

## Program Endorsement Brief: 2206.10/Geographic Information Systems Geospatial Technologies

Orange County Center of Excellence, May 2022

### Summary Analysis

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

The 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 one middle-skill occupation: *surveying and mapping technicians* (17-3031) and two above middle-skill occupations: *computer occupations, all other* (15-1299), and *cartographers and photogrammetrists* (17-1021). Middle-skill occupations typically require some postsecondary education, but less than a bachelor's degree.<sup>1</sup>

Although the occupations *computer occupations, all other* and *cartographers and photogrammetrists* are classified as above middle-skill, they are included in this report because they are pathway occupations for the middle-skill occupation *surveying and mapping technicians* and align with the knowledge, skills, and abilities (KSAs) that student can obtain through completion of geospatial technologies programs. However, program recommendation is based on the labor market data for the middle-skill occupation. 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 does not appear to be a supply gap for the middle-skill occupation *surveying and mapping technicians* in the region. However, the labor market information suggests that supply has been met for this occupation because the average number of annual awards is within the COE's 25% margin of annual job openings. Additionally, while this occupation typically requires a high school diploma or equivalent, 55.6% of workers in the field have completed some college or an associate degree as their highest level of education. Furthermore, entry-level wages exceed the living wage in both Los Angeles and Orange counties.

<sup>1</sup> 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.

**Therefore, due to some of the criteria being met, the COE endorses this proposed program.**

Detailed reasons include:

**Demand:**

- **Supply Gap Criteria** – Over the next five years, there is projected to be **159 jobs available annually** in the region due to new job growth and replacements, **which is less than the 181 awards conferred annually** by educational institutions in the region.
  - However, the labor market information suggests that the **supply has been met for this occupation within the LA/OC region** since the average number of annual awards (supply) is within the COE's 25% margin of annual job openings (demand).
  - Additionally, the TOP codes Surveying (0957.30) and Geographic Information Systems (2206.10) and their associated CIP codes also train for nine other occupations, including the above middle-skill occupation *cartographers and photogrammetrists*. Therefore, **supply for the middle-skill occupation surveying and mapping technicians is likely overstated.**
- **Living Wage Criteria** – Within Orange County, **typical entry-level hourly wages** for *surveying and mapping technicians* are **\$30.43, which is higher than the living wage** for one adult in the region (\$20.36 in Orange County).<sup>2</sup>
- **Educational Criteria** – The Bureau of Labor Statistics (BLS) lists **a high school diploma or equivalent as the typical entry-level education** for *surveying and mapping technicians*.
  - However, the national-level educational attainment data indicates **55.8% of workers in the field have completed some college or an associate degree** as their highest level of education.

**Supply:**

- There are **five community colleges** in the LA/OC region that issue awards related to geospatial technologies, conferring an average of **86 awards annually** between 2017 and 2020.
- Between 2016 and 2019, there was an average of **94 awards conferred annually** in related training programs by non-community college institutions, all of which were generated by **three individual four-year colleges throughout** the region.

**Occupational Demand**

Exhibit 1 shows the five-year occupational demand projections for the middle-skill occupation *surveying and mapping technicians*. In Los Angeles/Orange County, the number of jobs related to these occupations is projected to increase by 1% through 2025. There will be nearly 160 job openings per year through 2025 due to job growth and replacements.

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<sup>2</sup> Living wage data was pulled from California Family Needs Calculator on 5/10/2022. For more information, visit the California Family Needs Calculator website: <https://insightcced.org/family-needs-calculator/>.

**Exhibit 1: Middle-skill occupational demand in Los Angeles and Orange Counties<sup>3</sup>**

Geography	2020 Jobs	2025 Jobs	2020-2025 Change	2020-2025 % Change	Annual Openings
Los Angeles	844	843	(1)	(0%)	104
Orange	425	437	12	3%	55
<b>Total</b>	<b>1,269</b>	<b>1,280</b>	<b>11</b>	<b>1%</b>	<b>159</b>

Exhibit 2 shows the five-year occupational demand projections for the above middle-skill group of occupations. In Los Angeles/Orange County, the number of jobs related to these occupations is projected to increase by 1% through 2025. There will be nearly 160 job openings per year through 2025 due to job growth and replacements.

It is important to note that the *computer occupations, all other* (15-1299) SOC code includes eight emerging occupations that are not related to geospatial technology. Therefore, the occupational demand figures in Exhibit 2 are overstated for roles specifically related to geospatial technology, GIS, and geography.

**Exhibit 2: Above middle-skill occupational demand in Los Angeles and Orange Counties<sup>4</sup>**

Geography	2020 Jobs	2025 Jobs	2020-2025 Change	2020-2025 % Change	Annual Openings
Los Angeles	16,204	16,187	(16)	(0.1%)	1,193
Orange	6,771	6,875	105	2%	514
<b>Total</b>	<b>22,974</b>	<b>23,062</b>	<b>88</b>	<b>0.4%</b>	<b>1,707</b>

**Wages**

The labor market endorsement in this report considers the entry-level hourly wages for the middle-skill occupation *surveying and mapping technicians* in Orange County as they relate to the county’s living wage. Los Angeles 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.

**Orange County:** The typical entry-level hourly wages for the middle-skill occupation *surveying and mapping technicians* are \$30.43, which is above the living wage for one adult (\$20.63 in Orange County). Experienced workers can expect to earn wages of \$49.47, which is higher than the living wage estimate. Orange County’s average wages are above the average statewide wage of \$35.03 for this occupation.

All annual openings for the group of above-middle skill geospatial technology occupations have entry-level wages above the living wage for one adult (\$20.63 in Orange County). Typical entry-level hourly wages are in a range between \$27.08 and \$35.84. Experienced workers can expect to earn wages between \$49.04 and \$53.49, which are higher than the living wage estimate.

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

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Orange County's average wages are below the average statewide wage of \$52.52 for these occupations.

**Los Angeles County:** The typical entry-level hourly wages for middle-skill occupation *surveying and mapping* technicians are \$29.75, which is above the living wage for one adult (\$18.10 in Los Angeles County). Experienced workers can expect to earn wages of \$48.84, which is higher than the living wage estimate. Los Angeles County's average wages are above the average statewide wage of \$35.03 for this occupation.

All annual openings for the group of above-middle skill geospatial technology occupations have entry-level wages above the living wage for one adult (\$18.10 in Los Angeles County). Typical entry-level hourly wages are in a range between \$28.20 and \$38.63. Experienced workers can expect to earn wages between \$52.76 and \$55.73, which are higher than the living wage estimate. Los Angeles County's average wages are below the average statewide wage of \$52.52 for these occupations.

### **Job Postings**

There were 201 online job postings related to the middle skill occupation *surveying and mapping technicians* listed in the past 12 months. The highest number of job postings were for site survey technicians, survey technicians, and GIS managers. The top skills were AutoCAD, land survey, geographic information system (GIS), surveys, and field surveys. The top three employers, by number of job postings, in the region were Cannon Corporation, Sunrun Inc. and Vivint Solar.

Because the occupation *computer occupations, all other* includes eight emerging occupations that are not related to geospatial technology, an online job posting analysis was performed using the group of above-middle skill occupations and the following keywords: "geospatial", "geographic information systems" and "GIS". There were 952 online job postings related to the group of above middle-skill occupations that included the aforementioned keywords listed in the past 12 months. The highest number of job postings were for advanced systems analysis, integration and test engineers, mission system engineers (environmental space programs), GIS analysts, and senior business information development consultants. The top skills were project management, systems engineering, geographic information systems, physics, and collective bargaining. The top three employers, by number of job postings, in the region were The Boeing Company, Anthem Blue Cross, and Episource Incorporated.

### **Educational Attainment**

The Bureau of Labor Statistics (BLS) lists a high school diploma or equivalent as the typical entry-level education for the middle-skill occupation *surveying and mapping technicians*. However, the national-level educational attainment data indicates 55.8% of workers in the field have completed some college or an associate degree as their highest level of education. Of the 60% of *surveying and mapping technician* job postings listing a minimum education requirement in Los Angeles/Orange County, 37.5% (45) requested high school or vocational training, 10% (12) requested an associate degree, and 52.5% (63) requested a bachelor's degree.

The Bureau of Labor Statistics (BLS) lists a bachelor's degree as the typical entry-level education for the above middle skill occupations *computer occupations, all other* and *cartographers and photogrammetrists*. In the LA/OC region, all job openings for these occupations typically require a

bachelor’s degree. Furthermore, the national-level educational attainment data indicates that between 23.4% and 26.6% of workers in the field have completed some college or an associate degree as their highest level of education. Of the 85% of above middle-skill geospatial technology job postings listing a minimum education requirement in Los Angeles/Orange County, 5% (41) requested high school or vocational training, 3.8% (31) requested an associate degree, and 91.2% (741) requested a bachelor’s degree or higher.

### Educational Supply

**Community College Supply**—Exhibit 2 shows the three-year average number of awards conferred by community colleges in the related TOP codes: Surveying (0957.30) and Geographic Information Systems (2206.10). The colleges with the most completions in the region are: Santiago Canyon and Rio Hondo. Over the past 12 months, there was one other related program recommendation request from regional community colleges.

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

TOP Code	Program	College	2017-2018 Awards	2018-2019 Awards	2019-2020 Awards	3-Year Award Average
0957.30	Surveying	East LA	4	-	-	1
		<b>LA Subtotal</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>1</b>
		Santiago Canyon	46	64	44	51
		<b>OC Subtotal</b>	<b>46</b>	<b>64</b>	<b>44</b>	<b>51</b>
<b>Supply Subtotal/Average</b>			<b>50</b>	<b>64</b>	<b>44</b>	<b>53</b>
2206.10	Geographic Information Systems	LA Pierce	-	7	2	3
		Rio Hondo	36	19	15	23
		<b>LA Subtotal</b>	<b>36</b>	<b>26</b>	<b>17</b>	<b>26</b>
		Cypress	12	8	4	8
		<b>OC Subtotal</b>	<b>12</b>	<b>8</b>	<b>4</b>	<b>8</b>
<b>Supply Subtotal/Average</b>			<b>48</b>	<b>34</b>	<b>21</b>	<b>34</b>
<b>Supply Total/Average</b>			<b>98</b>	<b>98</b>	<b>65</b>	<b>86</b>

**Non-Community College Supply**—For a comprehensive regional supply analysis, it is also important to consider the supply from other institutions in the region that provide training programs for Geospatial Technologies. Exhibit 3 shows the annual and three-year average number of awards conferred by these institutions in the related Classification of Instructional Programs (CIP) Code: Geographic Information Science and Cartography (45.0702). Due to different data collection periods, the most recent three-year period of available data is from 2016 to 2019. Between 2016 and 2019, four-year colleges in the region conferred an average of 94 awards annually in related training programs.

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

CIP Code	Program	College	2016-2017 Awards	2017-2018 Awards	2018-2019 Awards	3-Year Award Average
45.0702	Geographic Information Science and Cartography	California State University-Long Beach	21	23	23	22
		California State University-Northridge	2	5	6	4
		University of Southern California	71	55	75	67
<b>Supply Total/Average</b>			<b>94</b>	<b>83</b>	<b>104</b>	<b>94</b>

**Appendix A: Occupational demand and wage data by county**

**Exhibit 4. Orange County**

Occupation (SOC)	2020 Jobs	2025 Jobs	5-Yr Change	5-Yr % Change	Annual Openings	Entry-Level Hourly Earnings (25th Percentile)	Median Hourly Earnings	Experienced Hourly Earnings (75th Percentile)
Surveying and Mapping Technicians (17-3031)	425	437	12	3%	55	\$30.43	\$41.56	\$49.47
<b>Middle-Skill Total</b>	<b>425</b>	<b>437</b>	<b>12</b>	<b>3%</b>	<b>55</b>			
Computer Occupations, All Other (15-1299)	6,624	6,726	103	2%	501	\$27.08	\$38.54	\$53.49
Cartographers and Photogrammetrists (17-1021)	147	149	2	1%	13	\$35.84	\$42.76	\$49.04
<b>Above Middle-Skill Total</b>	<b>6,771</b>	<b>6,875</b>	<b>105</b>	<b>2%</b>	<b>514</b>			

**Exhibit 5. Los Angeles County**

Occupation (SOC)	2020 Jobs	2025 Jobs	5-Yr Change	5-Yr % Change	Annual Openings	Entry-Level Hourly Earnings (25th Percentile)	Median Hourly Earnings	Experienced Hourly Earnings (75th Percentile)
Surveying and Mapping Technicians (17-3031)	844	843	(1)	(0%)	104	\$29.75	\$40.86	\$48.84

Occupation (SOC)	2020 Jobs	2025 Jobs	5-Yr Change	5-Yr % Change	Annual Openings	Entry-Level Hourly Earnings (25th Percentile)	Median Hourly Earnings	Experienced Hourly Earnings (75th Percentile)
<b>Middle-Skill Total</b>	<b>844</b>	<b>843</b>	<b>(1)</b>	<b>(0%)</b>	<b>104</b>			
Computer Occupations, All Other (15-1299)	15,823	15,795	(28)	(0.2%)	1,158	\$28.20	\$40.15	\$55.73
Cartographers and Photogrammetrists (17-1021)	381	392	12	3%	35	\$38.63	\$46.04	\$52.76
<b>Above Middle-Skill Total</b>	<b>16,204</b>	<b>16,187</b>	<b>(16)</b>	<b>(0.1%)</b>	<b>1,193</b>			

**Exhibit 6. Los Angeles and Orange Counties**

Occupation (SOC)	2020 Jobs	2025 Jobs	5-Yr Change	5-Yr % Change	Annual Openings
Surveying and Mapping Technicians (17-3031)	1,269	1,280	11	1%	159
<b>Middle-Skill Total</b>	<b>1,269</b>	<b>1,280</b>	<b>11</b>	<b>1%</b>	<b>159</b>
Computer Occupations, All Other (15-1299)	22,447	22,521	74	0%	1,659
Cartographers and Photogrammetrists (17-1021)	528	541	13	2%	48
<b>Above Middle-Skill Total</b>	<b>22,974</b>	<b>23,062</b>	<b>88</b>	<b>0.4%</b>	<b>1,707</b>

## 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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