

# LABOR MARKET ANALYSIS

FOR PROGRAM RECOMMENDATION



C·O·E

CENTERS OF EXCELLENCE  
FOR LABOR MARKET RESEARCH

## SURVEYING AND GEOMATICS IN THE GREATER SACRAMENTO REGION

North (Greater Sacramento)  
Center of Excellence

MAY 2023

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# SUMMARY

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The North (Greater Sacramento) Center of Excellence for Labor Market Research prepared this report to provide a labor market analysis of educational supply and occupational demand for middle-skilled careers in the North (Greater Sacramento) subregion. This report aims to determine if demand in the local labor market is unmet by the supply from existing community college programs and other postsecondary training providers.

This report primarily focuses on training that leads to jobs in middle-skilled occupations - jobs that typically require education beyond a high school diploma but less than a bachelor's degree - but may include higher-skilled occupations for training pathways that lead to a bachelor's degree. Lowered skilled occupations are rarely considered in this analysis due to the lessened barriers for entry-level work, such as no formal education and fewer on-the-job training requirements.

Key findings include:

- The North (Greater Sacramento) subregion held 740 surveying jobs in 2021. Surveying jobs are projected to increase by 11% over the next five years, adding 79 new jobs to the subregion by 2026.
- Over the next five years, surveying jobs will have 89 annual openings in the Greater Sacramento subregion, with nearly half in middle-skill occupations.
- Analysis of wage data shows that surveying occupations earn nearly \$12 to \$31 above the single adult living wage of \$14.53 per hour.
- Analysis of awards data shows that North (Greater Sacramento) community college conferred an average of 22 awards (certificates and associate degrees) in Surveying (TOP 0957.30) and GIS (TOP 2206.10) programs over the last three academic years.

Recommendations include:

- The North (Greater Sacramento) Center of Excellence recommends that community colleges develop new programs or modify existing programs to meet the demand for surveying occupations.
- The North (Greater Sacramento) Center of Excellence also recommends community colleges include transfer pathways as a part of new and existing survey programs.

# INTRODUCTION

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The North (Greater Sacramento) Center of Excellence (COE) was asked to provide labor market information for a proposed program at a regional community college. This report focuses on the following Standard Occupational Classification (SOC) occupations and codes:

- These middle-skill occupations require more education and training beyond a high school diploma but usually less than a four-year degree:
  - Surveying and Mapping Technicians (17-3031)
- Students who transfer and earn a four-year degree could pursue the following high-skill occupations:
  - Surveyors (17-1022)
  - Cartographers and Photogrammetrists (17-1021)

A review of related programs revealed the following Taxonomy of Programs (TOP) title(s) and code(s) are appropriate for inclusion in this report:

- Surveying (0957.30)
- Geographic Information Systems (2206.10)

The corresponding Classification of Instructional Program (CIP) title(s) and code(s) are:

- Surveying Technology/Surveying (15.1102)
- Geographic Information Science and Cartography (45.0702)
- Geospatial Intelligence (43.0407)

# OCCUPATIONAL DEMAND

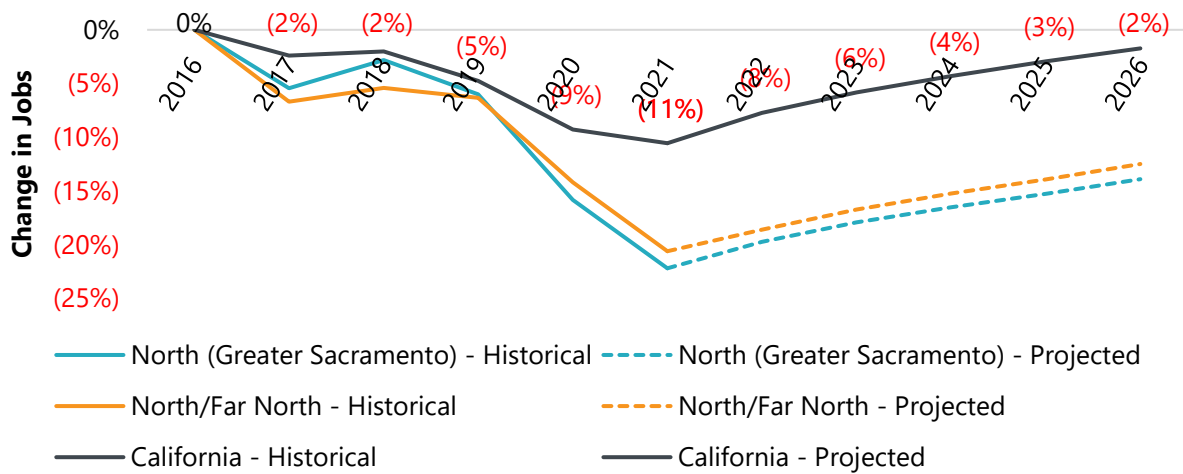
Exhibit 1 summarizes the five-year projected job growth for middle-skill and high-skill occupations in North (Greater Sacramento), North/Far North, and California.

**Exhibit 1. Employment and projected demand, 2021-2026**

Occupation	2021 Jobs	2026 Jobs	2021-2026 Change	2021-2026 % Change	2021-2026 Annual Openings
Surveying and Mapping Technicians	270	309	39	15%	44
Surveyors	367	395	28	8%	35
Cartographers and Photogrammetrists	103	114	11	11%	10
<b>North (Greater Sacramento)</b>	<b>740</b>	<b>819</b>	<b>79</b>	<b>11%</b>	<b>89</b>
Surveying and Mapping Technicians	372	416	44	12%	59
Surveyors	470	510	41	9%	46
Cartographers and Photogrammetrists	129	143	14	11%	13
<b>North/Far North</b>	<b>970</b>	<b>1,069</b>	<b>99</b>	<b>10%</b>	<b>118</b>
Surveying and Mapping Technicians	4,316	4,786	471	11%	670
Surveyors	4,348	4,729	382	9%	420
Cartographers and Photogrammetrists	1,132	1,246	114	10%	111
<b>California</b>	<b>9,795</b>	<b>10,762</b>	<b>967</b>	<b>10%</b>	<b>1,201</b>

Exhibit 2 compares the percent change in jobs between 2016 through 2021 and the projected changes through 2026. The rate of change is indexed to the total number of jobs in 2016.

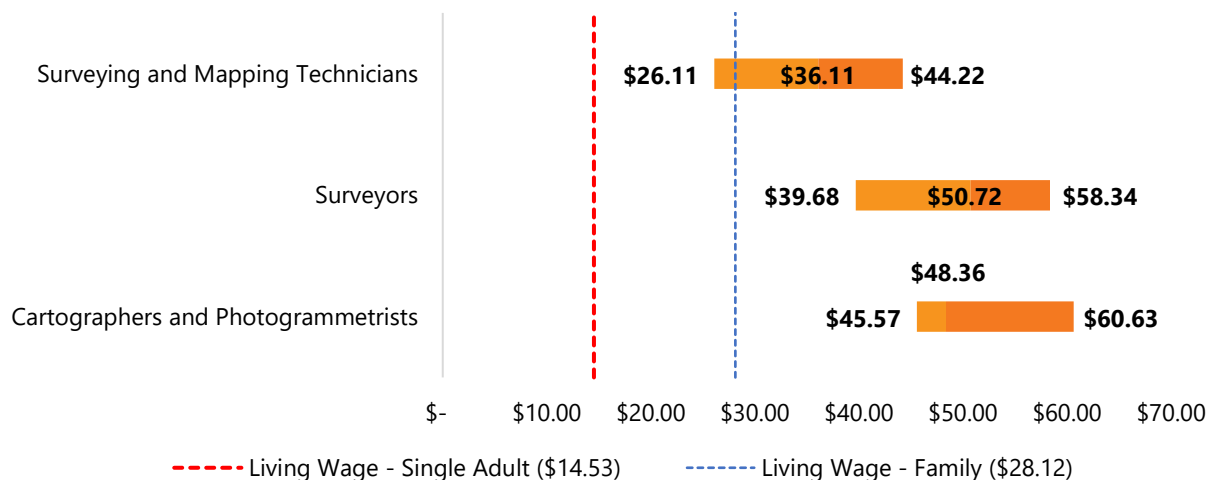
**Exhibit 2. Changes in employment, 2016-2026**



## WAGES

Exhibit 3 compares the 25<sup>th</sup> percentile, median, and 75<sup>th</sup> percentile hourly wages for the selected occupations to the North (Greater Sacramento) living wage for a single adult (\$14.53 per hour) and a small family (\$28.12 per hour).<sup>1,2</sup> The 25<sup>th</sup> and 75<sup>th</sup> percentile hourly wages are used to estimate entry-level and experienced worker wages.

**Exhibit 3. Comparison of wages by occupation, 2021**



<sup>1</sup> Living wage is defined as the level of income a single adult with no children must earn to meet basic needs, including food, housing, transportation, healthcare, taxes, and other miscellaneous basic needs. Please note that the 25th-percentile and 75th-percentile hourly wages are used as proxy for entry-level and experienced-level wages.

<sup>2</sup> A small family is defined as a single adult and one school aged child (between the ages of 5 and 12 years).

# JOB POSTINGS

This section analyzes recent data from online job postings (real-time LMI). Online job postings may provide additional insight into recent changes in the labor market that are not captured by historical trends.

The North COE identified 222 online job advertisements for the selected occupations in the seven-county Greater Sacramento subregion. Job posting data comes from Lightcast (formerly Emsi Burning Glass) and represents unique listings newly posted online between May 2022 and April 2023.

Exhibit 4 details the number of online job postings for the selected occupations.

**Exhibit 4. Number of job postings by occupation**

Occupation	Unique Job Postings	Share of Job Postings
Surveyors	164	74%
Surveying and Mapping Technicians	55	25%
Cartographers and Photogrammetrists	3	1%
<b>Total Job Postings</b>	<b>222</b>	<b>100%</b>

Exhibit 5 shows the top 10 relevant job titles with the most job postings.

**Exhibit 5. Top jobs titles**

Job Title	Number of Job Postings
Land Surveyors	46
Site Surveyors	44
Survey Technicians	20
Surveyors	16
Survey Party Chiefs	16
Transportation Surveyors	14
GIS Professionals	8

Job Title	Number of Job Postings
Project Surveyors	8
Registered Professional Land Surveyors	7
Surveyor Associates	6

Exhibit 6 shows the top 10 relevant employers with the most job postings for the selected occupations.

**Exhibit 6. Employers with the most job postings**

Employer	Number of Job Postings
Mark Thomas (A/E)	15
V3 Electric	13
County of Sacramento	13
State of California	12
Psomas & Associates	11
KPFF Consulting Engineers	5
GIS Surveyors	5
Freedom Forever	4
Witt O'Brien's	4
County of El Dorado	3



Exhibit 7 shows the cities with the most job postings.

**Exhibit 7. Job postings by City**

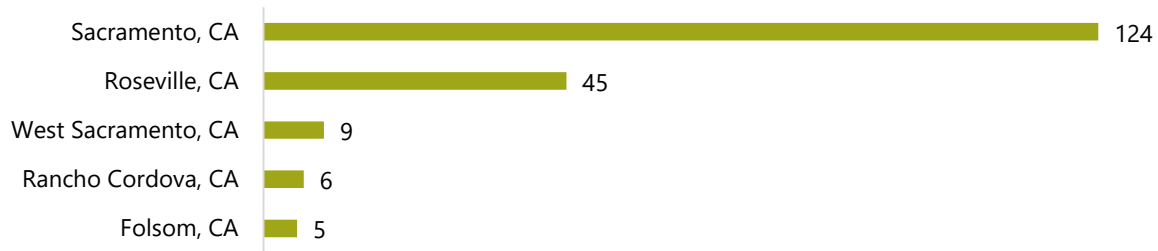


Exhibit 8 shows the top 10 skills across three categories for the studied occupations: specialized, essential, and software skills.<sup>3</sup>

**Exhibit 8. Most in-demand skills**

Specialized Skills	Common Skills	Software Skills
Surveying	Communications	Geographic Information Systems
Topography	Research	AutoCAD
Legal Land Description	Operations	AutoCAD Civil 3D
Easement	Filing	ArcGIS (GIS Software)
Data Collection	Good Driving Record	Microsoft Office (Access, Excel, Outlook, PowerPoint, Teams, Word)
Geographic Information Systems	Management	MicroStation (CAD Design Software)
Field Surveys	Computer Literacy	--
Topographic Surveying	Coordinating	--
AutoCAD	Time Management	--
Construction	Customer Service	--

<sup>3</sup> Specialized skills are those primarily required to perform specific tasks in an occupation. Essential skills are typically related to employability. These are skills that are prevalent across many occupations, and include both interpersonal attributes and learned skills (aka "soft skills"). Software skills are specific to any software tool or programming component used to support a job.

Exhibit 9 shows the minimum level of education requirements for related job postings in the Greater Sacramento subregion.<sup>4</sup>

**Exhibit 9. Employer-preferred job candidate education levels**

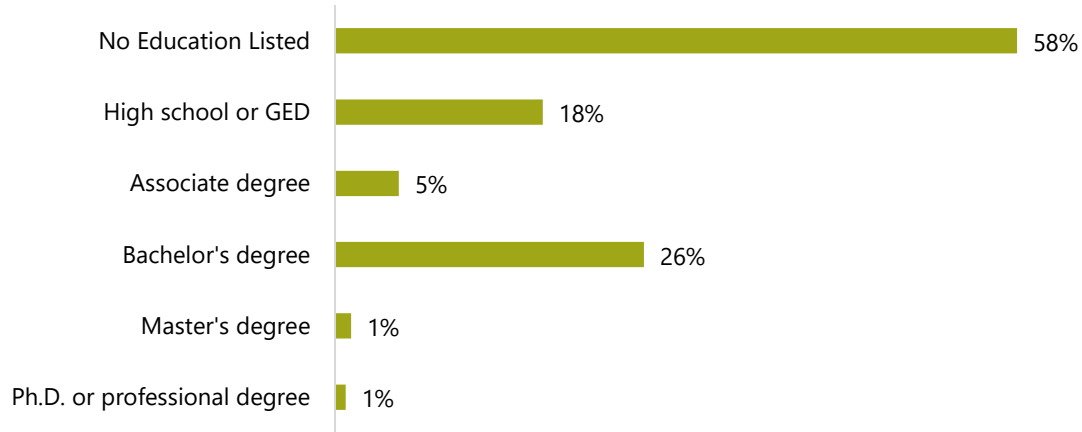
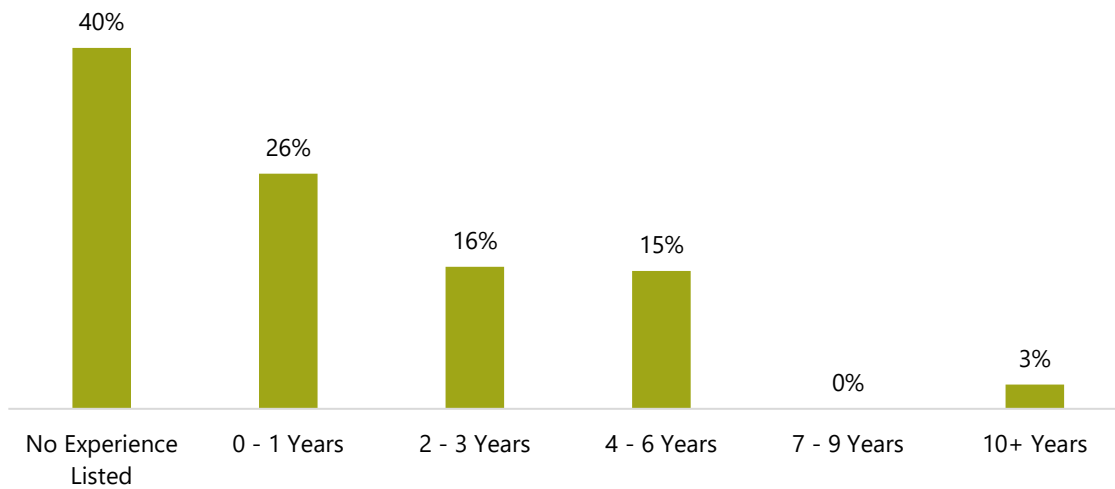


Exhibit 10 shows the experience levels employers require for job postings for the selected occupations.<sup>5</sup>

**Exhibit 10. Employer-preferred job candidate experience levels**



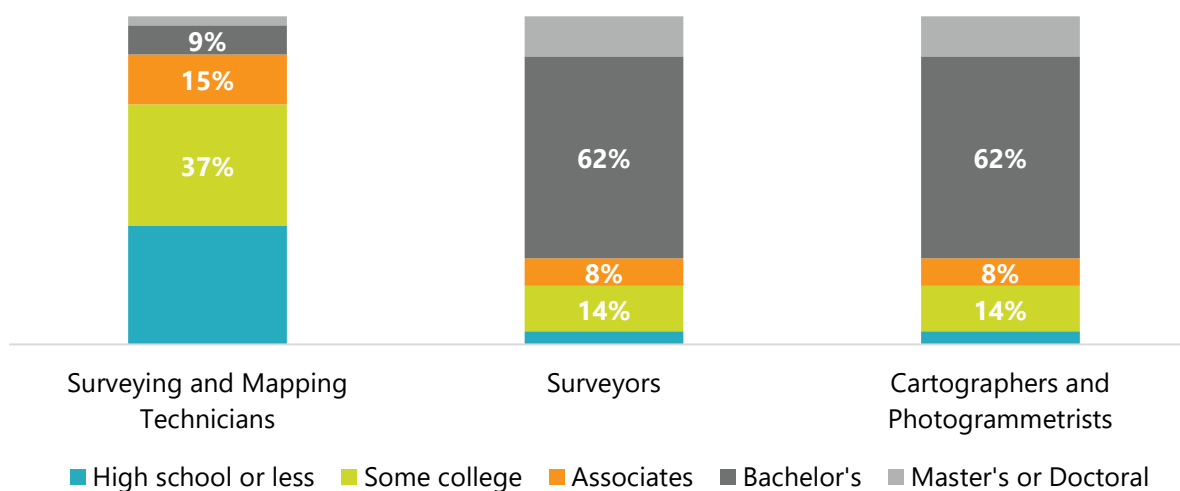
<sup>4</sup> Employers may include more than one level of education as a hiring requirement in a job posting. As a result, the values in exhibit 9 may sum to greater than 100%.

<sup>5</sup> Employers may include more than one level of experience as a hiring requirement in a job posting. As a result, the values in exhibit 10 may sum to greater than 100%.

## EDUCATION AND TRAINING REQUIREMENTS

The U.S. Census Bureau collects data on the highest education level achieved by workers across all occupations. Exhibit 11 shows California's educational attainment of the current workforce in the selected occupations.

**Exhibit 11. California educational attainment for selected occupations, 2019**



The U.S. Bureau of Labor Statistics (BLS) uses a categorical system to assign typical entry-level education and job requirements to each occupation for which the BLS publishes projection data. These categories include entry-level education, work experience in a related occupation, and on-the-job training. Exhibit 12 shows the selected occupations' typical entry-level job requirements.

**Exhibit 12. Typical entry-level job requirements**

Occupation	Entry-level Education Requirements	Work Experience Requirements	On-The-Job Training Requirements
Surveying and Mapping Technicians	High school diploma or equivalent	None	Moderate-term on-the-job training
Surveyors	Bachelor's degree	None	Internship/residency
Cartographers and Photogrammetrists	Bachelor's degree	None	None

## EDUCATIONAL SUPPLY

Educational supply for an occupation can be estimated by analyzing the number of awards issued in related Taxonomy of Programs (TOP) or Classification of Instructional Programs (CIP) codes. Exhibit 13 shows the TOP and CIP codes for educational programs related to the selected occupations.

**Exhibit 13. TOP and CIP codes for training programs related to the selected occupations**

TOP Programs and Codes	Aligned CIP Programs and Codes
Surveying (0957.30)	Surveying Technology/Surveying (15.1102)
Geographic Information Systems (2206.10)	Geographic Information Science and Cartography (45.0702) Geospatial Intelligence (43.0407)

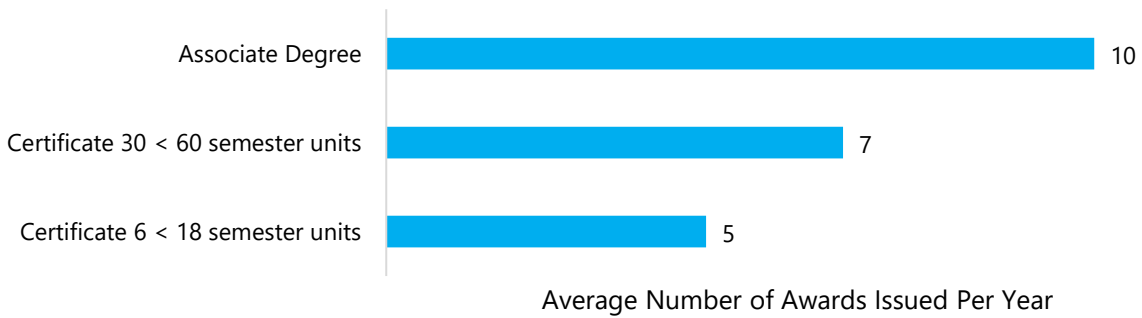
### Community College Supply

Exhibits 14 and 15 compare the average number of certificates and degrees from selected Greater Sacramento community college programs over the last three academic years.

**Exhibit 14. Annual average community college awards by program**

Program - TOP Code	College	Annual Awards 2019-20	Annual Awards 2020-21	Annual Awards 2021-22	3-Yr Annual Awards Average
Surveying (0957.30)	Sacramento City	--	1	0	1
	<b>Subtotal</b>	<b>--</b>	<b>1</b>	<b>0</b>	<b>1</b>
Geographic Information Systems (2206.10)	American River	15	18	17	17
	Folsom Lake	0	1	1	1
	Sierra	8	4	0	4
	<b>Subtotal</b>	<b>23</b>	<b>23</b>	<b>18</b>	<b>21</b>
	<b>Grand Total</b>	<b>23</b>	<b>24</b>	<b>18</b>	<b>22</b>

**Exhibit 15. Annual average community college awards by type, 2019-20 through 2021-22**



### Other Postsecondary Supply

The University of California, Davis, offers a master's degree program in Geographic Information Science and Cartography (CIP 45.0702). However, since programs beyond a bachelor's degree are beyond the scope of this report, supply data is not provided.

## FINDINGS

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- This report focuses on three occupations in the Surveying and Geomatics occupational pathway: Surveying and Mapping Technicians (17-3031), Surveyors (17-1022), and Cartographers and Photogrammetrists (17-1021). This report will refer to these occupations as "Surveying" occupations and jobs.
- The Greater Sacramento subregion held 740 surveying jobs in 2021. These jobs are projected to increase by 11% over the next five years, adding 79 new jobs to the subregion by 2026.
- Surveying jobs are projected to grow slightly faster in the Greater Sacramento subregion than in California.
- Over the next five years, surveying jobs are projected to have 89 annual openings in the Greater Sacramento subregion.
  - Most projected openings are for surveying and mapping technicians, with 44 of the 89 annual openings.
- Analysis of wage data shows that surveying occupations earn nearly \$12 to \$31 above the single adult living wage of \$14.53 per hour.
- According to real-time labor market information, there were about 222 online job postings for surveying occupations between May 2022 and April 2023.
  - Seventy-four percent of job postings were for surveyors, and another 25% for surveying and mapping technicians.
- Incumbent surveying and mapping technicians have the highest educational attainment consistent with community college offerings at 52%. Another 9% of these workers hold a bachelor's degree.
- Sixty-two percent of incumbent surveyors, cartographers, and photogrammetrists have bachelor's degrees.
- Four Greater Sacramento community colleges offer degrees and certificates in programs related to surveying. These programs conferred an average of 22 awards (certificates and associate degrees) in surveying and geomatic programs over the last three academic years (2019-20 through 2021-22).
  - Most average annual awards – 21 of 22 – were in Geographic Information Systems (TOP 2206.10) programs.

# RECOMMENDATIONS

- Based on a comparison of annual openings to average annual awards in the Greater Sacramento subregion, there seems to be an undersupply of workers in surveying and geomatic occupations.
  - Community colleges and other postsecondary training providers issued an average of 22 awards over the last three years.
  - There are 89 projected annual openings for surveying jobs.
- The North (Greater Sacramento) Center of Excellence recommends developing new programs or modifying existing ones in surveying and geomatics.
- Though nearly half of the projected annual openings over the next five years are for surveying and mapping technicians – a middle-skill occupation – job postings from the last 12 months, have been primarily concentrated among the surveyor occupation, with 70% of the online postings. The North (Greater Sacramento) Center of Excellence recommends community colleges include transfer pathways in their surveying and geomatics career education programs.

New Program Recommendation		
<b>Move forward with the new program</b>	<b>Proceed with caution</b>	<b>A new program is not recommended</b>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Program Modification	
<b>Move forward with program modifications</b>	<b>Program modifications are not recommended</b>
<input checked="" type="checkbox"/>	<input type="checkbox"/>

## APPENDIX A. METHODOLOGY AND SOURCES

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This report identified Occupations using the Center of Excellence TOP-to-CIP-to-SOC crosswalk and O\*Net OnLine. This report's findings were determined using labor market data from the Bureau of Labor Statistics (BLS), U.S. Census Bureau data from Emsi, and jobs posting data from Burning Glass.

Lightcast (Formerly EMSI/Burning Glass) 2023.2; QCEW Employees, Non-QCEW Employees, and Self-Employed. <https://www.economicmodeling.com/>. *Note: EMSI occupational employment data are based on final EMSI industry data and final EMSI staffing patterns. Wage estimates are based on Occupational Employment Statistics (QCEW and Non-QCEW Employees classes of worker) and the American Community Survey (Self-Employed and Extended Proprietors).*

Integrated Postsecondary Education Data System (IPEDS). National Center for Education Statistics. U.S. Department of Education. <https://nces.ed.gov/ipeds/>.

Labor Market Information Division. California Employment Development Department. <https://labormarketinfo.edd.ca.gov/>.

Management Information Systems (MIS) Data Mart. California Community Colleges Chancellor's Office. <https://datamart.cccco.edu/>.

O\*NET OnLine. U.S. Department of Labor/Employment and Training Administration (DOL ETA). <https://www.onetonline.org/>.

Public Use Microdata Sample (PUMS). U.S. Census Bureau American Community Survey (ACS). <https://www.census.gov/programs-surveys/acs/microdata.html>

Self-Sufficiency Standard Tool for California. The University of Washington. <http://www.selfsufficiencystandard.org/>

"Taxonomy of Programs." California Community Colleges Chancellor's Office. June 2012, 6<sup>th</sup> Edition. <https://www.cccco.edu/-/media/CCCCO-Website/About-Us/Divisions/Educational-Services-and-Support/Academic-Affairs/What-we-do/Curriculum-and-Instruction-Unit/Files/TOPmanual6200909corrected12513pdf.ashx>

"TOP-CIP-SOC Crosswalk." Centers of Excellence for Labor Market Research. June 2021 Edition. <http://coecc.net/>



## APPENDIX B. GLOSSARY OF KEY TERMS

Key Terms	Definition
<b>Occupation</b>	<p>Occupation refers to a category of similar jobs, careers, or professions regarding the work performed and the skills the workers possess. Workers who perform essentially the same tasks are in the same occupation, whether in the same industry. Some occupations are concentrated in a few industries, while others are found in many industries.</p> <p>Occupations differ from jobs in that jobs show the number of positions held in each occupation.</p>
<b>Jobs</b>	<p>A job is a specific instance of employment and includes any position where a worker provides labor for monetary compensation.</p> <p>Job numbers include employees (those who work for businesses) and proprietors (those who work for themselves). Full- and part-time jobs are included and counted equally (i.e., not adjusted to full-time equivalents). Data for jobs, or employment, are annual averages.</p>
<b>Employment</b>	<p>Employment refers to filled jobs, whether full- or part-time, temporary or permanent. The scope of "who" is counted as employed is noted in Appendix A. Methodology and Sources.</p>
<b>Job Change</b>	<p>Job change is the net increase or decrease of jobs over a given timeframe.</p>
<b>Job Opening</b>	<p>Job openings are the projected number of positions available for workers entering an occupation.</p> <p>Openings include growth and replacement job counts. Growth job counts are the positive change in the total number of workers employed. Replacement job counts are the estimates of new workers needed to replace workers permanently leaving the occupation.</p>
<b>Percentile Wage (or wages)</b>	<p>A percentile wage is the value of a wage at which a certain percentage of workers falls below. For example, a 25<sup>th</sup> percentile hourly wage of \$15.00 indicates that 25% of workers earn less than \$15.00, while 75% earn more. Percentile wages are specific to the geography shown in the report.</p> <p>The 25th-percentile and 75th-percentile hourly wages are used as a proxy for entry-level and experienced-level wages.</p>
<b>Living Wage</b>	<p>The living wage is the level of income a single adult with no children must earn to meet basic needs. The living wage is calculated using basic allowances for food, housing, transportation, healthcare, taxes, and other miscellaneous basic needs. For additional information, please visit <a href="https://selfsufficiencystandard.org/">https://selfsufficiencystandard.org/</a></p>

Key Terms	Definition
<b>Educational Attainment</b>	Educational attainment is the highest level of education achieved by workers in an occupation. The data include workers aged 25 years and older.
<b>Typical Entry-level Education</b>	<p>The education level most workers need to gain employment in an occupation. Categories range from "no formal educational credential" and "high school diploma or equivalent" to "doctoral or professional degree." The types most relevant to community training are "some college, no degree," "postsecondary nondegree award," and "associate degree."</p> <p>The typical entry-level education may differ from the actual educational levels attained by workers employed in an occupation.</p>
<b>Typical Work Experience</b>	The relevant prior experience a worker needs to gain employment in an occupation. Categories include "5 years or more", "less than five years," and "none."
<b>Typical On-The-Job (OTJ) Training</b>	The level of on-the-job training a worker needs to obtain for competency in the skills required for an occupation. Categories include "none," "short-term (1 month or less)," "moderate-term (more than one month but less than 12 months)," "long-term (more than 12 months)," "apprenticeship," and "internship/residency."
<b>Awards</b>	Awards are the number of certificates and degrees conferred for a specific course of study each year. Awards count "papers" and, as a result, may be greater than the number of students who complete a program.

**COVID-19 Statement:** This report includes employment projection data produced by Lightcast (formerly EMSI). Employment projections are developed using models based on historical data, which in this set of projections covers the period through 2021. Most input data, therefore, precedes the pandemic. Employment projections are long-term projections intended to capture structural changes in the economy, not cyclical fluctuations. As such, projections data are not intended to capture the impacts of the recession that began in February 2020. Cyclical fluctuations, like recessions, impact projections when they become part of the historical data set.

**Important Disclaimer:** All representations included in this report have been produced from primary research and/or secondary review of publicly and/or privately available data and/or research reports. Efforts have been made to qualify and validate the accuracy of the data and the reported findings; however, neither the Centers of Excellence, COE host District, nor California Community Colleges Chancellor's Office are responsible for applications or decisions made by recipient community colleges or their representatives based upon components or recommendations contained in this study.

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Centers of Excellence for Labor Market Research, Economic and  
Workforce Development Program



CENTERS OF EXCELLENCE  
FOR LABOR MARKET RESEARCH

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