



**AUTODESK**  
Official Press

**Louisa Holland**  
with Cyndy Davenport  
and Eric Chappell



**Mastering AutoCAD®  
Civil 3D® 2014**



**SYBEX**  
A Wiley Brand





# **Mastering**

## **AutoCAD® Civil 3D® 2014**





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**Louisa Holland**

**Cyndy Davenport**

**Eric Chappell**

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Best regards,

A handwritten signature in black ink, appearing to read 'Neil Edde', written in a cursive style.

Neil Edde  
Vice President and Publisher  
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—*Louisa Holland, Cyndy Davenport, and Eric Chappell*

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—*Louisa Holland*

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—*Cyndy Davenport*

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—*Eric Chappell*

# About the Authors

**Louisa “Lou” Holland** is a LEED-accredited civil engineer currently living in San Francisco, California. She has trained users on Eagle Point Software and AutoCAD® since 2001 and on AutoCAD Civil 3D since 2006. She has worked extensively with the Wisconsin Department of Transportation, CalTrans, and various consultants on AutoCAD Civil 3D implementations. Louisa is an Autodesk Approved Instructor (AAI), an AutoCAD Civil 3D Certified Professional, and a regular speaker at Autodesk University, Autodesk User Group International, and other industry events. In her next life, Louisa would like to be reincarnated as an Orange County housewife.

**Cyndy Davenport** has been working in the land development industry for 27 years in the capacity of design, technology management, implementation, training, and support. She’s earned repeated Civil 3D certifications in implementation, support, and training over the years. Cyndy is a regular speaker at Autodesk University and occasionally contributes workflow solutions on her blog to the Civil 3D community ([c3dcougar.typepad.com](http://c3dcougar.typepad.com)).

**Eric Chappell**, a recognized expert in the world of AutoCAD® Civil 3D® software, has been working, teaching, writing, and consulting in the world of civil engineering software for over 20 years. He has written training materials and performed training for end users, trainers, and Autodesk employees around the globe and worked with Autodesk in authoring and developing two Autodesk certification exams. He is the design systems manager for Timmons Group, a civil engineering and surveying firm. Eric is also a highly rated instructor at Autodesk University. Eric lives in the Richmond, Virginia, area.



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# Introduction

The AutoCAD® Civil 3D® program was introduced in 2004 as a trial product. Over the past few years, the AutoCAD Civil 3D series have evolved from the wobbly baby introduced on those first trial discs to a mature platform used worldwide to handle the most complex dynamic engineering designs. With this change, many engineers still struggle with how to make the transition. The civil engineering industry as a whole is an old dog learning new tricks.

We hope this book will help you in this journey. As the user base grows and users get beyond the absolute basics, more materials are needed, offering a multitude of learning opportunities. While this book is starting to move away from the basics and truly become a Mastering book, we hope that we are headed in that direction with the general readership. We know we cannot please everyone, but we do listen to your comments—all toward the betterment of this book.

Designed to help you get past the steepest part of the learning curve and teach you some guru-level tricks along the way, *Mastering AutoCAD Civil 3D 2014* is the ideal addition to any AutoCAD Civil 3D user's bookshelf.

## Who Should Read This Book

The Mastering book series is designed with specific users in mind. In the case of *Mastering AutoCAD Civil 3D 2014*, we expect you'll have a solid knowledge of AutoCAD in general and some basic engineering knowledge as well. A basic understanding of AutoCAD Civil 3D will be helpful, although there are explanations and examples to cover many needs and experience levels. We expect this book will appeal to a large number of AutoCAD Civil 3D users, but we envision a few primary users:

**Beginning Users Looking to Make the Move to Using AutoCAD Civil 3D** These people understand AutoCAD and some basics of engineering, but they are looking to learn AutoCAD Civil 3D on their own, broadening their skill set to make themselves more valuable in their firms and in the market.

**AutoCAD Civil 3D Users Looking for a Desktop Reference** With the digitization of the official help files, many users still long for a book they can flip open and keep beside them as they work. These people should be able to jump to the information they need for the task at hand, such as further information about a confusing dialog or troublesome design issue.

**Users Looking to Prepare for the Autodesk Certification Exams** This book focuses on the elements you need to pass the Associate and Professional exams with flying colors and includes margin icons to note topics of interest. Just look for the icon.

**Classroom Instructors Looking for Better Materials** This book was written with real data from real design firms. We've worked hard to make many of the examples match the

real-world problems we have run into as engineers. This book also goes into greater depth than any other available text, allowing short classes to review the basics (and leave the in-depth material for self-discovery) and longer classes can cover the full material presented.

This book can be used front to back as a self-teaching or instructor-based instruction manual. Each chapter has a number of exercises and most (but not all) build on the previous exercise. You can also skip to almost any exercise in any chapter and jump right in. We've created a large number of drawing files that you can download from [www.sybex.com/go/masteringcivil3d2014](http://www.sybex.com/go/masteringcivil3d2014) to make choosing your exercises a simple task.

## What You Will Learn

This book isn't a replacement for training. There are too many design options and parameters to make any book a good replacement for training from a professional. This book teaches you to use the tools, explores a large number of the options, and leaves you with an idea of how to use each tool. At the end of the book, you should be able to look at any design task you run across, consider a number of ways to approach it, and have some idea of how to accomplish the task. To use one of our common analogies, reading this book is like walking around your local home-improvement warehouse. You see a lot of tools and use some of them, but that doesn't mean you're ready to build a house.

## What You Need

Before you begin learning AutoCAD Civil 3D, you should make sure your hardware is up to snuff. Visit the Autodesk website, [www.autodesk.com](http://www.autodesk.com), and review graphic requirements, memory requirements, and so on. One of the most frustrating things that can happen is to be ready to learn only to be stymied by hardware-related crashes. AutoCAD Civil 3D is a hardware-intensive program, testing the limits of every computer on which it runs. You'll also want to download any service packs available.

We also strongly recommend using either a wide format or dual-monitor setup. The number of dialogs, palettes, and so on make AutoCAD Civil 3D a real estate hog. By having the extra space to spread out, you'll be able to see more of your design along with the feedback provided by the program itself.

You need to visit [www.sybex.com/go/masteringcivil3d2014](http://www.sybex.com/go/masteringcivil3d2014) to download all of the data and sample files. We recommend that you save these files locally on your computer in C:/Mastering unless told otherwise.

### **FREE AUTODESK SOFTWARE FOR STUDENTS AND EDUCATORS**

The Autodesk Education Community is an online resource with more than five million members that enables educators and students to download—for free (see website for terms and conditions)—the same software used by professionals worldwide. You can also access additional tools and materials to help you design, visualize, and simulate ideas. Connect with other learners to stay current with the latest industry trends and get the most out of your designs. Get started today at [www.autodesk.com/joinedu](http://www.autodesk.com/joinedu).

## The Mastering Series

The Mastering series from Sybex provides outstanding instruction for readers with intermediate and advanced skills in the form of top-notch training and development for those already working in their field and clear, serious education for those aspiring to become pros. Every *Mastering* book includes the following features:

- ◆ Real-world scenarios ranging from case studies to interviews that show how the tool, technique, or knowledge presented is applied in actual practice
- ◆ Skill-based instruction, with chapters organized around real tasks rather than abstract concepts or subjects
- ◆ A self-review section called The Bottom Line, so you can be certain you're equipped to do the job right

## What Is Covered in This Book

This book contains 19 chapters and two appendices:

- ◆ Chapter 1, "The Basics," introduces you to the interface and many of the common dialogs in AutoCAD Civil 3D. This chapter discusses navigating the interface and customizing your drawing's settings. You will also explore various tools for creating linework.
- ◆ Chapter 2, "Survey," examines the Survey tab of Toolspace and the unique toolset it contains for handling field surveying and for field book data handling. You will also look at various surface and surveying relationships.
- ◆ Chapter 3, "Points," introduces AutoCAD Civil 3D points and the various methods of creating them. You will also spend some time exploring the control of AutoCAD Civil 3D points with description keys and groups.
- ◆ Chapter 4, "Surfaces," introduces the various methods of creating surfaces, using free and low-cost data to perform preliminary surface creation. Then you will investigate the various surface editing and analysis methods. The chapter also discusses point clouds and their use.
- ◆ Chapter 5, "Parcels," examines the best practices for keeping your parcel topology tight and your labeling neat. It examines the various editing methods for achieving the desired results for the most complicated plats.
- ◆ Chapter 6, "Alignments," introduces the basic horizontal layout element. This chapter also examines using layout tools that maintain the relationships between the tangents, curves, and spiral elements that create alignments.
- ◆ Chapter 7, "Profiles and Profile Views," examines the vertical aspect of road design from the establishment of the existing profile to the design and editing of the proposed profile. In addition, you will explore how profile views can be customized to meet the required format for your design and plans.

- ◆ Chapter 8, “Assemblies and Subassemblies,” introduces the building blocks of AutoCAD Civil 3D cross-sectional design. You will look at the many subassemblies available in the tool palettes and look at how to build full design sections for use in any design environment.
- ◆ Chapter 9, “Basic Corridors,” introduces the basics of corridors—building full designs from horizontal, vertical, and cross-sectional design elements. You will look at the various components to understand how corridors work before moving to a more complex design set.
- ◆ Chapter 10, “Advanced Corridors, Intersections, and Roundabouts,” further examines using corridors in more complex situations. You will learn about building surfaces, intersections, and other areas of corridors that make them powerful in any design situation.
- ◆ Chapter 11, “Superelevation,” takes a close look at the tools used to add superelevation to roadways and railways. This functionality has changed greatly in the last few years, and you will have a chance to use the axis of Rotation (AOR) subassemblies that can pivot from several design points.
- ◆ Chapter 12, “Cross Sections and Mass Haul,” looks at slicing sections from surfaces, corridors, and pipe networks using alignments and the mysterious sample line group. Working with the wizards and tools, you will see how to make your sections to order. You will explore mass haul functionality to demonstrate the power of AutoCAD Civil 3D for creation of the mass haul diagrams.
- ◆ Chapter 13, “Pipe Networks,” gets into the building blocks of the pipe network tools. You will look at modifying an existing part to add new sizes and then building parts lists for various design situations. You will then work with the creation tools for creating pipe networks and plan and profile views to get your plans looking like they should.
- ◆ Chapter 14, “Grading,” examines both feature lines and grading objects. You will look at creating feature lines to describe critical areas and then using grading objects to describe mass grading.
- ◆ Chapter 15, “Plan Production,” walks you through the basics of creating view frame groups, sheets, and templates used to automate the plan and profile drawing sheet process. In addition, you will look at creating section views and section sheets.
- ◆ Chapter 16, “Advanced Workflows,” looks at the various ways of sharing and receiving data. We describe the data-shortcut mechanism for sharing data between AutoCAD Civil 3D users. We also consider other methods of importing and exporting, such as XML.
- ◆ Chapter 17, “Quantity Takeoff,” shows you the ins and outs of assigning pay items to corridor codes, blocks, areas, and pipes. You learn how to set up new pay items and generate quantity takeoff reports.
- ◆ Chapter 18, “Label Styles,” is devoted to editing and creating label styles. You learn to navigate the Text Component Editor and how to master label style conundrums you may come across.
- ◆ Chapter 19, “Object Styles,” examines editing and creating object styles. You will learn how to create styles for surfaces, profile views, and other objects to match your company standards.

- ◆ Appendix A, “The Bottom Line,” gathers together all the Master It problems from the chapters and provides a solution for each.
- ◆ Appendix B, “AutoCAD® Civil 3D® Certification,” points you to the chapters in this book that will help you master the objectives for the Certified Professional Exam.

## **How to Contact the Authors**

We welcome feedback from you about this book and/or about books you’d like to see from us in the future. Feel free to connect with us on LinkedIn:

- ◆ [www.linkedin.com/in/louisaholland](http://www.linkedin.com/in/louisaholland)
- ◆ <http://www.linkedin.com/pub/cyndy-davenport/13/61b/1a9>

You can also keep up with Cyndy Davenport on Twitter (C3DCougar) and email Eric Chappell at [civilessentials@gmail.com](mailto:civilessentials@gmail.com).

Sybex strives to keep you supplied with the latest tools and information you need for your work. Please check their website at [www.sybex.com/go/masteringcivil3d2014](http://www.sybex.com/go/masteringcivil3d2014), where we’ll post additional content and updates that supplement this book if the need arises.

Thanks for purchasing *Mastering AutoCAD Civil 3D 2014*. We appreciate it and look forward to exploring AutoCAD Civil 3D with you!

