Chapter 1

Introduction to AutoCAD Civil 3D 2023

Learning Objectives

After completing this chapter, you will be able to:

- *Understand the basic features of AutoCAD Civil 3D 2023*
- *Understand AutoCAD Civil 3D 2023 screen components*
- *Get familiar with different workspaces in AutoCAD Civil 3D 2023*

INTRODUCTION TO AUTOCAD CIVIL 3D 2023

AutoCAD Civil 3D is a powerful Building Information Modeling (BIM) tool that is used for designing, analyzing, and documenting engineering projects such as land development, transportation, and environmental projects.

This software includes various sets of tools for designing a civil engineering project along with the tools from other Autodesk products such as AutoCAD and Map 3D. It also has interfacing application such as Trimble Link™ , Carlson Connect™, InfraWorks, and Leica Exchange for transferring and converting data set into Civil 3D environment. These tools can be accessed through toolbars and Ribbon provided in the software interface. Civil 3D also supports the traditional commands that exist in AutoCAD software to invoke various tools. These commands are executed using the command prompt in the software.

AutoCAD Civil 3D 2023 provides a model-centric technology at the core that enables the entire team in a project to coordinate and work on a single updated model. Data sharing is conducted through various approaches ranging from Xrefs and data shortcuts to integrated data management controls. These approaches help team members to work in parallel, connected locally or remotely, on the latest updated model. As a result, a project can be managed well and the budget can also be controlled.

BASIC FEATURES OF AUTOCAD CIVIL 3D

AutoCAD Civil 3D features a range of design and analysis objects within its three-dimensional dynamic engineering model. These Civil 3D objects include points, surfaces, parcels, alignments, profiles, and gradings. All objects in this model have a hierarchical interaction mechanism with each other. This mechanism ensures that modifications carried out in one object are truly reflected in other objects that are connected to it.

A Civil 3D object is a drawing element that maintains a relationship with another Civil 3D objects. For example, an alignment object is a combination of lines and curves in a horizontal plane that collectively defines the location of a project component such as the centerline of a road. This alignment can be an independent object or it can be a parent object of other Civil 3D objects such as profiles and cross-sections. If you edit this alignment object, it will result in the change of other related Civil 3D objects.

Civil 3D has other objects such as points, surfaces, alignments, profiles, sites, parcels, gradings, corridors, assemblies, and subassemblies. All these objects have a designated hierarchy that can be viewed in an interface component called the **TOOLSPACE** palette.

AutoCAD Civil 3D also features various other object components such as tables, object labels, and the analysis results that are derived from the model. These object components are associated with the core model and they can be dynamically updated so as to reflect any change made in the core model.

Some of the various objects required to create a Civil 3D model are discussed next.

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Points

Points are the basic building blocks in AutoCAD Civil 3D. In Civil 3D, points are coordinate geometry points and are also known as the COGO points. In a civil engineering project, points are used to represent the existing ground locations and design elements. A Civil 3D point object is different from the AutoCAD point object. An AutoCAD point merely displays the location of an object. A Civil 3D point has a unique identification number and properties such as northing, easting, elevation, and description. These points can also have additional properties to control their appearance such as point style, point label style, and layer.

Point Groups

The point groups allow you to group the COGO points together. The groups are created by using the point objects that have similar characteristics. This helps you to control the overall appearance of the points. Point group objects make it easy to change the point number, point style, and other properties of a large number of points.

Surfaces

Surfaces are key objects in AutoCAD Civil 3D. They are the three-dimensional geometric representation of a land terrain. In Civil 3D, you can calculate a composite volume surface that represents the difference between two surface areas.

The surfaces are created using points, point files, DEM data, existing AutoCAD objects, contours, breaklines, and boundaries. You can also import the information regarding the surfaces from LandXML, TIN (Triangulated Irregular Network), and DEM (Digital Elevation Model) files.

In AutoCAD Civil 3D, you can perform various surface analyses to show different height ranges, slopes, and watershed areas. This is done to ensure that there are no unwanted point in the design.

Alignments

The alignment objects in civil engineering projects represent the geometry of features like the pipeline, road, canal, railway, or construction baselines in a horizontal plane. Creating and defining the alignment is the first step in the design process of highway, railway, or other engineering projects.

In AutoCAD Civil 3D, an alignment object can be created from a polyline or by using the **Alignment Layout Tools** toolbar. The alignment objects can also be edited using the grips or commands in the **Alignment Layout Tools** toolbar.

Profiles

The profiles (or long sections) are used to show surface levels along a selected horizontal alignment using the specified surfaces. After creating a profile in Civil 3D, you can design the vertical alignment directly on it by using standard alignment tools, grips, or editors.

Profile Views

The profile views are used to represent the graph lines which form the grid along which the profile is plotted. One profile view object can be used to represent multiple profiles. Profile

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view object also includes data bands. Data bands can be used to display additional information about the profile view.

Assemblies and Subassemblies

Assemblies constitute the primary structure of an AutoCAD Civil 3D corridor model. The subassemblies are the building blocks for creating an assembly. The assembly objects are composed of subassemblies. The assembly forms the primary structure of a corridor model. The subassemblies can be carriage ways, curbs, and slopes that can be added to the assembly baseline to create an assembly.

Corridors

A corridor represents a path such as a road, railway, or canal. The horizontal and vertical geometry of a corridor is defined by the alignment and the profile.

The corridor objects are created along one or more baselines (alignments). These are then created by placing a 2D section (assembly) at incremental locations along the baselines and by creating matching slopes that reach a surface model at each incremental location. The corridor models can be edited on the basis of sections.

Parcels

The parcels represent any closed boundary that is spatially referenced to a geographical location. However, the major use of parcel is to represent a tract of land which could be a lot in a subdivision. Parcel can also be a water body or even a lot in a given site which is termed as site parcel.

Grading

In AutoCAD Civil 3D, the grading tools enable the engineers to grade a surface by applying different grading criteria. On applying grading to a surface, you can analyze the grading and balance the cut and fill volumes of a surface.

Sections

In AutoCAD Civil 3D, sections or cross-sections provide a view of the terrain that is cut at an angle across a linear feature such as a proposed road. The sections are cut across the horizontal alignments at specified station intervals. These sections can be plotted individually for a specified station or as a group for a specified range of stations, depending on the purpose of a plot. You can generate the section volumes from a design for earthworks and materials using the **Quantity Take Off** tools.

Pipe Networks

You can use pipe networks to design the utility system such as the storm and wastewater system which carry fluids under the effect of gravity. The pipe networks are created from design catalogs and can be edited in plan views. You can also display the pipe network parts in profile and section views. Therefore, if a change is made to the pipe networks in plan view, the profile and section views are dynamically updated.

Pressure Pipe Networks

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In Civil 3D, the pressure pipe network consists of objects that are used to design a pipe network that carries fluids under pressure, such as water supply network. In this category, various tools are provided to design the network in plan and profile layout. Similar to pipe network, the pressure pipe network is created from the parts that are available in a parts list. This parts list is derived from the AutoCAD catalog which is a master collection of various available parts.

Superelevation View

Superelevation or banking is defined as the transverse inclination to the road pavement surface created to counter the centrifugal forces that are exerted on the vehicle while travelling along a curved path. The superelevation view in Civil 3D is used to represent the superelevation. It is also used to perform the superelevation calculations and edit the superelevation data.

STARTING AUTOCAD CIVIL 3D 2023

You can start AutoCAD Civil 3D 2023 by double-clicking on its shortcut icon on the desktop or from the taskbar. To start it from the taskbar, click on Windows icon and then choose **Civil 3D 2023 Imperial/Metric** from the menu displayed (for Windows 10), refer to Figure 1-1; AutoCAD Civil 3D 2023 will start and a window will be displayed with the **Start Tab** chosen by default.

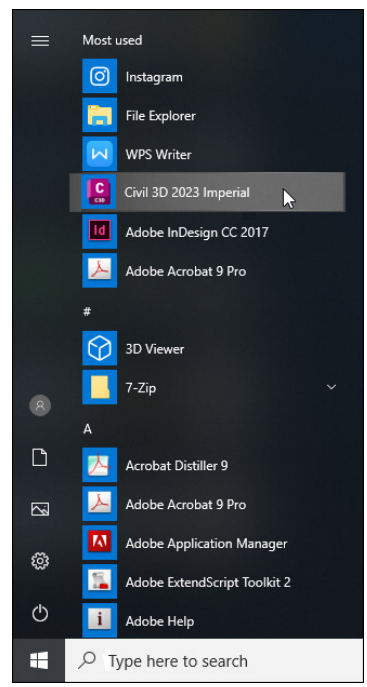


Figure 1-1 *Starting AutoCAD Civil 3D 2023 from the taskbar*

Using the options in the **Start** tab, you can access drawing files, recently opened drawing files and sheet sets, and online and learning resources.

This tab contains two other tabs: **Learn** and **Create**. The **Learn** tab consists of two panes. The left pane of this tab contains a list of video links under the head **Getting Started Videos**. These

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links and videos can be used as additional learning resources. The right pane of the **Learn** tab contains the links for learning tips and checking online resources in the **Learning Tips** and **Online Resources** areas, respectively.

The **Create** tab consists of three panes: **Get Started**, **Recent Documents**, and **Connect**. This tab provides information such as how to start Civil 3D, list of recently opened documents and notifications, and feedback. The third pane enables you to sign in to Autodesk.

AUTOCAD CIVIL 3D 2023 USER INTERFACE

THE CIVIL 3D INTERFACE CONSISTS OF VARIOUS COMPONENTS SUCH AS THE DRAWING AREA, COMMAND WINDOW, TOOLBARS, RIBBON, MODEL AND LAYOUT TABS, STATUS BAR, **TOOLSPACE** PALETTE, AND **PANORAMA** WINDOW, AS SHOWN IN FIGURE 1-2. THE TITLE BAR IS DISPLAYED ON THE TOP OF THE SCREEN AND DISPLAYS THE CURRENT DRAWING NAME.

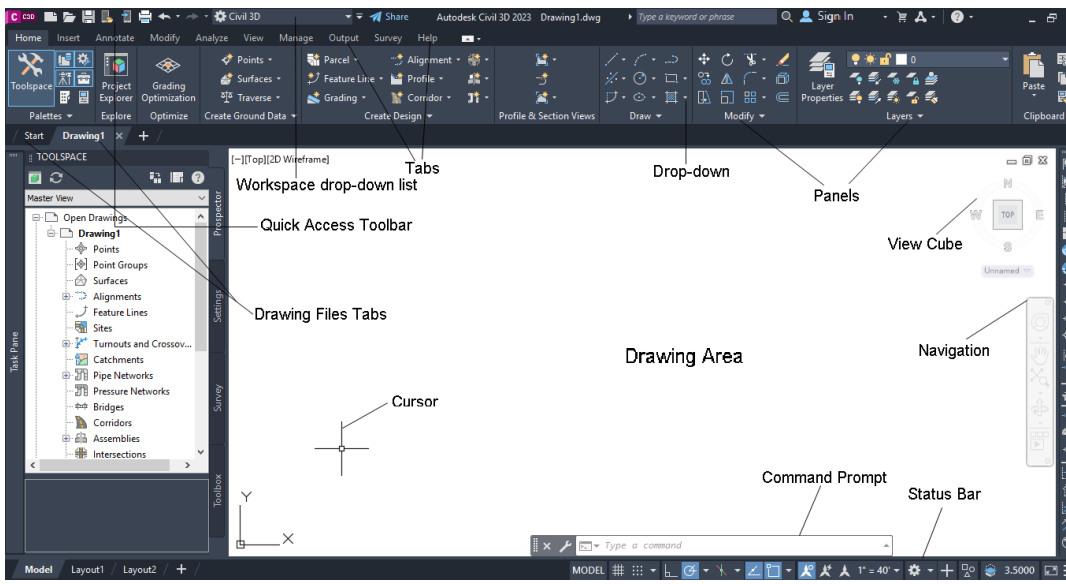


Figure 1-2 *AutoCAD Civil 3D 2023 interface components*

The AutoCAD Civil 3D interface components are discussed next.

Drawing Area

The drawing area covers the major portion of the screen. Here, you can draw various objects and use commands. To draw the objects, you need to define the coordinate points that can be selected by using a pointing device. The position of the pointing device is represented on the screen by the cursor. There is a coordinate system icon at the lower left corner of the drawing area. The window also has standard Windows buttons such as close, minimize, scroll bar, and so on at the top right corner. These buttons have the same functions as in any other standard window.

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Ribbon

The Ribbon interface in AutoCAD Civil 3D has a collection of tools that are grouped into various tabs based on their functionality. This interface provides an alternative to the layered menus, toolbars, and task panes which were used previously for displaying tools. The tools in the tabs are further sub grouped and placed into various panels depending on their usage and functionality. To invoke a command, choose the required tool from the Ribbon. Figure 1-3 shows the typical **Home** tab of the AutoCAD Civil 3D Ribbon.

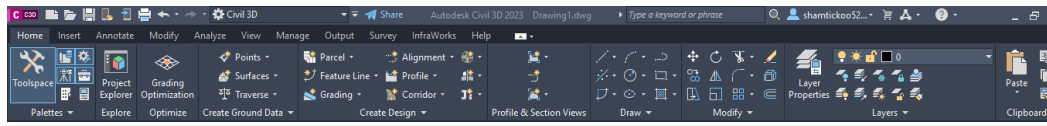


Figure 1-3 *Partial view of the Ribbon showing the* ***Home*** *tab*

When you start a Civil 3D session for the first time, by default the Ribbon is displayed horizontally below the **Quick Access Toolbar**. The panels in the Ribbon have various tools arranged in rows. Some of the tools have a small white down arrow displayed on their right. This arrow indicates that there are other tools as well that have similar functions and are grouped together in this drop-down. Click on the down arrow; a list of tools will be displayed. Note that if you choose a tool from the drop-down, the corresponding command will be invoked and the tool that you have chosen will be displayed in the panel. For example, to create a surface using the **Create Surface** tool, click on the down arrow next to the **Surfaces** drop-down in the **Create Ground Data** panel of the **Home** tab. Choose the **Create Surface** tool from the drop-down; the **Create Surface** dialog box will be displayed. Next, specify the various options in this dialog box to create the required surface.

In this book, the tool selection sequence is written as: choose the **Create Surface** tool from **Home > Create Ground Data > Surfaces** drop-down.





Some panels have a down arrow displayed on the right of their name. This indicates that more tools are available. To access these tools, click on the down arrow to expand the panel. You will notice that a push pin is available at the left of the panel. Click on the push pin to keep the panel in the expanded state. Also, some of the panels have an inclined arrow at the lower right corner. When you click on an inclined arrow, a dialog box will be displayed. You can define the setting of the corresponding panel in the dialog box.

You can reorder the panels in the tab. To do so, press and hold the left mouse button on the panel to be moved and then drag it to the required position in the tab. To undock the Ribbon, right-click on the blank space in the Ribbon; a shortcut menu is displayed. Choose the **Undock** option from the shortcut menu. Civil 3D allows you to customize the display and the contents of the tabs and panels in the Ribbon. To customize the Ribbon, right-click in the Ribbon; a shortcut menu will be displayed. Hover the cursor over an option in the menu; a flyout will be displayed. For example, if you hover the cursor over the **Show Tabs** option, a flyout will be displayed with the list of names of tabs that are available in the Ribbon. In the flyout, by default, a check mark is displayed beside those tab names that are available in ribbon. The check indicates that the corresponding panel will be displayed in the Ribbon. If you clear the check, the corresponding tab will get hidden in the Ribbon.

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The options in the **Autodesk InfraWorks** tab are shown in Figure 1-4. The AutoCAD Civil 3D 2023 gives you access to InfraWorks-related commands and enables you to launch InfraWorks directly from the Ribbon.

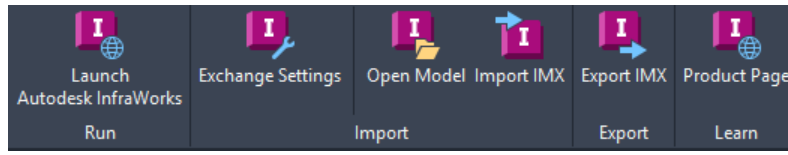


Figure 1-4 *The options in the* ***Autodesk InfraWorks*** *tab*

Application Menu

The **Application Menu**, shown in Figure 1-5, will be displayed when you choose the **Application** button located on the top left corner of the Civil 3D window.

It contains some of the tools that are available in the **Standard** toolbar. You can search a command using the search field in the **Application Menu**. To search a tool, enter the complete or partial name of the command in the search field; the possible tool list will be displayed. If you click on a tool from the list, the corresponding command will get activated.

By default, the **Recent Documents** button is chosen in the **Application Menu**. As a result, the list of recently opened drawings will be displayed in the menu. If you have opened multiple drawing files, choose the **Open Documents** button; the documents that are opened will be listed in the **Application Menu**. To set the preferences of the file, choose the **Options** button available at the bottom right of the **Application Menu**. To exit Civil 3D, choose the **Exit Autodesk Civil 3D 2023** button next to the **Options** button.

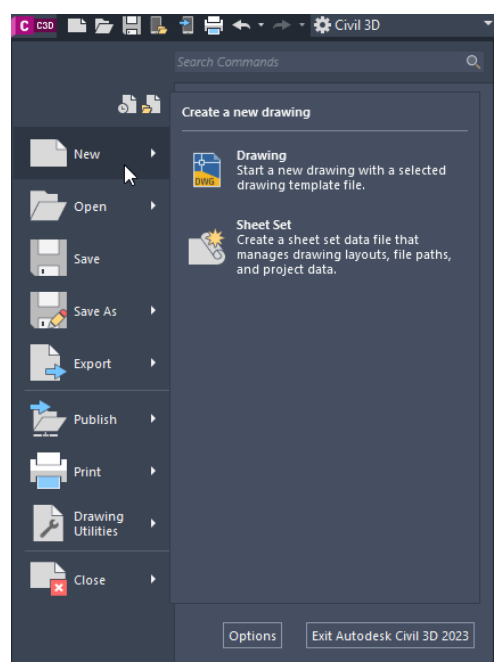


Figure 1-5 *The* ***Application Menu***

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Command Bar

The command bar located at the bottom of the drawing area has the command prompt where you can enter the commands. It also displays the subsequent prompt sequences and messages, refer to Figure 1-2. You can change the size of the command bar by placing the cursor on the top edge (double line bar known as the Grab bar) and then dragging it. This way you can increase its size to see the previous commands that you have used. By default, the command window displays only three lines. You can also press the F2 function key to display the **AutoCAD Text** window.

Drawing File Tabs

The drawing file tabs are displayed above the drawing area, refer to Figure 1-2, shows drawing that are currently opened. Using these drawing tabs, you can quickly switch between the drawings. The order in which these tabs are displayed is based on the sequence in which the files are opened.

Status Bar

The Status bar is displayed at the bottom of the screen, as shown in Figure 1-6. It contains some useful information and buttons that will make it easier for you to change the status of some AutoCAD functions. You can toggle between on and off states of most of these functions by choosing buttons from this bar.

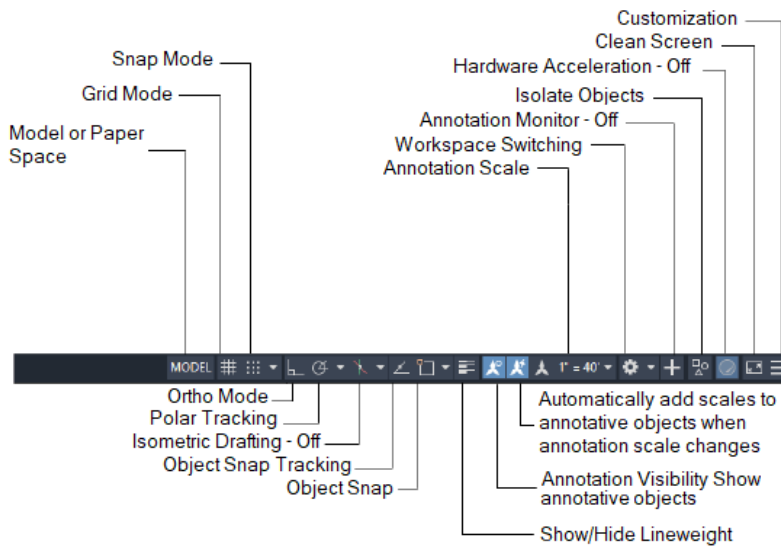


Figure 1-6 *The Status bar displayed in the Civil 3D workspace*

Model

The **Model** button is chosen by default because you work in the model space to create drawings. You will learn more about the model space in later chapters.

Display drawing grids

The grid lines are used as reference lines to draw objects in AutoCAD. If the **GRIDMODE** button is chosen, the display drawing grid will be on and the grid lines will be displayed on the screen.

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The F7 function key can be used to turn the grid display on or off.

Snap Mode

You can choose this button to turn on the snap mode. In this mode, the cursor moves in fixed increments. The F9 function key acts as a toggle key to turn the snap off or on.

Ortho Mode

You can choose this button to draw lines at right angles only. You can use the F8 function key to turn ortho mode on or off.

Polar Tracking

If you turn the polar tracking on, the movement of the cursor is restricted along a path based on the angle set as the polar angle. Choose the **Polar Tracking** button to turn the polar tracking on. You can also use the F10 function key to turn on this option. Note that turning the polar tracking on, automatically turns off the ortho mode.

Isometric Drafting

In AutoCAD, you can activate the required working plane. To activate the required working plane, choose the **Isometric Drafting** button from the Status bar. On choosing this button, a flyout is displayed with the **isoplane Left**, **isoplane Top**, and **isoplane Right** options. You can choose the required option from this flyout to activate the respective work plane.

Object Snap Tracking

When you choose this button, the inferencing lines will be displayed. Inferencing lines are dashed lines that are displayed automatically when you select a sketching tool and track a particular keypoint on the screen. Choosing this button turns the object snap tracking on or off. You can also use the F11 function key to turn the object snap tracking on or off.

Object Snap

When the **Object Snap** button is chosen, you can use the running object snaps to snap on to a point. You can also use the F3 function key to turn the object snap on or off. The status of **OSNAP** (off or on) does not prevent you from using the immediate mode object snaps.

Show/Hide Lineweight

This button in the Status Bar allows you to toggle on or off the display of lineweights in the drawing. If this button is not chosen, the display of lineweight will be turned off.

Show annotation objects

This button is used to control the visibility of the annotative objects that do not support the current annotation scale in the drawing area.

Add Scales to annotative objects when the annotative scale changes

On choosing this button, the annotation scales that are set current will be added to all the annotative objects present in the drawing.

Annotation Monitor

The **Annotation Monitor** button helps you to identify and address the disassociated annotations in the drawing. When this button is activated, you are automatically notified about the non

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associative dimensions, leaders, and associated model geometry.

Isolate Objects

This button is used to hide or isolate objects from the drawing area. On choosing this button, a flyout will be displayed. Choose the required option from this flyout and then select the objects to hide or isolate. To end isolation or display a hidden object, choose this button again and choose the **End Object Isolation** option.

Hardware Acceleration On

This button is used to set the performance of the software to an acceptable level.

Clean Screen

The **Clean Screen** button is available at the lower right corner of the screen. When you choose this button, it displays an expanded view of the drawing area by hiding all the toolbars except the command window, Status Bar, and menu bar. Choose the **Clean Screen** button again to restore the previous display rate.

Customization

The **Customization** button is available on the right corner of the Status Bar. Using this button, you can add or remove tools in the **Status Bar**.

TOOLSPACE Palette

In AutoCAD Civil 3D, you can view the project data and its status at any time in the **TOOLSPACE** palette. The data in the palette updates itself dynamically to show the status of the data within the drawing. To display the **TOOLSPACE** palette in a drawing, choose the **TOOLSPACE** button from the **Palettes** panel of the **Home** tab or type **SHOWTS** in the command line. There are four tabs in the palette: **Prospector**, **Settings**, **Survey**, and **Toolbox**. These tabs are discussed next.

Prospector Tab

The **Prospector** tab is used to manage project files. You can choose the **Prospector** tab in the **TOOLSPACE** palette. The options in the **Prospector** tab, as shown in Figure 1-7, are used to view, edit, and manage drawings. You can also edit the object data for the Civil 3D objects that are present in the drawing. In this tab, all the objects in a drawing or project are arranged in a hierarchy.

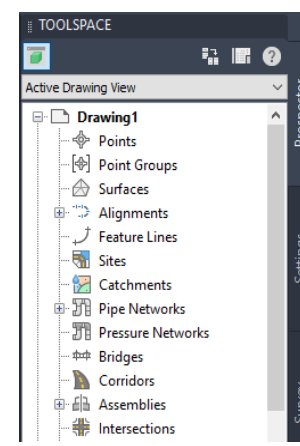


Figure 1-7 *The options displayed in the* ***Prospector*** *tab*

The drop-down list displayed at the top of the **Prospector** tab displays various options. The content displayed in the **Prospector** tab depends on the option selected from this drop-down list. Select the **Master View** option from the drop-down list; all project and drawing items, including drawing templates are displayed in a hierarchical order in the **Prospector** tab. If more than one Civil 3D drawing file are opened then the name of the active drawing is highlighted. Select the **Active Drawing View** option in the drop-down list; hierarchy of all the items in the active drawing is displayed in the **Prospector** tab, refer to Figure 1-7. You can toggle the display of the **Prospector** tab in the **TOOLSPACE** palette by choosing the **Prospector** button from the **Palettes** panel of

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the **Home** tab.

Settings Tab

Choose the **Settings** tab from the **TOOLSPACE** palette; various options in this tab will be displayed, as shown in Figure 1-8. You can also invoke this tab by choosing the **Settings** button from the **Palettes** panel of the **Home** tab. You can use this tab to view, create, and modify different styles for different object types in Civil 3D. This tab is also used to control the settings for drawings and commands.

Survey Tab

Choose the **Survey** tab from the **TOOLSPACE** palette; various options in this tab will be displayed. You can also invoke this tab by choosing the **Survey** button from the **Palettes** panel of the **Home** tab. The **Survey** tab shows the survey data present in the AutoCAD Civil 3D projects folder. This survey data can be accessed from multiple drawings. This tab displays a collection of databases such as **Survey Databases**, **Equipment Databases**, **Figure Prefix Databases**, and **Linework Code Sets**, as shown in Figure 1-9.

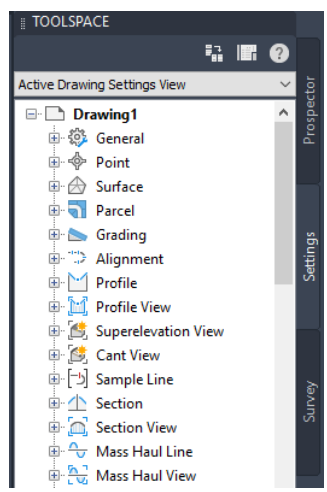


*Figure 1-8 The **Settings** tab chosen in the **TOOLSPACE** palette*

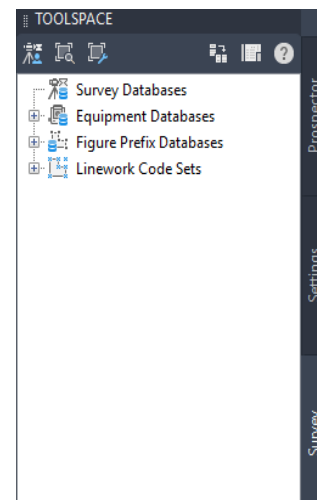


*Figure 1-9 The **Survey** tab chosen in the **TOOLSPACE** palette*

The survey databases consist of the records of survey points whereas the equipment database records the standard deviations and other operational parameters of the equipment used for the survey. The figure prefix databases record the conversion routines that are used while creating site features from the survey points.

Toolbox Tab

Choose the **Toolbox** button from the **Palettes** panel of the **Home** tab; the options in this tab will be displayed in the **TOOLSPACE** palette, as shown in Figure 1-10. This tab manages reports for each type of object in Civil 3D. These reports provide you useful engineering

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information regarding the objects in the drawing. The data available in these reports can be in Land XML format with custom/predefined XSL style sheets or in a .NET format



Figure 1-10 *The* ***Toolbox*** *tab chosen in the* ***TOOLSPACE*** *palette*

The TOOLSPACE Item View

The TOOLSPACE Item View is used to view the contents of a given node or subnode in a list. This pane is displayed below the tree in the **TOOLSPACE** palette. For example, the **Points** node has a set of points which are displayed in the Toolspace Item View at the bottom of the toolspace.

Shortcut Menu

AutoCAD Civil 3D provides you with shortcut menus that are an easy and convenient way of invoking tools and the recently used commands. These shortcut menus are context-sensitive which means that the commands present in them are dependent on the place or object for which they are displayed. A shortcut menu is invoked by right-clicking and is displayed at the cursor location. You can right-click anywhere in the drawing area to display the general shortcut menu. The shortcut menus are also displayed when you right-click on one or more drawing objects or on an individual item from the **TOOLSPACE** palette. Figure 1-11 shows a shortcut menu displayed on right-clicking on the **Points** node in the **Prospector** tab.

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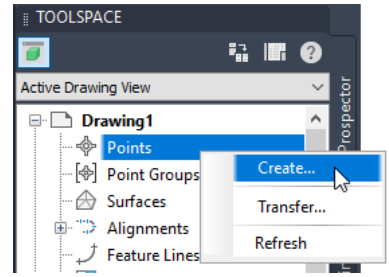


Figure 1-11 *Shortcut menu displayed on right-clicking on the* ***Points*** *node in the* ***Prospector*** *tab*

Layout Tools

In AutoCAD Civil 3D, you can use various layout toolbars to create and edit the Civil 3D objects such as alignments, grading, points, profiles, pipes, pressure pipes, and parcels. These toolbars provide access to object-specific designs and edit commands. To invoke a toolbar, choose the drop-down corresponding to the object. Next, choose the layout or creation method from the options that will be displayed in the flyout. Figure 1-12 shows the **Alignment Layout Tools - <alignment name>** toolbar invoked by choosing **Alignment Creation Tools** from **Home > Create Design > Alignment** drop-down.

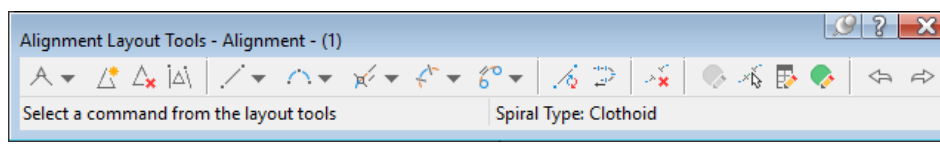


Figure 1-12 *The* ***Alignment Layout Tools - <alignment name>*** *toolbar*



Autodesk Account

You can access the Autodesk services using your Autodesk ID. To login to your Autodesk account, choose the **Sign In** button in the **InfoCenter** toolbar; a drop-down list will be displayed. Next, choose the **Sign In to Autodesk account** option from this list; the **Autodesk-Sign In** dialog box will be displayed, as shown in Figure 1-13. Enter your credentials in this dialog box and choose the **Sign In** button; Autodesk will validate your credentials and then provide access to your account.



Tip

You can sign up for a Autodesk ID by choosing the ***CREATE ACCOUNT*** *button in the* ***Autodesk - Sign In*** *dialog box.*

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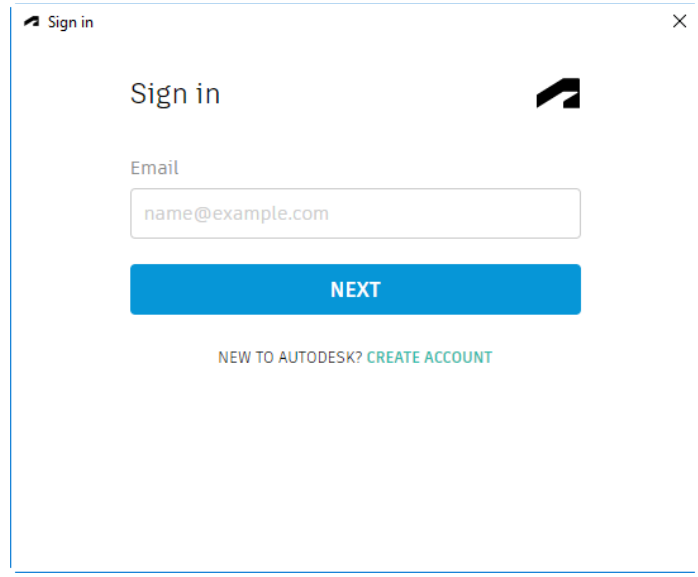


Figure 1-13 *The* ***Autodesk - Sign In*** *dialog box*

PANORAMA Window

This window can be used to display the entities of the objects such as alignments and profiles in a tabular form. The **PANORAMA** window is a floating, dockable window that can be kept open while working. This window includes several tables called vistas on different tabs. In the **PANORAMA** window, the data displayed in black is editable and the data displayed in grey is non-editable.

CIVIL 3D WORKSPACES

Workspaces are the set of toolbars, menus, and Ribbon that are grouped and organized together to work in a custom and task-oriented environment. A workspace controls the layout of the Civil 3D user interface. When you use a specific workspace, you can view the Ribbon, toolbars, and other applications that have been specified for the selected workspace. To invoke the applications and tools that are specified in other workspaces, enter the commands in the command line.

You can select workspaces at the beginning when you start the Civil 3D application or anytime during the drawing session. When you start AutoCAD Civil 3D, you are prompted to select a specific workspace and then continue. Once you are done, you can switch to other workspace settings at any time by choosing the **Workspace Switching** button that is located in the Status Bar. On doing so, a flyout will be displayed, as shown in Figure 1-14.

Choose an option from this flyout for specifying different workspace settings in the current drawing environments. After you choose the required option, the drawing interface will change according to the setting of the workspace you have chosen.

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In AutoCAD Civil 3D, there are four default workspaces such as **Civil 3D**, **Planning and Analysis**, **2D Drafting & Annotation**, and **3D Modeling**. These default workspaces are designed considering the tools that a user might use for that kind of project. You can also create your own customized workspace and save it using the **Save Current As** tool from the flyout, refer to Figure 1-14.

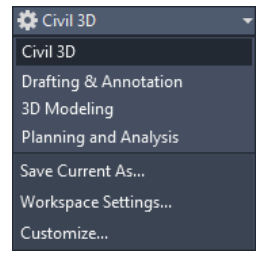


Figure 1-14 *The flyout displaying various options for choosing a workspace*

The default workspaces that are available in AutoCAD Civil 3D are discussed next.

Civil 3D

The Civil 3D workspace includes all the necessary tools and applications that required for designing a civil engineering project such as the road, railway, or a pipe network designing project.

Drafting & Annotation

This workspace is used for the purpose of documentation of a project. The **Annotation** tab is included in the Ribbon in this workspace. All the tools related to annotation are available in this tab so that you can annotate easily as per your requirement.

3D Modeling

This workspace contains all the tools and applications that are available in the AutoCAD and can be useful in AutoCAD Civil 3D.

Planning and Analysis

This workspace contains all the tools and features that are available in AutoCAD Map 3D and can be used directly in AutoCAD Civil 3D.

GETTING STARTED WITH AUTOCAD CIVIL 3D

Before you create a new project or start working on the existing project, you should be familiar with various tools and concepts that can be applied to create the initial setup of the project. The basic setup tools like drawing templates and setting units are discussed next.

Drawing Templates

Drawing templates are very useful tools for AutoCAD Civil 3D users. These tools help in maintaining consistency throughout the drawings in the project.

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To use a template in a drawing, choose the **Prospector** tab of the **TOOLSPACE** palette and then select the **Master View** option from the drop-down list at the top. Now, expand the **Drawing Templates** node and right-click on a template; a shortcut menu will be displayed, as shown in Figure 1-15.

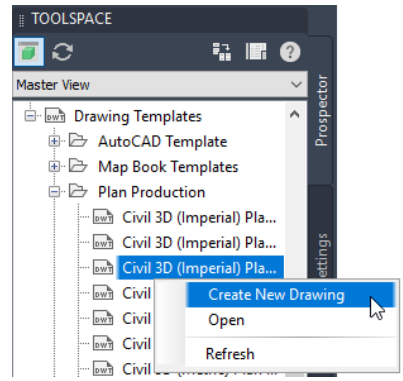


Figure 1-15 *Choosing a drawing template from the* ***Drawing Templates*** *node of the* ***Prospector*** *tab*

To create a new drawing file, choose the **Create New Drawing** option from the shortcut menu displayed; a new drawing file will be created using the settings of the drawing template file that you had selected.

You can also open the existing drawing template in AutoCAD Civil 3D. To do so, choose the **Open** option from the shortcut menu; the template will open in the drawing area.

An AutoCAD Civil 3D drawing template file contains information of the standard AutoCAD settings such as layers, text styles, dimension styles, and so on. It also contains AutoCAD objects such as lines and texts. The drawing template files also carry AutoCAD Civil 3D drawing information that is listed in the **Settings** and **Prospector** tabs of the **TOOLSPACE** palette.

Drawing Settings

Drawing settings allow the user to review or modify settings specified for a drawing. To edit the current drawing settings, right-click on the drawing name that is displayed in the **Settings** tab of the **TOOLSPACE** palette; a shortcut menu will be displayed. Choose the **Edit Drawing Settings** option from this shortcut menu, as shown in Figure 1-16; the **Drawing Settings - <drawing name>** dialog box will be displayed, refer to Figure 1-17. This dialog box contains five tabs that are discussed next.

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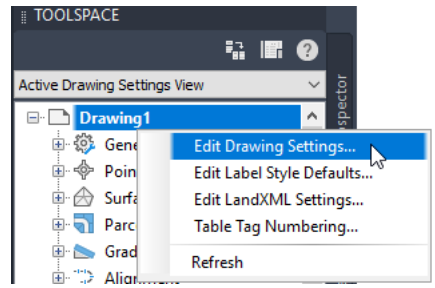


*Figure 1-16 Choosing the **Edit Drawing Settings** option*

Units and Zone Tab

This tab is used to set linear and angular units, intended plot scale, and coordinate zone for the current drawing.

Transformation Tab

This tab is primarily used to specify the parameters for the projection and coordinate system of the drawing.

Object Layers Tab

This tab provides a table in which the objects can be directly assigned a layer. To change the layer of an object, click in the field of the **Layer** column corresponding to that object; the **Layer Selection** dialog box will be displayed. In this dialog box, select the layer name that you want to assign to the selected object and choose the **OK** button; the dialog box will be closed and the selected layer name will be assigned to the object.

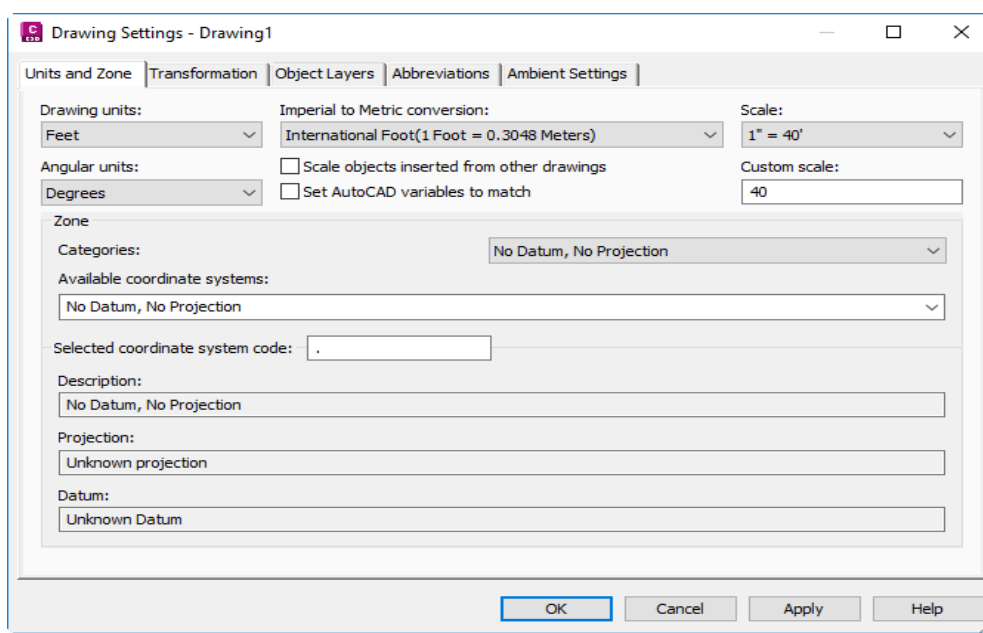


*Figure 1-17 The **Drawing Settings** dialog box*

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The layer of an object controls various properties such as color, linetype, and lineweight of an object to which it is assigned. As a result, the object to which a layer is assigned can have maximum flexibility in its display.

Abbreviations Tab

In this tab, you can set the abbreviations used in object labels, especially for alignment and profile geometry points.

Ambient Settings Tab

This tab provides global default settings such as precision, unit, rounding of the numeric values, visibility of tooltips, and so on. You can expand various properties and make the required settings in the **Value** column of this tab. The ambient settings made in the **Ambient** tab are used throughout the drawing unless they are overridden at the feature or command level.

After configuring the settings in the **Drawing Settings** dialog box, you need to examine the default styles for each feature and its labels, the feature name format, and other settings that you may want to modify. To do so, go through point, surface, and other features in the **Settings** tab and right-click on each feature. Next, choose the **Edit Feature Settings** option from the shortcut menu to invoke the **Edit Feature Settings** dialog box. You can examine various settings of the selected feature by using the options in this dialog box.

Self-Evaluation Test

Answer the following questions and then compare them to those given at the end of this chapter:

1. The horizontal and vertical geometry of a corridor is defined by its _____ and profile.

2. The _____ palette is used to view the project data and its status at any time.

3. You can use the _____ tab in the **TOOLSPACE** palette to view, create, and modify different styles for different object types in Civil 3D.

4. When you select the **Active Drawing View** option from the drop-down list in the **Prospector** tab, only the items in the _____ drawing will be displayed.

5. You can switch between the workspaces by choosing the _____ button in the Status Bar.

6. In Civil 3D, each defined point has a unique number. (T/F)

7. The **Planning and Analysis** workspace displays all the tools and toolbars that are available in AutoCAD Civil 3D. (T/F)

8. You can invoke the **Survey** tab by choosing the **Survey** button from the **Palettes** panel of the **Home** tab. (T/F)

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9. The annotation scale controls the size and display of the annotative objects in the model space. (T/F)

10. The **SHOWTS** command is used to display the **TOOLSPACE** palette. (T/F)

Review Questions

Answer the following questions:

1. In AutoCAD Civil 3D, the _____ tool enables the engineers to grade a surface by applying criteria such as slope to a surface or grade to a distance.

2. The _____ tab in the **TOOLSPACE** palette manages reports for each type of object in Civil 3D.

3. In AutoCAD Civil 3D, the _____ workspace is used for the purpose of drafting and annotating features.

4. In AutoCAD Civil 3D, _____ provides you with a view of the terrain that is cut at an angle across a linear feature.

5. The **Transformation** tab in the **Drawing Settings** dialog box is used to transform the coordinate system to local specifications. (T/F)

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Answers to Self-Evaluation Test

1. alignment, **2. TOOLSPACE**, **3. Settings**, **4.** active, **5. Workspace Switching**, **6.** T, **7.** F, **8.** T, **9.** T, **10.** T