

**Operation and Maintenance of Wastewater Collection Systems, Volume 2**  
**California State University, Sacramento**  
**(6.4 Continuing Education Units)**

**COURSE DESCRIPTION**

This course is designed to train operators in the practical aspects of operating and maintaining wastewater collection systems emphasizing safe practices and procedures. Information is presented on capacity, management, operation, and maintenance (CMOM) programs; lift station operation and maintenance; equipment maintenance; and collection system rehabilitation. In addition, management duties including organizational planning and organizing; staffing; internal and external communication; financial stability; safety program; security and resilience; collection system evaluation; and CMOM program implementation and continuation are covered.

**COURSE OUTLINE**

This manual builds on the information offered in Volume 1 to provide operators with the knowledge and skills to properly operate, maintain, inspect, and manage wastewater collection systems.

**Chapter 1, Introduction to CMOM**

*Learning Objectives*

1. Describe the role operators play in CMOM programs.
2. Summarize the association between safety and professionalism.
3. Explain how the day-to-day tasks operators perform contribute to the success of a CMOM program.

The main purposes of this chapter are to give an overview of capacity, management, operation, and maintenance (CMOM) programs used in many wastewater collection systems and the role operators play in the success of those programs.

**Chapter 2, Lift Stations**

*Learning Objectives*

1. Describe the requirements and components of lift stations.
2. Identify the advantages and disadvantages of the different types of controllers.
3. Review lift station plans and specifications.
4. Describe the operation and maintenance needed to keep a lift station operating as intended.
5. Determine the frequency of visits to a lift station.

The main purpose of this chapter is to train operators in the safe and effective operation and maintenance of lift stations in wastewater collection systems.

**Chapter 3, Equipment Maintenance**

*Learning Objectives*

1. Explain the possible consequences of an inexperienced, unqualified, or unauthorized operator attempting to troubleshoot or repair electrical equipment.
2. Understand the terms, nature of, and safety procedures for electricity.
3. Properly select and use meters.
4. Discuss the types of and maintenance for different motor and pump varieties.
5. Develop and conduct an effective maintenance program.

The main purpose of this chapter is to train operators in the procedures and schedules involved in maintaining equipment in wastewater collection systems with a focus on lift stations.

#### **Chapter 4, Rehabilitation**

##### *Learning Objectives*

1. Evaluate the condition of a wastewater collection system and the need for rehabilitation.
2. Establish priorities for a wastewater collection system rehabilitation program.
3. Identify and select the appropriate wastewater collection system rehabilitation method.
4. Explain how to plan, implement, and complete a wastewater collection system rehabilitation project.
5. Describe the process of notification and how to best cooperate with the public during a wastewater collection system rehabilitation project.

The main purpose of this chapter is to train operators to evaluate collection systems to identify parts of the system in need of rehabilitation and then to plan, implement, and complete the identified rehabilitation projects.

#### **Chapter 5, Management**

##### *Learning Objectives*

1. Identify the functions of a manager.
2. Describe the elements of programs and policies that are necessary for the effective operation of a utility, including staffing, communications, financial stability, and safety.
3. Prepare plans for financial stability, operation and maintenance, emergency preparedness, safety, security, and resiliency.
4. Apply CMOM practices to evaluate and improve capacity assurance, management, operations, and maintenance activities at a wastewater collection system utility.

The main purpose of this chapter is to train wastewater collection professionals in the basic duties and responsibilities of managing wastewater collection systems.

#### **TIME ASSIGNMENT**

**Text pages:** The content from the training manual used in this course, *Operation and Maintenance of Wastewater Collection Systems*, Volume 2, includes 600 pages. The average word count on a page from the training manual is 537 words. The training manual used for this course contains text, tables, graphs, illustrations, math example problems, section questions, and chapter review questions to enhance the presentation of information and the student learning experience. The course is designed for students to spend the same amount of time reading the tables, graphs, and illustrations as they spend reading the equivalent amount of related chapter text. Therefore, each page is assumed to contain the equivalent of 537 words. The average reading speed is 130 words per minute; therefore, each page is projected to require four minutes of student time for each reading.

**Math example problems:** The course contains 83 math example problems. The projected average time to solve each math problem is three minutes.

**Section questions:** The course contains 247 section questions, located in the “Check Your Understanding” sections integrated throughout the chapter text. These questions enable students to

self-assess their understanding of a section's material before proceeding to the next section. The projected average response time is 2 minutes per question.

**Chapter review questions:** The course contains 175 review questions, located in the "Chapter Review" at the end of each chapter. Question types include fill-in, multiple choice, and matching. The projected average response time is 2 minutes per question.

**Objective test questions:** The course contains 175 test questions. There is 1 objective test per chapter. The projected average response time is 2 minutes per question.

Course component	Number of component units	Minutes required to complete component unit	Total time assignment for component
Text pages	600 ×	4 =	2,400
Math example problems	83 ×	3 =	249
Section questions	247 ×	2 =	494
Chapter review questions	175 ×	2 =	350
Objective test questions	175 ×	2 =	350
			<b>3,843 minutes</b>
			<b>64 hours</b>