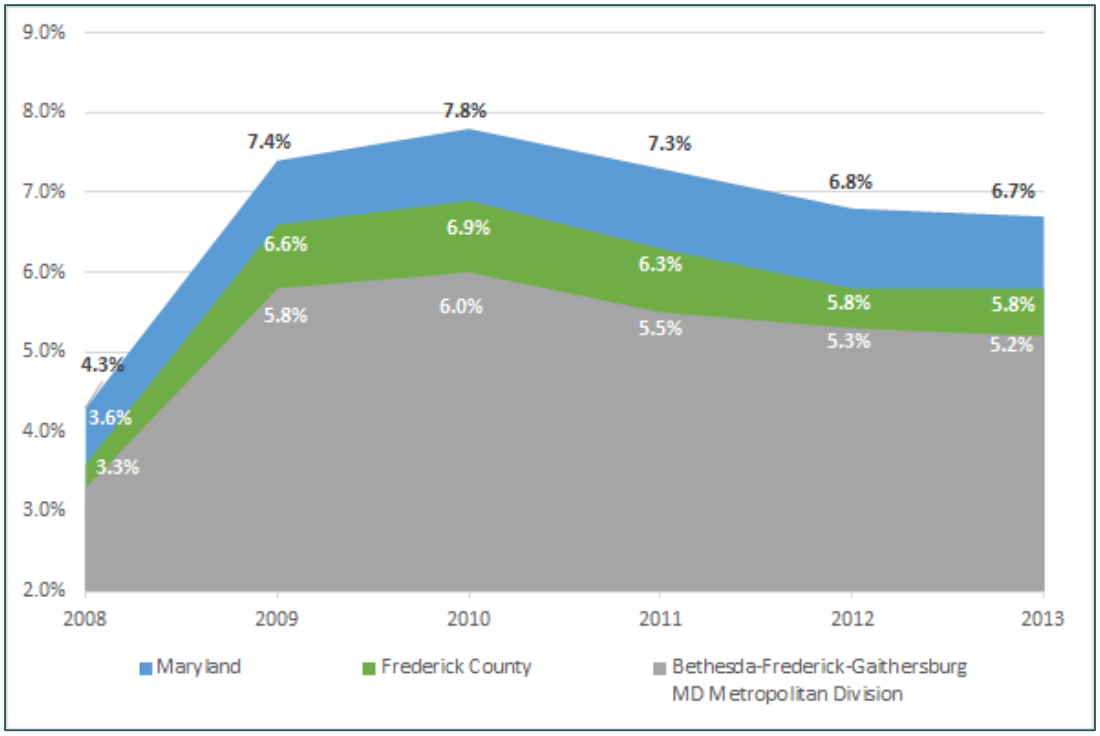


Source: MHEC, 2014.

2.5 EMPLOYER PROFILE OF FREDERICK COUNTY

As shown in **Exhibit 2-20**, the rate of unemployment in the region has fluctuated since 2008 when the current economic recession began. Frederick County fared better than the state each year, generally maintaining an unemployment rate 1% lower than Maryland as a whole. The Bethesda-Frederick-Gaithersburg Metropolitan Division maintained an even lower unemployment rate over the six year period.

EXHIBIT 2-20
MARYLAND, BETHESDA-FREDERICK-GAITHERSBURG MD, AND FREDERICK COUNTY UNEMPLOYMENT, ANNUAL AVERAGES FROM 2008 THROUGH 2013



Source: Maryland Department of Labor Licensing and Regulation, 2014.

Excluding military population, more than 80% of the positions within Frederick County are in the private sector, as shown in **Exhibit 2-21**. Trade, Transportation and Utilities, and Professional Business Services constitute the largest shares of employment within the local private sector (17% each).

EXHIBIT 2-21
FREDERICK COUNTY EMPLOYMENT BY SECTOR 2012 ANNUAL

Sector	#	%
Government Total	15,736	17%
Federal	3,932	4%
State	784	1%
Local	11,020	12%
Private Sector Total	76,940	83%
Natural Resources and Mining	609	1%
Construction	7,893	9%
Manufacturing	4,663	5%
Trade, Transportation and Utilities	15,380	17%
Information	1,202	1%
Financial Activities	6,338	7%
Professional and Business Services	15,296	17%
Education and Health Services	12,576	14%
Leisure and Hospitality	9,755	11%
Other Services/Unclassified	3,228	3%
Total Employment	**92,676**	**100%**

Source: Maryland Department of Labor Licensing and Regulation, August 2013.

As shown in **Exhibit 2-22**, based on DLLR 2010 data on workforce commuting patterns, the largest share of Frederick County residents are employed within the county (39%), while nearly 25% work in neighboring Montgomery County.

EXHIBIT 2-22
COUNTIES WHERE FREDERICK COUNTY RESIDENTS ARE EMPLOYED, 2010

Counties Where Residents Are Employed		
	#	%
Frederick County	40,770	39.0%
Montgomery County	25,815	24.7%
Baltimore County	4,076	3.9%
Prince George's County	3,989	3.8%
Washington County	3,460	3.3%
Howard County	3,426	3.3%
Carroll County	2,923	2.8%
District of Columbia, DC	2,872	2.7%
Anne Arundel County	2,821	2.7%
Fairfax County, VA	2,378	2.3%
All other locations	12,008	11.5%
TOTAL WORKERS FROM FREDERICK COUNTY	**104,538**	**100.0%**

Source: Maryland Department of Labor, Licensing and Regulation, 2014.

Exhibit 2-23 details the county of residence for workers employed win Frederick County. As shown nearly half of Nearly half (49%) of those who work in Frederick County also reside there, while another 10% live in neighboring Washington County.

EXHIBIT 2-23
COUNTIES WHERE FREDERICK COUNTY
WORKERS LIVE, 2010

Counties Where Workers Live		
	#	%
Frederick County	40,770	48.6%
Washington County	8,347	10.0%
Montgomery County	6,328	7.5%
Carroll County	3,591	4.3%
Baltimore County	2,841	3.4%
Prince George's County	2,138	2.5%
Adams County, PA	2,113	2.5%
Anne Arundel County	1,824	2.2%
Howard County	1,683	2.0%
Franklin County, PA	1,665	2.0%
All other locations	12,559	15.0%
TOTAL WORKERS IN FREDERICK COUNTY	**83,859**	**100.0%**

Source: Maryland Department of Labor, Licensing and Regulation, 2014.

2.6 SUMMARY OF FINDINGS

As stated at the onset of this chapter, market demographic factors and trends can and should inform any decision to expand access to higher education locally. Several key points have been highlighted in the data provided that may offer support for creation of a regional higher education center in Frederick County.

- First, adjacent to one of the most populous counties in the state, Frederick County has nearly a quarter million residents and is predicted to continue to significantly outpace the growth rate of Maryland.
- Local high school enrollment is projected to grow after 2017. Recent high school graduation numbers are trending upward and the graduation rate remains nearly ten percentage points above the state average.
- The typical college-going age cohorts in the County are growing faster than the respective state rates, and college participation of 18-24 year olds exceeds the state rate by several percentage points.
- Educational attainment of those 25 and older achieving a four-year degree or higher is nearly identical when comparing Frederick to the Maryland rate. The County is slightly higher for baccalaureate achievement (highest level attained), yet slightly lower for graduate degree completion.

- The local unemployment rate continues to decline since 2010, and remains a full percentage point below the state rate.
- In addition to a significant federal government and military employment base centered around Ft. Detrick, the employment distribution across various private industry sectors is a strong point of Frederick County.
- Finally, it is noted that while nearly half of those who work in Frederick County reside there, just over 60% of the County's employed workforce commute out of county for work. This is a key point when determining program delivery issues for expanded local access to higher education.

3.0 STAKEHOLDER INPUT

In addition to looking at secondary data (population trends, educational participation and attainment data, and occupational projections in the local market), it is critical to have direct feedback from local employers, community leaders, and others knowledgeable about the market in order to have a complete assessment of the region. An online survey was designed in conjunction with leaders of the Frederick County Chamber of Commerce to assess the higher education needs of local employers. In addition, qualitative interviews were conducted with

- Employer representatives
- Local education administrators
- Community leaders
- Frederick Regional Higher Education Advisory Board members

The results of the survey and the interviews are provided in this chapter.

3.1 EMPLOYER SURVEY FINDINGS

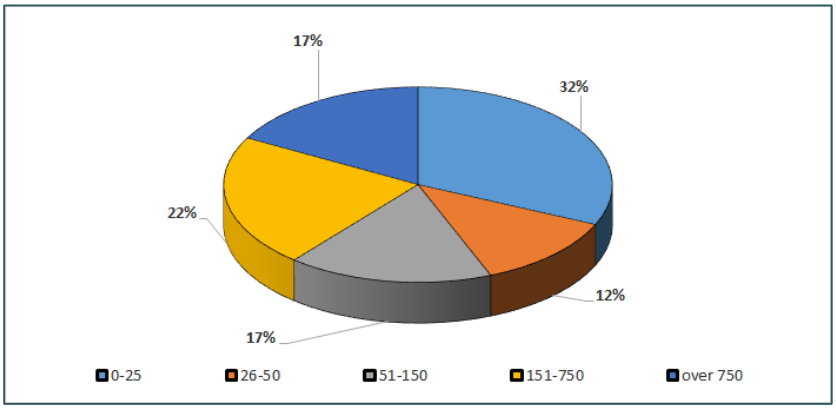
On March 13, 2014, the online survey was distributed to 136 representatives of local companies and organizations who are members of the Frederick County Chamber of Commerce. The survey target audience was developed using a purposeful rather than random sample of major local employers across a variety of industry sectors and supplemented with a set of smaller employers. Employers invited to participate represent a cross-section of business categories. The survey remained open until April 25, 2014, allowing employers more than six weeks to complete the instrument. Multiple follow-up appeals for participation to the sample of employers yielded 41 completed surveys (30% response rate). The largest proportion described their industry as Finance, Insurance, and Real Estate (27%). The final survey respondents were as follows:

- Acela Technologies, Inc.
- ADTEK Engineers, Inc.
- AstraZeneca
- Bank of America
- Battelle National Biodefense Institute
- Bechtel Power Corporation
- BioStat Solutions, Inc.
- Business Management Company, Inc.
- Canam Steel Corporation
- Community Living, Inc.
- ComSource, Inc.
- CorpOHS
- Frederick County Public Schools
- Frederick Memorial Hospital
- Frederick Mutual Insurance Company
- GTI Federal
- Hospice of Frederick County
- Hildebrand, Limparis & Associates
- Leidos Biomedical Research, Inc.
- Liberty Mutual
- Mental Health Assoc. of Frederick Co.
- MKSH
- MohnAllen, P.C.
- National Cancer Institute
- Opossum Pike Veterinary Clinic, Inc.
- Phoenix Mecano Inc.
- Plamondon Companies
- PNC Bank
- Rodgers Consulting, Inc.
- Ryan and Wetmore, PC
- St. John Regional Catholic School
- St. Joseph's Ministries

- State Farm Insurance Companies
- STULZ Air Technology Systems
- The City of Frederick Department of Economic Development
- The Frederick News-Post
- U.S. Army Garrison Fort Detrick, MD
- URS Corporation
- US Army Medical Research Institute of Infectious Diseases
- Woodsboro Bank
- YMCA of Frederick County

As shown in **Exhibit 3-1**, the largest share of respondents are companies with 25 or fewer full-time employees (34%). Nearly two-thirds of respondents (61%) have fewer than 151 employees. Organizations responding to the survey ranged in size from eight to 12,000 full-time employees. Combined survey respondents reported a total of 27,913 employees.

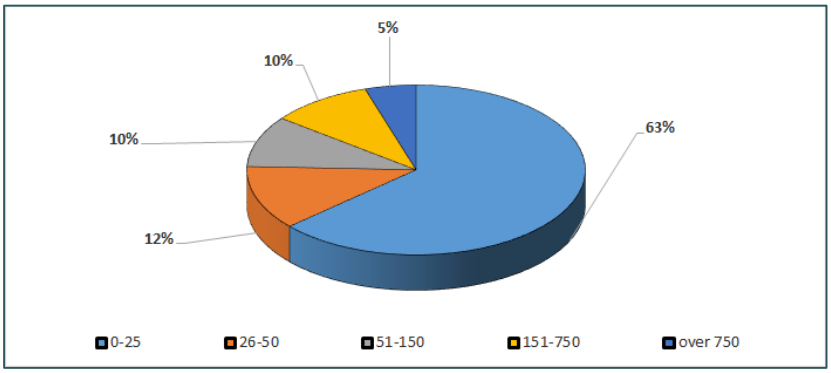
EXHIBIT 3-1
NUMBER OF FULL-TIME EMPLOYEES IN FREDERICK COUNTY
AS REPORTED BY EMPLOYERS



Source: Employer Survey, 2014.

While eight respondents indicated that they have no part-time employees, 17 indicated that they have 25 or fewer (63%), as shown in **Exhibit 3-2**. Organizations responding to the survey had between one and 2,000 part-time employees. Survey respondents accounted for a total of 4,955 part-time employees.

EXHIBIT 3-2
NUMBER OF PART-TIME EMPLOYEES IN FREDERICK COUNTY
AS REPORTED BY EMPLOYERS



Source: Employer Survey, 2014.

Employers were asked to indicate how many of their employees fell into a variety of categories. Some chose not to answer the question, but among those who did, the total employees represented and average percentage are shown below:

- Management (2,037, 10%)
- Professional (9,725, 49%)
- Technical/Paraprofessional (2,496, 12%)
- Clerical (2,383, 12%)
- Laborers (2,685, 13%)
- Other (769, 4%)

It should be noted that the responses that follow are reflective of the needs of the responding group of employers and their respective industry sectors, which represent a significant employment base in the County.

Nearly three-quarter of all respondents have difficulty filling positions at least occasionally (71%), and 22% of these face this challenge routinely. The most commonly cited reason for the inability to hire was a lack of qualified applicants (72%), followed by budgetary restrictions (17%).

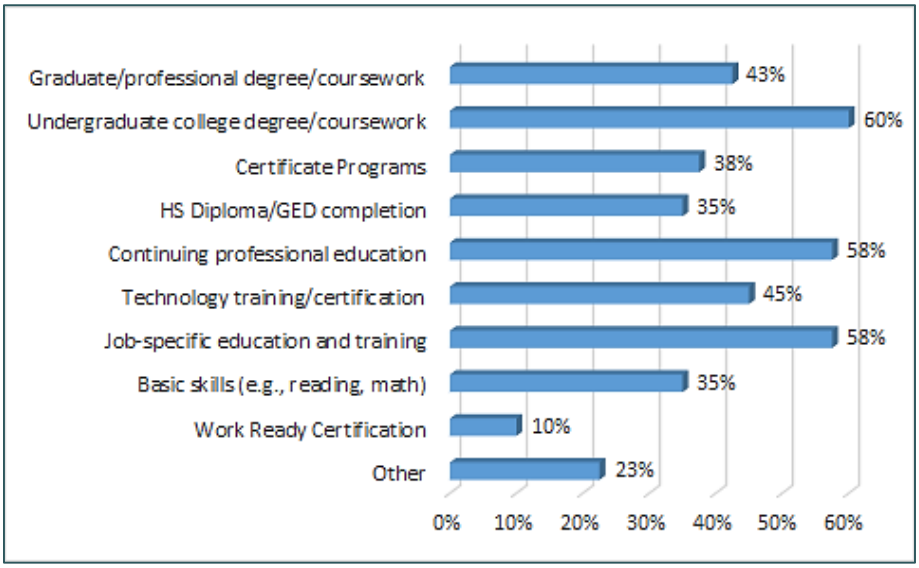
Employers were asked to indicate what kinds of educational credentials or training activities were most needed by their current employees, and the results are shown in **Exhibit 3-3**. More than half of respondents indicated that employees need training at one of three levels:

- Undergraduate college degree/coursework (60%)
- Continuing professional education (58%)
- Job-specific education and training (58%)

Additional educational/training needs commonly reported by respondents were as follows:

- Technology training/certification (45%)
- Graduate/professional degree/coursework (43%)

EXHIBIT 3-3
EDUCATIONAL CREDENTIALS OR TRAINING ACTIVITIES MOST NEEDED BY RESPONDENTS' CURRENT EMPLOYEES
(n=40)



Source: Employer Survey, 2014.
Note: Multiple response were allowed, percentages may not total 100%.

Respondents were asked to indicate the ways their employee education/training programs are currently provided for degree completion and continuing education, and the results are shown in **Exhibit 3-4**. More than half (53%) indicated that education/training is provided on-site by company trainers, while approximately one-third have relied on off-site programs offered by higher education institutions (37%), or specialty training organizations (34%).

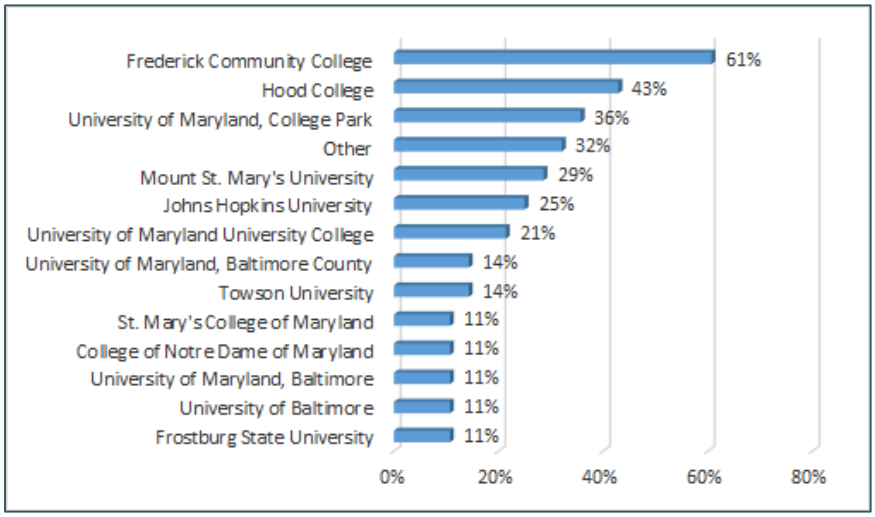
EXHIBIT 3-4
CURRENT EDUCATION/TRAINING PROGRAMS
REPORTED BY EMPLOYERS

	On your site		Off site location	
	#	%	#	%
By company trainers (n=28)	27	53%	7	9%
By educational institutions (n=29)	2	4%	29	37%
Through distance learning or telecommunications (n=24)	11	22%	16	20%
By specialty training organizations (n=29)	11	22%	27	34%

Source: Employer Survey, 2014.
Note: Multiple response were allowed, percentages may not total 100%.

Respondents reported which higher education providers they use for employee education and training, as displayed in **Exhibit 3-5**. Sixty-one percent of respondents rely on FCC for training and education needs of employees, while Hood College and University of Maryland, College Park were indicated by 43% and 36% of respondents, respectively. All institutions mentioned by at least 10% of respondents are shown in **Exhibit 3-5**.

EXHIBIT 3-5
HIGHER EDUCATION PROVIDERS CURRENTLY UTILIZED BY EMPLOYERS
(n=28)

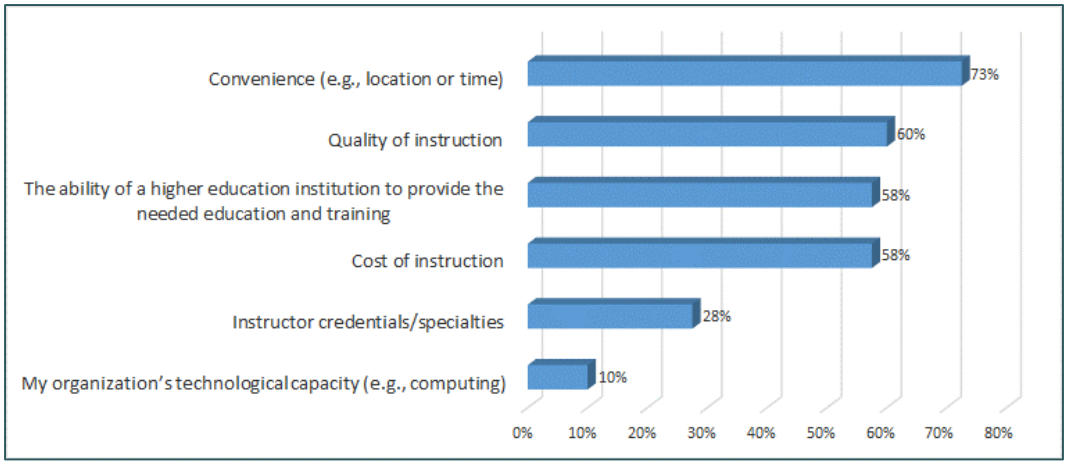


Source: Employer Survey, 2014.
Note: Multiple response were allowed, percentages may not total 100%.

The factors which weigh most heavily in respondents' decision of how to provide education and training to employees are shown in **Exhibit 3-6**. As shown, convenience is a factor for nearly three-quarters of employers in the analysis (73%). More than half indicated the following factors:

- Quality of instruction (60%)
- The ability of a higher education institution to provide the needed education and training (58%)
- Cost of instruction (58%)

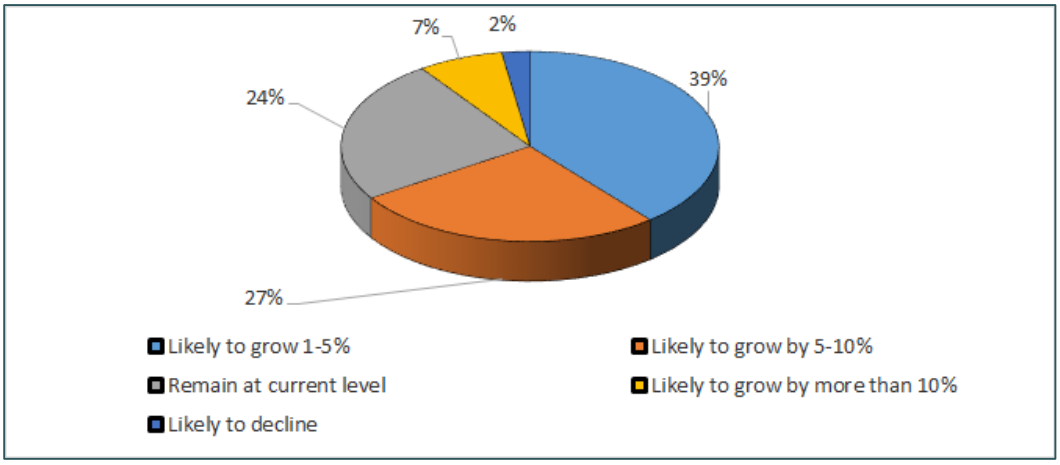
EXHIBIT 3-6
FACTORS THAT INFLUENCE THE DECISION OF HOW TO PROVIDE TRAINING FOR EMPLOYEES
(n=40)



Source: Employer Survey, 2014.
Note: Multiple response were allowed, percentages may not total 100%.

Exhibit 3-7 displays respondents' projections of growth within their organization over the next five years. As shown, the majority (73%) believe their organization is likely to grow during that time period, either by 1-5% (39% of respondents), 5-10% (27% of respondents), or more than 10% (7%).

EXHIBIT 3-7
ORGANIZATIONAL GROWTH FORECASTS FOR THE NEXT FIVE YEARS



Source: Employer Survey, 2014.

Employers were given an opportunity to list up to five academic programs which in their opinion should be available in the region to meet local education and employment needs through a new center. A consolidated listing of these desired programs is provided in **Exhibit 3-8**, along with the educational level(s) suggested for each. *It should be noted that employers were responding to an open ended question seeking "top of mind" academic program suggestions that they would most like to see offered through a regional higher education center in Frederick. Some disciplines were mentioned by more than one employer, and specific program names submitted by respondents may overlap.*

Highlighted cells indicate that, as far as the consultant team could determine, a degree at that level is not currently available from one or more of the three local higher education institutions. Online degrees offered by Maryland or out-of-state entities were not considered in this assessment of local availability. It also should be noted that of the 94 programs suggested by employers, 39 are available at the appropriate level through one or more of the three local higher education providers (a rate of 41%).

- Of 24 programs mentioned at the certificate level, 11 are available locally (46%).
- Of 18 programs mentioned at the associate level, 8 are available locally (44%).
- Of 19 programs mentioned at the baccalaureate level, 8 are available locally (42%).
- Of 33 programs mentioned at the graduate level, 12 are available locally (36%).

Approximately 35% of the programs listed are post-baccalaureate (includes both masters and doctoral level), and this group has the lowest percent available locally.

EXHIBIT 3-8
ACADEMIC PROGRAMS THAT EMPLOYERS INDICATE SHOULD BE OFFERED THROUGH THE FREDERICK REGIONAL HIGHER EDUCATION CENTER

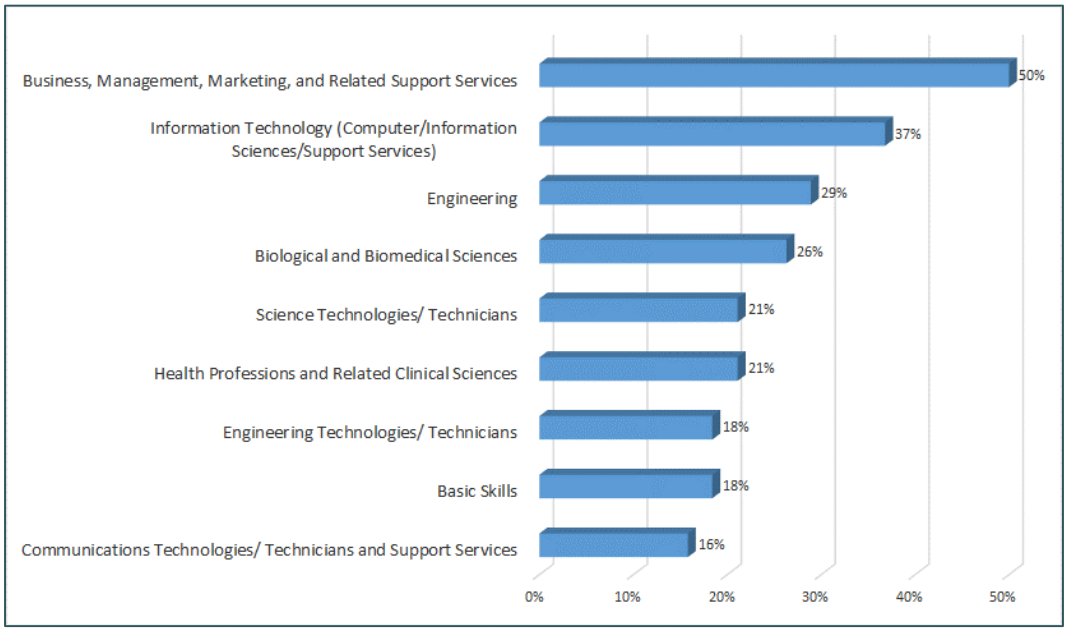
	Academic Program	Certificate	Associate	Bachelor's	Graduate
Business	Accounting*		✓	✓	
	Business/Finance/Management*	✓	✓	✓	✓
	Clinical project management	✓			✓
	RCDD/construction management	X	✓		
	Research management				X
	Project management	✓	X		✓
	Tax				X
Education	Elementary education*				✓
	Special education*				✓
Healthcare	Geriatric nursing assistant	✓			
	Medical administration technicians	✓			
	Medical researchers				X
	Medical technology	✓			
	Nursing*			✓	X
	Physical therapy assistant		X		
Information Technology, Math, and Engineering	Computer science		✓	✓	✓
	Cyber security*	X		X	
	Data modeling				X
	Engineering*			✓	
	Biomedical engineering				X
	Civil engineering	X	X	X	X
	Computer engineering			X	X
	Structural engineering	X	X	X	X
	Technological engineering				X
	Wireless (RF) engineering	X	X	X	X
	Mathematics				X
	Statistics				X
	Technology*	✓	✓	✓	✓
	Telecommunications			X	X
Science	Bioinformatics			X	✓
	Biological research				X
	Biology graduate internship				X
	Biomedical science		X	X	✓
	Biotechnical graduate internship				X
	Biotechnology*	✓	✓	✓	✓
	Chemistry		✓	✓	X
	Genetic studies				X
	Lab techniques	X	✓		
	Microbiology		X	X	✓
	Plant graduate internship				X
	Regulatory science	X	X	X	✓
Other	Animal care	X			
	Basic skills	✓			
	English*	X			
	HVAC	✓			
	Machinist	X	X		
	Material handling	X			
	Sheetmetal	X			
	Social work*				X
	Veterinary tech	X	X	✓	
	Welders	✓			

Notes: An asterisk indicates that the program is available at one or more of Maryland's regional higher education centers. A check mark indicates a program suggested by survey respondents, but is already offered local by FCC, Hood College, or MSMU. A highlighted "X" represents a suggested program that is not currently available locally.

Source: Employer Survey, 2014.

Employers were asked to indicate in which of several broad academic fields/disciplines they anticipate their employees (current or future) will need education and training over the next three to five years, and the categories cited by more than 15% of respondents are displayed in **Exhibit 3-9**. As shown, business, management, marketing and related support services was the most frequent response (50 %), followed by information technology (37 %), engineering (29%) and biological or biomedical sciences (26%). These academic program data represent a snapshot of perceived need and are greatly influenced by the industry sector of the responding employers. They should not be generalized to the region as a whole.

EXHIBIT 3-9
ACADEMIC FIELDS/CATEGORIES IN WHICH CURRENT OR FUTURE EMPLOYEES WILL LIKELY NEED EDUCATION AND TRAINING OVER THE NEXT THREE TO FIVE YEARS
(n=38)

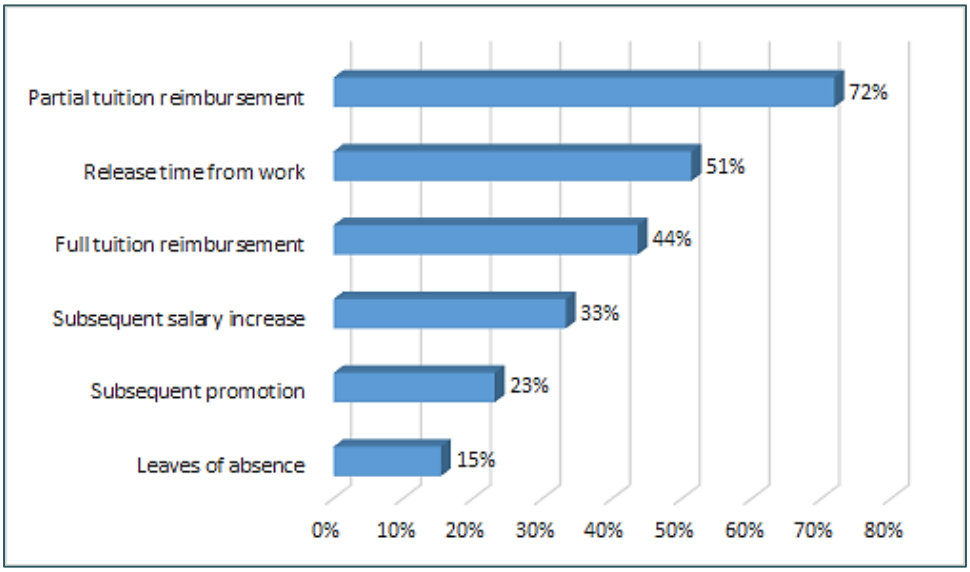


Source: Employer Survey, 2014.
Note: Multiple response were allowed, percentages may not total 100%.

Respondents who indicated needs in any of the broad academic disciplines shown in **Exhibit 3-9** were then asked to detail the specific number of current and future employees who would need training in a variety of specific disciplines within that broad grouping. The results of those survey items are displayed in **Appendix B**, and will be discussed in the next chapter reflecting specific programmatic needs by educational level and magnitude.

Employers were asked to indicate the incentives offered to encourage employees to participate in training and education and the results are shown in **Exhibit 3-10**. Nearly three-quarters of respondents (72%) offer partial tuition reimbursement, while 44% offer full tuition reimbursement. More than half (51%) offer release time from work to encourage participation in education and training.

EXHIBIT 3-10
INCENTIVES OFFERED TO ENCOURAGE EMPLOYEES TO PARTICIPATE IN TRAINING AND EDUCATION
(n=39)



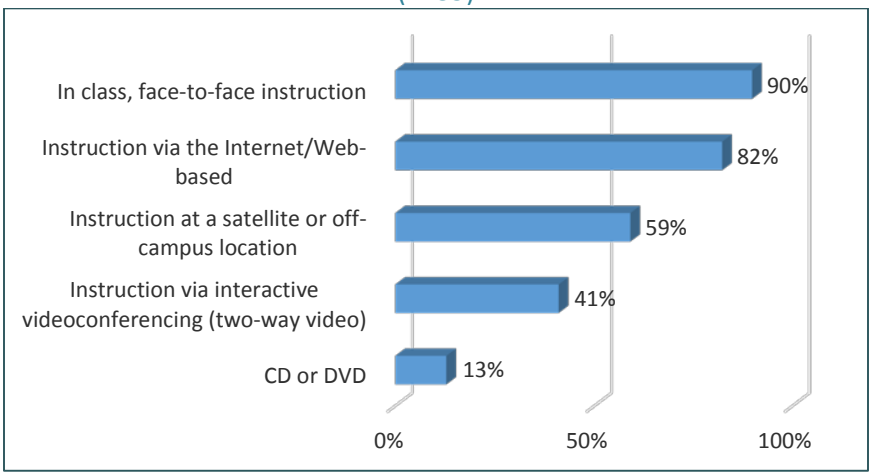
Source: Employer Survey, 2014.
Note: Multiple response were allowed, percentages may not total 100%.

SUMMARY OF EMPLOYER NEEDS (FROM SURVEY RESPONSES)

- Nearly 75% of respondents expect their organization to grow within the next five years.
- The majority of employers surveyed (nearly three-quarters) indicated that they have difficulty (at least occasionally) filling open positions within their organizations.
- Of those, three-quarters indicated that lack of qualified applicants was a primary reason.
- Overall, employers noted that undergraduate degrees, continuing education and job specific education/training would be most needed by their employees in the coming years.
- Through an open-ended question, several broad academic categories were identified as disciplines in which current or future employees will likely need training and programs. These included business, education, health care, information technology, engineering, and the sciences.
- Graduate programs were most prevalent compared to each of the other educational levels.
- Employers noted a number of fields in which training/education is needed but not available locally, such as specific engineering fields, IT and cyber security, and biomedical/biotechnology/microbiology disciplines, to name a few.
- Across all levels, roughly 75% of the engineering and IT programs and 60% of the science programs suggested by employers are not available locally.

A series of questions was asked to determine employer preferences for education/training modality and timing. As shown in **Exhibit 3-11**, the overwhelming majority of employers (90%) indicated that in class, face-to-face instruction would be most appropriate for their employees. Nearly as many indicated that Internet/web-based instruction would be appropriate (82%), while more than half believe that instruction at a satellite location would be acceptable (59%).

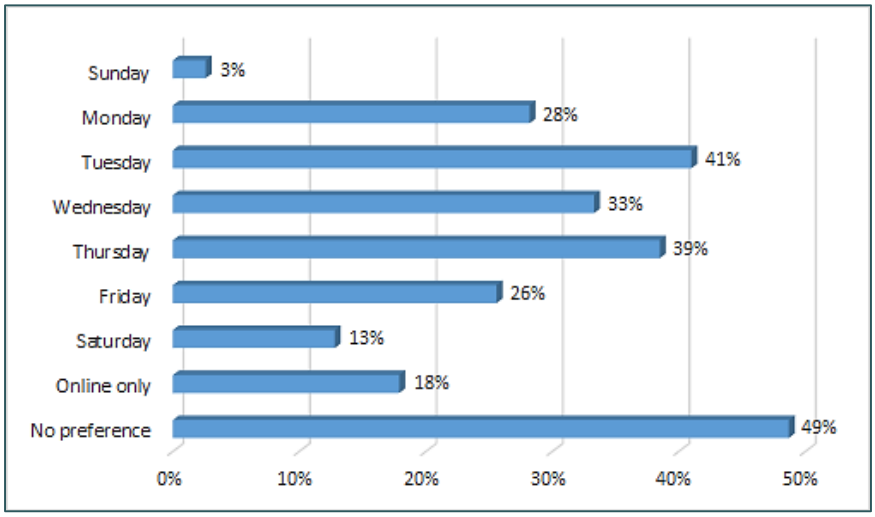
EXHIBIT 3-11
MOST APPROPRIATE METHODS OF EDUCATIONAL/TRAINING DELIVERY
ACCORDING TO EMPLOYERS
(n=39)



Source: Employer Survey, 2014.
Note: Multiple response were allowed, percentages may not total 100%.

The largest share of respondents (49%) indicated no preference for the day of the week which would work best for education/training of employees (see **Exhibit 3-12**). Among those who did indicate a preference, Tuesday and Thursday were the most frequently cited days (41% and 39%, respectively).

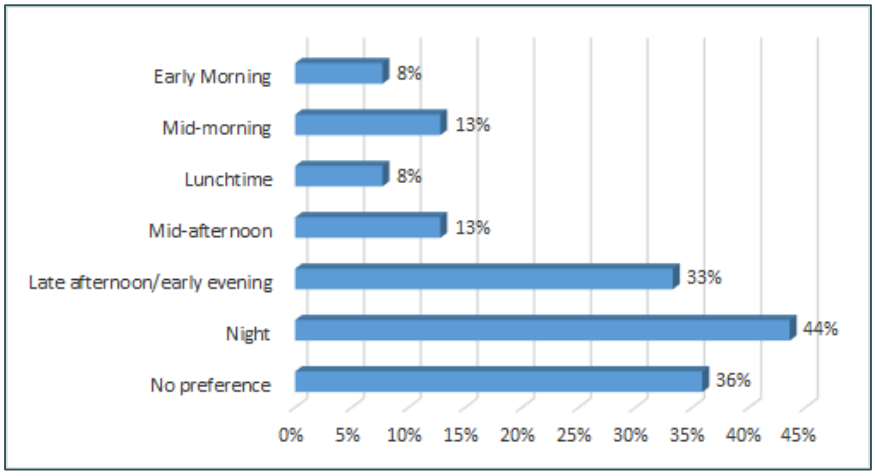
EXHIBIT 3-12
MOST APPROPRIATE DAYS FOR EDUCATIONAL/TRAINING
ACCORDING TO EMPLOYERS
(n=39)



Source: Employer Survey, 2014.
Note: Multiple response were allowed, percentages may not total 100%.

Night classes are preferred by the largest share of employer respondents (44%), as shown **Exhibit 3-13**, followed by late afternoon/early evening (33%).

EXHIBIT 3-13
MOST APPROPRIATE TIMES OF DAY FOR EDUCATIONAL/TRAINING
ACCORDING TO EMPLOYERS
(n=39)

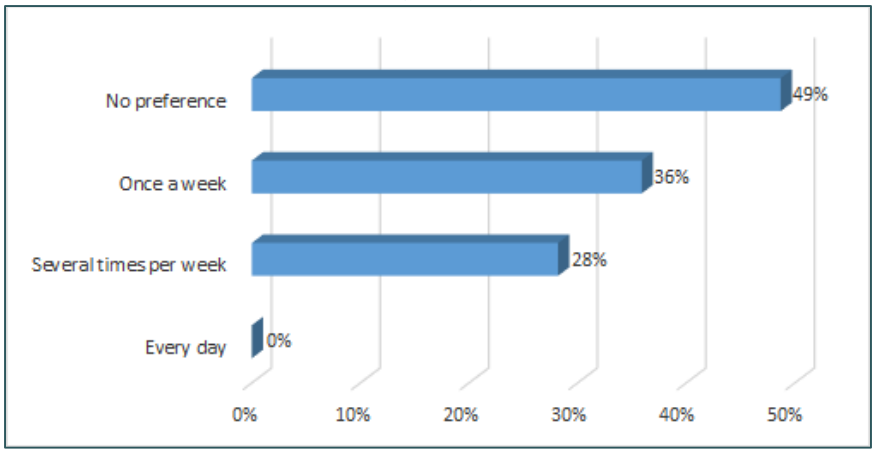


Source: Employer Survey, 2014.
Note: Multiple response were allowed, percentages may not total 100%.

When the data are examined in greater detail, employers indicate a preference for night classes Monday through Friday, followed by late afternoon/early evening classes Tuesday through Thursday.

Nearly half of employers indicated no preference for the frequency of educational/training programs (49%), as shown in **Exhibit 3-14**. Among those who did indicate a preference, the largest share (36%) indicated that once a week would be appropriate.

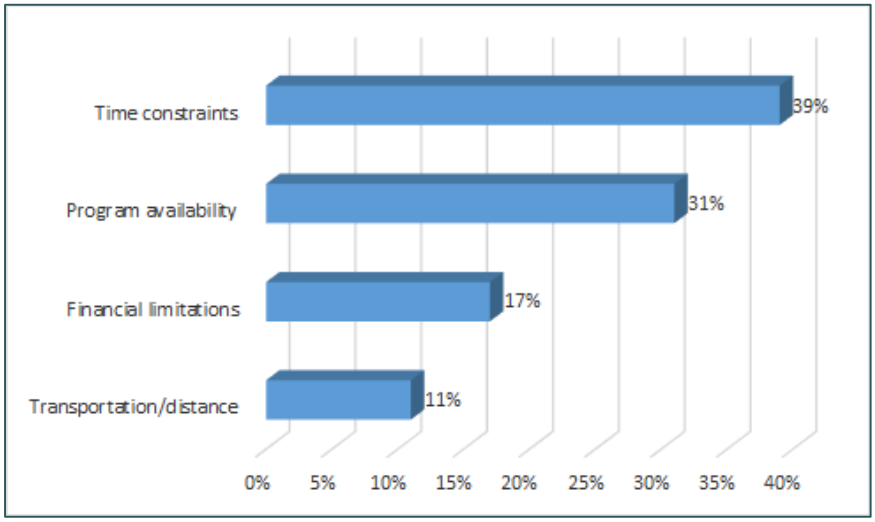
EXHIBIT 3-14
MOST APPROPRIATE FREQUENCY FOR EDUCATIONAL/TRAINING
ACCORDING TO EMPLOYERS
(n=39)



Source: Employer Survey, 2014.
Note: Multiple response were allowed, percentages may not total 100%.

When asked to indicate the major obstacles/barriers currently faced by residents and employees seeking education and training in the local area, the largest share of employers indicated time constraints (39%), followed by program availability (31%), as shown in **Exhibit 3-15**.

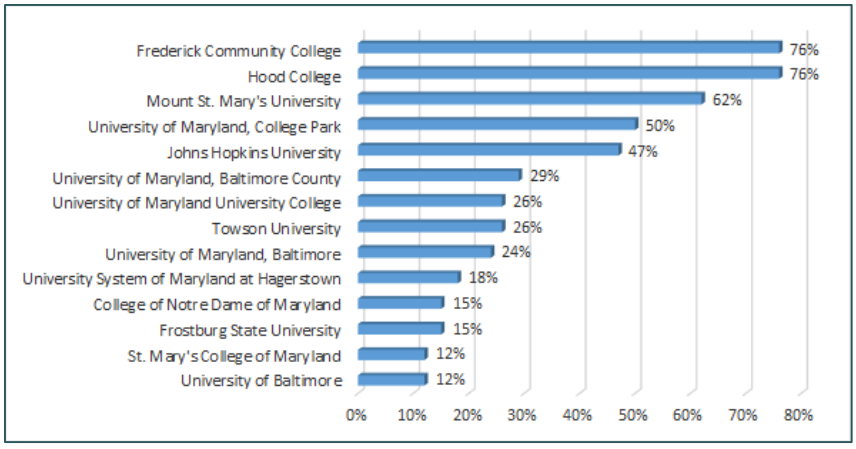
EXHIBIT 3-15
MAJOR OBSTACLES/BARRIERS CURRENTLY FACED BY RESIDENTS AND EMPLOYEES SEEKING EDUCATION AND TRAINING IN THE LOCAL AREA
(n=36)



Source: Employer Survey, 2014.

Survey respondents were asked to indicate which institutions they would prefer to participate in the Frederick Regional Higher Education Center, and their responses are displayed in **Exhibit 3-16**. Approximately three-quarters of employers surveyed indicated that FCC and Hood College should be included in the Center (76% each). Mount St. Mary's was indicated by 62% of employer respondents, while approximately half mentioned the University of Maryland College Park (50%) and Johns Hopkins University (47%). Other institutions mentioned by at least 10% of respondents are displayed in **Exhibit 3-16**.

EXHIBIT 3-16
INSTITUTIONS WHICH SHOULD BE INCLUDED IN THE FREDERICK REGIONAL HIGHER EDUCATION CENTER (n=34)



Source: Employer Survey, 2014.
Note: Multiple response were allowed, percentages may not total 100%.

SUMMARY OF EMPLOYER PREFERENCES FOR EDUCATION/TRAINING DELIVERY

- Face-to-face instruction is the slightly preferred educational modality over on-line instruction, but both are acceptable.
- If a preference were indicated, more employers reported that Tuesday and Thursday evenings would be the best times for such training and program delivery.
- Time and program availability are viewed as the greatest obstacles to education and training in the region.
- Frederick Community College, Hood College and Mount St. Mary's University were most frequently cited as higher education partners who should be part of a Frederick Regional Higher Education Center.
- Two major research universities, the University of Maryland College Park, and Johns Hopkins University were also mentioned by roughly half of the responding employers.

3.2 STAKEHOLDER INTERVIEWS

As an additional step in the needs assessment study, with guidance from the Frederick Regional Higher Education Advisory Board members and assistance from Frederick County Chamber staff, a series of personal interviews were scheduled and completed during a two-day site visit by the consulting team the second week in February. Additional follow-up interviews were completed by phone over the course of three months. A total of 34 interviews were completed representing a cross-section of private sector employers, educational institutions, public agencies and community leaders located in Frederick County (**Exhibit 3-17**). Of those participating in the interview process, 10 individuals sit on the Advisory Board.

EXHIBIT 3-17
STAKEHOLDERS WHO PARTICIPATED IN INTERVIEWS

Frederick Co. Higher Education Needs Assessment		
Completed Interviews (as of 4/21/14)		
First Name	**Last Name**	**Company/Organization**
Daryl	Boffman	Acela Technologies, Inc.
Donna	Kuzemchak	Alderman, City of Frederick
Kate	Surdez	AstraZeneca Biologics Manufacturing Centre
Patrick	Fitch	Batelle National Biodefense Institute (& Pat Weaver)
Patrick	Haley	BridgePath Scientific
Paul	Smith	Commissioner, Frederick County
Barbara	Brookmyer	Dental - FCHD
Jim	Racheff	DMS, Inc.
Dave	Esworthy	First United Bank & Trust
Theresa	Alban	Frederick County Public Schools, Superintendent
Helen	Propheter	Frederick County, Business Development Division
Jamie	White	Frederick Memorial Hospital
Lanessa	Hill	Ft. Detrick
Ron	Volpe	Hood College, President
Dave	Bufter	Leidos Biomedical Research Inc.
David	Heimbrook	Leidos Biomedical Research Inc.
Melissa	Sines	Maryland Nonprofits
JP	Matan	Matan Companies
Thomas	Lynch	Miles & Stockbridge P.C. (& Susan McBee)
Thomas	Powell	Mount St. Mary's University
Joe	Lebherz	Mount St. Mary's University (Frederick Campus)
Howard	Young	NCI/CCR
Bob	Wiltrout	NCI/CCR (& Jeff Strathern)
Tanya	Sappington	NCI/CCR, Admin Resource Center
Frank	Goldstein	Severn, O'Connor & Kresslein, P.A.
Matt	Holbrook	St. John Properties, Inc.
Brad	Montgomery	State Farm Insurance Companies
Richard	Griffin	The City of Frederick (& Nikki Bamonti)
Katrina	Wyand-Yurish	The Plamondon Companies
Josh	Pedersen	United Way of Frederick County
Ann	Wylie	University of Maryland College Park
Ronald	Young	Senator, District 3, Frederick & Washington Counties
Galen	Clagett	Delegate, District 3a, Frederick County
Kelly	Schulz	Delegate, District 4a, Frederick County
Patrick	Hogan	Delegate, District 3a, Frederick County

Note: Stakeholders highlighted in blue are Advisory Board Members.

The commentary and discussion generated through this qualitative interview component is intended to inform and planning efforts to offer academic program and training through a regional higher education center in Frederick County. A summation of key points illustrating perceptions, needs, issues and concerns expressed by the collection of interview participants is presented in the first half of this chapter. These points are grouped by either topic area or industry sector.

TOPIC AREA

Items that follow in this section represent, for the most part, comments that cross industry sectors.

- **Access and Convenience**
  - Expanding access to higher education is one of the keys to achieving 2025 statewide degree attainment goals, which go hand-in-hand with growing and sustaining a highly skilled workforce in Frederick County. A significant portion of post-baccalaureate education needs in the County can be attributed to current employees (non-traditional age) who need appropriate credentialing to continue career advancement. New programs must be geared towards working adults in terms of time of day/day of week schedules, delivery options, and costs.
  - Location for the point of program delivery is also important since a significant portion of the workers in Frederick County live outside its boundaries. Commute times to/from work may help or hinder the ability to take courses locally. The location of a new regional higher education center should be carefully situated to be accessible by its prime target audiences. Both in-class and distance education models will be required.
  - Not unique to Frederick or Maryland, but significant numbers of traditional age students have to work while attending college. Time constraints are very prevalent.
- **Affordability**
  - As mentioned above, cost of attendance is probably the biggest issue for many attempting to attain a college degree at any level. The good news in Frederick County for working adults is that many of the employers polled do provide some level of tuition assistance and books.
  - Cost of a credit hour and associated fees is set by each institution. Two local institutions, Hood College and Mount St. Mary's University, are relatively small private institutions which rely heavily on tuition to fund programs and services. Through financial aid and tuition discounting, both have made concerted efforts to be more cost-competitive with state-supported public institutions.
  - Some programs, by their very nature and content are more expensive to start up and operate at enrollment maturity. This is especially true for STEM related disciplines.
  - It is also common that graduate programming on the main campus is supported by a strong undergraduate enrollment base, which may not be available in an off-campus setting such as a regional center.
- **Graduate Program Partners**
  - Graduate and doctoral degree programs, especially in STEM related disciplines are expensive and difficult to start-up or extend away from an institution's home campus, let alone sustain a critical mass of enrollment over time. Local higher education institutions are doing their part, but may have limited resources to commit to some technical programs, or lack authorization to offer advanced degrees in certain disciplines. They must make practical decisions to support a predominantly undergraduate population base of their respective institutions.

- For certain critical technical positions (e.g., lead researcher or principal investigator) credentialing from a recognized university with a strong reputation and track record in the given discipline is extremely important to employers.
- Also noted is a desire to hire technical personnel who have hands-on real-world experience. Interviewees agree that collaboration between education and business sectors to establish more opportunities for students to gain meaningful work experiences is a key pathway to employment. They also acknowledge the continued effort to expand such opportunities in Frederick County from k-12 to post baccalaureate levels.
- Depending on the discipline and pedagogy, it may prove difficult to attract an established graduate degree granting institution (master's or doctoral degree) to serve the local market needs, if tenured faculty are burdened by the endeavor or students are required to commute frequently to the home campus outside of Frederick County.
- What may interest and attract non-local universities and their graduate faculty to engage in Frederick County are the plethora of high-end research activity and associated dollars, the cutting edge facilities and equipment available, and the rich talent pool of researchers and technical staff in various industry sectors.

- **Overlap and Duplication**
  - A serious, and well-founded concern of long-standing local baccalaureate/graduate degree granting institutions is the potential for outside institutions to bring in competing programs that negatively impact the local institution's enrollment base within Frederick County. In particular, Mount St. Mary's has committed significant resources to their Frederick site, which could be in jeopardy via a new center.
  - If a local center is to be established, some assurances and policies may be required to mitigate program overlap and duplication for local institutions, as well as partners as they are established at the center.

- **Local Advantages**
  - A number of interview participants touted the advantages Frederick County has over other communities and locations in-state or elsewhere that relate to workforce, quality of life, and education and training factors. These include:
    - The presence of Ft. Detrick's military elements, its tenant federal agency research operations, and private contractor scientific R&D support base.
    - Three respected long-standing higher education institutions that continue to be responsive to the local community.
    - A balanced mix of industry sectors with significant numbers of employees ranging from service companies, to manufacturing, logistics and distribution, technology start-ups, communications, hospitality and leisure.
    - Location within a reasonable drive to the Baltimore-Washington metro area for commerce, travel, arts and entertainment, and national research and public policy matters.
    - Ample land for development is available as the metro area continues to expand outward. Frederick County continues to grow and benefit from an influx of people and business to serve their needs.

- **Program Quality**
  - This topic was considered both an issue and an advantage by several interviewees. Though employers wish to attract education and training programs of the "highest" quality from the "best" colleges and universities, they recognize that within the county a remarkable talent pool resides or works. Furthermore, that talent pool could support expansion of higher education opportunities as potential instructional adjuncts and research collaborators.
- **Physical Presence**
  - Though there may be some debate on the extent of facilities required to house a regional higher education center and its location (Maryland has a variety of models in play at other RHECs), for the most part comments seem to suggest a physical presence is necessary to serve as the public face of a Frederick Higher Education Center.
  - The capital needs of a regional center may be accommodated very differently at start-up rather than at mature build-out. Often centers start out in a temporary facility until they demonstrate sustainable demand.
- **Specialized Space & Equipment**
  - In some instances specialized tools and equipment such as computer hardware and software, manufacturing technology, scientific lab space and specialized research tools may be required to offer the needed programs, especially in STEM related disciplines and at the post-baccalaureate level. This may not be feasible without outside support.
  - Collaboration and partnering with local resources for sharing time for existing specialized space and equipment, along with mentoring and work/study opportunities must be part of any plan for expanded higher education in Frederick.
- **Workforce Needs**
  - The initiative to establish a regional higher education center in Frederick County has been driven by an expressed need to expand local workforce capacity in biomedical/bioscience and advanced technology skills corresponding to local economic development goals via post-baccalaureate programs.
  - Throughout the "Great Recession," Frederick County has fared better than the state in terms of unemployment. As the recovery continues, the workforce's excess capacity continues to shrink, placing additional pressures on employers to attract new entrants to fill job openings, particularly in STEM skills positions. Part of that effort is to develop a home-grown pipeline and expand educational opportunities for young residents as well as current employees looking to advance.
  - It is acknowledged that employers will continue to seek top talent from across Maryland, the U.S., and beyond for cutting edge/high level leadership positions in science, research, technology, and management positions.
  - In order to grow the local pipeline to STEM related degree programs and eventually viable employment for residents, additional collaboration, interchange, and support must occur between education and business/industry.
  - There are non-STEM workforce needs. Those needs should not be discounted by local community leaders, economic development advocates, education administrators, and business/industry managers in planning for a regional higher education center.

INDUSTRY SECTOR

The following summary points reflect comments specific to industry sectors.

- **Bio-science/Bio-Medical Research** – NCI/CCR has been at the forefront of programs to integrate science, technology and research experience for local students into their secondary and college curriculums providing "hands-on" research lab experience. They also provide current scientific research support staff and technicians with pathways to pursue post-baccalaureate credentials and degrees, particularly in fields of biology, chemistry, pharmacology, bio-medicine, bio-technology, bio-informatics and related specialties. They offer a limited number of temporary post-degree paid fellowships for non-government employees in research positions. Hood College collaborates with NCI to offer internships with CCR for their Masters of Science Biology program. The NIH budget continues to shrink and that impacts staffing numbers. They receive large numbers of job applicants for each scientific and technical position opening.

  Battelle National Biodefense Institute has an extensive staff of scientists with Ph.D. or Master's degrees. Most new hires require graduate degree and lab experience. Ft. Detrick will be opening a new lab in the near future, which will increase demand on the local workforce for those with scientific and technical credentials and demonstrated skill sets. The difficulty lies in getting staff access to appropriate degree programs while working. To meet such demand, they seek a recognized, high quality Ph. D. program to provide local access, as well as training and credentialing in Project Management (PMP certification).

  Leidos Biomedical Research has over 1,000 scientists and technical personnel that hold a post-baccalaureate degree in similar disciplines mentioned above. Local access to advanced STEM degrees would help in recruitment and retention of research personnel. The value proposition for a recognized education partner for advanced and specialized degrees is the opportunity to collaborate on "cutting edge" research.

  Others firms seek staff with varying levels of formal education, but focused on a combination of science, technology, and engineering skills for research lab operations, security, and equipment maintenance.

- **Education** - The local K-12 school system has developed a series of internship, mentoring, and work/study collaborative opportunities with local employers and government research efforts coordinated through NCI and its contractors. The emphasis is on encouraging high school students to pursue pathways to STEM related college degree options, and hence applicable employment.

  Local postsecondary education institutions have actively introduced a number of degree and training programs to respond directly to local needs. Other programs for possible consideration include; Human Services Leadership, Physical and Occupational Therapy, Speech Pathology, Engineering (Civil/Manufacturing), and HR Management.

  University of Maryland College Park has a possible vehicle in place to provide a master's degree with specialty emphasis that would not have all of the requirements and approval processes that come with introduction of a new academic program or changes that impact accreditation status. A professional master's degree on a local site would likely require corporate tuition support, a sustainable critical mass of enrollment, demonstrated needs with specific outcomes, faculty and support staff hires, and compliance with accreditation requirements.

- **Healthcare** – To meet local demand, Hood College recently graduated its first class of the BSN-Bridge program, and looks to offer a 4-year BSN option. Other areas of need discussed by healthcare representatives include Occupational Therapy (Ph.D.), Physical Therapy (Ph.D.), Speech and Language Pathology (Ph.D.), School Psychology (Ph.D.), a master's of Public health, school nurses (RN/BSN), social work and geriatrics focused degrees and continuing education, certified medical technicians, and geriatric nurse assistants. Hospital officials also see a continued need for advanced practice nurses, Nurse Practitioners/APN (MSN), clinical nurse specialists, medical coders, pharmacists, and IT healthcare specialists. They acknowledge that neither a regional higher education center nor current local institutions can resolve all of the pressing healthcare workforce needs, but feel there are limited health science programs serving the Frederick region.
- **Hospitality** – Typically this industry promotes managers from within, but does seek assistant managers and managerial trainees with a college degree and two years of hospitality and/or business experience. Staff need customer service training along with good communications skills. While there is little turnover among corporate level staff and managers, there is high turnover among non-managerial staff at properties. The FCC Culinary Arts program has a good partnership program with local hospitality business sector.
- **Pharmaceutical** – AstraZeneca Biologics Manufacturing Centre will likely see significant local expansion with a pressing need for a large number of lab technicians with bachelor's degrees in biology and chemistry. Related skill sets in demand are manufacturing technology and quality assurance. There is a desire to see a greater emphasis locally on meeting the education needs of private sector employers in science, technology, and manufacturing.
- **IT/Technology** – There is a growing local demand for applied information and management systems knowledge, bio-informatics, telecommunications and related software and technology. A developing technology features utilization of Radio Frequency communications (RF) with wireless device applications. RF training is specialized and usually embedded in an electrical engineering program. There may be a growing regional demand for employee training in RF systems design, software development and application, and equipment testing.

SUMMARY OF QUALITATIVE INTERVIEW FINDINGS

- "Job critical" is to provide a highly skilled workforce that supports local employer needs and contributes to the economic well-being of Frederick County. To that end, a regional higher education center is the desired catalyst.
- The need is for expanded opportunities for local postsecondary education and training, with emphasis on access, convenience, and affordability.
- Local need crosses many disciplines and educational levels, but areas of acute need are STEM related programs, especially advanced graduate degree options.
- Local institutions should remain a part of any solution, and are recognized for their efforts to respond to local needs given their core missions. Program duplication or displacement of current local programs is not a desired outcome.
- It is preferred that advanced masters and doctoral programs in science and technology be offered through a recognized research university.

- Frederick County has a positive economic outlook, visible community support, a diverse employer base, and a remarkable level of highly specialized private and public sector personnel talent and physical assets that may help to attract advanced degree educational partners to a regional center.
- To support and grow a local pipeline to STEM education and thus high-paying jobs, a clear pathway must be evident. Continued collaboration between the school system, higher education partners, employers, and community leaders is imperative. A regional center could help to facilitate such partnerships.

4.0 INDICATORS OF PROGRAM NEED IN FREDERICK COUNTY

A major purpose of this assessment is to identify programs of need, parse out those that are currently being met locally to a reasonable degree, gather some measure of demand (magnitude of unmet need) for those that remain, and establish a priority from that metric. Such data will inform both MHEC and the Frederick Regional Higher Education Advisory Board as they explore strategies and actions related to meeting those needs and decisions regarding the establishment of a regional higher education center in Frederick County.

Furthermore, the information and data set forth in the entirety of this needs assessment report, and particularly, the indicators of demand presented in this chapter, may prove helpful in generating interest among potential educational partners who might consider offering programs locally.

Two different data elements are employed to frame potential program demand:

1. Occupational Projections of local Job Openings (new positions and replacements) through 2020, as released by the Maryland Department of Labor, Licensing and Regulation.
2. Survey responses from a sample of Frederick County employers reporting estimates of annual need for training and education of current and future employees.

Both data sets are sorted to reflect demand by three college degree levels typically required for entry into that profession/occupation:

- Graduate degrees (Master's, Doctorate, First Professional)
- Baccalaureate degrees (BA, BS, and non-professional)
- Associate's degree (AA, AA, AAS)

Note: Some first professional degree information has been removed from the charts and tables that follow, as those were not viewed as a priority or a realistic expectation to address through a regional higher education center at this time.

4.1 OCCUPATIONAL PROJECTIONS

In this section data is presented by each of three degree levels associated with occupational openings projected for Frederick County as described above. Two exhibits are included for each education level, directly reflecting where the job opportunities requiring college degrees will be, and the relative magnitude of total openings.

The first table displays official State projections of employment and job openings across a 10-year period for aggregate groupings of occupational categories. Data shows new positions ("change") plus replacements needed (filling existing positions due to turnover), and provides a total number of cumulative openings expected through the year 2020. A final data point identifies the percent of total openings due to replacement, often an indicator of potential re-credentialing or continuing education need.

The second table displays the top detailed occupational categories based on total number of openings across the 10-year horizon for that degree level, thus, an indicator of demand magnitude.

With a focus on occupations that typically require a graduate degree for entry, two aggregate categories of Healthcare Practitioners/Technicians, and Life/Physical/Social Sciences show the largest number of openings through 2020 (**Exhibit 4-1**), however, the latter group has a much smaller replacement rate.

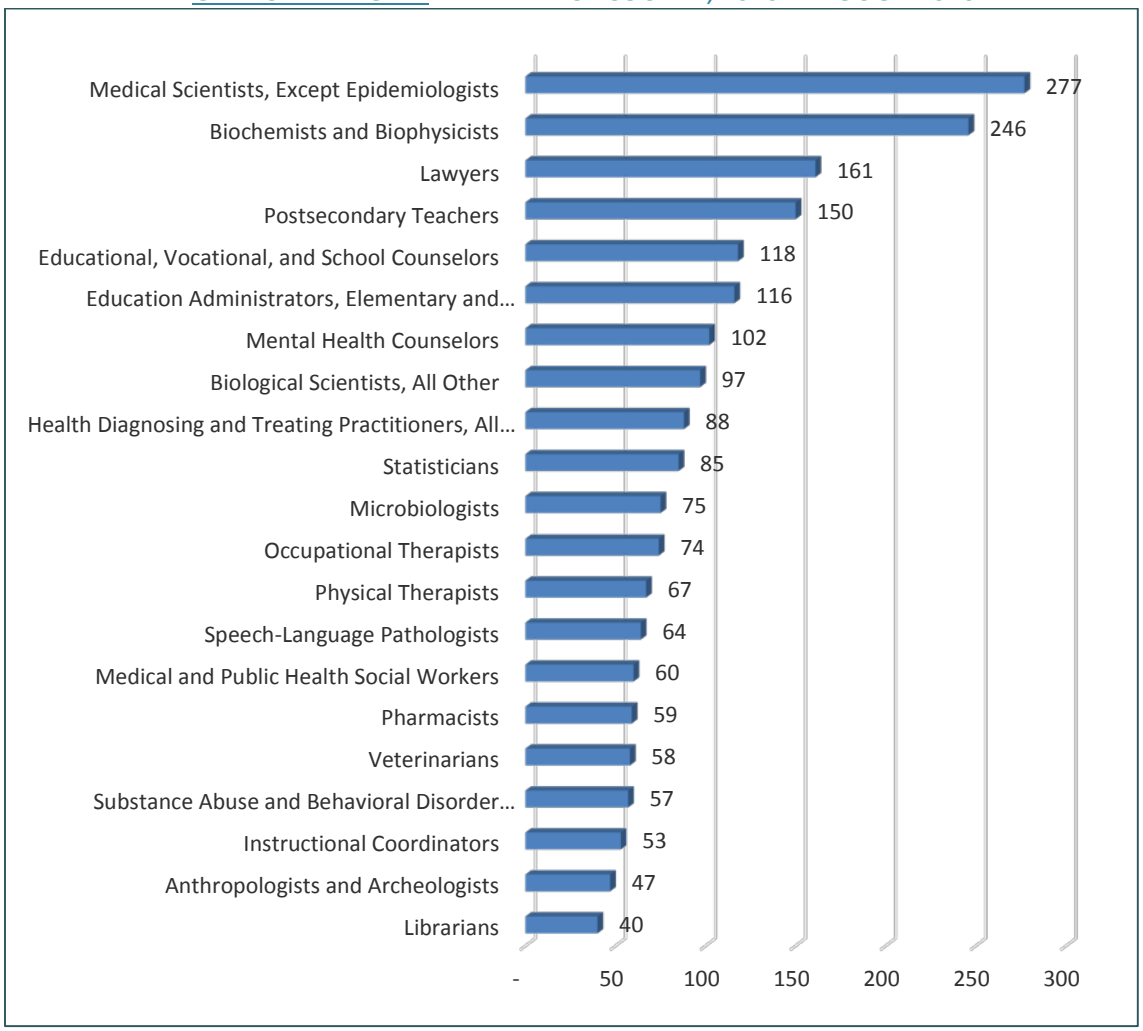
EXHIBIT 4-1
PROJECTED GROWTH BY AGGREGATE OCCUPATIONAL CATEGORIES REQUIRING A GRADUATE DEGREE IN FREDERICK COUNTY, 2010 THROUGH 2020

Occupational Categories Requiring a Master's, Doctorate, or Professional Degree By Total Number of Openings Over 10 years						
Occupational Category	Employment			Openings		% Replacement
	2010	2020	Change	Replace.	Total	
Healthcare Practitioners and Technical Occupations	1,601	2,253	652	344	996	35%
Life, Physical, and Social Science Occupations	1,025	1,672	647	208	855	24%
Community and Social Services Occupations	780	1,068	288	169	457	37%
Education, Training, and Library Occupations	1,052	1,250	198	184	382	48%
Legal Occupations	224	342	118	43	161	27%
Management Occupations	352	398	46	100	146	68%
Computer and Mathematical Occupations	116	196	80	53	133	40%

Source: Maryland Department of Labor Licensing and Regulation, 2014.

Looking at openings in more detailed occupational categories (**Exhibit 4-2**), medical scientists, and biochemists/biophysicists project more than 200 openings each over 10 years. A significant need (100+) for college instructors, vocational/school counselors, and Pk-12 administrators follows. Interestingly, based on DLLR projections, 47% of all job openings projected for biochemists in the state of Maryland through 2020 are attributed to Frederick County.

EXHIBIT 4-2
PROJECTED OPENINGS AMONG DETAILED OCCUPATIONAL CATEGORIES REQUIRING A GRADUATE DEGREE IN FREDERICK COUNTY, 2010 THROUGH 2020



Source: Maryland Department of Labor Licensing and Regulation, 2014.

For bachelor's degree prevalent occupations, **Exhibit 4-3** depicts the aggregate categories foreseen with the greatest number of openings, which include Business and Financial Operations, Computer and Mathematical positions, and Management. The top detailed occupational categories with considerable projected openings that require a bachelor's degree include engineers, business operations, information security, accounting, management analysts, high school teachers, and software developers, each with approximately 500-1,000 job openings through the end of this decade (**Exhibit 4-4**).

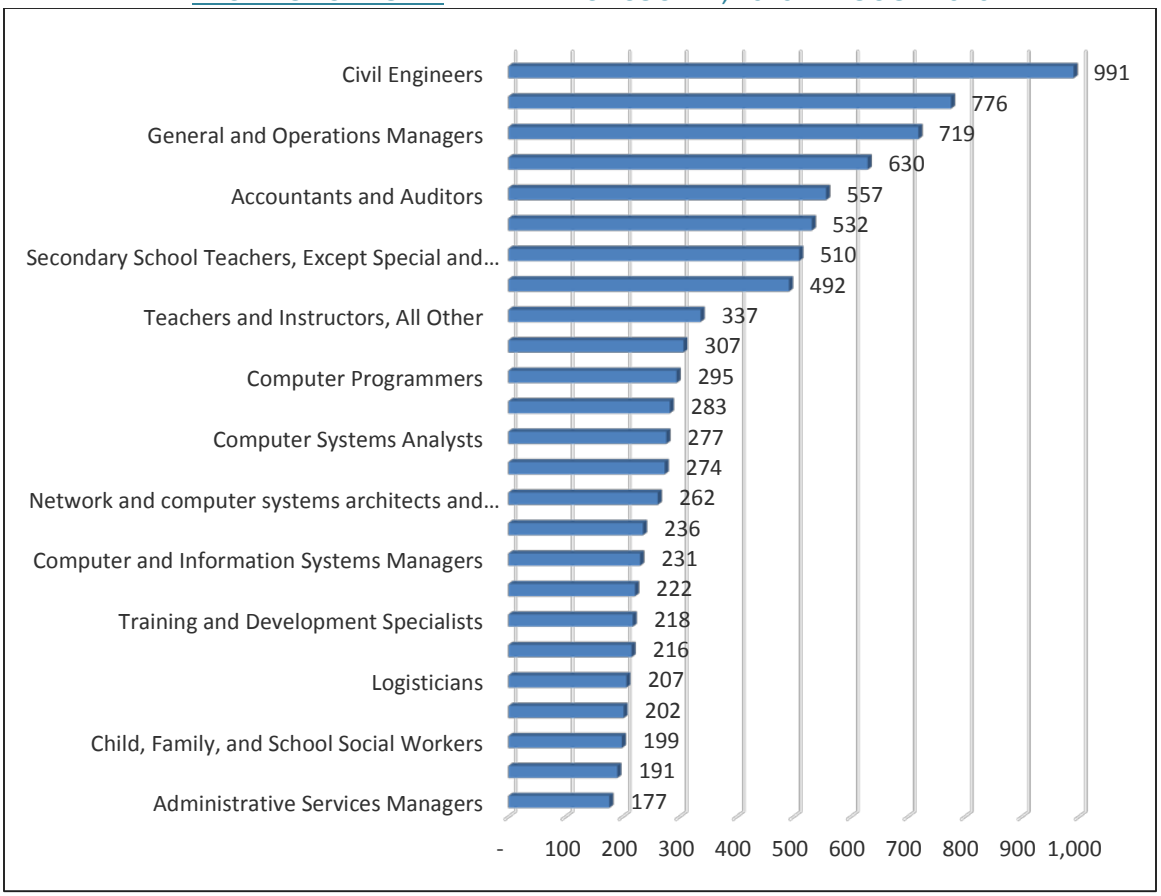
The number of openings for civil engineers in Frederick County is disproportionately greater when compared to projected openings across the state as a whole. Though not as prevalent in its disparity from the state, demand for filling Biomedical Engineer positions in Frederick County accounts for nearly one quarter of projected statewide need through 2020.

EXHIBIT 4-3
PROJECTED GROWTH BY AGGREGATE OCCUPATIONAL CATEGORIES REQUIRING A BACHELOR'S DEGREE IN FREDERICK COUNTY, 2010 THROUGH 2020

Occupational Categories Requiring a Bachelor's Degree By Total Number of Openings Over 10 years						
Occupational Title	Employment			Openings		%
	2010	2020	Change	Replace.	Total	Replacement
Business and Financial Operations Occupations	6,259	9,117	2,858	1,234	4,092	30%
Computer and Mathematical Occupations	3,182	5,261	2,079	501	2,580	19%
Management Occupations	4,199	5,433	1,234	921	2,155	43%
Architecture and Engineering Occupations	1,675	2,918	1,243	369	1,613	23%
Education, Training, and Library Occupations	3,437	3,904	467	806	1,273	63%
Arts, Design, Entertainment, Sports, and Media Occupations	836	1,114	278	235	517	45%
Life, Physical, and Social Science Occupations	622	922	300	164	464	35%
Community and Social Services Occupations	510	701	191	117	308	38%
Sales and Related Occupations	416	539	123	102	225	45%
Healthcare Practitioners and Technical Occupations	308	385	77	80	157	51%
Personal Care and Service Occupations	139	174	35	22	57	39%
Legal Occupations	59	80	21	9	30	30%
Office and Administrative Support Occupations	13	21	8	2	10	20%

Source: Maryland Department of Labor Licensing and Regulation, 2014.

EXHIBIT 4-4
PROJECTED OPENINGS AMONG DETAILED OCCUPATIONAL CATEGORIES REQUIRING A BACHELOR'S DEGREE IN FREDERICK COUNTY, 2010 THROUGH 2020



Source: Maryland Department of Labor Licensing and Regulation, 2014.

For positions typically requiring a 2-year degree to start, Healthcare Practitioners and Technical occupations are by far the most needed in Frederick County (**Exhibit 4-5**). However the Architecture and Engineering aggregate category, and the Life, Physical and Social Science job grouping show strong demand (projected openings) for appropriately skilled workforce as well.

EXHIBIT 4-5
PROJECTED GROWTH BY AGGREGATE OCCUPATIONAL CATEGORIES REQUIRING AN ASSOCIATE DEGREE IN FREDERICK COUNTY, 2010 THROUGH 2020

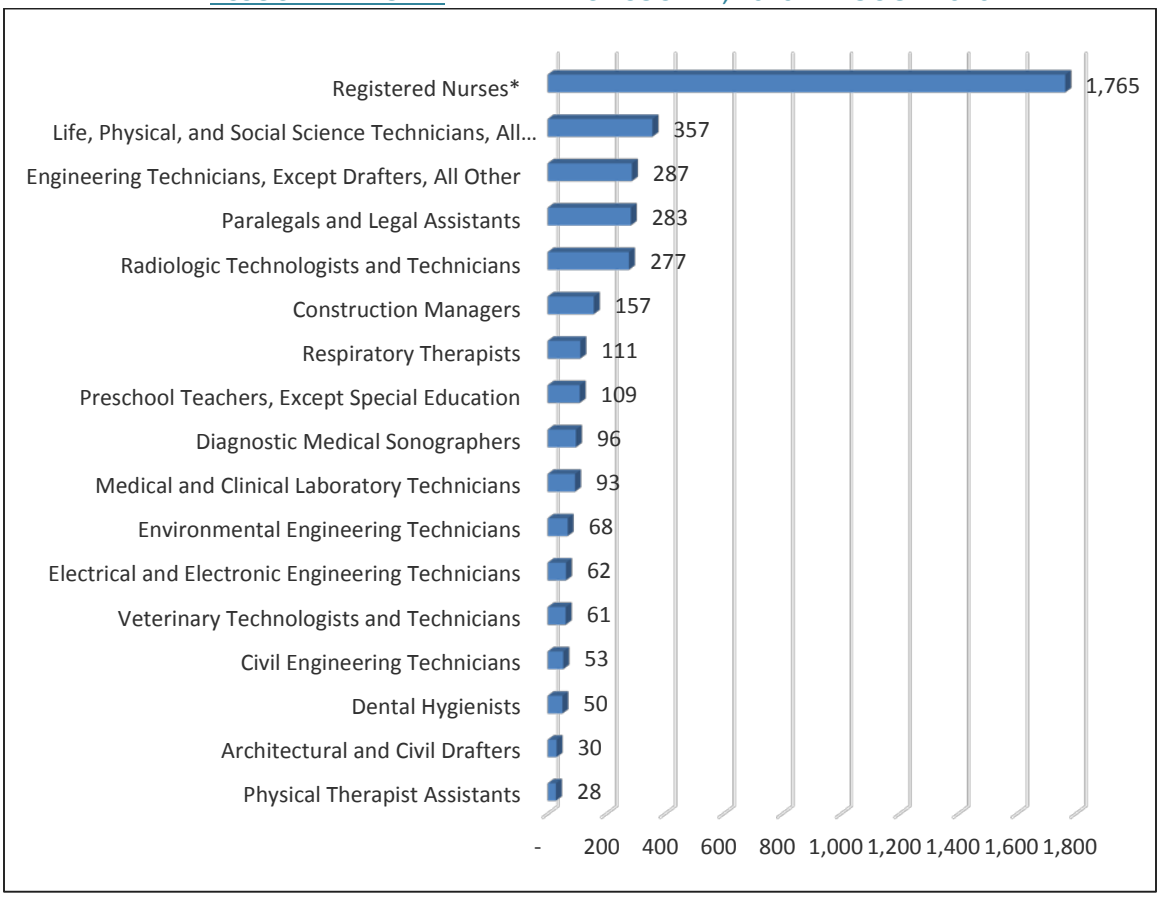
Occupational Categories Requiring an Associate's Degree By Total Number of Openings Over 10 years						
Occupational Title	Employment			Openings		% Replacement
	2010	2020	Change	Replace.	Total	
Healthcare Practitioners and Technical Occupations	4,697	6,341	1,644	835	2,479	34%
Architecture and Engineering Occupations	676	1,080	404	128	532	24%
Life, Physical, and Social Science Occupations	360	601	241	147	388	38%
Legal Occupations	374	604	230	53	283	19%
Management Occupations	826	930	104	53	157	34%
Education, Training, and Library Occupations	256	298	42	67	109	61%
Healthcare Support Occupations	32	62	30	5	35	14%
Office and Administrative Support Occupations	38	50	12	8	20	40%
Personal Care and Service Occupations	10	11	1	2	3	67%
Farming, Fishing, and Forestry Occupations	8	9	1	2	3	67%

Source: Maryland Department of Labor Licensing and Regulation, 2014.

When the aggregate healthcare grouping is broken down into detailed occupational categories, nursing accounts for over 70% of this demand (**Exhibit 4-6**). It should be noted that although the classification of education typically associated with entry-level positions indicates a 2-year degree is the norm for nursing, trends indicate that a bachelor's degree is of considerable importance in the marketplace. Supply and demand pressures along with certification and licensure requirements will dictate the magnitude of future need at the BSN degree level.

Also of significance to Frederick Community College in particular, is the need for technicians in areas of Life/Physical/Social Science, Engineering specialties, and a group of additional medical/healthcare occupations.

EXHIBIT 4-6
PROJECTED OPENINGS AMONG DETAILED OCCUPATIONAL CATEGORIES REQUIRING AN ASSOCIATE DEGREE IN FREDERICK COUNTY, 2010 THROUGH 2020



Note: *Based on interviews, local healthcare employers indicate a growing trend towards requirement of a BSN degree to fill some portion of these nursing openings.
Source: Maryland Department of Labor Licensing and Regulation, 2014.

Occupational Openings Summary

One measure that may assist planners in identifying needed postsecondary education programs and training for the local area through a new regional higher education center is future job growth as depicted by projected occupational openings in Frederick County through year 2020. Occupational groupings by typical education level required are summarized below along with the approximate number of total openings expected during the current decade. Occupations in **bold type** indicate areas where local programming is not readily available.

Graduate Level (masters, advanced master, doctorate):

- **Biological and Medical Scientists (700)**
- **Healthcare Services Professionals (625)**
- **Educational Administrators Pk-12 (325)**
- Postsecondary Teachers (150)

Baccalaureate Degree Level:

- **Civil Engineers (1,000)**
- Business, Management, Finance and Administrative Specialists (4,000)
- **Information Technology and Security, Computer/Network Systems and Software (2,700)***
- Pk-12 Teachers and Training Specialists (1,500)
- Nurses** (900)

Associate/Certificate Degree Level:

- Nurses** (900)
- Other Health Care Technicians (700)
- **Engineering Technicians (500)**
- Life, Physical and Social Science Technicians (350)

* Some specialty disciplines at the Bachelor's degree level are not readily available locally.
** Based on input from healthcare employers, the projected openings in the nursing profession were evenly divided between a BSN and 2-year associate degree level.

4.2 INDICATORS OF PROGRAM DEMAND

In this section we focus on estimated local education and training needs by degree level based on employer survey responses using CIP discipline descriptors. Such predicted need covering the next 3 to 5 years includes current and future employees of each responding firm or entity, and applies to degree completion as well as specific training and continuing education, as expressed by the employers.

For the three education levels (degrees), we present the detailed survey findings of training and education needs in descending order of magnitude within aggregate academic groupings. Furthermore, comparing the needed disciplines to local institution program inventories (Appendix A), the charts indicate if that particular discipline is not available through one or more of the local colleges. Disciplines with less than 10 employees in need were removed from these tables for brevity.

A cautionary note is offered, in that the disciplines listed and numbers of employees to be served, are reflective of the type and size of firms responding to the survey and the target sample (see Chapter 3.0 for explanation regarding the survey methodology and representation). The numbers associated with each reported program discipline represent a cumulative estimate of employees who might need that particular training or program within the time horizon. In all likelihood, an employee may be in need of education and training in more than one discipline, and therefore would be counted separately for each. This does not guarantee that all will pursue such education and training, and it does not predict if all of the related instruction would be received locally, or provided by a higher education institution. However, it does offer an indication of the relative potential for addressing that need, in this case through multiple approaches including local partners and a regional higher education center.

Program/discipline information presented in Exhibit 4-7 reflects reported needs from the employer survey targeted for graduate level education (masters, graduate certificates, advanced masters and doctorate). In several cases an applicable master's program may be available locally, but no local institution currently offers a doctoral program). Further, in some disciplines where the estimate of need

is large, the capacity of an existing program may not provide ample access to meet anticipated demand. Though this study did not attempt to correlate individual program capacity with demand estimates, such factors should be considered on an individual basis when planning to introduce a new program locally.

From the job openings data in the preceding section of this chapter, we know that a significant number of positions will be available for teachers and training specialists local. Survey data displayed in Exhibit 4-7 (Part I) is focused on the Pk-12 education system, and perceived needs for training and education in various disciplines for instructors, support personnel and administrators. Although a number of the requested disciplines are offered locally at the baccalaureate level, graduate education focused on the elementary and secondary education professions is somewhat limited. Additionally a number of these needs could be addressed through customized training opportunities or one or a sequence of courses and not require a full degree program. This may be another component of a regional higher education center to be considered.

However, need for teacher credentialing in the form of a master's degree or a graduate certificate in various disciplines is evident. Additionally, a doctoral program focused on educational administration, curriculum and instruction, assessment, or public administration may be warranted.

Turing attention to Exhibit 4-7 (Part II), non-education specific disciplines in Information Technology and Computer Systems, along with the Sciences (primarily related to biology and biomedical specialties) are most in need, and not readily available locally.

For example, *Biochemistry, Biophysics, and Molecular Biology* graduate level training and education needs are estimated for 50+ employees. This would require a very specialized and focused program with a limited capacity in order to address this need. Further this discipline is one of a dozen reported non-teacher education specialties (CIPs) listed that reflect an emphasis on science representing nearly 400 employees. Based on comments from various employers in this industry sector, education needs are for very specialized advanced graduate degrees, including Ph.D.'s. Depending on the position, the conferring institution is important as well the degree credential.

Although graduate programming in Computer Science and Information Technology is available locally, some of the discipline specialties may not be. This grouping represents more than 150 employees identified for possible training and education in this aggregate technical post-baccalaureate focus.

Some training and education programming at the graduate level in business and management operations may be captured in the two local MBA programs and their corresponding areas of concentration, but several specialty classifications (CIPs) requested by employers on the survey are not offered.

Finally, despite the major focus in local demand for nursing credentialing is at the 2-yr degree and the BSN (as determined by projected position openings, and interviews), there is some expressed need for access to a graduate nursing program.

EXHIBIT 4-7
LOCAL NEEDS REQUIRING GRADUATE LEVEL EDUCATION/TRAINING
(PART I)

Graduate Level Education/Training			
Academic Disciplines		Number of Current and Future Employees Needing Training as Indicated by Employer Survey	Program Not Available at This Level in the Local Market
Education Professions			
Education	Teacher Education and Professional Development	1000	
	Mathematics and Computer Science	700	
	Teaching English or French as a Second or Foreign Language	700	X
	Special Education and Teaching	500	
	Biological and Physical Sciences	500	X
	Educational Administration and Supervision - PK-12	500	
	Student Counseling and Personnel Services	300	X
	Social Work	300	
	Curriculum and Instruction	250	
	Public Administration	200	X
	Accounting and Computer Science	125	
	Behavioral Sciences	100	X
	Bilingual, Multilingual, and Multicultural Education	100	X
	Intercultural Multicultural and Diversity Studies	100	X
	Multi Interdisciplinary Studies	100	X
	Statistics	75	X
	Mathematics	75	
	Applied Mathematics	60	X
	Classical and Ancient Studies	50	X
	Nutrition Sciences	40	X
	Communications Technology Technician	35	X
	Mathematics and Statistics	25	X
	Educational Assessment, Evaluation, and Research	25	X
	Educational Instructional Media Design	25	X
	Graphic Communications	20	X
	Audiovisual Communications Technologies/Technicians	20	X
	Computer and Information Sciences	15	
	Computer Systems Networking and Telecommunications	15	X
	Computer/Information Technology Admin. and Management	15	
	Computer Programming	15	

Highlighted cells indicate that no program is available at this level locally.

Source: Employer Survey and local provider and RHEC program listings.

EXHIBIT 4-7
LOCAL NEEDS REQUIRING GRADUATE LEVEL EDUCATION/TRAINING
(PART II)

Graduate Level Education/Training			
Academic Disciplines		Number of Current and Future Employees Needing Training as Indicated by Employer Survey	Program Not Available at This Level in the Local Market
Non-Education Professions			
Business	Accounting and Related Services	46	
	Business Administration, Management and Operations	30	
	Business Operations Support and Assistant Services	15	
	Business Corporate Communications	14	X
	Human Resources Management and Services	14	
	Business Commerce	20	X
	Business Managerial Economics	13	X
	Finance and Financial Management Services	10	
Healthcare	Nursing	27	
Information Technology and Computer Systems	Computer and Information Sciences	43	
	Computer Programming	35	X
	Computer Systems Networking and Telecommunications	34	X
	Computer/Information Technology Admin. and Management	30	
	Computer Systems Analysis	18	X
	Management Information Systems and Services	15	
Science	Microbiological Sciences and Immunology	75	
	Biochemistry, Biophysics and Molecular Biology	54	X
	Cell/Cellular Biology and Anatomical Sciences	44	X
	Biological and Biomedical Sciences	31	
	Biology	30	
	Biology Technician Biotechnology Laboratory Technician	28	
	Biotechnology	25	
	Clinical/Medical Laboratory Science and Allied Professions	22	X
	Physiology, Pathology and Related Sciences	21	X
	Biomathematics and Bioinformatics	19	X
	Chemistry	11	X
	Ecology, Evolution, Systematics, and Population Biology	11	X
	Zoology/Animal Biology	11	X
	Plant Sciences	10	X
Other	Veterinary Medicine (DVM)	40	X
	Basic Skills	20	
	Agriculture	15	X

Highlighted cells indicate that no program is available at this level locally.

Source: Employer Survey and local provider and RHEC program listings.

For baccalaureate degree and corresponding levels of training and continuing education needs expressed on the employer survey, the listings presented in **Exhibit 4-8** are dominated by unmet need of

information technology, computer science and telecommunications disciplines, as well as specialty areas related to medical research and biological sciences. Teacher education again tops the list in terms of reaching the largest number of employees in need of education and training, but that may become a capacity issue associated with locally available programs.

EXHIBIT 4-8
LOCAL NEEDS REQUIRING BACHELOR'S LEVEL EDUCATION/TRAINING

Bachelor s Level Education/Training			
Academic Disciplines		Number of Current and Future Employees Needing Training as Indicated by Employer Survey	Program Not Available at This Level in the Local Market
Business	Business Administration, Management and Operations	348	
	Business Commerce	310	X
	Accounting and Related Services	157	
	Business Operations Support and Assistant Services	76	
	Business Corporate Communications	72	X
	Business Managerial Economics	48	
	Human Resources Management and Services	47	
	Finance and Financial Management Services	33	
Education	Teaching Assistants/Aides*	205	
Healthcare	Biological and Biomedical Sciences	41	
	Nursing	21	
	Clinical/Medical Laboratory Science and Allied Professions	15	X
	Pharmacology and Toxicology	11	X
Information Technology and Computer Systems	Computer and Information Sciences	53	
	Computer Systems Networking and Telecommunications	35	X
	Management Information Systems and Services	32	
	Communications Technology Technician	29	X
	Computer Programming	24	X
	Computer/Information Technology Administration and Management	19	
	Biomathematics and Bioinformatics	12	X
Science	Biology Technician Biotechnology Laboratory Technician	310	
	Microbiological Sciences and Immunology	72	
	Biology	71	
	Biochemistry, Biophysics and Molecular Biology	66	
	Biotechnology	34	
	Cell/Cellular Biology and Anatomical Sciences	27	X
	Physiology, Pathology and Related Sciences	21	X
	Plant Sciences	10	X
Other	Basic Skills	48	
	Data Processing	13	X
	Veterinary Biomedical and Clinical Sciences	12	X

Highlighted cells indicate that no program is available at this level locally.

*Note: All needs in this category are accounted for by the Frederick County Public School System.

Source: Employer Survey and local provider and RHEC program listings.

Although the list in **Exhibit 4-11** is much smaller than preceding ones focused on baccalaureate and graduate education, the associate degree level needs identified by surveyed employers reiterated the on-going emphasis on "basic skills" training and education. Additionally, security and electrical engineering and drafting/design technology programs, though limited in numbers from the survey, are in line with growing or established technology manufacturing sectors prevalent in the County. Although the 2-year nursing was not identified as a specific need from the survey, the estimated number of position openings identified in the earlier section of this chapter still demand attention. Frederick Community College has been very responsive to identifying and adapting their program inventory to respond to changing needs.

EXHIBIT 4-9
LOCAL NEEDS REQUIRING ASSOCIATE LEVEL EDUCATION/TRAINING

Associate Level Education/Training		
Academic Disciplines	**Number of Current and Future Employees Needing Training as Indicated by Employer Survey**	**Program Not Available at This Level in the Local Market**
Teaching Assistants/Aides*	400	
Basic Skills	76	
Security and Protective Services, Other	45	X
Biology, General	39	
Business Administration, Management and Operations	24	
Electrical, Electronics and Communications Engineering	14	X
Quality Control and Safety Technologies Technicians	13	X
Drafting/Design Engineering Technologies/ Technicians	12	X

*Note: All needs in this category are accounted for by the Frederick County Public School System.
Source: Employer Survey and local provider and RHEC program listings.

4.3 SUMMARY OF NEEDS

Whether the focus on education and training needs in Frederick County is derived from employer survey data, or extrapolated from projected annual job openings, several things are most evident.

- Traditional undergraduate programs routinely in demand such as nursing, teacher education and business (business, management, accounting, finance and HR) are well represented in the needs analysis. Local institutions have made strides in addressing such needs at the appropriate education level. However, in some instances demand is likely to exceed local program capacity.
- There are no local doctoral level education programs for administrators, curriculum, and evaluation/assessment specialists.
- Biological Science and a host of related science research specialties make up a significant portion of identified need at the graduate degree level (including Ph.D.'s) and to a lesser extent, at the 4-year degree level. Although there are two masters level degrees offered by local institutions, the advanced specialty concentrations, technical infrastructure, and the institutional credentials are critical missing elements in meeting local needs. The program areas of most interest include:

  - Biomedical sciences, biochemistry, biophysics, bioinformatics, biomathematics, immunology, biotechnology, cellular biology, and medical scientists.

- A second dominant cluster of need crossing both baccalaureate and graduate levels involves technology related disciplines and jobs centered around:

  - Computer and information sciences, programming, software development, systems analysis, networking, telecommunications, cybersecurity, and management information systems.

- Additional need for STEM programs and relevant positions appear on the lists for mathematics, statistics, and several engineering disciplines (civil and electrical engineering).

- Numerous heath related disciplines and occupations appear on the graduate and baccalaureate program needs lists that may prove more difficult to address due to the complexities and costs associated with such programs, accreditation and certification requirements, and the impacts these factors have on program capacity.

- There appears to be a significant, continuing need for nurses as projected by position openings, and credentialing is trending toward a BSN for a portion of those positions.

- Finally, reported need for training and education focused on basic skills such as communications, writing, English, math, organizational skills, team building, problem solving, and leadership transverse each level of post-secondary education, and may be integrated into other program majors or corporate and continuing education curriculum.

5.0 MARYLAND REGIONAL HIGHER EDUCATION CENTERS

Maryland has a well-established system of regional higher education centers (RHECs) sited across the state. The Frederick Regional Higher Education Center Advisory Board and MHEC representatives realized the cumulative knowledge and experiences of these centers would hopefully prove quite valuable to planning for and implementing a similar entity in their county. Thus part of the mandated scope of work for this needs assessment study was to gather input from each center in this regard.

The eight existing regional centers in Maryland were reviewed in order to provide information that could help guide decision making and planning related to a proposed center in Frederick. Information about the centers was obtained from MHEC offices, center Websites, and interviews with center leadership. This chapter summarizes the interviews by key topic area and presents an analysis of program offerings by degree level, some suggested "best practices" as well as "lessons learned" offered by the center leaders, as well as the consulting team.

5.1 INTRODUCTION TO MARYLAND REGIONAL HIGHER EDUCATION CENTERS

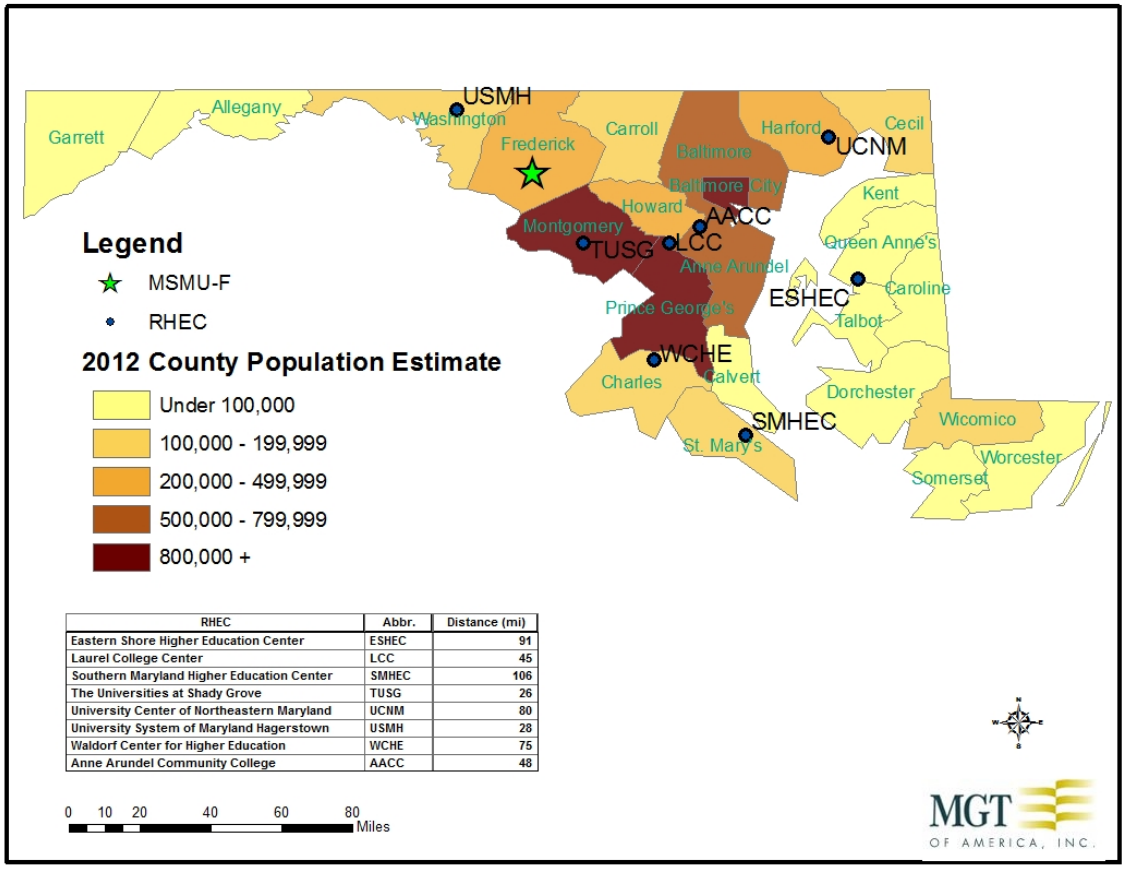
Each of the eight regional centers has a model of operation and governance, program inventory, institutional partnerships, and facilities that is unique to their specific situation, surroundings, local needs and target audiences.

The regional centers and location of each are as follows:

- Anne Arundel Community College at Arundel Mills
- Eastern Shore Higher Education Center, Wye Mills (Queen Anne's County)
- Laurel College Center (Prince Georges County)
- Southern Maryland Higher Education Center, California (St. Mary's County)
- The Universities at Shady Grove, Rockville (Montgomery County)
- University Center of Northeastern Maryland, Aberdeen (Harford County)
- University System of Maryland Hagerstown (Washington County)
- Waldorf Center for Higher Education (Charles County)

Exhibit 5-1 displays the location of each RHEC. As shown, most of the Centers are located a significant distance from Frederick County and vary dramatically in home county size (population).

EXHIBIT 5-1
LOCATION OF MARYLAND'S EIGHT REGIONAL HIGHER EDUCATION CENTERS



RHEC	Abbr.	Distance (mi)
Eastern Shore Higher Education Center	ESHEC	91
Laurel College Center	LCC	45
Southern Maryland Higher Education Center	SMHEC	106
The Universities at Shady Grove	TUSG	26
University Center of Northeastern Maryland	UCNM	80
University System of Maryland Hagerstown	USMH	28
Waldorf Center for Higher Education	WCHE	75
Anne Arundel Community College	AACC	48

Source: ArcView GIS depictions of geographies. Population estimates, U. S. Census.

The Maryland Regional Higher Education Centers and their institutional partners are shown in **Exhibit 5-2** along with the degree level of programming offered at each. Institutional partners which are most active with the centers include:

- University of Maryland University College (UMUC) – partnering with eight RHECs
- Towson University – partnering with five RHECs
- University of Maryland College Park (UMCP) – partnering with five RHECs
- Notre Dame of Maryland University – partnering with four RHECs
- Salisbury University – partnering with four RHECs

There are a number of other institutions, primarily from Maryland, that partner with only one or two regional centers as noted in the chart below.

EXHIBIT 5-2
PARTNER INSTITUTIONS OPERATING AT MARYLAND CENTERS BY DEGREE LEVEL

	UM Shady Grove	USM Hagerstown	Arundel Mills	Eastern Shore	UC Northeastern MD	Laurel College	Southern Maryland	Waldorf
Bowie State University	G						G	
Capitol College							U, G	
College of Notre Dame of Maryland University								U, G
Coppin State University		U						
Frostburg State University		U, G	U					
Gratz College							G	
Gratz College RTC				G				
Harrisburg University of Science and Technology							G	
Johns Hopkins University					U, G		G	
McDaniel College			G					
Morgan State University					G			
Notre Dame of Maryland University			U, G	G	U, G	U	G	
Salisbury University	U	U, G		U, G			U, G	
Stevenson University			U	U, G			U	
The George Washington University							G	
Towson University	U, G	U, G			U, G		G	U
UM Baltimore	U, G							
UM Baltimore County	U, G							
UM College Park	U, G	G			G	G	U, G	
UM Eastern Shore	U			U, G				
UM University College	U, G	U	U	U	U	U	U	U
University of Baltimore	U, G							
Washington Adventist University							U	
Webster University							G	

Source: Compiled from MHEC summary fact sheet of RHECs, each center's website, and MGT interviews with RHEC directors.
Note: U = undergraduate degree available at the center through this partner, G = graduate degree available at the center through this partner.

Exhibit 5-3 displays a list of common academic programs each available at three or more of the RHECs in Maryland. Not surprisingly, the undergraduate programs most commonly found across centers are also programs that are routinely popular on most main campuses as well. The only exception from this list are programs related to Cybersecurity, a growing academic program, which correlates to an emerging workforce demand targeted by Maryland.

Commonly found graduate programming is often driven by business management (including MBA options), education degrees to supplement local school system personnel needs, and the continuous efforts to fill advanced patient care and administrative requirements in the healthcare system. The gamut of engineering and information technology graduate programing is congruent with the push for more STEM degree completions throughout Maryland, and across the nation.

EXHIBIT 5-3
COMMON PROGRAMS AVAILABLE
AT MARYLAND CENTERS

Undergraduate	
Program	**Number of RHECs where this program is available**
Business Administration/Management	8
Criminal Justice (or Sociology with a Criminal Justice focus)	6
Cybersecurity	5
Elementary Education	8
Information Systems Management	6
Nursing	5
Social Science	3
Social Work	4

Graduate	
Program	**Number of RHECs where this program is available**
Business Administration/Management	5
Elementary Education	8
Engineering	4
Information Technology	3
Nursing	5
Social Work	4

Source: MGT analysis.

A detailed listing of programs offered at each regional center by degree level and partner institution is displayed in **Appendix D**.

5.2 CRITICAL ISSUES FROM RHEC INTERVIEWS

In this section, we summarize a variety of issues explored with RHEC Directors during interviews. The interview process was focused on learning about each center's approach and strategy to issues related to start-up and operation typically associated with higher education centers. The following section summarizes those findings. Responses are identified by center, because each Maryland RHEC is somewhat unique in its surroundings, mission, programming and populations served.

Governance Structure

Arundel Mills Center
A Learning Response Team was formed with representatives from each of the partner institutions and the community college. Initially, the Team met monthly to develop processes and to guide the Center's development. After 10 years in existence, the meeting frequency has declined a bit but continues to meet to address issues as they arise. In addition, marketing representatives from all partner institutions and the community college meet annually to plan joint marketing efforts. The Center developed a Memorandum of Understanding (MOU) for partner agreements to cover a broad set of aspects of the relationship.

Eastern Shore Higher Education Center
Eastern Shore Higher Education Center is the only center in the state that is located on a community college campus (Chesapeake College). A steering group comprised of the campus partners exists for advisement and information sharing. The director reports to the vice president of academic affairs of Chesapeake College and the college's Board of Trustees, however, the Center is considered a separate entity from the college. The Center serves five counties, but does not receive direct support from them.

Laurel College Center
The Center is a partnership between Howard Community College and Prince George's Community College. A Policy and Coordination Council meets every other month, and is comprised of the Vice Presidents for financial affairs, academic affairs, student services, and workforce development; and senior administrators (community college Presidents). There is a Joint Community College Board meeting every other year. There is a liaison from each partnering college working with the community colleges and Laurel on nuts-and-bolts issues. The Center offerings include courses from the two community colleges and the university partners.

The partner universities offer upper level and graduate programs. Articulation between community college and university programs is important. The Center is moving toward greater partner involvement in the future.

Southern Maryland Higher Education Center
The Southern Maryland Higher Education Center's Board of Governors is appointed by the Governor and is comprised of 13 members representing the three county region. The chairperson is appointed by the Governor.

University Center of Northeastern Maryland
The Center's building is owned by the county government; the facility is on state land, and the Center is managed by Harford Community College. Two advisory boards support the Center, the first of which is an advisory board of the partners (e.g., Harford Community College, Cecil Community College, representatives from economic development entities and the business community from both counties, and the director of the Center) and is specific to the Center. The advisory board uses subcommittees to focus on specific issues such as Facilities and Technology, Marketing, and Programs and Partnerships. The second, the Northeast Maryland Higher Education Advisory Board provides support and advice; it is mandated through legislation and supports the overall region.

The Universities at Shady Grove
The Shady Grove Governing Council Academic Program Advisory Committee is comprised of the chief academic affairs officers, and reviews programs and policies. The Board of Advisors is comprised of approximately 30 representatives from business, large and small industry, public schools, state/local government, Montgomery College president. The board has no fiduciary responsibility; it represents stakeholders' interests and serves to advocate for the Center and to tie Center offerings to industry and economic development. The Universities at Shady Grove is the largest regional center with a 4,000 student headcount and is comprised of public universities only. The director attributed its large enrollments to location near population, focus on economic development, large Federal workforce, high tech industry presence, and large established community college. There is high demand for bachelor and graduate degrees and Montgomery College is a prime feeder institution.

USM at Hagerstown
The Center is one of two in the University System of Maryland and operates as a function of the system office. There is a Governing Council comprised of the Senior Vice Chancellor of Academic Affairs, the Center's Executive Director, and the Provosts of the partner institutions. The Council meets four or five times per year, and addresses policy issues/changes. There also is a Board of Advisors, a local board consisting of approximately 20 representatives of large employers, the chamber, and Presidents of two community colleges. This board provides advice related to programs, recruitment, and raising private sector funds. The Center's Executive Director dually reports to the Senior Vice Chancellor and President of Frostburg State University. Frostburg State University is the coordinating institution and provides back office administrative services. The Center pays an annual fee for these services.

Waldorf Center for Higher Education
The Waldorf Center is a joint partnership between University of Maryland University College (UMUC) and College of Southern Maryland (CSM). There is no advisory or governing board for the Center; the two institutional boards are relied upon for advisement. In addition to UMUC and CSM, Towson University and Notre Dame of Maryland University rent classrooms space. Their offerings are somewhat limited, but plans to expand are in place.

Management and Operational Decisions

Arundel Mills Center
The Executive Director administers the Center along with an Assistant Director and Scheduler. A broader group meets to prepare the annual Plan for MHEC (e.g., Dean of Enrollment Services, Director of Finance, Executive Director of Information Technology, and Institutional Assessment).

The Center is required to submit an Annual Plan to MHEC and maintains enrollment information on partner student use.

Eastern Shore Higher Education Center
There are two operations/management staff for the Center who deal with operations and management issues.

Laurel College Center
The director is responsible for room assignments, technology, staffing, and supplies. The Center occupies five floors of a 10 story office building (leased space). The Center offers mostly community college programs. There are 300-500 partner institution enrollments. Decisions look at the community college majors and the needs of community/employers. Growing fields include cybersecurity, education (less popular in recent years), and health fields. Demographics, academic information, partner interests/strengths are weighed in the decision

Southern Maryland Higher Education Center
The Center has an Executive Director appointed by the Board of Governors. Additional full-time staff include four Principals:

a. University Coordination who serves as a liaison with university partners, schedules space/classrooms, and maintains records on class enrollments (minimal data).
b. Executive Assistant who serves as an administrative secretary.
c. Event Coordinator who oversees over 200 programs/events each year.
d. Janitor who oversees services during the week (additional weekend services are contracted).

In addition, the Center employs eight part-time student staff and a three-quarter time Business Manager/Bookkeeper.

University Center of Northeastern Maryland
The director manages the Center with advisory board input. The director reports to the vice president at Harford Community College.

The Universities at Shady Grove
The director works collaboratively with the institution partners.

USM at Hagerstown
The Executive Director makes day-to-day decisions and budget decisions.

Waldorf Center for Higher Education
UMUC is the managing partner of the Center. The Associate Vice President provides strategic oversight of the Center. Day-to-day operations are overseen by the Assistant Director (new).

Academic Program and Degree Selection

Arundel Mills Center
Recently, a bachelor's program in Engineering with a concentration in Electrical Engineering was instituted. The community college offered a lower level engineering program and the industry in the region has a strong engineering employee base. The community college President and Vice President successfully obtained funding from the county to build an engineering lab and additional needed space for the program. The Center's MOU restricts partnering institutions from competing with each other at the Center. Over time, some programs were discontinued due to lack of use/interests. Some of this can be attributed to the partner institutions' marketing efforts.

Eastern Shore Higher Education Center
When the Center was initiated, a needs assessment study was conducted and identified three areas of strongest interest and need: nursing, social work, and education. Offerings were built program-by-program. A second study was initiated in December 2013 with a survey to Chamber of Commerce members, Economic Development representatives, faculty, and residents. The findings are being compiled.

Laurel College Center
The Center offers mostly community college programs. There are 300-500 partner institution enrollments. Decisions look at the community college majors and the needs of community/employers. Growing fields include cybersecurity, education (less popular in recent years), and health fields.

Southern Maryland Higher Education Center
The Center offers 100 degree programs, all of which are part-time with the exception of one. The programs are workforce oriented. Tuition is typically paid by the students' employers. Development of program offerings is a "diplomatic" process. The Center is located in a relatively small community of 350,000 population, and the economy is heavily research/development based (military related; testing/evaluation). There is a substantial teacher workforce in need of continuing education opportunities to maintain certification and to obtain master's degrees. The need for new programs comes from the employers/businesses.

University Center of Northeastern Maryland
Needs are identified through data/research analysis from the business community and partners. HCC and CCC compile data on employment needs in order to identify areas of interests for new programs. Currently, Aberdeen Proving Ground is conducting a needs assessment, and it is anticipated that interest in programs will be identified. If interest in a new program is identified, higher education institutions that offer the program are approached by the director about offering it at the Center. The greatest challenge to bringing a program to the Center involves the institution finding instructors for the offerings.

The Universities at Shady Grove
Program decisions are made "carefully" following research by the Board of Advisors, counties, workforce experts, collaboration with partners, and industry advocacy. The Center is planning biological sciences/engineering, health, STEM, life sciences, and computer engineering programs.

USM at Hagerstown
The Executive Director researches and discusses options with the Provosts and Program Chairs, and decisions are ratified by the Governing Council.

Waldorf Center for Higher Education
Program/degree decisions are made in consideration of supporting a 2+2 approach, i.e., where programs exist at one institution, what programs are needed from the other institution to complete articulations. In addition, programs are considered that will support growth at each institution. Other institutions offer programs that do not compete with UMUC or CSM.

Process to Determine Regional Needs

Eastern Shore Higher Education Center
Besides the survey/study approach, the director participates in numerous committees, meets with stakeholders, and builds personal relationships to stay in touch with the workforce and economic development needs of the region. The director also works closely with Chesapeake College to develop articulation programs with the other campus partners. In addition, the director interacts frequently with students to learn their interests.

Laurel College Center
Demographics, academic information, Partner interests/strengths are weighed in the decision.

Southern Maryland Higher Education Center
The process involves constant communication with industries/employers via attendance at community/civic group meetings, interaction with partner governing boards, administering surveys, and convening advisory groups for various fields. Most ideas for new programs are initiated from employers, but some are brought forward by university partners. On average, 5-10 new programs are initiated each year. Much of the area "industry" is related to the military base, where 2,000 new employees are hired each year (32 engineering program offerings, currently). In addition, the teacher workforce has been a large part of Center offerings since its inception (34 graduated education programs offered).

University Center of Northeastern Maryland
MHEC requirements and standards are followed. The advisory board is involved in the analysis and decision making.

The Universities at Shady Grove
There is no established process, but consideration is given to workforce data and trends, pathway programs with Montgomery College, local job demand, and the local talent pool.

USM at Hagerstown
Research to demonstrate need is conducted on an as needed basis. An established and uniform process is not in place. The research is either conducted internally or by an external consultant. There is interest in conducting a needs assessment this year.

Waldorf Center for Higher Education
Data are collected and analyzed from various sources, including Census, workforce development and needs, postsecondary education attainment in the population, shifts in enrollment in existing programs, large employer needs, community survey to measure awareness and interest.

Access and Degree Completion Barriers

Arundel Mills Center
Location near major interstate and a mega-mall.

Eastern Shore Higher Education Center
Recognize that adult learners may progress through programs slowly and will have different interests and needs than that of traditional-age students.

Laurel College Center
Transportation can be a major barrier so consider location of the Center to minimize the barrier. Tutoring and ESOL classes are needed. Provide advisement to students. Marketing is essential to raise awareness of Center, and to promote articulation. Choose a name that communicates "Center" rather than a free-standing institution; name should represent the institutions; have a tag line "Community of Colleges and Universities."

University Center of Northeastern Maryland
The greatest barriers relate to inconsistent course offerings. Often the institution have a minimal number of students enrolled in a course in order to offer it. When courses are cancelled because of low participation, students become frustrated. Financial support for adult students is limited.

Many of the bachelor's degree program students arrive with community college degrees but still may need some elective courses. The course offerings at the Center are focused on the major courses for the degree, and electives are not typically offered. Students need to commute to the main campuses to complete elective requirements.

The Universities at Shady Grove
Full programs, not partial, are needed. Finances are a major problem for many students/families. Awareness of the Center needs constant attention. Raising awareness is best accomplished through a "total community effort."

USM at Hagerstown
The greatest barrier is the financial needs of students. The Center focuses on working adults, but has seen the share of traditional age students increasing.

Waldorf Center for Higher Education
Affordability and access are potential barriers. To address these, ensure that the transfer pathways are transparent, focus efforts on completion, offer complete program onsite (do not necessitate students going to home campuses), provide scholarship support, and have a consistent university presence.

Operational Support, Student Services, and Instructional Delivery

Arundel Mills Center
The community college offers all partner students access to the virtual library, testing center, and a bank of computers. The partner institutions provide all advisement and registration services.

Eastern Shore Higher Education Center
The Center provides office space to partners. For partners with long-established programs, an office is assigned. For partners with programs that are new or less robust, shared office space is available. Each partner has access to a copier (via code), computers, printing, phones, furniture, locker space, chart

paper/markers, and instructional technology. A building attendant (full-time) cares for the facility (the Center pays for his service and other contracted services).

Student services are provided primarily by the partner colleges (e.g., tutoring, academic support, online or face-to-face). The Center's Learning Resource Center is open to all students and offers a lending library. A cafeteria is on site and open until 6:00 p.m. College partners often provide additional onsite services during peak times such as registration. (Book orders are now done online through the college partners.)

Instructional services are provided by the college partners. Instruction is delivered primarily face-to-face or in a hybrid mode (minimal fully-online courses). Distance learning through real-time video feed from one institution to another is offered through two labs currently; a third lab will be available starting in March.

Laurel College Center
Classes are offered mostly face-to-face, with some hybrid courses offered by the Partners. Student services for the community college students included advisement, placement, registration, paying fees. Financial aid services are offered onsite twice each year and through SKYPE with the main campuses. Partners offer periodical services (some once per week or month).

Southern Maryland Higher Education Center
The delivery model is primarily face-to-face; however, some online and hybrid courses are offered and some student services are online. Some university partners have coordinators onsite and/or increase their presence during peak times. The delivery model intends for students not to need to travel to the main campuses.

University Center of Northeastern Maryland
Instruction is offered onsite, online, and in hybrid modes. Student services are offered by higher education institution partners, onsite, at the home campuses, and/or online. Some partners establish specific hours for general student services support, or offer support during high demand times (e.g., registration periods). Space in the Center is available for support services staff.

The Universities at Shady Grove
A rich array of student services are offered (counseling, academic success, student affairs/life, registration, admissions, recruitment). The Center raises funds for scholarships. The Partner institutions formed an agreement to share courses across the institutions on site. Some courses are jointly sponsored. The Center offers complete services for students; there is no need to go to main campuses. Strong pathways exist between Montgomery College and partner programs. Instruction is offered face-to-face and hybrid, plus a small number offered online.

USM at Hagerstown
Operational support is provided back office to Frostburg. Staff include the Executive Director, 2 FT/PT facilities staff, 2 FT/PT IT staff, 2 staff share marketing/recreation/outreach/student services. The Center operates from 8:00 a.m. until 10:00 or 11:00 p.m.; Saturday until 2:00 p.m. Student Services include a Writing Center (for all students), Career Services, and Student Council. Each institution provides its own academic advisement (onsite, usually part-time). There currently is an effort to centralize internship and practical experience opportunities.

Waldorf Center for Higher Education
Student services are offered primarily onsite (face-to-face) with some video conference advising (UMUC). The Virginia system (TeleTechNet) was mentioned by the interviewee as a strong interactive distance learning platform which could be considered for a new RHEC. Student support services are provided for students of the two institutions at a one-stop shop with advisors from both institutions. Marketing is done through use of billboards and direct mail.

Space Allocation

Arundel Mills Center
There are four classrooms and a suite of offices for the partner institutions to use. The staff Scheduler works with the partners to schedule the space to meet needs. Some partners offer classes at other sites of the community college, but those are not counted toward the Center's efforts. Scheduling at the Center is a challenge due to limited space.

Eastern Shore Higher Education Center
Space is allocated starting with the original partner colleges, working well in advance of a new semester. The director requests space needs from the partner colleges. As a high level of consistency exists from one semester to the next, the needs are predictable. Space is allocated on a first come, first served basis, along with some negotiation to meet everyone's needs. All spaces are utilized in the evenings.

Laurel College Center
So far, there is adequate space for everyone. Some negotiations occur to make most/best use of the space. Partners use space in the evenings, only.

Southern Maryland Higher Education Center
The space allocation process is "utilitarian" and based on the size of enrollments (classrooms seat a maximum of 15 or 25 students). Classes for degree programs take priority over other training programs or events. Saturday classes are popular. Events are scheduled on weekends and during the daytime, as well. Most degree program classes occur in weekday evenings.

University Center of Northeastern Maryland
Scheduling is completed manually into an online template according to need. The Center has been able to accommodate demand by and variable times and program duration needs of the partners. The peak instructional times are between 4:40 and 10:00 p.m., Monday through Thursday. Space is rented for meetings Monday through Saturday, with Friday being the most common. Classroom and computer labs are available.

The Universities at Shady Grove
The Executive Director in consult with the partner institutions. Programs pay for space use.

USM at Hagerstown
Space is requested by the partner institutions based on course offerings. Typically, the previous semester is a starting point for scheduling, and negotiations are used to integrate use of space among all partners.

Waldorf Center for Higher Education
This has not been a problem. UMUC offers courses in the daytime; both institutions offer courses in the evening.

Start-Up and Growth Issues

Arundel Mills Center
The Center received valuable advice from other model centers (Macomb Center in Michigan; Loraine Community College in Ohio).

Eastern Shore Higher Education Center
It is important to build trust with students that a program will remain at the Center until their completion. Obtain college partner commitment to continue a program through a cohort completion.

Laurel College Center
The Center now sees the need to have the four-year partners more involved in governance and marketing. Greater involvement translates into greater commitment.

Southern Maryland Higher Education Center
Looking at other centers, it is important to aggressively market the center's programs, i.e., don't wait for students to walk in. In addition, the center's staff need to include experience/understanding of graduate programs and their students (expectations are different from community colleges).

University Center of Northeastern Maryland
The director emphasized the importance of having a clear vision for the Center (i.e., target student populations, other uses for the Center).

The Universities at Shady Grove
Initially, do not "over promise" because even with the best planning, it takes time to be fully operational (estimate 2-5 years). Avoid program duplication among partner institutions. Work closely with the partners for pathway programs. Proposals for new programs need to demonstrate articulation pathway and justify their economic need to be sustainable overtime. The Center now has articulation agreements with five community colleges.

USM at Hagerstown
There were typical growing pains. Changes occur due to changing needs, e.g., no longer need as many computer labs.

Waldorf Center for Higher Education
Student services are offered in a unique approach that uses an advisement model based on completion points and students have the same advisor through their 2+2 program. Caution was offered against centralizing student services due to higher costs (duplication) and potential confusion of who to see for advisement. In other words, keep each institution responsible for its own services. Some services are delivered face-to-face during peak times, e.g., Veteran's services, financial aid.

Community and Employer Perceptions

Arundel Mills Center
Local perceptions are positive, but marketing efforts need to be strong and continuous (e.g., Information Sessions, Chamber outreach, partner outreach, Website(s).

Eastern Shore Higher Education Center
Because the Center is located on Chesapeake College land, many community members have the misperception that the Center is part of the college rather than a separate entity.

Laurel College Center
Awareness grows with continued communication and close ties with the Chamber. Strong ties to employers are important. Consider forming advisory groups for program areas.

Southern Maryland Higher Education Center
Using "soft" measurements, feedback about the Center via word of mouth and recognition in public/community meeting indicates that the community thinks highly of the Center.

University Center of Northeastern Maryland
The Center recently completed a rebranding effort. For those who know about the Center, perceptions are favorable. The business community is more aware of the Center than are adult students, who are harder to reach.

The Universities at Shady Grove
Businesses that are involved with the Center are very pleased and supportive. The diversity of students is appreciated. There is strong community support, but some members of the community still do not understand the Center.

USM at Hagerstown
It is important to constantly communicate the Center to the community both in terms of its offerings as well as to explain that it is not a university, but a collection of partner institutions.

Waldorf Center for Higher Education
Many community members remain unaware of the Center. Marketing is key in promoting the Center. For those aware of the Center, it is perceived as a great resource.

Best Practices

Arundel Mills Center
Visit other model centers for advice. Restrict competition between partners. Be selective when choosing partners to ensure that institutional cultures and goals will mesh with the Center. Develop AA/AAS degree articulation agreements with partner institutions. When a program is offered at both the baccalaureate and graduate degree levels, attempt to have the same partner institution offer both levels in order to improve student transition from one to the other.

Place a high priority on marketing and coordination with partner institutions. One marketing idea: have institutional flags for each partner at the Center to promote the partnerships. Locate Center in an easily accessible place (good transportation, near people at work/home).

Eastern Shore Higher Education Center
It is important to be highly visible in the community and to work closely with the college partners.

With a small marketing budget, be strategic on how to spend: e.g., billboard, sponsor TV ads, radio spots, newspaper, and email blasts.

Laurel College Center
For the Laurel Center, establishing strong communication between the two community colleges benefitted the Center with strong mutual support. The Center attempts to have some events to bring students together.

Southern Maryland Higher Education Center
Multiple marketing efforts need to be employed, e.g., open houses, ads, mailings, etc., to recruit students. The center needs to have an entrepreneurial approach to meet the needs of the community workforce development. The Southern Maryland Higher Education Center now has 14 university partners, and is negotiating with a 15th institution. Good communication, marketing, and attention to partner needs leads to success. Also, aggressively marketing center space for community events/meeting use can significantly increase rental revenues.

University Center of Northeastern Maryland
The Advisory Board and Subcommittees structure has worked well, in part because it involves a broad range of stakeholders.

The Universities at Shady Grove
It is important to understand your market place to identify sustainable programs. Undergraduate programs need student services/academic support services. The Center has centralized these services and all partner institutions collaborate.

USM at Hagerstown
Always try to improve on delivering what is needed.

Waldorf Center for Higher Education
Meet with college partners quarterly. For primary institutions, hold faculty meetings. It is critical to link institutions with the 2+2 approach and to offer graduate programs to support workforce and economic development needs. The director needs to be intertwined in the community; include a focus on external affairs.

Lessons Learned for Frederick County

- Reach out to other Centers for development guidance, both within Maryland and in other states. Have one designated point of contact for each partner institution to ensure consistent and efficient communication. Align upper level program offerings of the partners with lower level offerings at the community college(s).
- There are financial incentives for independent colleges to offer programs/classes at the Center rather than other locations. With Frederick's location, attracting out-of-state college partners may be possible. Having generous hours of operation and encouraging community groups to use available space helps to promote the Center and its programs. If a nonprofit group needs space for meetings (not for fund raising), consider offering the space free of charge. Work to keep all stakeholders happy. Advocate for students to keep programs going. Expect that a new program will take about three years to become firmly established.
- Host *Visioning Events* with the Chamber and local employers to raise awareness of the Center. The governance group should meet regularly. When selecting Partners, consider institutional culture to ensure a good match. Consider offering space rent-free to Partners for a few years to help support interest and success. When selecting staff for the Center, recognize that each one needs to wear many hates, to be flexible, and support concept of the Center.
- Start modestly, collaborate with other regions as needed, and understand your audience. It takes five years to build relationship and to fully establish a Center. Offer full programs. Pathway programs/articulation and responding to community needs are critical.
- With increasing tuition costs, there is an endless need for financial/scholarship support.
- When designing or renovating a facility for use as a Center, address safety and security concerns, e.g., multiple exits.
- Be prepared to be flexible and to readjust the schedule if offerings don't result in enrollments. It is difficult to routinely get good, up-to-date data on demand for programs. Attempt to keep "red tape" to a minimum. Listen to your community and target audiences to be served.

5.3 SUMMARY OF FINDINGS

The consultant team has consolidated all of the information derived from RHEC interviews and data, along with our knowledge of other similar higher education centers operating outside of Maryland, for the Frederick Advisory Board to consider as they plan their approach to a Frederick County RHEC.

GOVERNANCE

A governing/coordinating board needs to represent the intended identity of the Center. Each existing Center has a board that is unique to its history and purpose. For example, if the focus of the Center is primarily 2+2 articulation with a single community college, the board of the community college may serve as the Center's board. However, if the focus extends beyond 2+2 into graduate programs, a board comprised of Center member institutions may be more appropriate. In some cases, the Center relies on boards of a few of its primary institutional partners plus a Council of key administrators. A board may be

comprised of key stakeholders including both institutions of higher education and industry representatives.

Depending on the composition of the governing board, additional boards comprised of institutional marketing representatives or industry advisors strengthen the Center's efforts. For example, a board of institutional marketing representatives can coordinate and present a clear message of what the Center is and how it can serve individuals, employers and the community. An advisory board of industry, business, economic development, and Chamber representatives can help guide the evolution of the Center's offerings and build funds for scholarship support.

A Memorandum of Understanding is an essential document, defining partner agreement and relationships related to both governance and operational functions.

PROGRAM DECISIONS

A combination of analytical research of demographic and industry/work force trends and anecdotal information from industry, economic development, Chamber, higher education partners, and Center staff is used to make decisions about programs to initiate, expand, or phase out. Partner institution strengths and interests contribute to program decisions. Pathway programs of the partnering institutions offer students prepared for the next level program (both 2+2 and higher levels). Center staff participate broadly in community/civic activities and organizations to remain aware of the educational and employment needs of the region. Industry/employers needs often initiate program analysis, but in some cases, partnering institutions propose program offerings.

Centers typically restrict partnering institutions from competing with each other's programs to avoid program duplication and diluting individual program enrollment. However, exceptions are permitted if program content differs significantly, or each program serves a unique audience.

In Maryland, the MHEC provides requirements and standards for program offering decisions at RHECs. The Center's governing and/or advisory boards participate in the decision making process.

MARKETING

Success of Centers are dependent on marketing and needs to be a high priority for boards and staff. The staff and board need high visibility in the community and must communicate a clear message about the purpose of the Center to serve the region. One component of communication entails a coordinated effort among partnering institutions. The Center's name needs to communicate that it is a "center" rather than a free-standing institution. Students will not just show up and enroll in programs without deliberate and constant attention to communicating the message of the Center. Marketing messages need to include a message to employers and community leaders about the need to raise funds to support students with financial need as well as the message to needy students about the availability of financial support.

OTHER PLANNING CONSIDERATIONS

During interviews, Center leadership offered insight into best practices and lessons learned to assist the Frederick Center initiative in planning and decision making:

- Develop a Memorandum of Understanding (MOU) to define the roles, responsibilities, and expectations of the Center and partners and to clarify critical policies and procedures.

- Develop a decision model to actively involve Center partners in decision making related to academic, financial, operational and marketing issues.
- Develop strong pathway programs connecting successful programs with the next level degree program. Develop articulation agreements where appropriate. This is particularly important with the local community college.
- Restrict competition among partners. Develop a process and criteria to determine which partner institution is most appropriate to offer a program through the center. This criteria may include a "right of first refusal" for local institutions or non-local partner institutions before seeking other options.
- Emphasize consistent and coordinated marketing for the Center, its partners, and the education and training offerings they provide through the Center. Include Center leadership involvement in community and civic organizations and events. Aggressively market Center space for use for community events and meetings during times when space is not in use for instruction.
- It is very important to have a physical presence that is visible and easily identified as the Regional Center. This could be realized on a shared site such as an existing campus, or a stand-alone facility. Often higher education center start-ups use temporary space with the option of adding to or changing locations/facilities as future demand dictates. Not all instructional or support activities associated with the Center must be delivered on the same site.
- Locate the Center near potential participants and/or within easy access to driving routes and interstates. Access is key and being in a location that is easily accessible, especially from identified priority target populations is essential to center success.
- Reach out to other Centers for development guidance.
- Encourage collaboration and educational opportunities between businesses, industry, and partner institutions, with varying levels of involvement such as; adjunct instructors, mentoring, equipment, physical space, research activities, and financial resources.
- Employ industry, business, and community supporters to raise funds for student financial support.

5.4 ADDITIONAL RESOURCES

A list of ten selected higher education centers across the country that include multiple partner institutions to deliver programs is offered below as an informational resource for members of the Frederick Regional Higher Education Center Advisory Board.

- University Center of Lake County (IL), http://www.ucenter.org/
- Quad Cities Graduate Study Center (IL/IA), http://www.gradcenter.org/
- Roanoke Higher Education Center (VA), http://www.education.edu/
- Low Country Graduate Center (SC), https://lowcountrygraduatecenter.wordpress.com/
- Southwest Virginia Higher Education Center, http://www.swcenter.edu/
- Auraria Higher Education Center (CO), http://www.ahec.edu/
- Santa Fe Higher Education Center (NM), http://hec.sfcc.edu/about_the_sfhec/

- University Center of North Puget Sound (WA), http://www.uceverett.org/
- Macomb University Center (MI), http://www.macomb.edu/future-students/choose-program/university-center/index.html
- The University Partnership at Loraine County Community College (OH), http://www.loraincccc.edu/UP/

6.0 CONCLUSIONS

This needs assessment study is yet another step in the continued process to expanded access to higher education in Frederick County. One model for achieving that goal is establishment of a new regional higher education center. Study results and conclusions are intended to help inform decisions by MHEC, the Frederick Regional Higher Education Advisory Board, and elected officials in determining the best approach and strategy to meeting the postsecondary education needs of the area. Those who have the most to gain, Frederick's residents, employers, business owners, and workers, have been represented in this and prior studies to gauge collective need. We have presented our findings and conclusions with this in mind.

The subsequent sections of this final chapter provide a brief synopsis of our observations based on the needs assessment findings, followed by a series of issues and concerns for the involved parties to consider as they move closer to expanding access to higher education and training in the County, thus enhancing the skilled, educated workforce required to sustain a competitive and viable economy well into the future. This is an outcome sought not only locally, but across the State of Maryland.

6.1 OBSERVATIONS

Frederick County is well positioned to continue to maintain relatively low unemployment, grow its diverse business/industry mix, support the presence of extensive federal and military activities, and match or surpass the educational attainment levels of the state and progress towards achieving Year 2025 goals.

Advantages that currently exist in Frederick County which will help further this quest include:

- Several key industry clusters (bioscience and technology) with significant employment capacity that rely heavily on STEM educated workers. These jobs typically provide a good living wage base.
- A significant mix of public and private sector resources among local business and industry.
- A longstanding presence of the US Army at Ft. Detrick, along with a plethora of operations from the Department of Defense and other federal agencies.
- An impressive talent pool of leading research scientists and support staff, as well as cutting edge research lab and testing facilities and equipment, unlike that found in many other communities of this size.
- Relatively easy access to opportunities and activities of the Baltimore-Washington metropolitan area.
- Three long-standing local higher education entities fully engaged in the community, offering a wealth of degree programs and training opportunities.
- A supportive and forward-thinking group of local elected officials, economic development professionals, and business leaders.

What else is needed? Community and business leaders recognize that in order to continue to grow and expand, the skilled workforce must keep pace. Currently, there is concern that:

- The local pipeline of available workers with appropriate skill sets and credentials does not achieve the depth and breadth needed for the future, especially in STEM-related disciplines.
- Efforts to grow and maintain a local pipeline to support workforce needs, must continue to expand opportunities and pathways.
- The local higher education institutions do not have the resources to meet all of the identified local needs.
- Current courses and degree programs of need are not easily accessible or affordable to local residents and employees in Frederick County.
- A lack of such higher education options may prove detrimental in the long-run to existing employers in terms of retention or expansion, and attracting new business to the County.

Furthermore, as discussed in **Chapter 4.0** of this report, there is a very long and diverse list of perceived post-secondary education and training needs. Some of those identified needs will continue to be addressed by the local institutions, but others may be difficult to attract a willing partner to the area.

6.2 POTENTIAL PROGRAMS FOR CONSIDERATION

Relying on input from local stakeholders, responses from the employer survey, and the projections of occupational position openings produced by Maryland DLLR, our team has identified particular education programming of need that should be explored for a new regional higher education center in Frederick County.

The list of programs that follow were selected due to the quantity of potential employment need, the lack of local access, and /or the unique discipline specialty and credential identified by local employers.

Graduate Level Programs:

- Biotechnology, Biomedical Science, and Bioinformatics Specialties (advanced master's and doctorate)
- Educational Administration, Curriculum, Assessment (doctorate)
- Informational Technology, Computer and Network Systems, Telecommunications (master's)
- Engineering Specialties (master's) - Civil , Biomedical, Structural, Wireless RF
- Business Management and Operations with emphasis on one or two prolific local industry sectors (master's)

Baccalaureate Level Programs:

- Computer Systems, Networks, Telecommunications
- Cyber Security
- Business Communications
- Biomedical Lab Technology

- Nursing BSN
- General Bachelor's Degree Completion Option

Two-Year/Associate Degree Programs:

- Engineering and Bioscience Technology

At this time, other programming needs below a 4-year degree or post baccalaureate certificate should remain the responsibility of Frederick Community College.

6.3 ISSUES FOR ADVISORY BOARD CONSIDERATION

Based on the consultant team's work in similar situations, what we heard from local stakeholders, and information and experiences shared by representatives of the existing eight Regional Higher Education Centers (RHECs) spread across Maryland, we offer the following issues for the Frederick Advisory Board to consider as they move forward. Assuming they move to formally seek establishment an RHEC in Frederick County, they will need to address the following issues:

1. It will be critical to carefully determine and clearly define the primary mission of the RHEC as it will drive expectations and, ultimately, results. Who will be the primary audience for the programs they wish to deliver? Non-traditional working adults, traditional age high school and community college students? Current employees seeking specialized or advanced post-baccalaureate degrees and training?
2. The three local higher education institutions and the local school system should have continued involvement in the planning and implementation of an RHEC. They should not be replaced in their current and future efforts to provide access to needed educational opportunities and to contribute to the local pipeline by the new RHEC and its future partners. Under most scenarios, program duplication or introduction of programs competing with existing local institutions or partners should be avoided, if at all possible. However, when warranted, meeting local education needs through other options may be required.
3. The governance model and operational plan for an RHEC should be carefully crafted to provide input and collaboration among all of the public and private partners involved that must support this endeavor at start-up through build-out, and who ultimately will be the beneficiaries of its success.
4. "Build it and they will come" is not a good strategic plan. A collaborative and targeted effort will be required of all partners in terms of resources, marketing, and program selection and delivery.
5. A physical presence (facility) for the RHEC will be necessary as a tangible acknowledgement of its existence. This should be a place that can be readily identified as the face of the RHEC and a location that is easily accessible to its intended target audiences. An RHEC is about access. That does not imply that courses and programs must all be delivered at the same site. It is also assumed that some significant portion of programs associated with the RHEC may be delivered online or through a distributed format.
6. Finally, careful program selection and delivery will be key to the initial success or failure of the RHEC and its growth going forward. Programs must respond to documented needs, and be accessible and delivered in a manner appropriate for the intended students and discipline. They should provide a credential that is valuable to both the recipient, their career path goals, and

their respective employer. Affordability and convenience will be key. The initial RHEC programming choice and the education partners selected for participation will be critical. For advanced graduate degrees in STEM disciplines, attracting a recognized, quality partner institution may require leveraging related local talent, community and employer assets, and offering collaborative research opportunities for existing faculty at the desired partner institution.

APPENDIX A

FREDERICK COMMUNITY COLLEGE

Undergraduate Academic Offerings

- Accounting
- Addictions Counseling
- American Sign Language Studies
- Architectural Computer Aided Design
- Architectural Computer Aided Design (CAD)
- Art
- Biology
- Bioprocessing Technology
- Building Trades Technologies With concentrations in: Carpentry, Electrical, HVAC, Plumbing, Welding
- Business Administration
- Business Enterprise
- Business Management
- Business Studies
- Chemistry
- Child Care Preschool and School Age Teacher Training
- Civil War
- Communications (Speech)
- Computer Aided Design Operator
- Computer Graphics
- Computer Science
- Computer Science Studies
- Computerized Accounting
- Construction Management & Supervision
- Construction Management Basics
- Construction Technology Academy
- Corrections
- CPA Exam Qualification
- Criminal Justice
- Culinary Arts & Supervision
- Digital Media Design
- Drama
- Early Childhood Development
- Early Childhood Education/Early Childhood
- Economics
- Education
- Engineering
- English/Literature
- Entrepreneurship
- General Studies Fire Science
- General Studies Therapeutic Massage
- Geographic Information Systems Basics
- Gerontology
- Government & Politics
- History
- Hospitality Supervision
- Human Services (Gerontology, Social Work Transfer, Developmental Problems)
- Information Systems Management
- Information Technology With concentrations in: Database Administration, Information Technology Specialist, Software Specialist, Computer Studies, Information Security & Assurance, Personal Computer, Software
- International Business
- Management
- Mathematics
- Mathematics (Secondary)
- Medical Administrative Specialist
- Medical Assistant
- Medical Coding Basics
- Medical Laboratory Technology
- Medical Transcription Basics
- Music
- Nuclear Medicine Technology
- Nursing
- Paralegal
- Personal/ Fitness Trainer
- Philosophy
- Physical and Health Education
- Police Science
- Practical Nursing

- Pre-Nursing
- Psychology
- Respiratory Care
- Sociology
- Spanish (Secondary)
- Special Education
- Supervision
- Surgical Technology
- Television Production

HOOD COLLEGE

Undergraduate Academic Offerings

- Accounting
- African American Studies
- African Studies
- American Studies
- Archaeology
- Art
- Art Education (pre-K–12)
- Art History
- Biochemistry
- Biology
- Biotechnology
- Business Administration
- Business Marketing
- Chemistry
- Classical Studies
- Coastal Studies
- Communication Arts
- Computational Science
- Computer Science (B.S.)
- Creative Writing
- Criminology and Delinquency
- Digital Media
- Early Childhood Education
- Ecology
- Economics
- Elementary Education/Special Education
- Engineering Dual Degree
- English
- Environmental Biology
- Environmental Chemistry
- Environmental Science and Policy
- Environmental Studies
- Finance
- Forensic Sciences
- French
- French-German
- German
- Gerontology
- Global Studies
- Graphics
- History
- Human Resource Management
- Integrated Marketing Communications
- International Economics and Finance
- Journalism
- Latin American Studies
- Law and Society
- Literature
- Management
- Marketing
- Mathematics
- Mathematics Education
- Medieval Studies
- Middle Eastern Studies
- Molecular Biology
- Music
- Music History and Literature
- Music Performance
- Nursing*
- Pharmacy
- Philosophy
- Physics
- Piano Pedagogy
- Political Economy
- Political Science
- Pre-Dental Studies
- Pre-Law Studies
- Pre-Medical
- Pre-Veterinary
- Psychology
- Public History
- Public Relations
- Religious Studies
- Renaissance Studies
- Secondary Education
- Social Science Research
- Social Work
- Sociology
- Spanish
- Special Education
- Studio Art
- Theater and Drama
- Videography
- Web Development
- Women's Studies
- Writing

Graduate Academic Offerings

Arts and Humanities
- Ceramics (C)
- Ceramics (M.A.)
- Ceramics (MFA)
- Humanities (M.A.)

Biomedical and Environmental
- Biomedical Science (M.S.)
  With concentrations in: Biotechnology/Molecular Biology, Microbiology/Immunology/Virology, Regulatory Compliance,
- Environmental Biology (M.S.)
- Geographic Information Systems (C)
- Regulatory Compliance (C)

Business
- Business Administration (MBA) With concentrations in: Accounting, Finance, Human Resources, Information Systems, Marketing, Public Management
- Management of Information Technology (MIT)
- Regulatory Compliance (C)

Care
- Gerontology (C)
- Human Sciences (M.A.)
- Thanatology (M.A.)
- Thanatology (C)

Computer Science and Information Technology
- Computer Science (M.S.)
- Cybersecurity (C)
- Information Technology (M.S.)
- Management of Information Technology (M.S.)

Education
- Curriculum and Instruction (M.S.) With concentrations in: Elementary Education, Elementary Science and Mathematics Education, Secondary Education, Special Education
- Educational Leadership (M.S.)
- Educational Leadership (C)
- Elementary STEM Education (C)
- Humanities (M.A.)
- Mathematics Education (M.S.)
- Secondary Mathematics Education (Certificate)
- Reading Specialization (M.S.)

MOUNT ST. MARY'S UNIVERSITY

Undergraduate Academic Offerings

- Accounting
- Biochemistry
- Biology
- Business
- Chemistry
- Communication Studies
- Computer Science - Cyber Security
- Criminal Justice
- Economics
- Education
- Elementary Education
- Elementary & Special Education
- English
- Environmental Science
- Environmental Studies
- Fine Arts - Art, Art Educ., Music, Theater
- Foreign Languages - French, German, Greek, Interdisciplinary, Italian, Japanese, Latin, Spanish
- History
- Information Systems
- Interdisciplinary Studies - International Studies, Environmental Studies, Gender Studies, Latin American Studies, Legal Studies, Non-Western Studies
- International Studies
- Legal Studies
- Mathematics
- Non Western Studies
- Nursing
- Occupational or Physical Therapy
- Philosophy
- Political Science
- Pre-Law Program
- Pre-Med Studies
- Psychology
- Secondary Education
- Sociology
- Sport Management
- Theology

Graduate Academic Offerings

- Master of Business Administration
- Emerging Leaders MBA
- Master of Science in Biotechnology and Management
- Master of Health Administration
- Master of Education
- Master of Arts in Teaching
- Master of Arts in Philosophical Studies

Graduate Certificate Offerings

- Certificate of Advanced Study in Reading
- Logistics and Supply Chain Management
- Government Contracting Certificate
- Organizational Development Certificate
- Project Management Certificate

Adult Undergraduate Programs

- Accelerated Bachelor of Science in Business
- Bachelor of Science in Elementary Education/Elementary Special Education
- Accelerated Bachelor of Arts in Criminal Justice
- Bachelor of Science in Human Services

APPENDIX B

NOTE: Estimated employee counts displayed in the following charts may represent an overlap between specific disciplines. Counts are in reference to how many employees, current or future, at each firm or organization which will likely need training or education programs in that specific discipline. So, one employee may need training in multiple areas, and therefore would be included in the count estimate for each unique discipline.

B-1
NUMBER OF CURRENT AND FUTURE EMPLOYEES NEEDING EDUCATION/TRAINING IN SPECIFIC DISCIPLINES BY LEVEL
AGRICULTURE, AGRICULTURE OPERATIONS, AND RELATED SCIENCE

	Current Employees				Future Employees			
Agriculture, General	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
			1	10			2	5
Total	**0**	**0**	**1**	**10**	**0**	**0**	**2**	**5**
Animal Sciences	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
			3	3			3	3
Total	**0**	**0**	**3**	**3**	**0**	**0**	**3**	**3**
Plant Sciences	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
			5	5			5	5
Total	**0**	**0**	**5**	**5**	**0**	**0**	**5**	**5**
Soil Sciences	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
			1	1			1	1
Total	**0**	**0**	**1**	**1**	**0**	**0**	**1**	**1**

Source: Employer Survey, 2014.

B-2
NUMBER OF CURRENT AND FUTURE EMPLOYEES NEEDING EDUCATION/TRAINING IN SPECIFIC DISCIPLINES BY LEVEL
BASIC SKILLS

	Current Employees				Future Employees			
Basic Skills	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
	30		5		2	2		
	15	10	25	20	60		7	
	5	19	5		40	40		
					3		4	3-5
					5	5	2	
Total	**50**	**29**	**35**	**20**	**110**	**47**	**13**	**0**

Source: Employer Survey, 2014.

B-3
NUMBER OF CURRENT AND FUTURE EMPLOYEES NEEDING EDUCATION/TRAINING IN SPECIFIC DISCIPLINES BY LEVEL
BIOLOGICAL AND BIOMEDICAL SCIENCES

	Current Employees				Future Employees			
Biology, General	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
			12	12			12	12
			15	5			2	1
			5			39	25	
Total	**0**	**0**	**32**	**17**	**0**	**39**	**39**	**13**
Biochemistry, Biophysics and Molecular Biology	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
				3			5	3
			5	1			10	5
			13	13			10	10
			10	5			5	0
			5	7			3	7
Total	**0**	**0**	**33**	**29**	**0**	**0**	**33**	**25**
Botany/Plant Biology	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
			1	1			1	1
			0	0			0	0
Total	**0**	**0**	**1**	**1**	**0**	**0**	**1**	**1**
Cell/Cellular Biology and Anatomical Sciences	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
			5	10			5	15
			10	5			5	0
				7			2	7
Total	**0**	**0**	**15**	**22**	**0**	**0**	**12**	**22**
Microbiological Sciences and Immunology	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
				3			5	3
			15	20			17	20
			30	10			5	5
				7				7
Total	**0**	**0**	**45**	**40**	**0**	**0**	**27**	**35**
Zoology/Animal Biology	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
			3	5			1	1
			5	5			0	0
Total	**0**	**0**	**8**	**10**	**0**	**0**	**1**	**1**
Genetics	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
			1	1			1	1
			5	5			2	2
Total	**0**	**0**	**6**	**6**	**0**	**0**	**3**	**3**
Physiology, Pathology and Related Sciences	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
			2	2			2	2
			15	15			2	2
Total	**0**	**0**	**17**	**17**	**0**	**0**	**4**	**4**
Pharmacology and Toxicology	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
			2	2			2	2
			5	5			2	0
Total	**0**	**0**	**7**	**7**	**0**	**0**	**4**	**2**
Biomathematics and Bioinformatics	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
				3			2	2
			2	2			2	2
				2				2
			5	5			1	1
Total	**0**	**0**	**7**	**12**	**0**	**0**	**5**	**7**
Biotechnology	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
			5	1			10	5
			2	2			2	2
			10	10			5	5
Total	**0**	**0**	**17**	**13**	**0**	**0**	**17**	**12**
Ecology, Evolution, Systematics, and Population Biology	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
			2	2			**2**	**2**
			5	5			0	2
Total	**0**	**0**	**7**	**7**	**0**	**0**	**2**	**4**
Biological and Biomedical Sciences, Other	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
			2	1			10	5
			2	2			2	2
	0	0	0	3	0	0	0	3
			20	10			5	5
Total	**0**	**0**	**24**	**16**	**0**	**0**	**17**	**15**

Source: Employer Survey, 2014.

B-4
NUMBER OF CURRENT AND FUTURE EMPLOYEES NEEDING EDUCATION/TRAINING IN SPECIFIC DISCIPLINES BY LEVEL
BUSINESS, MANAGEMENT, MARKETING, AND RELATED SUPPORT SERVICES

	Current Employees				Future Employees			
Business Commerce, General	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
			300	8			7	9
			2	2			1	1
Total	**0**	**0**	**302**	**10**	**0**	**0**	**8**	**10**
Business Administration, Management and Operations	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
			5				2	
			4			20	20	
			300	8			3	6
			7	2			3	2
		4	4	4				3
								2
								3
Total	**0**	**4**	**320**	**14**	**0**	**20**	**28**	**16**
Accounting and Related Services	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
							1	
			2	3			5	
			100	8			40	17
			5	2			2	1
			2	10				
								5
Total	**0**	**0**	**109**	**23**	**0**	**0**	**48**	**23**
Business Operations Support and Assistant Services	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
							1	
	3	2						
			60	8			9	4
			5	2			1	1
Total	**3**	**2**	**65**	**10**	**0**	**0**	**11**	**5**
Business Corporate Communications	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
					1		1	
			60	8				
			1	1			9	4
							1	1
Total	**0**	**0**	**61**	**9**	**1**	**0**	**11**	**5**
Business Managerial Economics	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
			40	8		1		
			1	1			7	4
Total	**0**	**0**	**41**	**9**	**0**	**1**	**7**	**4**
Entrepreneurial and Small Business Operations	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
							1	
							1	1
							1	1
Total	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**2**
Finance and Financial Management Services	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
							1	
			20	5				
			1	1			10	3
							1	1
Total	**0**	**0**	**21**	**6**	**0**	**0**	**12**	**4**
Hospitality Administration Management	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
							1	1
			1	1			1	1
Total	**0**	**0**	**1**	**1**	**0**	**0**	**2**	**2**
Human Resources Management and Services	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
			20	6			1	
			15	3			6	3
							5	2
Total	**0**	**0**	**35**	**9**	**0**	**0**	**12**	**5**

Source: Employer Survey, 2014.

B-4 (CONTINUED)
NUMBER OF CURRENT AND FUTURE EMPLOYEES NEEDING EDUCATION/TRAINING IN SPECIFIC DISCIPLINES BY LEVEL
BUSINESS, MANAGEMENT, MARKETING, AND RELATED SUPPORT SERVICES

	Current Employees				Future Employees			
International Business	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
			0	1				1
Total	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**1**
Management Information Systems and	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
			15	5			14	7
			2	2			1	1
Total	**0**	**0**	**17**	**7**	**0**	**0**	**15**	**8**
Marketing	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
		1				1	1	
Total	**0**	**1**	**0**	**0**	**0**	**1**	**1**	**0**
Specialized Sales, Merchandising and Marketing Operations	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
						1		
Total	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**
Construction Management	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
	4		2			1		
					4		1	
Total	**4**	**0**	**2**	**0**	**4**	**1**	**1**	**0**
Communication and Media Studies	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
							1	
Total	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**

Source: Employer Survey, 2014.

B-5
NUMBER OF CURRENT AND FUTURE EMPLOYEES NEEDING EDUCATION/TRAINING IN SPECIFIC DISCIPLINES BY LEVEL
COMMUNICATION, JOURNALISM, AND RELATED PROGRAMS

	Current Employees				Future Employees			
Journalism	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
			1				5	
Total	**0**	**0**	**1**	**0**	**0**	**0**	**5**	**0**
Public Relations, Advertising, and	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
			0				1	
Total	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**

Source: Employer Survey, 2014.

B-6
NUMBER OF CURRENT AND FUTURE EMPLOYEES NEEDING EDUCATION/TRAINING IN SPECIFIC DISCIPLINES BY LEVEL
COMMUNICATIONS TECHNOLOGIES/TECHNICIANS AND SUPPORT SERVICES

	Current Employees				Future Employees			
Communications Technology Technician	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
				30			1	
			20	2	20	4	2	2
	8	3	3				3	1
								5
Total	**8**	**3**	**23**	**32**	**20**	**4**	**6**	**8**
Audiovisual Communications Technologies	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
				15				5
			1				1	
Total	**0**	**0**	**1**	**15**	**0**	**0**	**1**	**5**
Graphic Communications	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
				15				5
			1				1	
Total	**0**	**0**	**1**	**15**	**0**	**0**	**1**	**5**

Source: Employer Survey, 2014.

B-7
NUMBER OF CURRENT AND FUTURE EMPLOYEES NEEDING EDUCATION/TRAINING IN SPECIFIC DISCIPLINES BY LEVEL
CONSTRUCTION TRADES/DRAFTING

	Current Employees				Future Employees			
Building Construction	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
	3	2			6	4		
Total	**3**	**2**	**0**	**0**	**6**	**4**	**0**	**0**
Electrical and Power Transmission	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
	4	2			10	2	1	
Total	**4**	**2**	**0**	**0**	**10**	**2**	**1**	**0**

Source: Employer Survey, 2014.

B-8
NUMBER OF CURRENT AND FUTURE EMPLOYEES NEEDING EDUCATION/TRAINING IN SPECIFIC DISCIPLINES BY LEVEL
EDUCATION

	Current Employees				Future Employees			
Education, General	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
				3				1
Total	**0**	**0**	**0**	**3**	**0**	**0**	**0**	**1**
Bilingual, Multilingual, and	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
				100				100
Total	**0**	**0**	**0**	**100**	**0**	**0**	**0**	**100**
Curriculum and Instruction	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
				250				250
				3				
Total	**0**	**0**	**0**	**253**	**0**	**0**	**0**	**250**
Educational Administration and Supervision - PK-12	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
		5	5					500
				500				
Total	**0**	**5**	**5**	**500**	**0**	**0**	**0**	**500**
Educational Instructional Media	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
				25				25
Total	**0**	**0**	**0**	**25**	**0**	**0**	**0**	**25**
Educational Assessment, Evaluation, and Research	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
				25				25
				3				
Total	**0**	**0**	**0**	**28**	**0**	**0**	**0**	**25**
Special Education and Teaching	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
	2	2						500
				400				5
				5				
Total	**2**	**2**	**0**	**405**	**0**	**0**	**0**	**505**
Student Counseling and Personnel Services	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
				300				300
				1				
Total	**0**	**0**	**0**	**301**	**0**	**0**	**0**	**300**
Teacher Education and Professional Development, Specific Levels and Methods	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
				1000				1000
				3				3
Total	**0**	**0**	**0**	**1003**	**0**	**0**	**0**	**1003**
Teacher Education and Professional Development, Specific Subject Areas	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
				1000				1000
				3				3
Total	**0**	**0**	**0**	**1003**	**0**	**0**	**0**	**1003**
Teaching English or French as a Second or Foreign Language	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
				500				700
Total	**0**	**0**	**0**	**500**	**0**	**0**	**0**	**700**
Teaching Assistants/Aides	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
		5	5		**5**	10	5	
		400	200		10			
				10			500	
Total	**0**	**405**	**205**	**10**	**15**	**10**	**505**	**0**

Source: Employer Survey, 2014.

B-9
NUMBER OF CURRENT AND FUTURE EMPLOYEES NEEDING EDUCATION/TRAINING IN SPECIFIC DISCIPLINES BY LEVEL
ENGINEERING

	Current Employees				Future Employees			
Engineering, General	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
							6	6
							1	
Total	**0**	**0**	**0**	**0**	**0**	**0**	**7**	**6**
Civil Engineering	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
							6	6
Total	**0**	**0**	**0**	**0**	**0**	**0**	**6**	**6**
Computer Engineering, General	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
			1				1	
			1				1	
Total	**0**	**0**	**2**	**0**	**0**	**0**	**2**	**0**
Electrical, Electronics and Communications Engineering	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
	4	4					1	
							1	
					10	10	2	
Total	**4**	**4**	**0**	**0**	**10**	**10**	**4**	**0**
Mechanical Engineering	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
							2	
							1	
Total	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**0**
Ocean Engineering	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
							1	
Total	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**
Construction Engineering	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
							2	
Total	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**
Industrial Engineering	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
							1	
Total	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**
Manufacturing Engineering	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
							3	
							1	
Total	**0**	**0**	**0**	**0**	**0**	**0**	**4**	**0**

Source: Employer Survey, 2014.

B-10
NUMBER OF CURRENT AND FUTURE EMPLOYEES NEEDING EDUCATION/TRAINING IN SPECIFIC DISCIPLINES BY LEVEL
ENGINEERING TECHNOLOGIES/TECHNICIANS

	Current Employees				Future Employees			
	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
Engineering Technology, General						2	2	
						1		
					1			
Total	**0**	**0**	**0**	**0**	**1**	**3**	**2**	**0**
Civil Engineering Technologies	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
						3	3	
Total	**0**	**0**	**0**	**0**	**0**	**3**	**3**	**0**
Electrical Engineering Technologies Technicians	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
	5	2	2	2		1		
					2	1	1	1
Total	**5**	**2**	**2**	**2**	**2**	**2**	**1**	**1**
Electromechanical Instrumentation and	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
	5	2	2	2	2	1	1	1
Total	**5**	**2**	**2**	**2**	**2**	**1**	**1**	**1**
Environmental Control Technologies	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
	7	2	2	2	3	1	1	1
Total	**7**	**2**	**2**	**2**	**3**	**1**	**1**	**1**
Quality Control and Safety Technologies	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
		10	5	5		3	1	1
Total	**0**	**10**	**5**	**5**	**0**	**3**	**1**	**1**
Mechanical Engineering Related Technologies/ Technicians	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
	5	1	1	1			1	
					2	1	1	1
						1		
Total	**5**	**1**	**1**	**1**	**2**	**2**	**2**	**1**
Construction Engineering	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
			1				1	
Total	**0**	**0**	**1**	**0**	**0**	**0**	**1**	**0**
Engineering-Related Technologies	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
			2				1	
Total	**0**	**0**	**2**	**0**	**0**	**0**	**1**	**0**
Computer Engineering	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
			2				1	
Total	**0**	**0**	**2**	**0**	**0**	**0**	**1**	**0**
Drafting/Design Engineering Technologies/ Technicians	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
	8	4			1			
			1		**1**			
					20	8		
							1	
Total	**8**	**4**	**1**	**0**	**22**	**8**	**1**	**0**
Nuclear Engineering Technologies/	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
			2				1	
Total	**0**	**0**	**2**	**0**	**0**	**0**	**1**	**0**
Engineering-Related Fields	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
			2				1	
Total	**0**	**0**	**2**	**0**	**0**	**0**	**1**	**0**

Source: Employer Survey, 2014.

B-11
NUMBER OF CURRENT AND FUTURE EMPLOYEES NEEDING EDUCATION/TRAINING IN SPECIFIC DISCIPLINES BY LEVEL
HEALTH PROFESSIONS AND RELATED CLINICAL SCIENCES

	Current Employees				Future Employees			
Health Services/Allied Health/Health Sciences, General	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
			1	1		2	1	1
		4	2	2				
Total	**0**	**4**	**3**	**3**	**0**	**2**	**1**	**1**
Dental Support Services and Allied	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
			1	1			1	1
Total	**0**	**0**	**1**	**1**	**0**	**0**	**1**	**1**
Health and Medical Administrative Services	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
			1	1			1	1
				2				1
Total	**0**	**0**	**1**	**3**	**0**	**0**	**1**	**2**
Allied Health Diagnostic,	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
			1				1	
Total	**0**	**0**	**1**	**0**	**0**	**0**	**1**	**0**
Clinical/Medical Laboratory Science and Allied Professions	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
				4			10	15
		5	2	2			1	
			1			1	1	1
Total	**0**	**5**	**3**	**6**	**0**	**1**	**12**	**16**
Medicine (MD)	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
				2				3
								2
Total	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**5**
Medical Basic Sciences	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
				4				1
Total	**0**	**0**	**0**	**4**	**0**	**0**	**0**	**1**
Medical Clinical Sciences Graduate Medical	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
			2				2	
				4				2
Total	**0**	**0**	**2**	**4**	**0**	**0**	**2**	**2**
Mental and Social Health Services and Allied Professions	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
			1					1
				1				1
							1	
Total	**0**	**0**	**1**	**1**	**0**	**0**	**1**	**2**
Nursing	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
				4			5	20
			4	2	4		1	
	15		5				2	
			2				2	1
Total	**15**	**0**	**11**	**6**	**4**	**0**	**10**	**21**
Pharmacy, Pharmaceutical	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
				2				2
Total	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**2**
Public Health	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
			1	1				1
							1	1
Total	**0**	**0**	**1**	**1**	**0**	**0**	**1**	**2**
Veterinary Medicine (DVM)	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
				35				1
								3
								1
Total	**0**	**0**	**0**	**35**	**0**	**0**	**0**	**4**
Veterinary Biomedical and Clinical Sciences	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
				1		2	2	
				2			10	
								1
Total	**0**	**0**	**0**	**3**	**0**	**2**	**12**	**1**
Health Aides/Attendants/	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
		2	2			2	2	
Total	**0**	**2**	**2**	**0**	**0**	**2**	**2**	**0**
Medical Illustration and Informatics	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
				1				
Total	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**
Bioethics Medical Ethics	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
				2				
Total	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**

Source: Employer Survey, 2014.

B-12
NUMBER OF CURRENT AND FUTURE EMPLOYEES NEEDING EDUCATION/TRAINING IN SPECIFIC DISCIPLINES BY LEVEL
INFORMATION TECHNOLOGY (COMPUTER/INFORMATION SCIENCES/SUPPORT SERVICES)

	Current Employees				Future Employees			
Computer and Information Sciences, General	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
				2			2	
			10	15			5	
				1			1	
			4	1			2	2
			10	4	10	3	4	2
			5				1	1
			2				5	1
	4	2	2					25
Total	**4**	**2**	**33**	**23**	**10**	**3**	**20**	**31**
Computer Programming	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
			10	15				25
			1	1			2	1
			5	2			1	1
				1			5	2
								2
Total	**0**	**0**	**16**	**19**	**0**	**0**	**8**	**31**
Data Processing	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
			2	1			1	1
			5	2			5	2
Total	**0**	**0**	**7**	**3**	**0**	**0**	**6**	**3**
Information Science/Studies	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
			1	1			1	1
								1
Total	**0**	**0**	**1**	**1**	**0**	**0**	**1**	**2**
Computer Systems Analysis	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
				6				6
			1	1			1	1
			3	2			3	2
Total	**0**	**0**	**4**	**9**	**0**	**0**	**4**	**9**
Data Entry/ Microcomputer	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
			2	2			2	1
Total	**0**	**0**	**2**	**2**	**0**	**0**	**2**	**1**
Computer Science			2	1			1	1
			2	2			2	1
								1
Total	**0**	**0**	**4**	**3**	**0**	**0**	**3**	**3**
Computer Software and Media Applications	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
			1	1			1	1
			2	2			2	1
				1				
Total	**0**	**0**	**3**	**4**	**0**	**0**	**3**	**2**
Computer Systems Networking and Telecommunications	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
	1						1	
	8	2	2		20	6	10	4
				15			5	2
			5	2			2	2
			10	3				20
				1				
Total	**9**	**2**	**17**	**21**	**20**	**6**	**18**	**28**
Computer/ Information Technology Administration and Management	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
			1			1		
			4	2			1	
			5	5			1	
			2				3	1
	1						2	2
	4							20
				15	10			
Total	**5**	**0**	**12**	**22**	**10**	**1**	**7**	**23**

Source: Employer Survey, 2014.

B-13
NUMBER OF CURRENT AND FUTURE EMPLOYEES NEEDING EDUCATION/TRAINING IN SPECIFIC DISCIPLINES BY LEVEL
INTERPERSONAL SKILLS

	Current Employees				Future Employees			
Interpersonal and Social Skills	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
	5							10
				10				
Total	**5**	**0**	**0**	**10**	**0**	**0**	**0**	**10**

Source: Employer Survey, 2014.

B-14
NUMBER OF CURRENT AND FUTURE EMPLOYEES NEEDING EDUCATION/TRAINING IN SPECIFIC DISCIPLINES BY LEVEL
LEGAL PROFESSIONS AND STUDIES

	Current Employees				Future Employees			
Non-Professional General Legal Studies	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
			1				1	
Total	**0**	**0**	**1**	**0**	**0**	**0**	**1**	**0**
Law (LL or JD)	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
				2				2
Total	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**2**
Legal Support Services/Paralegal	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
			1				1	
Total	**0**	**0**	**1**	**0**	**0**	**0**	**1**	**0**

Source: Employer Survey, 2014.

B-15
NUMBER OF CURRENT AND FUTURE EMPLOYEES NEEDING EDUCATION/TRAINING IN SPECIFIC DISCIPLINES BY LEVEL
LEISURE AND RECREATIONAL ACTIVITIES

	Current Employees				Future Employees			
Leisure and Recreational Activities	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
	30				30			
		1					2	
Total	**30**	**1**	**0**	**0**	**30**	**0**	**2**	**0**

Source: Employer Survey, 2014.

B-16
NUMBER OF CURRENT AND FUTURE EMPLOYEES NEEDING EDUCATION/TRAINING IN SPECIFIC DISCIPLINES BY LEVEL
LIBRARY SCIENCE

	Current Employees				Future Employees			
Library Science Librarianship	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
				1				1
Total	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**1**
Library Assistant	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
			1				1	
Total	**0**	**0**	**1**	**0**	**0**	**0**	**1**	**0**
Library Science, Other	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
		1				1		
Total	**0**	**1**	**0**	**0**	**0**	**1**	**0**	**0**

Source: Employer Survey, 2014.

B-17
NUMBER OF CURRENT AND FUTURE EMPLOYEES NEEDING EDUCATION/TRAINING IN SPECIFIC DISCIPLINES BY LEVEL
MATHEMATICS AND STATISTICS

	Current Employees				Future Employees			
Mathematics	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
				75				75
Total	**0**	**0**	**0**	**75**	**0**	**0**	**0**	**75**
Applied Mathematics	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
				60				60
Total	**0**	**0**	**0**	**60**	**0**	**0**	**0**	**60**
Statistics	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
				75				3
								75
Total	**0**	**0**	**0**	**75**	**0**	**0**	**0**	**78**
Mathematics and Statistics, Other	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
				25	1			
								25
Total	**0**	**0**	**0**	**25**	**1**	**0**	**0**	**25**

Source: Employer Survey, 2014.

B-18
NUMBER OF CURRENT AND FUTURE EMPLOYEES NEEDING EDUCATION/TRAINING IN SPECIFIC DISCIPLINES BY LEVEL
MECHANIC AND REPAIR TECHNOLOGIES/TECHNICIANS
(E.G., ELECTRICAL CONSTRUCTION AND MAINTENANCE, INDUSTRIAL MAINTENANCE)

	Current Employees				Future Employees			
Mechanics and Repairers, General	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
	10				10			
Total	**10**	**0**	**0**	**0**	**10**	**0**	**0**	**0**
Electrical/Electronics Maintenance and Repair Technology	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
	1				4			
	4							
Total	**5**	**0**	**0**	**0**	**4**	**0**	**0**	**0**
Heating, Air Conditioning,	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
	5				5			
Total	**5**	**0**	**0**	**0**	**5**	**0**	**0**	**0**
Heavy/Industrial Equipment Maintenance	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
	1				2			
	5				5			
Total	**6**	**0**	**0**	**0**	**7**	**0**	**0**	**0**
Vehicle Maintenance and Repair	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
	1				1			
Total	**1**	**0**	**0**	**0**	**1**	**0**	**0**	**0**
Vehicle Maintenance and Repair	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
	3				3			
Total	**3**	**0**	**0**	**0**	**3**	**0**	**0**	**0**

Source: Employer Survey, 2014.

B-19
NUMBER OF CURRENT AND FUTURE EMPLOYEES NEEDING EDUCATION/TRAINING IN SPECIFIC DISCIPLINES BY LEVEL
MILITARY TECHNOLOGIES

	Current Employees				Future Employees			
Military Technologies	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
		1				1		
Total	**0**	**1**	**0**	**0**	**0**	**1**	**0**	**0**

Source: Employer Survey, 2014.

B-20
NUMBER OF CURRENT AND FUTURE EMPLOYEES NEEDING EDUCATION/TRAINING IN SPECIFIC DISCIPLINES BY LEVEL
MULTI/INTERDISCIPLINARY STUDIES

	Current Employees				Future Employees			
Biological and Physical Sciences	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
				500				500
Total	**0**	**0**	**0**	**500**	**0**	**0**	**0**	**500**
Mathematics and Computer Science	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
				700				700
Total	**0**	**0**	**0**	**700**	**0**	**0**	**0**	**700**
Accounting and Computer Science	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
				125				125
Total	**0**	**0**	**0**	**125**	**0**	**0**	**0**	**125**
Behavioral Sciences	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
				100				100
Total	**0**	**0**	**0**	**100**	**0**	**0**	**0**	**100**
Nutrition Sciences	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
				40				40
Total	**0**	**0**	**0**	**40**	**0**	**0**	**0**	**40**
Classical and Ancient Studies	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
				50				50
Total	**0**	**0**	**0**	**50**	**0**	**0**	**0**	**50**
Intercultural Multicultural and	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
				100				100
Total	**0**	**0**	**0**	**100**	**0**	**0**	**0**	**100**
Multi Interdisciplinary	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
				100				100
Total	**0**	**0**	**0**	**100**	**0**	**0**	**0**	**100**

Source: Employer Survey, 2014.

B-21
NUMBER OF CURRENT AND FUTURE EMPLOYEES NEEDING EDUCATION/TRAINING IN SPECIFIC DISCIPLINES BY LEVEL
NATURAL RESOURCES AND CONSERVATION

	Current Employees				Future Employees			
Natural Resources Conservation and	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
							1	
Total	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**
Natural Resources Management and	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
							1	
Total	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**
Wildlife and Wildlands Science	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
							1	
Total	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**
Natural Resources and Conservation,	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
							1	
Total	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**

Source: Employer Survey, 2014.

B-22
NUMBER OF CURRENT AND FUTURE EMPLOYEES NEEDING EDUCATION/TRAINING IN SPECIFIC DISCIPLINES BY LEVEL
PARKS, RECREATION, LEISURE, AND FITNESS STUDIES

	Current Employees				Future Employees			
Health and Physical Education/Fitness	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
	5	2	1		10	2		
Total	**5**	**2**	**1**	**0**	**10**	**2**	**0**	**0**

Source: Employer Survey, 2014.

B-23
NUMBER OF CURRENT AND FUTURE EMPLOYEES NEEDING EDUCATION/TRAINING IN SPECIFIC DISCIPLINES BY LEVEL
PHYSICAL SCIENCES (E.G., PHYSICS, CHEMISTRY)

	Current Employees				Future Employees			
Chemistry	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
				4				1
				3		5	5	3
Total	**0**	**0**	**0**	**7**	**0**	**5**	**5**	**4**
Physics	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
				2				1
Total	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**1**
Physical Sciences, Other	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
			3				3	
				1				1
Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Source: Employer Survey, 2014.

B-24
NUMBER OF CURRENT AND FUTURE EMPLOYEES NEEDING EDUCATION/TRAINING IN SPECIFIC DISCIPLINES BY LEVEL
PRECISION PRODUCTION

	Current Employees				Future Employees			
Drafting	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
					1			
Total	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**
Precision Metal Working	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
					1			
Total	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**

Source: Employer Survey, 2014.

B-25
NUMBER OF CURRENT AND FUTURE EMPLOYEES NEEDING EDUCATION/TRAINING IN SPECIFIC DISCIPLINES BY LEVEL
PUBLIC ADMINISTRATION AND SOCIAL SERVICE PROFESSIONS

	Current Employees				Future Employees			
Public Administration	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
				200				200
Total	**0**	**0**	**0**	**200**	**0**	**0**	**0**	**200**
Social Work	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
				300				300
Total	**0**	**0**	**0**	**300**	**0**	**0**	**0**	**300**

Source: Employer Survey, 2014.

B-26
NUMBER OF CURRENT AND FUTURE EMPLOYEES NEEDING EDUCATION/TRAINING IN SPECIFIC DISCIPLINES BY LEVEL
SCIENCE TECHNOLOGIES/ TECHNICIANS

	Current Employees				Future Employees			
Biology Technician Biotechnology Laboratory	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
			3	8			10	20
			300				300	
Total	**0**	**0**	**303**	**8**	**0**	**0**	**310**	**20**
Nuclear and Industrial Radiologic	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
							1	1
Total	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**
Science Technologies/	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
						1		
Total	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**

Source: Employer Survey, 2014.

B-27
NUMBER OF CURRENT AND FUTURE EMPLOYEES NEEDING EDUCATION/TRAINING IN SPECIFIC DISCIPLINES BY LEVEL
CRIMINAL JUSTICE OR OTHER SECURITY/PROTECTIVE SERVICES

	Current Employees				Future Employees			
Security and Protective Services,	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
		40	4	2		5	1	1
Total	**0**	**40**	**4**	**2**	**0**	**5**	**1**	**1**

Source: Employer Survey, 2014.

B-28
NUMBER OF CURRENT AND FUTURE EMPLOYEES NEEDING EDUCATION/TRAINING IN SPECIFIC DISCIPLINES BY LEVEL
TECHNOLOGY EDUCATION/INDUSTRIAL ARTS

	Current Employees				Future Employees			
Technology Education/ Industrial	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
						1		
Total	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**

Source: Employer Survey, 2014.

B-29
NUMBER OF CURRENT AND FUTURE EMPLOYEES NEEDING EDUCATION/TRAINING IN SPECIFIC DISCIPLINES BY LEVEL
TRANSPORTATION AND MATERIALS MOVING

	Current Employees				Future Employees			
Ground Transportation	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
	2				5			
Total	**2**	**0**	**0**	**0**	**5**	**0**	**0**	**0**
Transportation and Materials Moving,	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
		2				1		
Total	**0**	**2**	**0**	**0**	**0**	**1**	**0**	**0**

Source: Employer Survey, 2014.

B-30
NUMBER OF CURRENT AND FUTURE EMPLOYEES NEEDING EDUCATION/TRAINING IN SPECIFIC DISCIPLINES BY LEVEL
OTHER

	Current Employees				Future Employees			
Other	Certificate	Associate	Bachelor's	Graduate	Certificate	Associate	Bachelor's	Graduate
Core industry training	40				40			
Industrial machining	3				3			
Veterinary technician		20	6			4	2	
Total	**43**	**20**	**6**	**0**	**43**	**4**	**2**	**0**

Source: Employer Survey, 2014.

APPENDIX C

C-1
PROJECTED GROWTH BY DETAILED OCCUPATIONAL CATEGORY REQUIRING A GRADUATE DEGREE IN FREDERICK COUNTY BY TOTAL NUMBER OF OPENINGS THROUGH 2020

Occupations Requiring a Master's, Doctorate, or Professional Degree By Total Number of Openings Over 10 years					
Occupational Title	Employment			Openings	
	2010	2020	Change	Replace.	Total
Medical Scientists, Except Epidemiologists	267	527	260	17	277
Dentists, General	344	492	148	102	250
Biochemists and Biophysicists	216	413	197	49	246
Lawyers	224	342	118	43	161
Postsecondary Teachers	432	515	83	67	150
Educational, Vocational, and School Counselors	288	344	56	62	118
Education Administrators, Elementary and Secondary School	293	326	33	83	116
Mental Health Counselors	122	198	76	26	102
Physicians and Surgeons, All Other	191	255	64	38	102
Biological Scientists, All Other	232	277	45	52	97
Health Diagnosing and Treating Practitioners, All Other	177	231	54	34	88
Statisticians	64	110	46	39	85
Microbiologists	133	178	45	30	75
Occupational Therapists	70	131	61	13	74
Physical Therapists	75	133	58	9	67
Speech-Language Pathologists	167	199	32	32	64
Medical and Public Health Social Workers	95	132	37	23	60
Pharmacists	137	161	24	35	59
Veterinarians	56	103	47	11	58
Substance Abuse and Behavioral Disorder Counselors	87	125	38	19	57
Instructional Coordinators	118	145	27	26	53
Anthropologists and Archeologists	40	70	30	17	47
Podiatrists	73	106	33	14	47
Internists, General	55	84	29	11	40
Librarians	98	112	14	26	40
Historians	28	55	27	12	39
Health Educators	44	72	28	10	38
Rehabilitation Counselors	63	84	21	13	34
Therapists, all other	72	91	19	15	34
Operations Research Analysts	31	52	21	10	31
Education Administrators, Postsecondary	59	72	13	17	30
Audiologists	34	60	26	2	28
Urban and Regional Planners	38	55	17	10	27
Physician Assistants	47	64	17	9	26
Marriage and Family Therapists	34	52	18	7	25
Family and General Practitioners	46	58	12	9	21
Pediatricians, General	27	40	13	5	18
Computer and Information Research Scientists	21	34	13	4	17
Clergy	34	43	9	6	15
English Language and Literature Teachers, Postsecondary	44	52	8	7	15
Psychologists, All Other	12	21	9	4	13
Clinical, Counseling, and School Psychologists	20	27	7	6	13
Art, Drama, and Music Teachers, Postsecondary	34	41	7	5	12
Nursing Instructors and Teachers, Postsecondary	35	41	6	6	12
Philosophy and Religion Teachers, Postsecondary	28	35	7	4	11
Business Teachers, Postsecondary	30	36	6	5	11
Physicists	26	29	3	8	11
Chiropractors	12	20	8	2	10

Source: Maryland Department of Labor Licensing and Regulation, 2014.
Note: Occupations with fewer than 10 openings over the time horizon were excluded from this chart.

C-2
PROJECTED GROWTH BY DETAILED OCCUPATIONAL CATEGORY REQUIRING A BACHELOR'S DEGREE IN FREDERICK COUNTY BY TOTAL NUMBER OF OPENINGS, THROUGH 2020 (PART 1)

Occupations Requiring a Bachelor's Degree By Total Number of Openings Over 10 years					
Occupational Title	Employment			Openings	
	2010	2020	Change	Replace.	Total
Civil Engineers	917	1722	805	186	991
Business Operations Specialists, All Other	1188	1736	548	228	776
General and Operations Managers	1790	2176	386	333	719
Information Security Analysts, Web Developers, and Computer Network Architects	728	1250	522	108	630
Accountants and Auditors	828	1207	379	178	557
Management Analysts	659	1084	425	107	532
Secondary School Teachers, Except Special and Vocational Education	1412	1536	124	386	510
Software Developers, Systems Software	491	932	441	51	492
Teachers and Instructors, All Other	1099	1268	169	168	337
Human resources, labor relations, and training specialists, all other	396	636	240	67	307
Computer Programmers	316	538	222	73	295
Software Developers, Applications	364	609	245	38	283
Computer Systems Analysts	335	549	214	63	277
Market Research Analysts and Marketing Specialists	254	460	206	68	274
Network and computer systems architects and administrators	311	520	209	53	262
Medical and Health Services Managers	401	539	138	98	236
Computer and Information Systems Managers	305	489	184	47	231
Loan Officers	558	637	79	143	222
Training and Development Specialists	274	446	172	46	218
Special Education Teachers, Middle School	419	511	92	124	216
Logisticians	232	395	163	44	207
Database Administrators	219	384	165	37	202
Child, Family, and School Social Workers	341	459	118	81	199
Compliance Officers, Except Agriculture, Construction, Health and Safety, and Transportation	234	397	163	28	191
Administrative Services Managers	283	390	107	70	177
Cost Estimators	321	430	109	62	171
Graphic Designers	207	309	102	64	166
Biological Technicians	213	292	79	72	151
Computer Occupations, All Other	418	479	61	78	139
Insurance Sales Agents	120	211	91	27	118
Insurance Underwriters	127	194	67	41	108
Life Scientists, All Other	147	241	94	9	103
Personal Financial Advisors	297	365	68	34	102
Engineering Managers	119	197	78	23	101
Environmental Scientists and Specialists, Including Health	89	163	74	26	100
Financial Analysts	208	262	54	44	98
Natural Sciences Managers	90	133	43	54	97
Financial Managers	292	331	39	53	92
Marketing Managers	130	183	53	38	91
Interpreters and Translators	126	180	54	34	88
Biomedical Engineers	59	130	71	13	84
Mechanical Engineers	109	158	49	35	84
Meeting and Convention Planners	85	150	65	16	81
Financial Specialists, All Other	218	251	33	46	79
Engineers, All Other	96	147	51	21	72
Medical and Clinical Laboratory Technologists	188	220	32	37	69
Technical Writers	83	134	51	16	67
Public Relations Specialists	126	159	33	34	67
Purchasing Managers	91	127	36	28	64
Sales Managers	118	148	30	34	64

Source: Maryland Department of Labor Licensing and Regulation, 2014.
Note: Occupations with fewer than 10 openings over the time horizon were excluded from this chart.

C-2
PROJECTED GROWTH BY DETAILED OCCUPATIONAL CATEGORY REQUIRING A BACHELOR'S DEGREE IN FREDERICK COUNTY BY TOTAL NUMBER OF OPENINGS, THROUGH 2020 (PART 2)

Occupations Requiring a Bachelor's Degree By Total Number of Openings Over 10 years					
Occupational Title	Employment			Openings	
	2010	2020	Change	Replace.	Total
Industrial Engineers	79	122	43	17	60
Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products	154	178	24	36	60
Industrial Production Managers	76	117	41	18	59
Special Education Teachers, Preschool, Kindergarten, and Elementary School	113	139	26	33	59
Computer Hardware Engineers	62	104	42	15	57
Budget Analysts	100	136	36	21	57
Recreation Workers	139	174	35	22	57
Special Education Teachers, Secondary School	151	163	12	45	57
Credit Analysts	142	168	26	30	56
Community and Social Service Specialists, All Other	83	117	34	18	52
Editors	90	115	25	26	51
Electronics Engineers, Except Computer	103	126	23	25	48
Surveyors	43	81	38	9	47
Securities, Commodities, and Financial Services Sales Agents	142	150	8	39	47
Chemists	78	98	20	25	45
Environmental Engineers	37	72	35	8	43
Human Resources Managers	59	86	27	14	41
Property, Real Estate, and Community Association Managers	143	154	11	30	41
Probation Officers and Correctional Treatment Specialists	44	74	30	10	40
Electrical Engineers	45	70	25	11	36
Adult Literacy, Remedial Education, and GED Teachers and Instructors	90	110	20	14	34
Education Administrators, All Other	101	105	4	28	32
Public Relations Managers	52	67	15	15	30
Kindergarten Teachers, Except Special Education	64	77	13	17	30
Aerospace Engineers	28	51	23	6	29
Occupational Health and Safety Specialists	44	57	13	16	29
Legal Support Workers, All Other	56	76	20	8	28
Social Scientists and Related Workers, All Other	29	44	15	12	27
Writers and Authors	60	68	8	16	24
Loan Counselors	67	74	7	17	24
Healthcare Practitioners and Technical Workers, All Other, including genetic counselors	22	37	15	8	23
Dietitians and Nutritionists	35	45	10	12	22
Education Administrators, Preschool and Child Care Center/Program	54	61	7	15	22
Training and Development Managers	26	41	15	6	21
Compensation, Benefits, and Job Analysis Specialists	46	56	10	8	18
Social and Community Service Managers	26	37	11	6	17
Health and Safety Engineers, Except Mining Safety Engineers and Inspectors	22	33	11	5	16
Architects, Except Landscape and Naval	21	31	10	4	14
Advertising and Promotions Managers	29	35	6	8	14
Vocational Education Teachers, Postsecondary	30	38	8	5	13
Physical Scientists, All Other	15	22	7	5	12
Producers and Directors	26	30	4	8	12
Chemical Engineers	20	25	5	6	11
Statistical Assistants	13	21	8	2	10
Reporters and Correspondents	27	24	-3	10	10

Source: Maryland Department of Labor Licensing and Regulation, 2014.
Note: Occupations with fewer than 10 openings over the time horizon were excluded from this chart.

C-3
PROJECTED GROWTH BY DETAILED OCCUPATIONAL CATEGORY REQUIRING AN ASSOCIATE DEGREE IN FREDERICK COUNTY BY TOTAL NUMBER OF OPENINGS THROUGH 2020

Occupations Requiring an Associate's Degree By Total Number of Openings Over 10 years					
Occupational Title	Employment			Openings	
	2010	2020	Change	Replace.	Total
Registered Nurses	3471	4608	1137	628	1765
Life, Physical, and Social Science Technicians, All Other	321	542	221	136	357
Engineering Technicians, Except Drafters, All Other	325	550	225	62	287
Paralegals and Legal Assistants	374	604	230	53	283
Radiologic Technologists and Technicians	557	748	191	86	277
Construction Managers	826	930	104	53	157
Respiratory Therapists	202	275	73	38	111
Preschool Teachers, Except Special Education	256	298	42	67	109
Diagnostic Medical Sonographers	147	220	73	23	96
Medical and Clinical Laboratory Technicians	144	209	65	28	93
Environmental Engineering Technicians	60	117	57	11	68
Electrical and Electronic Engineering Technicians	119	158	39	23	62
Veterinary Technologists and Technicians	52	104	52	9	61
Civil Engineering Technicians	54	97	43	10	53
Dental Hygienists	63	100	37	13	50
Architectural and Civil Drafters	50	70	20	10	30
Physical Therapist Assistants	25	49	24	4	28
Cardiovascular Technologists and Technicians	41	53	12	6	18
Desktop Publishers	28	39	11	5	16
Chemical Technicians	17	28	11	2	13

Source: Maryland Department of Labor Licensing and Regulation, 2014.
Note: Occupations with fewer than 10 openings over the time horizon were excluded from this chart.

APPENDIX D

D-1
PROGRAM OFFERINGS AT THE ARUNDEL MILLS CENTER

Arundel Mills					
	UM University College	Frostburg State University	McDaniel College	Notre Dame of Maryland University	Stevenson University
UNDERGRADUATE					
Business					
Business Administration B.S.	X				
Management Studies B.S.	X				
Computer Techologies					
Cybersecurity B.S.	X				
Homeland Security	X				
Information Systems Management B.S.	X				
Education					
Liberal Studies/Elementary Education B.A.				X	
Engineering					
Engineering B.S.		X			
Health Professions					
Nursing B.S.					X
GRADUATE					
Education					
Administrator Certificate			X		
Administration and Supervision Certificate				X	
Education M.S.			X		
Human Resources Development H.R.D. M.S.			X		
Leadership in Teaching L.D.T.				X	
Teaching M.A.T.				X	
Library Media Specialist Certification				X	
Reading Specialist Certification				X	
Special Education Certification				X	
TESOL Certification				X	

Source: MHEC and MGT interviews with RHEC representatives, 2014.

D-2
PROGRAM OFFERINGS AT THE EASTERN SHORE HIGHER EDUCATION CENTER

Eastern Shore						
	UM University College	UM Eastern Shore	Salisbury University	Gratz College RTC	Stevenson University	Notre Dame of Maryland University
UNDERGRADUATE						
Business						
Business Administration B.S.	X					
Criminal Justice						
Criminal Justice B.S.	X					
Education						
Elementary Education B.S.			X			
ESOL B.A. (online courses)			X			
Professional and Technical Education Certification courses		X				
Environmental Management						
Environmental Management B.S. (online program)	X					
Health Professions						
Nursing B.S.					X	
Social Work						
Social Work B.A.S.W.			X			
Other						
Interdisciplinary Studies - American Studies Track B.S./B.S.			X			
GRADUATE						
Business						
Business Administration M.B.A.			X			
Organizational Leadership Ph.D. (pending)		X?				
Criminology and Criminal Justice						
Forensic Studies (online program) M.S.					X	
Education						
Career and Technical Education coursework		X				
Education M.A.				X		
Educational Leadership M.Ed.			X			
ESOL Certificate (online courses)			X			
Gifted and Talented M.A.						X
Instructional Leadership for Changing Populations Ph.D.						X
Geography						
GIS Management M.S. (online program)			X			
Health Professions						
Nursing M.S. (online program)					X	
Social Work						
Social Work M.S.W.			X			
Other						
Work-based Learning Endorsement courses		X				

Source: MHEC and MGT interviews with RHEC representatives, 2014.

D-3
PROGRAM OFFERINGS AT THE LAUREL COLLEGE CENTER

Laurel College			
	UM College Park	UM University College	Notre Dame of Maryland University
UNDERGRADUATE			
Business			
Business Administration B.A.			X
Criminology and Criminal Justice			
Criminal Justice B.S.		X	
Education			
Elementary Education/Liberal Arts B.A.			X
Elementary Education/Liberal Studies and Special Education Certification B.A.			X
Information Systems			
Information Systems Management B.S.		X	
Social Science			
Social Science B.S.		X	
GRADUATE			
Education			
Elementary and Secondary Education Master's Certification (MCERT)	X		

Source: MHEC and MGT interviews with RHEC representatives, 2014.

D-4 (PAGE 1)
PROGRAM OFFERINGS AT THE SOUTHERN MARYLAND EDUCATION CENTER (UNDERGRADUATE)

Southern Maryland														
	UM College Park	UM University College	Notre Dame of Maryland University	Johns Hopkins University	Bowie State University	Capitol College	The George Washington University	Gratz College	Harrisburg University of Science and Technology	Salisbury University	Stevenson University	Webster University	Washington Adventist University	Towson University
UNDERGRADUATE														
Business, Management and Communication														
Business Administration B.S.		X				X								
Information Systems Management B.S.		X												
Management Studies B.S.		X												
Education														
Early Childhood Care and Education B.A.													X	
Early Childhood Education/Special Education B.A.													X	
Engineering and Information Technology														
Computer Engineering B.S.						X								
Computer Science B.S.						X								
Electrical Engineering B.S.						X								
Electronic Engineering Technology B.S.						X								
Mechanical Engineering B.S.	X													
Nursing, Health, and Social Work														
RN to Bachelor's B.S.N.											X			
Social Work B.A.										X				

Source: MHEC and MGT interviews with RHEC representatives, 2014.

D-4 (PAGE 2)
PROGRAM OFFERINGS AT THE SOUTHERN MARYLAND EDUCATION CENTER (GRADUATE)

Southern Maryland													
	UM College Park	UM University College	Notre Dame of Maryland University	Johns Hopkins University	Bowie State University	Capitol College	The George Washington University	Gratz College	Harrisburg University of Science and Technology	Salisbury University	Stevenson University	Webster University	Washington Adventist University	Towson University
GRADUATE														
Business, Management and Communication														
Business Administration M.B.A.						X						X		
Contemporary Communication: Strategic Communication M.A.			X											
Government Contracting Graduate Certification												X		
Human Resource Management M.A.												X		
Information Assurance M.S.I.A.E.						X								
Management M.A., with Individualized Specialiuations or Concentrations in: Information Systems and Project Management			X											
Procurement and Acquisition Management M.A.												X		
Technical Management M.S.				X										
Education														
Accelerated Certification for Teaching ACT			X											
Instructional Leadership for Changing Populations Ph.D.			X											
Teaching M.A., in: Early Childhood Education, Elementary Education, Secondary Education			X											
Leadership in Special Education M.A.			X											
Gifted and Talented Education M.A.			X											
Leadership in Special Education M.A., in: STEM for Educators K-8			X											
Certification of Advanced Study in Education (CASE), post-Master's, in: Special Education, TESOL, Administration, Reading, Library Media			X											
STEM K-8 Certification, post-Masters			X											
Graduate Certification Programs and Post Masters Certification for Certified Teachers, in Special Education			X											
Certification Program in Teaching English for Speaders of Other Languages (TESOL)			X											
Certification Program for Administration and Supervision														
Certification Program for: Reading Specialist, Gifted and Talented Specialist, Library Media			X											
Math Education, M.S., in: Middle School Track, Secondary School Track														X
Reading M.Ed.														X
Early Childhood Education M.Ed.														X
Human Resource Development M.S.														X
Educational Leadership														
Certification in Administration and Supervision, post-Master's														X
School Counseling M.S.				X										
Clinical Communication Counseling M.S.				X										
Instruction M.A.								X						
Learning Technologies M.S.									X					
Engineering and Information Technology														
Systems Engineering Ph.D.							X							
Engineering Management Ph.D.							X							
Engineering Management, Focus on Systems Engineering M.S.							X							
Systems Engineering M.S.				X										
Technical Management M.S.				X										
Information Assurance D.Sc.						X								
Information Assurance M.S.						X								
Professional master of Engineering, with options in: Aerospace Engineering, Electrical and Computer Engineering Environmental Engineering, Mechanical Engineering (Energy and Environment Core), Nuclear Engineering, Reliability Engineering, Sustainable Energy Engineering, Civil and Environmental Engineering, Project Management	X													
Graduate Certificate in Engineering, with options in: Aerospace Engineering, Electrical and Computer Engineering, Mechanical Engineering (Energy and Environment Core), Reliability Engineering Systems Engineering, Nuclear Engineering, Sustainable Energy Engineering, Civil and Environmental Engineering, Project Management, Environmental Engineering, Software Engineering	X													
Information Systems and Management M.S.									X					
Learning Technologies M.S.									X					
Nursing, Health, and Social Work														
Nursing: Nurse Practitioner Track M.S.					X									
Social Work M.S.W.										X				

Source: MHEC and MGT interviews with RHEC representatives, 2014.

D-5
PROGRAM OFFERINGS AT THE UNIVERSITY CENTER OF NORTHEASTERN MARYLAND

UC Northeastern MD						
	UM College Park	UM University College	Notre Dame of Maryland University	Johns Hopkins University	Towson University	Morgan State University
UNDERGRADUATE						
Business						
Business Management B.A.			X			
Business Administration/ Management B.S./B.A.					X	
Business Administration (Management Concentration) B.S./B.A.					X	
Human Resource Management B.S.		X				
Cyber Security						
Cyber Security B.S.		X				
Education						
Early Childhood Education/Special Education B.S.					X	
Elementary Education/Special Education B.S.					X	
Elementary Education B.A.			X			
Nursing						
Nursing B.S.			X			
Psychology						
Psychology B.A./B.S.					X	
Sociology/Criminal Justice						
Police Executive Leadership B.S.				X		
Sociology (Criminal Justice Concentration) B.S./B.A.					X	
Technology						
Information Technology B.S./B.A.					X	
GRADUATE						
Business						
Contemporary Communication M.A.			X			
Leadership and Management M.A.						
Conscentrations in:						
Health Care Administration						
Human Resource Management						
Project Management			X			
Education						
Education Ed.D.						X
Human Resource Development						
Educational Leadership Track M.S.					X	
Leadership in Teaching M.A.			X			
Engineering						
Applied and Computational Mathematics M.S.				X		
Engineering, Professional Masters	X					
Systems Engineering M.S.				X		
Nursing						
Nursing M.S.			X			
Sociology/Criminal Justice						
Police Executive Leadership M.S.				X		
Technology						
Applied Information Technology M.S.					X	

Source: MHEC and MGT interviews with RHEC representatives, 2014.

D-6 (PAGE 1)
PROGRAM OFFERINGS AT THE UNIVERSITIES AT SHADY GROVE (UNDERGRADUATE)

	UM Shady Grove								
	UM College Park	UM University College	UM Eastern Shore	Towson University	Salisbury University	University of Baltimore	UM Baltimore County	UM Baltimore	Bowie State University
UNDERGRADUATE									
Biological Sciences									
Biological Sciences B.S.	X								
Biotechnology									
Biotechnology B.T.P.S.		X							
Business									
Accounting B.S.	X	X							
Business Administration B.S.		X							
General Business B.S.	X								
General Business w/Entrepreneurship Specialization B.S.	X								
International Business B.S.	X								
Marketing B.S.	X								
Human Resource Management B.S.		X							
Communication									
Communication B.S.	X								
Communication Studies B.S.		X							
Computer and Information Sciences									
Computer and Information Sciences B.S.		X							
Computer Networks and Security B.S.		X							
Cybersecurity B.S.		X							
Digital Media and Web Technology B.S.		X							
Information Systems Management B.S.		X							
Construction Management Technology									
Construction Management Technology B.S.			X						
Criminology and Criminal Justice									
Criminology and Criminal Justice B.A.	X								
Education									
Early Childhood Education B.S.				X					
Elementary Education/Special Education (EESE-Integrated Program with Dual Certification)				X					
Exercise Science									
Exercise Science B.S.					X				
Health Systems Management									
Health Systems Management B.S.						X			
History									
History B.A.							X		
Hotel and Restaurant Management									
Hotel and Restaurant Management B.S.			X						
Investigative Forensics									
Investigative Forensics B.S.		X							
Laboratory Management									
Laboratory Management B.T.P.S.		X							
Nursing									
Nursing B.S.							X		
Political Science									
Political Science B.A.							X		
Psychology									
Psychology B.A.							X		
Public Health Science									
Public Health Science B.S.	X								
Public Safety Administration									
Public Safety Administration B.S.		X							
Respiratory Therapy									
Respiratory Therapy B.S.					X				
Simulation and Digital Entertainment									
Simulation and Digital Entertainment B.S.						X			
Social Work									
Social Work B.A.							X		

Source: MHEC and MGT interviews with RHEC representatives, 2014.

D-6 (PAGE 2)
PROGRAM OFFERINGS AT THE UNIVERSITIES AT SHADY GROVE (GRADUATE)

	UM Shady Grove								
	UM College Park	UM University College	UM Eastern Shore	Towson University	Salisbury University	University of Baltimore	UM Baltimore County	UM Baltimore	Bowie State University
GRADUATE									
Biotechnology									
Biotechnology M.S.		X							
Biotechnology M.P.S.							X		
Business									
Business and Management (Accounting) M.S.	X								
Business and Management (Marketing Analytics) M.S.	X								
Business Administration M.B.A.	X								
Management M.S.		X							
Computer Information Systems and Technology									
Technology Management M.S.		X							
Information Technoloagy M.S.		X							
Cybersecurity									
Cybersecurity M.P.S.							X		
Education									
Administration 1 Certificate (Post-Masters)				X					
Early Childhood Education M.Ed.				X					
Education M.Ed.									X
Education Ed.D.									X
Education Curriculum and Instruction Grades 1-5 M.Ed.	X								
Education Curriculum and Instruction - Reading Specialist	X								
Education Policy and Leadership Ed.D.	X								
Elementary and Secondary Education Subjects Master's Certification	X								
Human Development M.Ed.	X								
Literacy Coaching Specialist Certificate	X								
Math Education (Specialization in Middle School Math)	X								
Physical Education Master's Certificate	X								
Special Education M.A.T.				X					
Special Education M.Ed.				X					
Engineering									
Engineering, Professional Master	X								
Geographic Information Systems									
Geographic Information Systems M.P.S.							X		
Health Care Administration/Management									
Health Care Administration M.S.		X							
Health Systems Management M.S.						X			
Industrial-Organizational Psychology									
Industrial-Organizational Psychology M.P.S.							X		
Information Management									
Information Management M.I.M.	X								
Library Science									
Library Science M.L.S.	X								
Nursing									
Nursing M.S.								X	
Pharmacy									
Pharmacy Pharm.D.								X	
Public Administration									
Public Administration M.P.A.						X			
Public Administration D.P.A.						X			
Public Health									
Public Health Practice and Policy M.P.H.	X								
Publications Design									
Publications Design M.A.						X			
Social Work									
Social Work M.S.W.								X	

Source: MHEC and MGT interviews with RHEC representatives, 2014.

D-7
PROGRAM OFFERINGS AT USM AT HAGERSTOWN

USM Hagerstown						
	UM College Park	UM University College	Towson University	Salisbury University	Frostburg State University	Coppin State University
UNDERGRADUATE						
Business						
Accounting B.S.		X				
Business Administration B.S.					X	
Sport Management B.S.						X
Computer Techologies						
Cybersecurity B.S.		X				
Information Systems Management B.S.		X				
Education						
Elementary/Early Childhood Education B.S.					X	
Health Professions						
Health Information Management B.S.						X
Nursing B.S.			X			
Nursing - RN to B.S.			X			
Social Sciences						
Criminal Justice B.S.		X				
Investigative Forensics B.S.		X				
Psychology B.S.					X	
Social Science B.S.		X				
Sociology B.S.					X	
Social Work						
Social Work B.A.S.W.				X		
Other						
Liberal Studies B.S.					X	
GRADUATE						
Business						
Business Administration M.B.A.						
Education						
Administration and Supervision M.Ed.					X	
Curriculum and Instruction M.Ed.					X	
Educational Leadership Ed.D.					X	
Elementary Education M.A.T.					X	
Interdisciplinary M.Ed.					X	
Reading M.Ed.					X	
Secondary Education M.A.T.					X	
Special Education M.Ed.						
Engineering						
Aerospace GCEN	X					
Aerospace M.Eng.	X					
Bioengineering M.Eng.	X					
Civil and Environmental GCEN	X					
Civil and Environmental M.Eng.	X					
Electrical and Computer GCEN	X					
Electrical and Computer M.Eng.	X					
Environmental GCEN	X					
Environmental M.Eng.	X					
Fire Protection M.Eng.	X					
Mechanical GCEN	X					
Mechanical M.Eng.	X					
Nuclear Engineering M.Eng.	X					
Reliability GCEN	X					
Reliability M.Eng.	X					
Software Engineering GCEN	X					
Sustainable Energy Engineering M.Eng.	X					
Systems M.Eng.	X					
Health Professions						
Nursing M.S.			X			
Nursing Education Post-Baccalaureate Certificate			X			
Social Work						
Social Work M.S.W.				X		

Source: MHEC and MGT interviews with RHEC representatives, 2014.

D-8
PROGRAM OFFERINGS AT THE WALDORF CENTER FOR HIGHER EDUCATION

Waldorf			
	UM University College	College of Notre Dame of Maryland University	Towson University
UNDERGRADUATE			
Business			
Accounting B.S.	X		
Business Administration B.S.	X		
Legal Studies B.S.	X		
Management Studies B.S.	X		
Communication			
Communication Studies B.A.	X		
Computer and Information Sciences			
Information Systems Management B.S.	X		
Computer Science B.S.	X		
Computer Networking and Security B.S.	X		
Cybersecurity B.S.	X		
Digital Medica and Web Technologies B.S.	X		
Criminal Justice and Safety Services			
Criminal Justice B.S.	X		
Environmental Management B.S.	X		
Fire Service Administration B.S.	X		
Homeland Security B.S.	X		
Investigative Forensics B.S.	X		
Education			
Elementary Education B.S.			X
Accelerated Certification for Teaching, Post-Baccalaureate			
Early Childhood Education			
Elementary Education			
Dual Early Childhood/Elementary			
Dual Elementary/Special Education		X	
Dual Secondary/Special Education			
Secondary Education Grades 7-12			
(Numerous Subject Areas)			
Subject Matter N-12 - Art, Music			
Liberal Arts			
English B.S.	X		
History B.A.	X		
History with Women's Study Minor B.S.	X		
Humanities B.A.	X		
Social Sciences			
Political Science B.S.	X		
Social Science B.S.	X		
GRADUATE			
Education			
Gifted and Talented Education M.A.		X	
Leadership in Special Education M.A.			
Administrator 1			
Exceptionalities		X	
Leadership in Teaching M.A.			
Administrator 1			
Library Media Specialist			
Math Instructional Leader			
Reading Specialist			
General Track (6 core courses/6 electives)		X	
TESOL for Certified Teachers M.A.		X	
Graduate Degree Program for Teacher Certification M.A.			
Early Childhood Education			
Elementary Education			
English for Speakers of Other Languages (ESOL)			
Dual Early Childhood/Elementary			
Dual Elementary/Special Education		X	
Dual Secondary/Special Education			
Secondary Education Grades 7-12			
(Numerous Subject Areas)			
Subject Matter N-12 - Art, Music			
Certification, Post-Masters (non-degree)			
Administrator 1			
Gifted and Talented			
Library Media Specialist			
Math Instructional Leader		X	
Reading Specialist			
Special Education			
ESOL			
Certification of Admanced Study in Education (CASE)			
Administrator 1			
Gifted and Talented			
Library Media Specialist			
Math Instructional Leader		X	
Reading Specialist			
Special Education			
ESOL			
Instructional Leadership for Changing Populations Ph.D.		X	

Source: MHEC and MGT interviews with RHEC representatives, 2014.