

**Program Endorsement Brief: 0924.00 – Engineering Technology, General
Surveying Technology
Surveying Engineering Technology**

Los Angeles/Orange County Center of Excellence, July 2021

Summary Analysis

Program Endorsement:	Endorsed: All Criteria Met <input checked="" type="checkbox"/>	Endorsed: Some Criteria Met <input type="checkbox"/>	Not Endorsed <input type="checkbox"/>
Program Endorsement Criteria			
Supply Gap:	Yes <input checked="" type="checkbox"/>		No <input type="checkbox"/>
Living Wage: (Entry-Level, 25th)	Yes <input checked="" type="checkbox"/>		No <input type="checkbox"/>
Education:	Yes <input checked="" type="checkbox"/>		No <input type="checkbox"/>
Emerging Occupation(s)			
	Yes <input type="checkbox"/>		No <input checked="" type="checkbox"/>

The Los Angeles/Orange County Center of Excellence for Labor Market Research (COE) prepared this report to provide Los Angeles/Orange County regional labor market supply and demand data related to two middle-skill occupations: *civil engineering technologists and technicians* (17-3022) and *surveying and mapping technicians* (17-3031). Middle-skill occupations typically require some postsecondary education, but less than a bachelor’s degree.¹

However, the field of engineering technology is comprised of many occupations that typically require workers to obtain a bachelor’s degree or higher. Therefore, two above middle-skill occupations are included in this report to illuminate a pathway for students who choose to continue their education beyond the community college level. The above middle-skill occupations in this report are *cartographers and photogrammetrists* (17-1021) and *surveyors* (17-1022).

This report is intended to help determine whether there is demand in the local labor market that is not being met by the supply from community college programs that align with the relevant occupations.

Based on the available data, there appears to be a supply gap for the middle-skill occupations of interest in the region. In addition to all four occupations typically having entry-level wages above the region’s living wage, the majority (51%) of annual openings for the occupations in this report typically require an associate degree. **Therefore, due to all of the criteria being met, the COE endorses this proposed program.** Detailed reasons include:

¹ The COE classifies middle-skill jobs as the following:

- All occupations that require an educational requirement of some college, associate degree or apprenticeship;
- All occupations that require a bachelor’s degree, but also have more than one-third of their existing labor force with an educational attainment of some college or associate degree; or
- All occupations that require a high school diploma or equivalent or no formal education, but also require short- to long-term on-the-job training where multiple community colleges have existing programs.

Demand:

- **Supply Gap Criteria** – Over the next five years, there is projected to be **534 jobs openings available annually** in the region due to new job growth and replacements, **which is more than the 329 awards conferred annually** by educational institutions in the region.
 - 80% of the projected job openings are for the two middle-skill technician occupations.
- **Living Wage Criteria** – In Los Angeles County, all four occupations have entry-level wages above the county’s living wage (\$15.04/hour).²
- **Educational Criteria** – The Bureau of Labor Statistics (BLS) lists a bachelor’s degree as the typical entry-level education for *cartographers and photogrammetrists* (17-1021) and *surveyors* (17-1022); an associate degree for *civil engineering technologists and technicians* (17-3022); and a high school diploma or equivalent for *surveying and mapping technicians* (17-3031).
 - National-level educational attainment data indicates **between 23% and 58% of workers in the field have completed some college or an associate degree.**
 - The majority (51%) of annual openings for the occupations in this report typically require an associate degree.

Supply:

- Between 2017 and 2020, 10 community colleges in the LA/OC region issued awards in programs that have historically trained for the four occupations of interest, conferring an average of **312 awards**.
- Between 2016 and 2019, non-community college institutions conferred an average of **17 awards** in programs related to the appropriate TOP code.

² Living wage data was pulled from California Family Needs Calculator on 7/12/2021. For more information, visit the California Family Needs Calculator website: <https://insightcced.org/2018-family-needs-calculator/>.

Occupational Demand

Exhibit 1 shows the five-year occupational demand projections for the four occupations of interest. In Los Angeles/Orange County, the number of jobs related to these occupations is projected to increase by 3% through 2024. There will be nearly 550 job openings per year through 2024 due to job growth and replacements.

This report includes employment projection data by Emsi, which uses EDD information. Emsi's projections are modeled on recorded (historical) employment figures and incorporate several underlying assumptions, including the assumption that the economy, during the projection period, will be at approximately full employment. To the extent that a recession or labor shock, such as the economic effects of COVID-19, can cause long-term structural change, it may impact the projections. At this time, it is not possible to quantify the impact of COVID-19 on projections of industry and occupational employment. Therefore, the projections included in this report do not take the full impact of COVID-19 into account.

Exhibit 1: Occupational demand in Los Angeles and Orange Counties³

Geography	2019 Jobs	2024 Jobs	2019-2024 Change	2019-2024 % Change	Annual Openings
Los Angeles	3,785	3,870	85	2%	350
Orange	1,936	1,998	62	3%	183
Total	5,720	5,867	147	3%	534

Wages

The labor market endorsement in this report considers the hourly wages for the four occupations of interest in Los Angeles County, as they relate to the county's living wage. Orange County wages are included below in order to provide a complete analysis of the LA/OC region. Detailed wage information, by county, is included in Appendix A.

Los Angeles County: The typical entry-level hourly wages for the four occupations of interest are in a range between \$26.75 and \$37.60, which is higher than the living wage for one adult (\$15.04 in Los Angeles County). Experienced workers can expect to earn hourly wages between \$40.48 and \$57.30, which are higher than the living wage estimate.

Orange County: The typical entry-level hourly wages for the four occupations of interest are in a range between \$26.38 and \$39.06, which is higher than the living wage for one adult (\$17.36 in Orange County). Experienced workers can expect to earn hourly wages between \$39.80 and \$58.60, which are higher than the living wage estimate.

³ Five-year change represents new job additions to the workforce. Annual openings include new jobs and replacement jobs that result from retirements and separations.

Job Postings

Over the past 12 months, there have been 819 online job postings related to the four occupations of interest. The highest number of job postings were for land/site surveyor, field technician, project surveyor, and engineering technician. The top skills were AutoCAD, land survey, calculation, civil 3D, and civil engineering. The top employers, by number of job postings, in the region were Charter Communications, Psomas and Associates, Menemsha Development, and UtiliQuest.

It is important to note that the job postings data included in this section reflects online job postings listed in the past 12 months and does not yet demonstrate the full impact of COVID-19. While employers have generally posted fewer online job postings since the beginning of the pandemic, the long-term effects are currently unknown.

Educational Attainment

The Bureau of Labor Statistics (BLS) lists the following typical education levels for the four occupations studied in this report:

- **Bachelor's degree:** *cartographers and photogrammetrists (17-1021) and surveyors (17-1022)*
- **Associate degree:** *civil engineering technologists and technicians (17-3022)*
- **High school diploma or equivalent:** *surveying and mapping technicians (17-3031)*

National-level educational attainment data indicates between 23% and 58% of workers in the field have completed some college or an associate degree. Of the 74% job postings listing a minimum education requirement in Los Angeles/Orange County, 31% (185) requested a high school diploma, 15% (92) requested an associate degree, and 54% (327) requested a bachelor's degree.

Educational Supply

Community College Supply — Exhibit 2 shows the annual and three-year average number of awards conferred by community colleges in the related TOP codes: Engineering Technology, General (0924.00); Surveying (0957.30); and Geographic Information Systems (2206.10). The colleges with the most completions in the region are Pasadena and Santiago Canyon. Over the past 12 months, there were 11 other related program recommendation requests from regional community colleges.

Exhibit 2: Regional community college awards (certificates and degrees), 2017-2020

TOP Code	Program	Colleges	2017-18 Awards	2018-19 Awards	2019-20 Awards	3-Year Average
0924.00	Engineering Technology, General (requires Trigonometry)	Cerritos	23	26	15	21
		East LA	-	-	1	0
		Glendale	17	14	7	13
		Mt San Antonio	-	-	2	1
		Pasadena	173	176	216	188
		LA Subtotal	213	216	241	223
		Santa Ana	1	1	3	2
		OC Subtotal	1	1	3	2
Supply Subtotal/Average			214	217	244	225
0957.30	Surveying	East LA	4	-	-	1
		LA Subtotal	4	-	-	1
		Santiago Canyon	46	64	44	51
		OC Subtotal	46	64	44	51
Supply Subtotal/Average			50	64	44	53
2206.10	Geographic Information Systems	LA Pierce	-	7	2	3
		Rio Hondo	36	19	15	23
		LA Subtotal	36	26	17	26
		Cypress	12	8	4	8
		OC Subtotal	12	8	4	8
Supply Subtotal/Average			48	34	21	34
Supply Total/Average			312	315	309	312

Non-Community College Supply — It is important to consider the supply from non-community college institutions in the region that provide training programs for the occupations of interest. Exhibit 3 shows the annual and three-year average number of awards conferred by these institutions in the related Classification of Instructional Programs (CIP) Codes: 45.0702 – Geographic Information Science and Cartography; and 15.000 – Engineering Technology, General.

Due to different data collection periods, the most recent three-year period of available data is from 2016 to 2019. Between 2016 and 2019, non-community college institutions in the region conferred an average of 17 awards annually in related training programs.

Exhibit 3: Regional non-community college awards, 2016-2019

CIP	Program	Institution	2016-17 Awards	2017-18 Awards	2018-19 Awards	3-Year Average
15.0000	Engineering Technology, General	California State Polytechnic University - Pomona	11	1	4	5
45.0702	Geographic Information Science and Cartography	Mount Saint Mary's University	-	6	1	2
		University of Southern California	-	16	11	9
Supply Total/Average			11	23	16	17

Appendix A: Occupational demand and wage data by county

Exhibit 4. Los Angeles County

Occupation (SOC)	2019 Jobs	2024 Jobs	5-Yr Change	5-Yr % Change	Annual Openings	Entry-Level Hourly Earnings (25th Percentile)	Median Hourly Earnings	Experienced Hourly Earnings (75th Percentile)
Cartographers and Photogrammetrists (17-1021)	159	170	11	7%	14	\$37.39	\$44.51	\$51.32
Surveyors (17-1022)	667	699	32	5%	56	\$37.60	\$49.43	\$57.30
Civil Engineering Technologists and Technicians (17-3022)	2,115	2,120	5	0%	178	\$26.75	\$33.10	\$40.48
Surveying and Mapping Technicians (17-3031)	844	881	37	4%	102	\$27.99	\$38.46	\$47.20
Total	3,785	3,870	85	2%	350			

Exhibit 5. Orange County

Occupation (SOC)	2019 Jobs	2024 Jobs	5-Yr Change	5-Yr % Change	Annual Openings	Entry-Level Hourly Earnings (25th Percentile)	Median Hourly Earnings	Experienced Hourly Earnings (75th Percentile)
Cartographers and Photogrammetrists (17-1021)	60	64	4	7%	5	\$35.48	\$42.37	\$48.91
Surveyors (17-1022)	366	388	22	6%	32	\$39.06	\$50.80	\$58.60
Civil Engineering Technologists and Technicians (17-3022)	1,098	1,117	19	2%	96	\$26.38	\$32.58	\$39.80
Surveying and Mapping Technicians (17-3031)	411	429	18	4%	50	\$28.38	\$38.90	\$47.55
Total	1,936	1,998	62	3%	183			

Exhibit 6. Los Angeles and Orange Counties

Occupation (SOC)	2019 Jobs	2024 Jobs	5-Yr Change	5-Yr % Change	Annual Openings	Typical Entry-Level Education
Cartographers and Photogrammetrists (17-1021)	219	234	15	7%	20	Bachelor's degree
Surveyors (17-1022)	1,034	1,087	53	5%	88	Bachelor's degree
Civil Engineering Technologists and Technicians (17-3022)	3,212	3,237	25	1%	274	Associate degree
Surveying and Mapping Technicians (17-3031)	1,255	1,310	55	4%	152	High school diploma or equivalent
Total	5,720	5,867	147	3%	534	

Appendix B: Sources

- O*NET Online
- Labor Insight/Jobs (Burning Glass)
- Economic Modeling Specialists, International (Emsi)
- Bureau of Labor Statistics (BLS)
- Employment Development Department, Labor Market Information Division, OES
- California Community Colleges Chancellor's Office Management Information Systems (MIS)
- California Family Needs Calculator, Insight Center for Community Economic Development
- Chancellor's Office Curriculum Inventory (COCI 2.0)

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