

An aerial rendering of a residential development. The scene shows a large, winding road that curves through a neighborhood of houses with grey roofs. The houses are arranged in a semi-circular pattern. To the left of the road is a lush green golf course with several sand traps and a small pond. The overall scene is bright and clear, suggesting a sunny day.

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AUTOCAD® CIVIL 3D® 2016

ESSENTIALS

Eric Chappell



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Copyright © 2015 by John Wiley & Sons, Inc., Indianapolis, Indiana
Published simultaneously in Canada
ISBN: 978-1-119-05959-2
ISBN: 978-1-119-05958-5 (ebk.)
ISBN: 978-1-119-05975-2 (ebk.)

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Library of Congress Control Number: 2015936399

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To Logan

ACKNOWLEDGMENTS

What an amazing year it has been! I get to continue writing this series and updating it for yet another great release of Autodesk® AutoCAD® Civil 3D® software. And after a wonderful 16 months on the Premium Support Services team at Autodesk, I have changed roles and I'm now serving as Community Evangelist for InfraWorks® 360. This new role gives me the opportunity to focus on reaching the Autodesk infrastructure software (including InfraWorks, Civil 3D, and others) community and try to be a positive force to inform and enable this great group of people.

In addition, I will be updating the entire InfraWorks 360 series of books to address all the exciting changes there. These are certainly exciting times to be involved in the civil/infrastructure design industry and to be using Autodesk products. I'm blessed to be in such a wonderful position to observe and participate in the transformation that is taking place. For years, we have been talking about 3D and BIM in the civil/infrastructure industry and now we're finally putting our money where our mouths are. There will be big changes over the next few years, so invest in yourself through training and learning, and hold on and enjoy the ride!

I've said it before on past books and I'll say it again on this one: This book was a team effort. Kudos to Stephanie McComb for getting the book off the ground and for keeping it moving along throughout the process. Thanks to the wonderful editors, Christine O'Connor and Kathryn Duggan, for correcting all my mistakes (there were many) and making the book hold up to the high standard of quality that is characteristic of Wiley/Sybex. It was an honor to once again work with my good friend Joshua Modglin and to know that, as technical editor, he had my back on the technical aspects of the book.

And as always, thanks to my wife, Dixie, and my four children for enduring yet another "book season" and all of the not-so-fun stuff that comes with it. I love you all, and I do it all for you.

ABOUT THE AUTHOR

Eric Chappell has been working, teaching, writing, and consulting in the world of civil engineering software for more than 20 years, and he is a recognized expert in the world of Autodesk® AutoCAD® Civil 3D® software. Eric joined the Autodesk family in September 2013 as a Premium Services Specialist and has recently taken on the role of Community Evangelist for InfraWorks® 360. In the 12 years prior to working for Autodesk, he wrote training materials and performed training for end users, trainers, and Autodesk employees around the globe. For several years, he has worked with Autodesk in authoring and developing two Autodesk certification exams. He also served as design systems manager for Timmons Group, a civil engineering and surveying firm based in Richmond, Virginia, where he managed software, standards, and training for more than 200 users. Eric is also a highly rated instructor at Autodesk University, where he has taught for the past 10 years.

Prior to writing and consulting, Eric spent nearly 10 years in the civil engineering and surveying fields while working for the H.F. Lenz Company in Johnstown, Pennsylvania. During his time at H.F. Lenz, he gained considerable practical experience as a survey crewman, designer, engineer, and CAD supervisor. Eric also holds a BS degree in Civil Engineering Technology from the University of Pittsburgh at Johnstown and is certified in Pennsylvania as an EIT.

Eric is originally from southwestern Pennsylvania, but he has lived in the Richmond, Virginia, area for the past 13 years with his wife and four children. He enjoys being outdoors and spending time with his family. He can sometimes be seen playing drums for the band Sons of Zebedee, which performs at a variety of events in the Central Virginia area.

Eric is also the author of a series of Wiley/Sybex titles for Autodesk InfraWorks 360 and InfraWorks 360 LT. Be sure to check out *Autodesk InfraWorks 360 Essentials* along with *Autodesk Roadway Design for InfraWorks 360 Essentials*, *Autodesk Bridge Design for InfraWorks 360 Essentials*, and *Autodesk Drainage Design for Autodesk InfraWorks 360 Essentials*. Other titles may also be available throughout the year based on the release of more InfraWorks 360 modules.

If you would like to contact the author with comments or suggestions, please email CivilEssentials@gmail.com. You're also welcome to visit Eric's blog at <http://ericchappell.blogspot.com>.

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INTRODUCTION

When the first version of this book was born just over four years ago, my hope was for it to be one book in a long and successful series that would educate, inspire, and even excite many people about using the Autodesk® AutoCAD® Civil 3D® software. In order to make that happen, I decided that each book in the series had to meet the following criteria:

- ▶ It should be basic enough to enable *anyone* to learn Civil 3D.
- ▶ It should be in-depth enough to enable a person to be productive using Civil 3D for basic tasks.
- ▶ It should foster understanding by associating the things you do in Civil 3D with familiar things you see every day.
- ▶ The examples and exercises should be based on the real world.
- ▶ The book should not simply demonstrate random software features but should also teach the process of project completion using Civil 3D.

Since the first version of the book was released, I have received tons of great feedback about how well this book functions in many learning environments. I have also used the book myself to teach classes in a corporate environment, and I am very pleased with how it performs. I am confident that the goals I listed have been met, and for that reason I have held to the same writing style, format, and delivery that proved to be so successful in the previous versions.

As you work your way through the book as a teacher, a student, or an end user, you'll find that the first two chapters, although very important, are more general and introductory. After that, you're going to take a journey through the completion of a residential land development project—start to finish. In fact, the example project is based on a residential development that was built about 10 years ago, not far from my home. The topics are presented as though you have never touched a CAD program before, and wherever possible, there are sidebars and other forms of augmentation that relate what you're doing to the real world.

You'll also find that as I wrote this book, I tried to sympathize with future readers by thinking back to my college days when I was learning about surveying and civil engineering for the first time. There were many times when I felt frustrated and lost because I was learning new and foreign concepts and did not see how they related to the real world. I can remember being out in the field during my surveying class—looking through the survey instrument, writing down measurements, and having no idea why. That wasn't an enjoyable feeling, and it

isn't one I want you to experience as you learn the new and foreign concepts in this book. Eventually I learned all about surveying, and now I have an in-depth understanding of how those measurements relate to designing and building roads, buildings, and other things—but it took many years. It's my sincerest hope that this book gives you a head start on some of those types of concepts while at the same time relating them to Civil 3D in ways that hit home for you.

What's New in This Book?

If you already own *AutoCAD Civil 3D 2015 Essentials*, you'll be happy to know that *AutoCAD Civil 3D 2016 Essentials* has been updated to address important changes in AutoCAD Civil 3D 2016. All applicable images have been updated in this version of the book to account for changes to the user interface and changes to functionality. The dataset files have also been updated to ensure compatibility with AutoCAD Civil 3D 2016.

Who Should Read This Book?

This book should be read by anyone who needs or wants to begin learning AutoCAD Civil 3D. It's appropriate for ages ranging from high school to retirement, and although it's intended for those who have no experience or skill with Civil 3D, it can also serve as a great resource for refreshing your knowledge base or filling in any gaps. In addition, this book can be used as a resource for preparing to take the AutoCAD Civil 3D 2016 Certified Professional exam. See www.autodesk.com/certification for more certification information and resources. You can also refer to this book's appendix to see which certification topics are covered and where they can be found in the book.

In addition to those pursuing a certification, here are some specific examples of individuals who would benefit from reading this book:

- ▶ High-school students following a design-related educational track
- ▶ College students learning to be designers or engineers
- ▶ Employees who have recently joined a company that utilizes Civil 3D
- ▶ Employees who work for companies that have recently implemented Civil 3D
- ▶ Experienced Civil 3D users who are self-taught and who want to fill in gaps in their knowledge base

What You Will Learn

This book covers the basic skills and concepts needed to begin using Civil 3D to design land development projects. The concepts include those related to Civil 3D as well as those related to civil engineering and surveying in general. It doesn't cover all topics or all Civil 3D features, but it provides a solid foundation you can use to perform basic tasks. This foundation can then serve as a stepping-off point as you learn more advanced skills and work toward an in-depth understanding of Civil 3D.

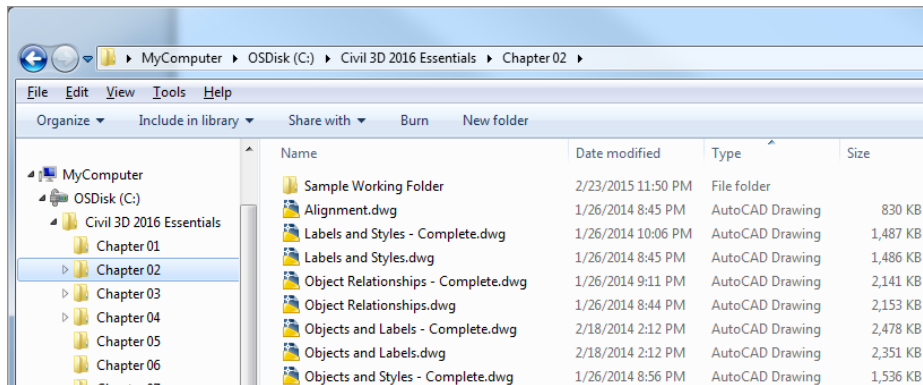
The first two chapters will give you a basic understanding of Civil 3D and help you to understand and appreciate how it “thinks.” The remaining 16 chapters will teach you how to use the tools that Civil 3D provides to complete a typical land development design project.

What You Need

Specific hardware requirements for running AutoCAD Civil 3D 2016 had not been released as this book went to press. See the Autodesk website (www.autodesk.com) for current requirements.

To perform the exercises in this book, you must have AutoCAD Civil 3D 2016 installed on your computer. It's recommended that you use the default software setup with two exceptions: Change your drawing screen color to white, and dock the command line at the bottom of the screen. This book contains many screen captures of Civil 3D drawings, which were all produced with these distinctive changes to the user interface. Also, at times, the exercises refer to drawing entities by color, which is sometimes dependent on the background color.

To complete the exercises, you'll need to download the necessary files from www.sybex.com/go/civil3d2016essentials. Here you'll find a list of Zip files, one for each chapter. When you unzip the file for the first chapter to the local C: drive of your computer, a folder named `Civil 3D 2016 Essentials` will be created with the chapter folder inside it. As you unzip additional chapter files to the local drive, simply merge the new `Civil 3D 2016 Essentials` folder into the old one. The resulting files and folders will appear similar to the following image:



Zip files are available in imperial and metric units. As you complete the exercises, metric values will be shown in parentheses. The imperial and metric values for a given item usually are *not* equivalent, to avoid using irregular values for the design. For example, the value for the width of a sidewalk would be shown as 3' (1m) even though 3' doesn't exactly equal 1m.

Finally, be sure to check the book's website for any updates to this book should the need arise. You can also contact me directly by email at CivilEssentials@gmail.com or visit my blog at <http://ericchappell.blogspot.com> to read even more about the book and Civil 3D in general.

FREE AUTODESK SOFTWARE FOR STUDENTS AND EDUCATORS

The Autodesk Education Community is an online resource with more than 5 million members that enables educators and students to download—for free (see the 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.

Attention: Instructors

As you know, the best classes start with good preparation, and you can get off to a good start by downloading the instructor materials that accompany this book. Please visit www.sybex.com/go/civil3d2016essentials to access the instructor materials, which contain suggested syllabi, PowerPoint files, additional exercises, and quiz questions that you can use to assist you in making your class a success.

What Is Covered in This Book?

AutoCAD Civil 3D 2016 Essentials is organized to provide you with the knowledge needed to master the basics of AutoCAD Civil 3D 2016:

Chapter 1: Navigating the User Interface Familiarizes you with the Civil 3D environment so that you can navigate more easily in the software.

Chapter 2: Leveraging a Dynamic Environment Demonstrates the dynamic Civil 3D environment to establish its importance and encourage you to take full advantage of it whenever possible. This chapter focuses on important relationships between different components of a typical design model.

Chapter 3: Establishing Existing Conditions Using Survey Data Demonstrates how to convert survey field measurements into a Civil 3D drawing while focusing on the survey functions of Civil 3D. This chapter covers creating a survey database, importing data, and processing the data to create a map of the project.

Chapter 4: Modeling the Existing Terrain Using Surfaces Demonstrates how to create a model of the existing terrain of the project while focusing on the surface functions of Civil 3D. This chapter covers creating a new surface and adding data to it to form a 3D model of the before-construction condition of the project.

Chapter 5: Designing in 2D Using Alignments Demonstrates how to perform basic 2D layout while focusing on the alignment functions of Civil 3D. This chapter covers creating alignments, applying design criteria, and editing alignments.

Chapter 6: Displaying and Annotating Alignments Demonstrates how to control the appearance of alignments and provide annotation while focusing on Civil 3D alignment styles and alignment labels. This chapter covers applying alignment styles, creating alignment labels, and creating alignment tables.

Chapter 7: Designing Vertically Using Profiles Demonstrates how to design the vertical aspect of a linear feature while focusing on the profile functions of Civil 3D. This chapter covers creating profiles, applying design criteria, editing profiles, and displaying profiles in profile views.

Chapter 8: Displaying and Annotating Profiles Demonstrates how to control the appearance of profiles and provide annotation while focusing on Civil 3D profile styles and profile labels. This chapter covers applying profile styles, creating profile labels, and object projection.

Chapter 9: Designing in 3D Using Corridors Demonstrates how to design a 3D model of a linear feature while focusing on the corridor functions of Civil 3D. This chapter covers creating assemblies, creating and editing corridors, and creating corridor surfaces.

Chapter 10: Creating Cross Sections of the Design Demonstrates how to generate and display cross sections of your design while focusing on the sample line and section functions of Civil 3D. This chapter covers creating sample lines, sampling various sources, and creating section views.

Chapter 11: Displaying and Annotating Sections Demonstrates how to control the appearance of sections and provide annotation while focusing on Civil 3D section styles and section labels. This chapter covers applying section styles, creating section labels, and object projection.

Chapter 12: Designing and Analyzing Boundaries Using Parcels Demonstrates how to design a lot layout for a residential land development project while focusing on the parcel functions of Civil 3D. This chapter covers creating and editing parcels.

Chapter 13: Displaying and Annotating Parcels Demonstrates how to control the appearance of parcels and provide annotation while focusing on Civil 3D parcel styles and parcel labels. This chapter covers applying parcel styles, creating parcel labels, and creating parcel tables.

Chapter 14: Designing Gravity Pipe Networks Demonstrates how to design underground gravity pipe systems for a residential land development project while focusing on the pipe network functions of Civil 3D. This chapter covers creating and editing pipe networks.

Chapter 15: Designing Pressure Pipe Networks Demonstrates how to design underground pressure pipe systems for a residential land development project while focusing on the pressure pipe network functions of Civil 3D. This chapter covers creating and editing pressure pipe networks.

Chapter 16: Displaying and Annotating Pipe Networks Demonstrates how to control the appearance of pipe networks (both gravity and pressure) and provide annotation while focusing on Civil 3D pipe styles, structure styles, fitting styles, appurtenance styles, and pipe network labels. This chapter covers displaying pipe networks in profile view, creating pipe network labels, and creating pipe network tables.

Chapter 17: Designing New Terrain Demonstrates how to design a proposed ground model for a residential land development project while focusing on the feature-line and grading functions of Civil 3D. This chapter covers creating and editing feature lines and grading objects.

Chapter 18: Analyzing, Displaying, and Annotating Surfaces Demonstrates how to perform surface analysis and display the results as well as annotate design surfaces. This chapter covers managing multiple surfaces, labeling surfaces, and analyzing surfaces.

Appendix: AutoCAD Civil 3D 2016 Certification Provides information about AutoCAD Civil 3D certification as well as how this book will help you to prepare for the certification exams. This appendix includes specific certification objectives along with where related material appears in the book.

The Essentials Series

The Essentials series from Sybex provides outstanding instruction for readers who are just beginning to develop their professional skills. Every Essentials book includes these features:

- ▶ Skill-based instruction with chapters organized around projects rather than abstract concepts or subjects.
- ▶ Downloadable tutorial files showing the start and end state of each exercise.
- ▶ Digital extras so you can work through the project tutorials yourself. Please check the book's web page at www.sybex.com/go/civil3d2016essentials for these companion downloads.



The certification margin icon will alert you to sections that are especially relevant to AutoCAD Civil 3D 2016 certification. See the appendix for a quick snapshot of the certification objectives covered in the book.

The Autodesk certification exam objectives listed in the appendix were accurate at press time; to find the latest information about the exam and what is covered, go to www.autodesk.com/certification.

Navigating the User Interface

If you're new to the AutoCAD® Civil 3D® software environment, then your first experience has probably been a lot like staring at the instrument panel of an airplane. Civil 3D can be quite intimidating, with lots of buttons, strange shapes, and unusual icons—all packed into a relatively small area. In addition, you may be even more intimidated by the feeling that there is a lot of power under the hood.

This leads us to our main objective for this chapter, which is to alleviate that feeling of intimidation and make you feel much more at ease within the Civil 3D environment. Let me start you down that path by saying that there's a big difference between an airplane and Civil 3D. In Civil 3D, if you really mess up, you can simply close the drawing file without saving. When piloting an airplane, it's a little more difficult to undo your mistakes.

After completing this chapter, you will have achieved a greater comfort level within the Civil 3D environment by being able to identify the main user interface components and utilize them for basic functions. You will also be able to use two specific features that will serve you well throughout the program: the Transparent Commands toolbar and the Inquiry Tool.

In this chapter, you'll learn to:

- ▶ **Navigate the Civil 3D user interface**
- ▶ **Launch general commands through the application menu**
- ▶ **Launch key software commands and functions using the ribbon**
- ▶ **Navigate the design contents using the Toolspace**
- ▶ **Navigate the model using the drawing area**
- ▶ **Communicate with Civil 3D using the command line**
- ▶ **Access and modify design information using Panorama**

- ▶ Access specialized commands using the Transparent Commands toolbar
- ▶ Get information about your design using the Inquiry Tool

Getting to Know the Civil 3D User Interface

Certification Objective

To begin learning about the Civil 3D environment, let's take our airplane analogy down a notch and think about this as learning to drive an automobile. When your parents first sat you down at the wheel and talked about the car's controls, they probably didn't mention the air conditioning or the radio. Those, of course, are important parts of the driving experience, but I'm betting they started with the most important parts, such as the steering wheel, the gas pedal, and, most important of all, the brake pedal. We're going to approach your first experience with "driving" Civil 3D in much the same manner.

There are many, many parts to the Civil 3D user interface. For the purpose of this book, I'll cover just the ones that will be most important in enabling you to navigate the software effectively. Figure 1.1 shows the major components of the user interface.

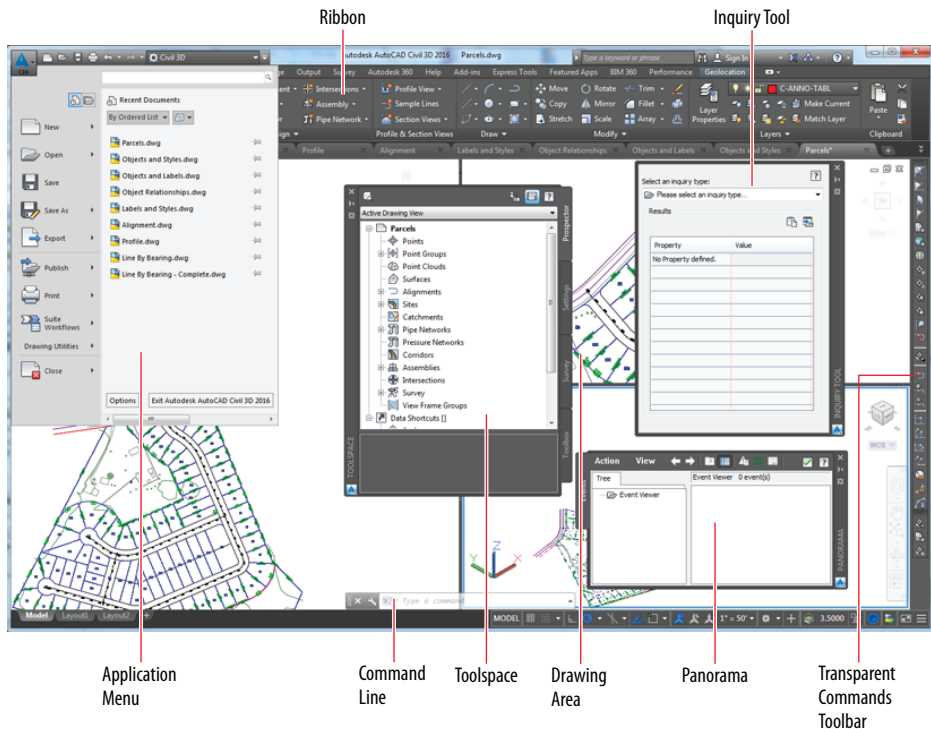


FIGURE 1.1 Major components of the Civil 3D user interface

Application Menu The place where you can find everyday file-handling commands that enable you to do things like open, save, and print your drawings

Ribbon The place where most Civil 3D commands are launched

Toolspace The Civil 3D “command center” where all the data and settings are laid out in an organized fashion

Drawing Area The place where the drawing is created

Command Line The “chat window” where you and Civil 3D talk to one another

Panorama A multipurpose window where you can view and/or edit drawing information and properties

Inquiry Tool A tool with many smaller tools within it that enable you to get information about your design

Transparent Commands Toolbar A toolbar with special commands that allow drafting and geometric construction to be done in the way that civil engineers and surveyors do it

Working with the Application Menu

The application menu (see Figure 1.2) expands out from the square AutoCAD Civil 3D icon located at the top left of your screen. Here, you’ll find commands for creating, opening, saving, and printing your drawing files.

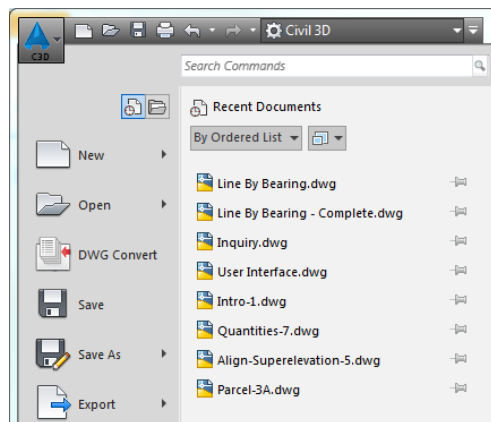


FIGURE 1.2 Part of the Civil 3D application menu

The Quick Access Toolbar just to the right of the AutoCAD Civil 3D icon is a handy subset of your most commonly used general-purpose tools. It can be customized to add more tools if you like.

If you haven't already done so, download and install the files for Chapter 1 according to the instructions in this book's Introduction.

Exercise 1.1: Use the Application Menu to Open a File

In this exercise, you will use the application menu to open a file.

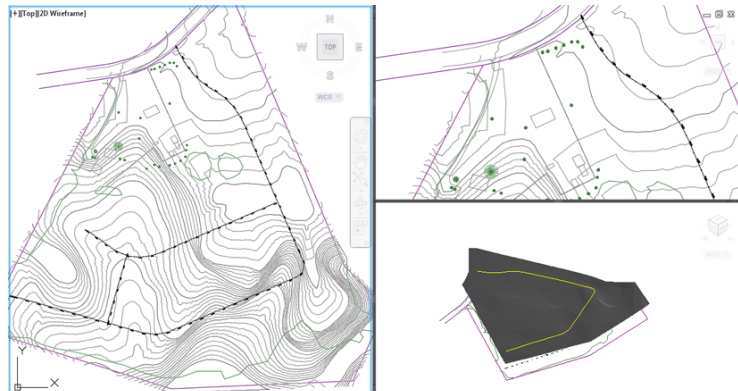


1. Launch Civil 3D by double-clicking the Civil 3D 2016 Imperial (Metric) icon on the desktop of your computer.
2. Click the application menu icon.
3. On the application menu, click Open.
4. Browse to the Chapter 01 class data folder, and open User Interface.dwg.
5. Open the application menu once more, and investigate the commands that are listed there. You'll notice that most of them have to do with creating, opening, saving, and printing drawing files.
6. Keep this drawing open for the next exercise.

Because nothing changes in this drawing file as a result of the exercise steps, no User Interface – Complete file is necessary.

IT'S ALL IN HOW YOU LOOK AT IT

This drawing, like many other drawings you'll open while working through this book, is set up with three viewports. The one on the left is top-down, or *plan view*, showing the entire project. The one at the top right is also plan view, but it is zoomed in to a different part of the drawing. The lower-right viewport is a *3D view*. These are three views of the same design, and what happens in one will happen in the other two. Think of it as three cameras showing three different viewpoints of the same subject, with each viewport being like a television monitor.



Working with the Ribbon

The *ribbon* is located at the top of your screen, and it is the launching pad for most of your Civil 3D commands. The commands that it contains are organized into groups through the use of *tabs* and *panels*. The ribbon itself is divided into a series of tabs that include Home, Insert, Annotate, and so on, as illustrated in Figure 1.3.

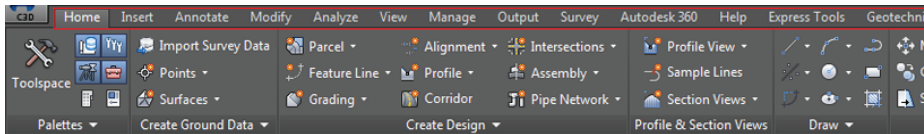


FIGURE 1.3 Tabs arrange large numbers of similar Civil 3D commands into groups.

Each tab is divided into panels. For instance, the Home tab shown in Figure 1.4 includes the Palettes, Create Ground Data, Create Design, Profile & Section Views, and Draw panels.

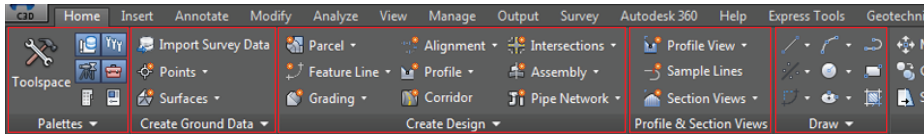


FIGURE 1.4 Panels provide another level of grouping within a ribbon tab.

Because Civil 3D groups the commands in this way, you never have to choose from more than a handful of commands once you’ve taken your best guess at the correct tab and panel. Also, you’ll find that the more you use Civil 3D, the better you will get at knowing the location of the commands. It’s not so much memorizing their positions as it is learning how Civil 3D “thinks”—that is, the way in which it relates commands to one another and categorizes them into tabs and panels.

One other thing you should know is that most panels expand downward to show you the less frequently used commands in a particular category. You’ll know that a panel expands when you see a downward-pointing white triangle next to its name. For example, Figure 1.5 shows the Home tab’s Create Design panel expanded with more commands. Don’t forget to look on these hidden panels when searching for commands.

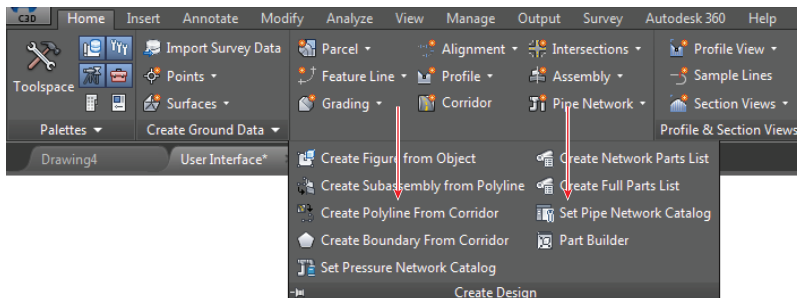
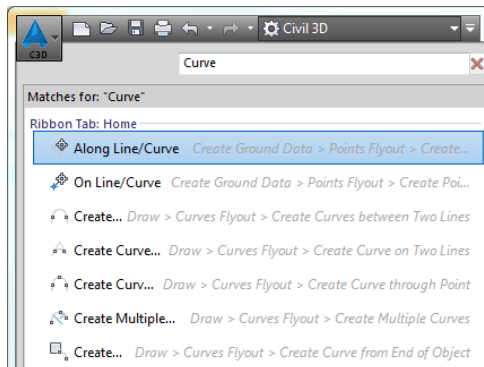


FIGURE 1.5 Most panels expand downward to reveal more commands, as is the case with the Create Design panel on the Home tab of the ribbon.

One of the best features of the ribbon is its ability to respond to what you select in the drawing area. For example, if you click a Civil 3D alignment, the ribbon changes and serves up alignment-related commands on a special tab. The same is true for surfaces, parcels, and so on. These special tabs are referred to as *contextual ribbon tabs*. They are a huge help when you're first learning Civil 3D and a huge time-saver even after you've become a master.

ANOTHER GREAT WAY TO FIND COMMANDS

Sometimes you really have no idea where to even begin looking for a command. The application menu has a handy tool that will help you find just about any command, regardless of where it is in the user interface. Simply click the application menu and type a keyword in the search bar. You'll be given a list of commands that match your keyword. You can launch a command right from the list by clicking it, or you can learn where the command is located by looking at the information shown to the right of it.



Exercise 1.2: Use the Ribbon to Launch Commands

In this exercise, you will familiarize yourself with the ribbon's tabs and panels.

1. Launch Civil 3D 2016, and open the file named `User Interface.dwg`.
2. Click the Home tab of the ribbon to bring it to the forefront (it may be there already).
3. Click the downward-pointing white triangle at the bottom of the Create Design panel and note how it expands down, as shown previously in Figure 1.5.
4. Click the Insert tab of the ribbon. Here, you see words like *insert*, *import*, and *attach*, which are all ways of bringing information into the drawing.
5. Click the other tabs of the ribbon, and see whether you can relate some of the words you see in the commands to the title of each ribbon tab.
6. Place your cursor in the left viewport, and roll the mouse wheel forward to zoom in to the drawing. Keep zooming in until you can clearly see the road centerlines labeled with stationing numbers (these are Civil 3D alignments). Click one of the road centerlines, and note that the ribbon displays a contextual tab to make alignment commands accessible (see Figure 1.6).

If you are continuing from the previous exercise, you can skip to step 2. If you don't have the necessary file(s), download and install the files for Chapter 1 according to the instructions in this book's Introduction.

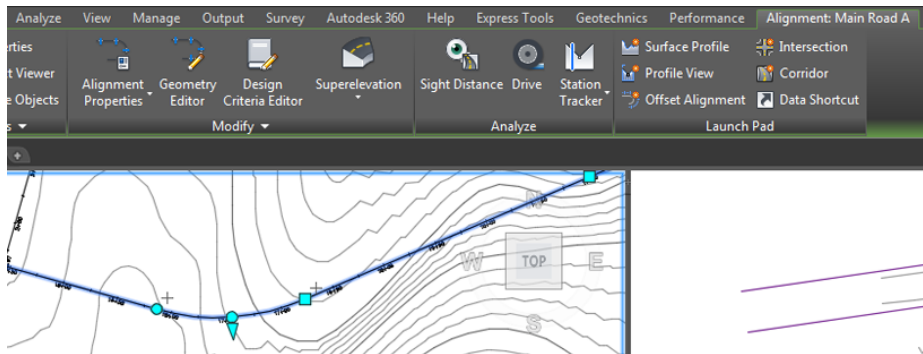


FIGURE 1.6 The ribbon displays the contextual Alignment: Main Road A tab because an alignment has been selected in the drawing (the name of the tab you see may be slightly different depending on which alignment you selected).

7. Keep this drawing open for the next exercise.

Because nothing changes in this drawing file as a result of the exercise steps, no User Interface – Complete file is necessary.

Working with the Toolspace

You can open the Toolspace by clicking the Toolspace icon on the Home tab of the ribbon.

Think of the Toolspace as the Civil 3D “command center” where all Civil 3D data and settings are laid out in a nice, orderly arrangement. It has several main functions that are represented by the different tabs it can contain. Altogether, the Toolspace can house four tabs: Prospector, Settings, Survey, and Toolbox.

Prospector Tab

Certification Objective

Prospector is arguably the most important part of the Civil 3D user interface. As you build your design, *Prospector* arranges the different components of your design in a tree structure (see Figure 1.7). Why a tree structure and not just a list of items? Later in this book, you’ll study how Civil 3D creates relationships between different parts of your design. In some ways, this tree structure helps represent some of those relationships as a hierarchy. Another, more practical reason for a tree structure is that it’s an efficient way to show a long list of items in a relatively small area—the branches of the tree can be collapsed to make room to expand other branches.

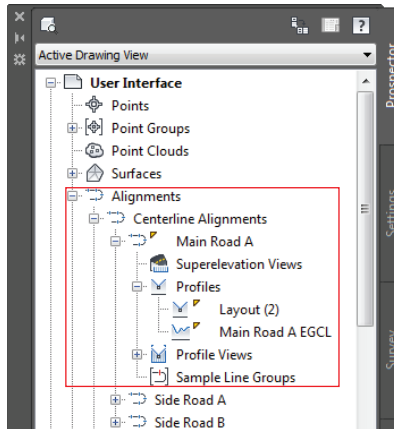


FIGURE 1.7 The Prospector tab showing a portion of the tree structure

Another way to think about Prospector is that it arranges your design categorically rather than spatially. In other words, in your drawing area, you might see road centerlines crossing through parcels, which cross through contours, which cross through survey points. Everything is in the right place spatially, but from an organizational standpoint, it's kind of a mess. Prospector sorts out this mess and puts all the points in one place, all the parcels in one place, and so on. Prospector also knows exactly where those objects are in the drawing. You can right-click an object in Prospector and use the Select command or Zoom To command to locate that object within the drawing.

Exercise 1.3: Explore the Model with the Prospector Tab

In this exercise you will use the Prospector tab of the Toolspace to explore the model.

1. Launch Civil 3D 2016, and open the file named `User Interface.dwg`.
2. If the Toolspace is not already open, click Toolspace on the Home tab of the ribbon.
3. Click the Prospector tab of the Toolspace to bring it to the forefront.
4. Explore the tree structure of Prospector by clicking the plus signs to expand the different branches.
5. Expand Alignments > Centerline Alignments > Main Road A > Profiles. This hierarchical arrangement provides effective organization and suggests a relationship between the alignment and its profiles.
6. Click within the left viewport to activate it. Then, on the Prospector tab, right-click Side Road B, and select Zoom To. Notice how Prospector knows the location of the alignment named Side Road B, even if you don't.
7. Keep this drawing open for the next exercise.

Because nothing changes in this drawing file as a result of the exercise steps, no User Interface – Complete file is necessary.

It's important to point out that Prospector isn't just a place for viewing your design; it's also a place where you can change the appearance of your design,

If you are continuing from the previous exercise, you can skip to step 2. If you don't have the necessary file(s), download and install the files for Chapter 1 according to the instructions in this book's Introduction.



If the Prospector tab is not visible, click the Home tab of the ribbon and then click the Prospector icon on the Palettes panel.

create new components for your design, edit your design, and so on. These types of functions are accessed through contextual menus such as the one used in step 6 of Exercise 1.3. A good rule of thumb when using Prospector is, “When in doubt, right-click it.”

**Certification
Objective**

If you are continuing from the previous exercise, you can skip to step 2. If you don't have the necessary file(s), download and install the files for Chapter 1 according to the instructions in this book's Introduction.

Settings Tab

Civil 3D has a lot of settings that control nearly every aspect of how the software behaves. In fact, one of the things that makes Civil 3D so powerful is that you can customize its settings to accommodate nearly any type of design, any company standard, or any other factor that defines the environment within which you use it. The *Settings tab* is where these settings are managed; however, you won't be spending much time here in the early part of your Civil 3D career. This area is more often the territory of a CAD manager or Civil 3D guru.

Exercise 1.4: Explore the Drawing Settings with the Settings Tab

In this exercise, you will use the Settings tab of the Toolspace to explore the drawing settings.

1. Launch Civil 3D 2016, and open the file named `User Interface.dwg`.
2. If the Toolspace is not already open, click **Toolspace** on the **Home** tab of the ribbon.
3. Click the **Settings** tab of the Toolspace.
4. Expand **Surface** > **Surface Styles**, and note the list of styles shown there. These styles control the appearance of models that represent the shape of the ground.
5. Expand **Surface** > **Label Styles** > **Contour**, and note the list of styles shown there. These styles control a certain type of label that is used to annotate surface models.
6. Keep this drawing open for the next exercise.

Because nothing changes in this drawing file as a result of the exercise steps, no `User Interface – Complete.dwg` file is necessary.



If the **Settings** tab is not visible, click the **Home** tab of the ribbon and then click the **Settings** icon on the **Palettes** panel.