

# Water and Wastewater Technology

---

*Inland Empire/Desert Region (Riverside and San Bernardino counties combined) & Los Angeles County*

## Summary

- Employment for the water and wastewater occupational group is expected to **increase by 2% between 2018 and 2023** in the Inland Empire/Desert region. A total of **784 job openings** will be available over the five-year timeframe.
- The **entry-level wage** for the water and wastewater occupational group is **above the MIT Living Wage estimate of \$12.39 per hour** for a single adult living in the Inland Empire/Desert region.
- **There appears to be an opportunity for program growth** based on the annual average number of program credentials issued for the selected community college programs in the region (**59 total**), and the annual openings for the water and wastewater occupational group across the region (**157 average annual openings**).
- The education supply and job demand analysis in this report does not include Los Angeles County.

## Introduction

This report provides data on the occupations related to the California Community College water and wastewater program (TOP 0958.00). This program prepares students for employment by providing instruction related to the principles, technical skills and equipment used to process, purify, store and distribute potable water, and dispose of wastewater. Instruction in the design, construction, operation, and maintenance of equipment for water or wastewater treatment systems is also included (Taxonomy of Programs, 2012). The occupations included in the water and wastewater occupational group are the following:

- Environmental Engineering Technicians
- Water and Wastewater Treatment Plant and System Operators

## Job Opportunities

In 2018, there were 1,798 jobs in the water and wastewater occupational group in the Inland Empire/Desert Region. This occupational group is projected to increase employment by 2% by 2023. Employers in the region will need to hire 784 workers over the next five years to fill new jobs and backfill jobs that workers are permanently vacating (includes occupational transfers and retirements). Exhibit 1 displays five-year projections for the water and wastewater occupational group in the Inland Empire/Desert region and Los Angeles County. Tables 1 and 2 in the appendix display the projected job growth, wages, education, training, and work experience required for each of the occupations in this group in the Inland Empire/Desert region and Los Angeles County, respectively.

*Exhibit 1: Five-year projections for the water and wastewater occupational group*

Region	2018 Jobs	5-Yr % Change (New Jobs)	5-Yr Openings (New + Replacement Jobs)	Annual Openings (New + Replacement Jobs)	% of workers age 55+
Inland Empire/Desert	1,798	2%	784	157	27%
Los Angeles County	2,723	2%	1,184	237	28%

Source: EMSI 2018.4

## Earnings

The entry-level wage for the water and wastewater occupational group is above the MIT Living Wage estimate of \$12.39 per hour for a single adult living in the Inland Empire/Desert region (\$14.36 for Los Angeles County). The entry-level wage is also sufficient for two working adults and one child (\$14.75 per hour, per adult, or \$30,680 annually for each adult) (Glasmeier, 2019). Exhibit 2 displays wage information for the water and wastewater occupational group in the Inland Empire/Desert region.

*Exhibit 2: Earnings for the water and wastewater occupational group*

Region	Occupation	Entry to Experienced Hourly Wage Range*	Median Wage*	Average Annual Earnings
Inland Empire/Desert Living Wage: \$12.39/hr.	Water and Wastewater Treatment Plant and System Operators	\$25.49 to \$39.82	\$31.48	\$67,400
	Environmental Engineering Technicians	\$25.70 to \$36.66	\$30.73	\$64,800
Los Angeles County Living Wage: \$14.36/hr.	Water and Wastewater Treatment Plant and System Operators	\$27.35 to \$43.20	\$35.31	\$72,800
	Environmental Engineering Technicians	\$16.86 to \$26.89	\$20.95	\$47,500

Source: EMSI 2018.4

\*Entry Hourly is 25<sup>th</sup> percentile wage, the median is 50<sup>th</sup> percentile wage, and experienced is 75<sup>th</sup> percentile wage.

## Job Postings, Employers, Skills, and Education

Exhibit 3 displays the number of job ads posted during the last 12 months along with the regional and statewide average time to fill for the water and wastewater occupational group in the Inland Empire/Desert region and Los Angeles County. On average, Inland Empire/Desert region employers fill online job postings for the water and wastewater occupational group with 42 days. The regional average is one day shorter than the California's average, indicating that local and statewide employers encounter similar challenges when seeking candidates to fill these positions.

*Exhibit 3: Job ads and time to fill for the water and wastewater occupational group, Apr 2018 – Mar 2019*

Region	Occupation	Job Ads	Regional Average Time to Fill (Days)	California Average Time to Fill (Days)
Inland Empire/Desert	Water and Wastewater Treatment Plant and System Operators	72	33	32
	Environmental Engineering Technicians	7	46	53
Los Angeles County	Water and Wastewater Treatment Plant and System Operators	122	37	32
	Environmental Engineering Technicians	2	53	53
<b>Total</b>		<b>203</b>	<b>42</b>	<b>43</b>

Source: Burning Glass – Labor Insights

Exhibit 4 displays the employers posting the most job ads for the water and wastewater occupational group during the last 12 months in the Inland Empire/Desert region and Los Angeles County.

*Exhibit 4: Employers posting the most job ads for the water and wastewater occupational group, Apr 2018 – Mar 2019*

Region	Occupation	Employers
Inland Empire/Desert	Water and Wastewater Treatment Plant and System Operators ( <i>n</i> =66)	<ul style="list-style-type: none"> <li>San Bernardino County</li> <li>Inland Empire Utilities Agency</li> </ul>
	Environmental Engineering Technicians ( <i>n</i> =6)	<ul style="list-style-type: none"> <li>Riverside County</li> <li>City of Ontario</li> </ul>
Los Angeles County	Water and Wastewater Treatment Plant and System Operators ( <i>n</i> =99)	<ul style="list-style-type: none"> <li>Golden State Water Company</li> <li>American States Water Company</li> </ul>
	Environmental Engineering Technicians ( <i>n</i> =2)	<ul style="list-style-type: none"> <li>South Coast Air Quality Management District</li> <li>Environmental Science Associates</li> </ul>

Source: Burning Glass – Labor Insights

Exhibit 5 displays a sample of specialized and employability skills that employers are seeking when looking for workers to fill positions in the water and wastewater occupational group. Specialized skills are occupation-specific skills that employers are requesting for industry or job competency. Employability skills are foundational skills that transcend industries and occupations; this category is commonly referred to as “soft skills.” The skills requested in job postings may be utilized as a helpful guide for curriculum development. Due to the low number of job ads, skills data is not currently available for fish and game wardens.

*Exhibit 5: Sample of in-demand skills from employer job ads for the water and wastewater occupational group, Apr 2018 – Mar 2019*

Region	Occupation	Specialized Skills	Employability Skills
Inland Empire/ Desert	Water and Wastewater Treatment Plant and System Operators (n=64)	<ul style="list-style-type: none"> <li>Supervisory Control and Data Acquisition (SCADA)</li> <li>Process Control</li> <li>Repair</li> </ul>	<ul style="list-style-type: none"> <li>Physical Abilities</li> <li>Writing</li> <li>Troubleshooting</li> </ul>
	Environmental Engineering Technicians (n=7)	<ul style="list-style-type: none"> <li>Repair</li> <li>Data Entry</li> <li>Water Quality</li> </ul>	<ul style="list-style-type: none"> <li>Preparing Reports</li> <li>Computer Literacy</li> <li>Building Effective Relationships</li> </ul>
Los Angeles County	Water and Wastewater Treatment Plant and System Operators (n=118)	<ul style="list-style-type: none"> <li>Sample Collection</li> <li>Repair</li> <li>Calculation</li> </ul>	<ul style="list-style-type: none"> <li>Physical Abilities</li> <li>Organizational Skills</li> <li>Self-Starter</li> </ul>
	Environmental Engineering Technicians (n=2)	<ul style="list-style-type: none"> <li>Budgeting</li> <li>Emissions Monitoring</li> <li>California Environmental Quality Act (CEQA)</li> </ul>	<ul style="list-style-type: none"> <li>Writing</li> <li>Editing</li> <li>Oral Communication</li> </ul>

Source: Burning Glass – Labor Insights

Exhibit 6 displays the work experience and entry-level education typically required to enter each occupation according to the Bureau of Labor Statistics (BLS), educational attainment for incumbent workers with “some college, no degree” and an “associate degree” according to the U.S. Census (2016-17), and the minimum advertised education requirement from employer job ads. Due to the low number of job ads, education data is not currently available for fish and game wardens.

*Exhibit 6: Work experience, typical entry-level education, educational attainment, and minimum advertised education requirements for the water and wastewater occupational group, Apr 2018 – Mar 2019*

Region	Occupation	Typical Entry-Level Education Requirement	Educational Attainment*	Minimum Advertised Education Requirement from Job Ads			
				Number of Job Ads (n=)	High school diploma or vocational training	Associate degree	Bachelor's degree or higher
Inland Empire/Desert	Water and Wastewater Treatment Plant and System Operators	High school diploma or equivalent	41%	44	100%	-	-
	Environmental Engineering Technicians	Associate degree	53%	5	60%	-	40%
Los Angeles County	Water and Wastewater Treatment Plant and System Operators	High school diploma or equivalent	41%	81	86%	14%	-
	Environmental Engineering Technicians	Associate degree	53%	2	-	-	100%

Source: EMSI 2018.4, Burning Glass – Labor Insights

\*Percentage of incumbent workers with a Community College Credential or Some Postsecondary Coursework

## Student Completions and Program Outcomes

Exhibit 7 displays the average annual regional California Community College (CCC) credentials conferred during the three academic years between 2014 and 2017, from the California Community Colleges Chancellor's Office Management Information Systems (MIS) Data Mart, along with the headcount from the most recent year available on LaunchBoard. Credentials are the combined total of associate degrees and certificates issued during the timeframe, divided by three in order to calculate an annual average. This is done to minimize the effect of atypical variation that might be present in a single year. Headcount is the unduplicated number of students who enrolled in one or more courses in the program. The relevant TOP code is from the Taxonomy of Programs manual, and the corresponding program titles used at each college (in *italics*) is sourced from the Chancellor's Office Curriculum Inventory (COCI). Please note, a credential is not always equal to a single person in search of a job opening since a student may earn more than one credential, such as an associate degree in addition to a certificate.

*Exhibit 7: Annual average community college credentials and headcount for the water and wastewater technology program in the Inland Empire/Desert Region*

<b>0958.00 – Water and Wastewater Technology</b>	<b>CCC Headcount, Academic Year 2016-17</b>	<b>CCC Annual Average Credentials, Academic Years 2014-17</b>
<b>Mt. San Jacinto – <i>Water Technology</i></b>	204	
Associate Degree		13
Certificate 30 to < 60 semester units		20
<b>San Bernardino – <i>Water Technology/Water Supply Technology</i></b>	268	
Associate Degree		12
Certificate 18 to < 30 semester units		8
Certificate 6 to < 18 semester units		5
Credit Award < 6 semester units		1*
<b>Victor Valley</b>	13	
<b>Total CCC Headcount, Academic Year 2016-17</b>	<b>482</b>	
<b>Total Annual Average CCC Credentials, Academic Years 2014-17</b>		<b>59</b>

Source: LaunchBoard, MIS Data Mart, COCI

\*San Bernardino issued one credit award <6 semester units in 2015-16.

Community college student outcome information is from the LaunchBoard and based on the selected TOP code and region. The data for these metrics is based on records submitted to the California Community Colleges Chancellor's Office Management Information Systems (MIS) by community colleges, which comes from self-reported student information from CCC Apply and the National Student Clearinghouse. Employment and earnings metrics are based on records from California's Employment Development Department's Unemployment Insurance database. Finally, employment in a job closely related to the field of study comes from self-reported student responses on the CTE Employment Outcomes Survey (CTEOS),

administered by Santa Rosa Junior College (LaunchBoard, 2017). Data from the latest academic year for each metric is provided in Exhibits 11 – 13.

*Exhibit 8: 0958.00 – Water and wastewater technology strong workforce program outcomes*

<b>Strong Workforce Program Metrics: 0958.00 – Water and Wastewater Technology, Academic Year 2015-16, unless noted otherwise</b>	<b>Inland Empire/ Desert Region</b>	<b>California Median</b>
Course enrollments (2016-17)	1,015	165
Completed 12+ units in one year (2016-17)	73	18
Transferred to a 4-year institution	12	0
Employed in fourth fiscal quarter after exit	82%	85%
Median annual earnings*	\$51,499	\$49,961
Job closely related to field of study (2014-15)	83%	79%
Median change in earnings	32%	31%
Attained a living wage	80%	79%
Economically disadvantaged students* (2016-17)	62%	63%

Source: LaunchBoard

\*Data for these metrics is available in Community College Pipeline. All others are available in Strong Workforce Program Metrics



## References

- Burning Glass Technologies. (2019). *Labor Insights/Jobs*. Retrieved from <https://www.burning-glass.com/>
- California Community Colleges Chancellor's Office. LaunchBoard. (2019). *California Community Colleges LaunchBoard*. Retrieved from <https://www.calpassplus.org/Launchboard/Home.aspx>
- California Community Colleges Chancellor's Office Management Information Systems (MIS) Data Mart. (2019). *Data Mart*. Retrieved from <https://datamart.cccco.edu/datamart.aspx>
- California Community Colleges Chancellor's Office, Curriculum and Instructional Unit, Academic Affairs Division. (2012). *Taxonomy of Programs, 6<sup>th</sup> Edition, Corrected Version*. Retrieved from [http://extranet.cccco.edu/Portals/1/AA/Credit/2013Files/TOPmanual6\\_2009\\_09corrected\\_12.5.13.pdf](http://extranet.cccco.edu/Portals/1/AA/Credit/2013Files/TOPmanual6_2009_09corrected_12.5.13.pdf)
- Economic Modeling Specialists International (EMSI) (2019). *Datarun 2018.4*. Retrieved from <https://www.economicmodeling.com/>
- Glasmeier, A. Massachusetts Institute of Technology (MIT). (2019). Retrieved from <http://livingwage.mit.edu/>
- National Center for O\*NET Development. (2019). *O\*NET OnLine*. Retrieved from <https://www.onetonline.org/>

## Contact

Michael Goss, Director  
Center of Excellence, Inland Empire/Desert Region  
[michael.goss@chaffey.edu](mailto:michael.goss@chaffey.edu)  
April 2019



## **Appendix: Occupation definitions, sample job titles, five-year projections for water and wastewater occupations**

*Occupation Definitions (SOC) code), Education and Training Requirement, Community College Educational Attainment*

### **Environmental Engineering Technicians (17-3025)**

Apply theory and principles of environmental engineering to modify, test, and operate equipment and devices used in the prevention, control, and remediation of environmental problems, including waste treatment and site remediation, under the direction of engineering staff or scientist. May assist in the development of environmental remediation devices.

**Sample job titles:** *Air Quality Instrument Specialist, Engineer Technician, Environmental Engineering Assistant, Environmental Engineering Technician, Environmental Field Technician, Environmental Specialist, Environmental Technician, Haz Tech (Hazardous Technician), Industrial Waste Inspector, Senior Environmental Technician*

*Entry-Level Educational Requirement: Associate degree*

*Training Requirement: None*

*Percentage of incumbent workers with a Community College Award or Some Postsecondary Coursework: 53%*

### **Water and Wastewater Treatment Plant and System Operators (51-8031)**

Operate or control an entire process or system of machines, often through the use of control boards, to transfer or treat water or wastewater.

**Sample job titles:** *Plant Operator, Process Operator (Process Op), Relief Operator, SCADA Operator (Supervisory Control and Data Acquisition Operator), Waste Water Treatment Plant Operator (WWTP Operator), Wastewater Operator (WW Operator), Water Control Dispatcher, Water Plant Operator, Water Treatment Operator, Water Treatment Plant Operator*

*Entry-Level Educational Requirement: High school diploma or equivalent*

*Training Requirement: More than 12 months of on-the-job training*

*Percentage of incumbent workers with a Community College Award or Some Postsecondary Coursework: 41%*



Table 1: 2018 to 2023 job growth, wages, education, training, and work experience required for the water and wastewater occupational group, Inland Empire/Desert Region

Occupation (SOC)	2018 Jobs	5-Yr Change	5-Yr % Change	Annual Openings (New + Replacement Jobs)	Entry-Experienced Hourly Wage*	Median Hourly Wage*	Average Annual Earnings	Typical Entry-Level Education & On-The-Job Training Required	Work Experience Required
Water and Wastewater Treatment Plant and System Operators (51-8031)	1,464	24	2%	126	\$25.49 to \$39.82	\$31.48	\$67,400	High school diploma or equivalent & more than 12 months	None
Environmental Engineering Technicians (17-3025)	334	9	3%	31	\$25.70 to \$36.66	\$30.73	\$64,800	Associate degree & none	None
<b>Total</b>	<b>1,798</b>	<b>33</b>	<b>2%</b>	<b>157</b>	-	-	-	-	-

Source: EMSI 2018.4

\*Entry Hourly is 25<sup>th</sup> percentile wage, the median is 50<sup>th</sup> percentile wage, experienced is 75<sup>th</sup> percentile wage.

Table 2: 2018 to 2023 job growth, wages, education, training, and work experience required for the water and wastewater occupational group, Los Angeles County

Occupation (SOC)	2018 Jobs	5-Yr Change	5-Yr % Change	Annual Openings (New + Replacement Jobs)	Entry-Experienced Hourly Wage*	Median Hourly Wage*	Average Annual Earnings	Typical Entry-Level Education & On-The-Job Training Required	Work Experience Required
Water and Wastewater Treatment Plant and System Operators (51-8031)	2,038	31	2%	175	\$27.35 to \$43.20	\$35.31	\$72,800	High school diploma or equivalent & more than 12 months	None
Environmental Engineering Technicians (17-3025)	685	16	2%	62	\$16.86 to \$26.89	\$20.95	\$47,500	Associate degree & none	None
<b>Total</b>	<b>2,723</b>	<b>46</b>	<b>2%</b>	<b>237</b>	-	-	-	-	-

Source: EMSI 2018.4

\*Entry Hourly is 25<sup>th</sup> percentile wage, the median is 50<sup>th</sup> percentile wage, experienced is 75<sup>th</sup> percentile wage.