Appendix D

Additional Tools for Collaboration

In addition to the drafting and customizing tools that are used by a single user at a computer workstation, there are numerous tools that are encountered only in collaborative environments, where the workspace extends beyond the individual and the individual computer. This appendix introduces an array of these tools that you will encounter in a collaborative environment. The tools presented here are not necessary for the completion of any independent drawing, but they quickly become necessary as you begin to share your drawings with others or receive drawings from others.

Block libraries and external references are two very powerful collaboration tools you have already encountered. You can create useful blocks, external references, and libraries of content within your own drawings, but the real power appears when you can reach across many platforms beyond what is on your computer to borrow and generate sharable content. As described throughout the book, the AutoCAD DesignCenter palette organizes these processes into a single interface. Gaining access to content outside of your own hard drive requires Internet or local network connectivity and at least one of several applications that facilitate sharing and collaborating online.

In this appendix, the features presented are done so based on whether they use the Internet. You start off by learning about CAD Standards tools and then progress to tools that assist in sharing drawings with other AutoCAD users and even those that don't use AutoCAD. Yes, you will often need to collaborate with individuals who might not have access to or use AutoCAD on a daily basis.

CAD Standard Tools

The sharing of drawing files and creation of work projects accessed by users in different locations and companies creates the need for ways to manage variations in drawing standards. The CAD Standard features in

AutoCAD are important in work environments where drawings from one organization may be used by other organizations or departments. Utilizing drawing standards (DWS) files allows quick checking and modifying of drawings to ensure that externally created or outsourced drawings use standards compatible with those standards in place for drawings created in-house.

CAD Standards

AutoCAD's CAD Standards feature requires the use of a drawing standards file. This can be any drawing that contains the desired standards, including layer definitions and properties, dimension styles, text styles, linetypes, and multileader styles. To understand the issues involved, imagine that in *Your Company, Inc.* all drawings have a standard layer (for example, **Layer1**) that is red. To support this practice, a certain Drawing A has been defined as a drawing standards file (saved with a .dws extension). *Your Company* receives Drawing B from *Their Company*. Drawing B and Drawing A both have a layer named **Layer1**, but in *Their Company*, **Layer1** is yellow. As *Your Company's* CAD expert, you must ensure that Drawing B complies with *Your Company's* standards. You proceed as follows:

- ✔ Open **Drawing B** from *Their Company*.
- ✔ Click **Manage** > **CAD Standards** > **Configure** from the ribbon.
  *This opens the **Configure Standards** dialog box.*
- ✔ Click the **<+>** button to add a drawing standards (DWS) file.
- ✔ From the **Select Standards file** dialog box, select **Drawing A.dws** as the drawing standards file.
- ✔ In the **Configure Standards** dialog box, click the **Check Standards** button.
  This opens a dialog box that shows you any discrepancies between Drawing A.dws and Drawing B.
- ✔ Click the **Fix** button to alter **Layer1** in Drawing B to match **Layer1** of *Drawing A.dws*.

Now that *Drawing A.dws* is defined as a drawing standards file for Drawing B, whenever you try to change a property in Drawing B and it does not match an established standard, you get a ***Standards Violation*** notification on the right side of the status bar. You can use the blue link in the notification to run a standards check and fix the problem, or you can ignore and close the message.

Layer Translation

Layer translation is closely related to CAD Standards checking. It works similarly but addresses only layers and allows you to adjust the layers in any drawing to match layers in another drawing. You are not restricted to using drawings that have been defined as drawing standards (DWS) files but can use any drawing to update any other drawing. Properties that can be matched are all the properties that define layers. To translate **Layer1** properties in *Drawing A.dws* to **Layer1** properties in Drawing B, do the following:

- ✔ Open **Drawing B**.
- ✔ Click **Manage** > **CAD Standards** > **Layer Translator** from the ribbon.
  *This opens the **Layer Translator** dialog box. Layers in the current drawing are shown in the **Translate From** panel. There is nothing in the **Translate To** panel until you load a drawing.*
- ✔ Click **Load**.
  *This opens a **Select Drawing File** dialog box. You select a drawing, template drawing, or drawing standards file.*
- ✔ Navigate to the folder where *Drawing A.dws* is located.
- ✔ Select *Drawing A.dws*.
  Notice that this can be any drawing. It does not have to be a .dws drawing file.
- ✔ Click **Open**.
  Layers from Drawing A.dws *are now listed in the **Translate To** panel.*
- ✔ Highlight **Layer1** in both panels.
- ✔ Click **Map**.
  *The proposed translation shows in the **Layer Translations Mapping** panel.*
- ✔ Click **Translate**.
- ✔ Click **Yes** to save or **No** to eliminate the old layer information in **Drawing B**.

Management of Named Objects

When managing multiple drawings from different sources, you are likely to encounter the problem of duplicate definitions. For example, what happens when a drawing that is externally referenced or block-inserted has layers, linetypes, text styles, dimension styles, multileader styles, blocks, or views with names that are the same as those in the current drawing? Good question. In the case of block drawings, name definitions in the current drawing override those in the inserted block, regardless of its origin. In the case of externally referenced drawings, named objects are given special designations that eliminate the duplication. For example, if Drawing B is attached to Drawing A and both have a layer called **FLOOR**, a new layer named **Drawing B|FLOOR** is created in Drawing A.

Internet Features

As the world has become more connected, collaboration has changed and relies on Internet connectivity and cloud-based applications. In recent years, many new tools have been introduced to improve collaborative workflows. AutoCAD drawings can be published to the web, transferred as email attachments, uploaded, downloaded, and included as part of websites and home pages. CAD professionals working on projects together can edit and comment on versions of the same drawing, using cloud-based drawing,

editing, and markup features as described later in this chapter. A standard subscription to AutoCAD 2027 or AutoCAD LT 2027 includes access to Autodesk's Forma Data Management (also called Autodesk Docs), which is Autodesk's current cloud-based document management.

The following sections describe some of the basic Internet features in AutoCAD that will be required to take advantage of many of the cloud-based applications covered later in this chapter. Here, though, you learn how to open a website from in the AutoCAD application, access your Autodesk account, and even learn about some of the industry-specific cloud-based services Autodesk offers that can be used in combination with AutoCAD.

BROWSER Command

The first level in the hierarchy of online features are the commands that simply allow you to access Internet content directly from within AutoCAD. AutoCAD is a fully integrated Internet program, so if you have Internet access, you can access websites directly from the AutoCAD drawing space. You first must be connected to your Internet service provider. Once connected, you can move easily in and out of AutoCAD as you access all the resources available on the web.

The following steps demonstrate how to access Autodesk.com and other websites from within the AutoCAD application.

- ✔ Be sure that you are connected to an Internet service provider.

  *You may already be connected to the Internet, depending on your system. If you are not, you need to go through a log-in procedure. In most cases, AutoCAD automatically initiates your log-in procedure when you enter a web command. If this does not happen, do not exit AutoCAD; instead, use the **Minimize** button (the third button from the right at the top of the application, with the minus sign) to temporarily leave the AutoCAD application. Specific instructions for connecting to the Internet from your system isn't something that can be covered in this publication. For those, consult your Internet provider's documentation, instructor, or system manager.*

- ✔ If necessary, after connecting to the Internet, click the AutoCAD icon on the Windows taskbar to return to the AutoCAD application.

- ✔ At the command-line prompt, type **browser <Enter>**.

  *This starts the **BROWSER** command, through which you can access Internet addresses, local network addresses, or locations on your own computer. AutoCAD prompts for an address:*

  ```
  Enter Web location (URL) <http://www.autodesk.com>:
  ```

  *The default location is shown within the arrows (< >) and may be different from the one shown here. It can be any valid location on your computer or on the Internet. Pressing **<Enter>** at this prompt takes you directly to this website. It opens in a new window, leaving the AutoCAD application window open in the background.*

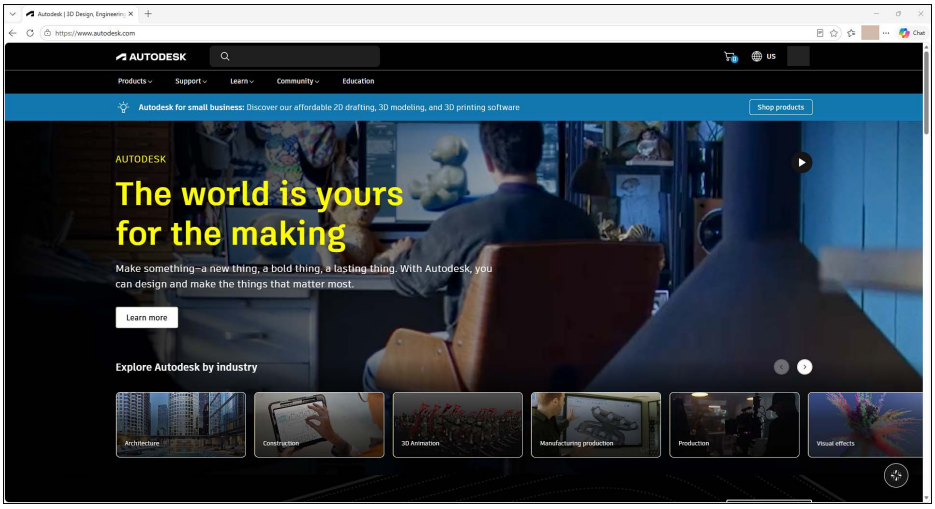
NOTE

All descriptions and illustrations of web pages were current as of the writing of this text. Websites can and should change; so by the time you read this, things may look different.

✔ Press **<Enter>** to accept the default website.

Wait... If your Internet connection is in order, you will see the Autodesk website home page, as shown in Figure D-1, or whatever website is the default location on your system. While you are here, take a minute to look around; then close the Autodesk website and return to the AutoCAD application window.

Figure D-1
Autodesk website



INETLOCATION System Variable

INETLOCATION allows you to change the default Uniform Resource Locator (URL) used by the **BROWSER** command. If you visit the same website repeatedly, you can save time and effort by making that your default web address for the **BROWSER** command. The procedure is as follows:

✔ At the command-line prompt, type **inetlocation <Enter>**.

*AutoCAD prompts for a new location. Once entered, the specified location becomes the new default for the **BROWSER** command. Note that the command requires a complete web address, beginning with "http://" or "https://".*

✔ Enter your preferred Internet location.

✔ At the command-line prompt, type **browser** and press **<Enter>** twice.

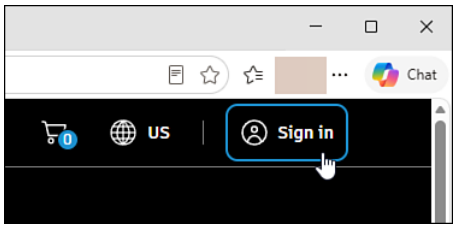
*The Web address you specified opens in a new window whenever you enter **BROWSER** without providing a new web address.*

Your Autodesk Account

As you should already know, you need to have an active Autodesk Account to access your software. You can use the same account to log in to the Autodesk website and access any cloud-based services (like Forma Data Management).

✔ From the Internet browser that you previously opened, click the **Sign in** button in the upper-right area of the web page, as shown in Figure D-2.

Figure D-2
Sign in button



- ✔ Enter the same email address you use to access your AutoCAD license and click **Next**.
- ✔ Enter your password and click **Next**.
- ✔ At this point you may receive a two-step verification message if you have one set up. This could work with an authenticator app or text message and is different for each person. Follow the prompts to complete this step.
- ✔ You should see your account name or avatar in the upper-right corner of the web page.
- ✔ Click your account name or avatar in the upper-right area of the web page.

  This opens the menu of options shown in Figure D-3. From inside the AutoCAD application, you can also access your account from the ***Autodesk Account Sign-On*** *tool shown in Figure D-4. Clicking this tool displays a menu with five options:* ***Account Details***, ***Explore Purchase Options***, ***Manage License***, ***Privacy Settings***, *and* ***Sign Out and Quit***.

Figure D-3
Autodesk account sign in options on Autodesk.com

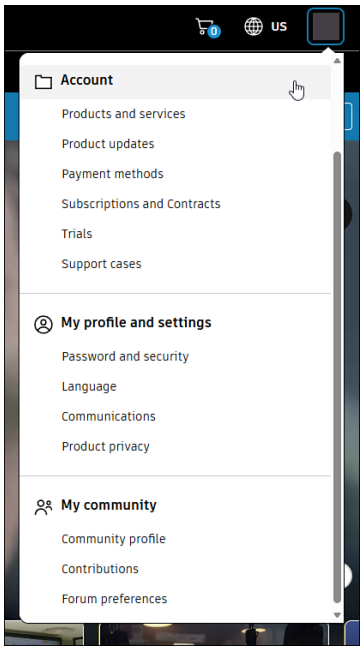
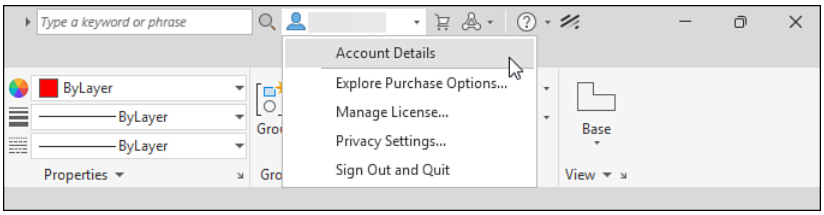


Figure D-4
Autodesk account sign-on options in AutoCAD



Autodesk Forma Data Management and Other Autodesk Products

Once you have an Autodesk account, you have options that are available to you through Autodesk.com. These include a wide variety of Autodesk products designed to address the specialized needs of industries and workflows within industries. Except for Autodesk Forma Data Management (also called Autodesk Docs), these Autodesk products may require an additional paid subscription beyond the one required to use AutoCAD. Which products are included with your subscription depends on the type of subscription you own or are assigned to by your company. Here, you proceed by accessing the Autodesk products page and introducing three common Autodesk cloud-based platforms.

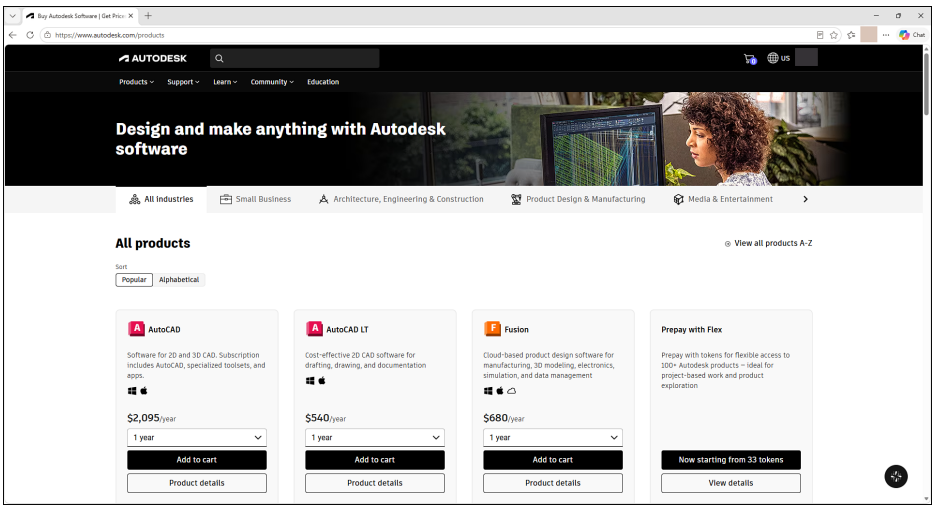
✔ From the list of options shown in Figure D-4, select **Explore Purchase Options** or browse to https://www.autodesk.com/products in a web browser.

This opens a product page as shown in Figure D-5.

✔ Scroll to the bottom of the page to see the **Products A-Z** list.

✔ Scan the list for products that have "forma" in their names.

Figure D-5
Autodesk products page



Detailed information on the capabilities of these and other Autodesk products are readily available by clicking the product link in the list. It isn't possible to cover all these products here, but to facilitate what is available beyond AutoCAD desktop, the cloud-based services and online collabora-

tion tools Autodesk offers are covered in this appendix. Briefly, Autodesk Forma Data Management, like the **SHARE** command covered later in this appendix, is intended for one-to-one file sharing, commenting, and reviewing. It's also intended as a single-project sharing space. Autodesk Forma Data Management is included with your AutoCAD subscription. It does not have a limit on storage space but does have a maximum file size of 5 TB per individual file. From your Autodesk Forma Data Management account home page, you can upload files and create links to share them with others, much as you can with **SHARE**. Unlike **SHARE** links, Autodesk Forma Data Management links do not need to be extended after 30 days. The originator of a share or Autodesk Forma Data Management file automatically becomes the administrator of that file and related files shared through the same account.

There are many additional Forma options that are more complex and feature rich. They're designed for teamwork and collaboration. They have more organizational features to facilitate file management and collaboration, as well as tools for construction, estimating, site design, and more. Projects developed on these platforms require a designated administrator and allow any member of a project team to upload, view, comment, and mark up files related to the project. Forma is Autodesk's online platform for project management for all Autodesk products.

Working on Drawings with and from Others

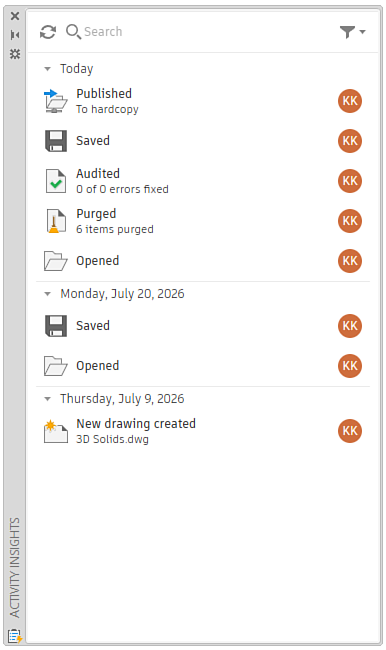
As you work on large projects, you'll find yourself collaborating with a wide range of designers of different disciplines along with a project's client. AutoCAD provides features that help you understand which changes have been made to the drawings in a project and even to package up all drawings in a project and send them to someone else who might need to review or work on them.

Activity Insights

While working on drawings with others, it can be beneficial to have a basic understanding of various activities, such as when a drawing was last modified or plotted or even if its filename was changed. The Activity Insights feature logs key events and information as you work on drawing files. There is no additional action needed to utilize Activity Insights because it's automatically enabled, but it's recommended that you store your activity logs in a shared location like a network drive. By storing them in a shared location, others who work on the drawings also have access to any logged activities.

You can view logged activities by using the **Activity Insights** palette shown in Figure D-6. Display the **Activity Insights** palette by clicking the **View** tab on the ribbon and then clicking the **Activity Insights** tool from the **History** panel. Once displayed, you can view the logged events associated with the drawing file that is currently open. You can use the drop-down lists at the top of the **Activity Insights** palette to filter the logged activities being viewed.

Figure D-6
Activity Insights palette



TIP

There will be times when you're working on the same drawings as other designers, which is common when working on large projects. If you end up opening a drawing file as read-only and it shouldn't be, there's a good chance someone else has it open. You can use the **Who Has** feature (**WHOHAS** command) to select a drawing file and see who has it open in AutoCAD. **Who Has** displays information about when the drawing file was opened, from what workstation, and by which user.

Drawing History

As you work on drawings, chances are good that there will be times when you may need to go back to an earlier version of a drawing file. In addition to Autodesk Forma Data Management, cloud-based storage providers like Egnyte, OneDrive, Dropbox, and Box provide ways to share and back up your drawing files, and they also maintain versions of your drawing files as they're saved or modified. Storing drawings on a cloud-based storage provider is covered later in this chapter.

Starting in AutoCAD 2025, the **Activity Insights** palette was combined with a prior palette called **Drawing History**. The **Drawing History** palette no longer exists, but the **Activity Insights** palette allows you to access and compare but not restore or download previous versions of a drawing file stored on a cloud-based storage provider. Previous versions of the current drawing file can be accessed using the **Activity Insights** palette shown in Figure D-6.

NOTE

If you need to restore or download a previous version of a drawing file, you must use the tools of the cloud-based storage provider because these options are not available as part of the **Activity Insights** palette.

Drawing Compare

Working on large projects brings many different challenges, from tight deadlines and complex deliverables to collaboration with many different individuals. When receiving updated drawings from other designers inside or outside your company, you will want to know just how those drawings were changed and whether any of those changes affect your drawings. You can compare the geometry between two drawing files or two versions of the same drawing with the Drawing Compare feature.

You compare two drawings either from the **Drawing History** palette, which was mentioned in the previous section, or using the **COMPARE** command. You can start the **COMPARE** command by clicking **View** > **Compare** > **DWG Compare** from the ribbon.

Here is an overview of the basic workflow to compare two drawings:

✔ Open the drawing you want to compare against.

✔ Click **View** > **Compare** > **DWG Compare**.

*This starts the **COMPARE** command. You're prompted to select the drawing file to compare with in a standard file selection dialog box.*

✔ Browse to and select the drawing you want to compare with; this is known as the *compare drawing*.

*The drawing window changes to indicate that the **Comparison** mode is active and the **DWG Compare** toolbar is displayed near the top center of the drawing window, as shown in Figure D-7. Yellow revision clouds are placed around the differences identified between the two drawings, and those differences are shown in red (compare drawing) and green (current drawing) by default.*

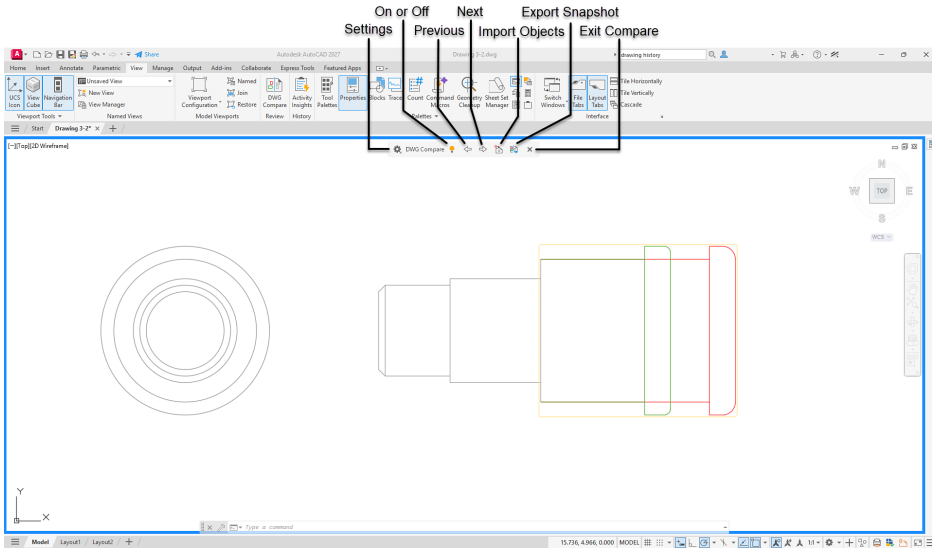


Figure D-7
Compare drawing versions

✔ From the **DWG Compare** toolbar, click the **Previous** and **Next** buttons to step through the differences identified between the two drawings.

✔ If there are geometry differences in the compare drawing that you want in the current drawing, click **Import Objects** on the **DWG Compare** toolbar.

You're prompted for the objects to import into the current drawing from the compare drawing.

✔ Select the objects shown in red to be imported into the current drawing.

The objects are imported into the current drawing and are now shown in gray.

✔ Click **Exit Compare** on the **DWG Compare** toolbar to exit the Comparison mode.

The **On** or **Off** button of the **DWG Compare** toolbar can be used to toggle **Comparison** mode; when set to **Off**, only the objects in the current drawing are displayed in the drawing area. The **Export Snapshot** button between the **Import Objects** and **Exit Compare** buttons on the **DWG Compare** toolbar is used to export the results of the comparison to a new drawing, and then that drawing is opened. The final button on the **DWG Compare** toolbar is the **Settings** button, which allows you to customize the colors of the differences found along with other settings that control the behavior of Drawing Compare.

TIP

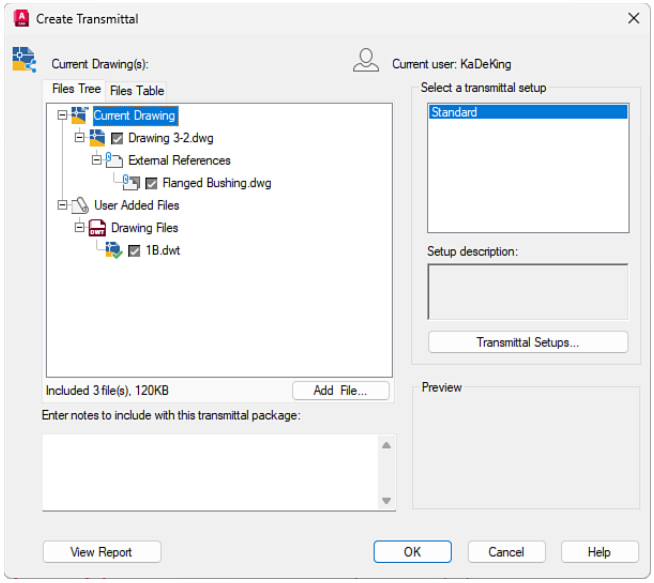
If you store your drawing files on a cloud-based storage provider, using the **Activity Insights** palette can make comparing versions of drawings easier. You don't need to browse to the drawing file to compare against or need earlier versions of the drawing file to compare.

Transmit Drawings

While it would be great if everyone working on a project could all work from the same set of drawing files, this isn't always possible. When working with others outside of your company who can't use a cloud-based storage provider for sharing drawings, you can use the **Transmittal** feature. The **Transmittal** feature allows you to collect and zip your drawings and any referenced files needed to properly view and plot your drawings, such as xrefs, raster images, SHX fonts, PC3 plotter configurations, and more.

You can start the **Transmittal** feature by typing **etransmit <Enter>** at the command-line prompt or clicking the **Application** menu button and then **Publish** > **eTransmit**. The current drawing must be saved before it can be packaged, so if prompted to save your open drawing, click **Yes**. In the **Create Transmittal** dialog box, as shown in Figure D-8, add any additional drawings you want to package by clicking **Add File**. Click **OK** to package the files listed in the dialog box. You can click the **Transmittal Setups** button to see where and how the drawing files will be packaged. You can even define your own transmittal setups to give you control over the packaging of your drawing files.

Figure D-8
Transmit drawing files



Manage References of Received Drawings

Managing received drawings and referenced drawings (Xrefs) can be time-consuming to ensure all files are available and recent changes don't impact the objects in your drawing files. If files are missing or significant changes are identified in referenced files, it can delay the start and completion of a project. AutoCAD provides a few tools that can be helpful in verifying all referenced files have been received and to identify any changes in Xrefs.

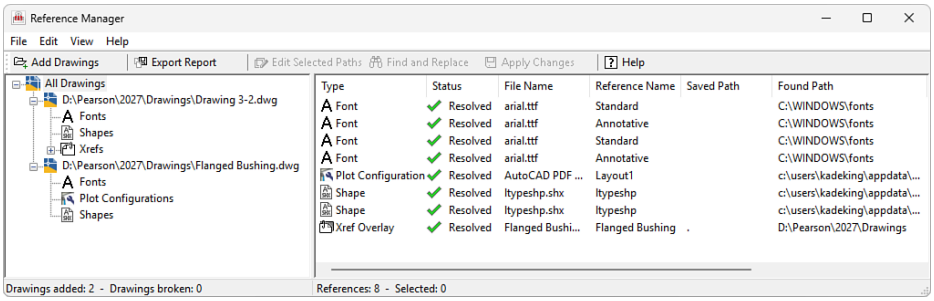
Reference Manager

The **Reference Manager** allows you to manage and check for missing referenced files in specified drawing files. This utility runs external to AutoCAD and can help you update the paths of files referenced by drawings received from an outside company and quickly identify those referenced files you might not have been sent.

You can launch the **Reference Manager** from the Windows Start menu by clicking the **Windows Start** button and then clicking (**All Apps** on Windows 11) **AutoCAD 2027 – English**, **Reference Manager**. Optionally, you can type **Reference Manager** in the Windows Search bar.

The **Reference Manager**, shown in Figure D-9, opens. Click **Add Drawings** to add the drawings you want to check for missing or update the paths of referenced files. The status of the referenced files for the added drawing files is displayed. Referenced files with a status of **Not Found** are either missing or might be in a different folder than they were originally in when attached to the drawing file. Double-click the **Saved Path** field of a referenced file to update its path. Click **Apply Changes** when done editing paths and then close the Reference Manager.

Figure D-9
External Reference Manager



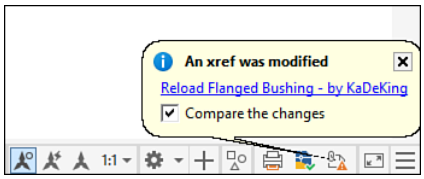
TIP

If there are still many referenced files that are shown with a status of **Not Found** after updating their paths, click the **Export Report** button to create a CSV file that contains all the files listed in the Reference Manager. You can then send that list to the individual from whom you got the drawings to obtain the missing drawings or verify the drawings are not significant. Files that are not significant might be a company logo for a title block or watermark used to indicate the status of the drawing.

Xref Compare

When you open a drawing that contains one or more xrefs, you might receive a notification similar to the one shown in Figure D-10. This notification informs you that one of the referenced files has changed since the last time it was loaded. Clicking the **Compare** link allows you to compare the referenced file against what was previously loaded, similar to comparing two drawing files with the Drawing Compare feature. Instead of the **DWG Compare** toolbar, you use the **Xref Compare** toolbar that is displayed near the top center of the drawing window to view and step through the differences identified. Unlike the Drawing Compare feature, the differences can't be imported into or exported from the current drawing.

Figure D-10
Xref changed notification



TIP

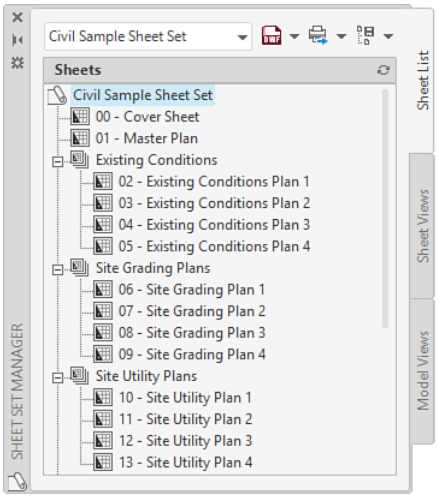
If you dismiss the Xref Compare notification, you can later compare the referenced file using the **XCOMPARE** command or right-clicking the xref in the **External References** palette and selecting **Compare** > **Recent Changes** from the shortcut menu. From the **Compare** submenu, you can also select the **Selected File** option to choose a drawing file from which to compare for differences.

Sheet Set Management

Most industrial design projects involve not one drawing but a set of drawings detailing different views or different aspects of a single design. When a design project is to be communicated to a client or consultant, it's likely to be represented by a whole set of related drawings. Sets of drawings like these, called *sheet sets*, may be created manually by saving specific layouts from individual drawings and then assembling all the relevant layouts and views in a single location. This process can become quite complex, especially when the individual drawings are on different computers and rely on external references, font files, plot files, and so on that may reside in different locations.

To facilitate the creation of sheet sets, AutoCAD includes an interface named the **Sheet Set Manager**, as shown in Figure D-11. You can display the Sheet Set Manager by using the **SHEETSET** command, typing **SSM** or clicking **View** > **Palettes** > **Sheet Set Manager**.

Figure D-11
Sheet Set Manager



Through this interface, layouts from individual drawings are collected into a sheet set. Here, layouts can easily be organized into subsets so that the sheet set presents a coherent design concept. One sheet of the set may be designated as title sheet or sheet index, which may contain a table showing the organizational hierarchy of the complete sheet set. Sheets in the sheet set can be given numbers and designations shown with standard symbol blocks that update automatically if the number and organization of the sheet set changes.
Consider the following workflow:

- ✔ Create designs in model space.
- ✔ In each drawing, create layouts with a design presentation.
- ✔ Using the **Sheet Set Manager**, collect layouts from all relevant drawings into a single set.
- ✔ Create a title sheet or sheet index listing all layouts (sheets) and showing how they are organized.

- ✔ Publish all or some of the sheets in the sheet set for distribution to the client and others for review or to start the construction or manufacturing of the final design.
- ✔ Create a sheet set package that contains the sheet set and all files required to view the set, all organized through the **Sheet Set Manager**.
- ✔ Archive the sheet set.
- ✔ Transmit the sheet set to a client or consultant.

The Sheet Set Manager has been modernized several times in AutoCAD 2023 through AutoCAD 2027 and has now been designed to work with drawings stored on Autodesk Forma Data Management (also called Autodesk Docs).

Access Drawings Anywhere

Being able to access and share your drawing files from a cloud-based storage provider is key not only to making collaboration easier but making it possible to design from anywhere. Design software is evolving beyond the desktop and making it possible to access many of the tools you need to create new drawings and make edits to your drawings while on the go from a web browser or mobile device. Originally, online applications focused on viewing and commenting tools for drawing files, but that has been evolving more over the past decade to include rich editing capabilities.

Cloud Storage Providers

Cloud-based storage providers are the cornerstone of being able to access your drawing files from anywhere and share them with others on a project. Autodesk offers a collaboration solution that allow you to store and manage your drawing files: Autodesk Forma Data Management (also called Autodesk Docs). Autodesk Forma Data Management is available as part of your AutoCAD license. Autodesk Forma is a wider solution with many additional options available and was mentioned earlier as an industry-specific file management and collaboration solution.

Along with the solutions Autodesk offers, there are additional cloud-based storage providers that are popular with many companies in and out of the design software space. AutoCAD desktop application, AutoCAD web app, and AutoCAD mobile app all support the ability to access drawing files stored on OneDrive, Google Drive, Dropbox, and Box. Other cloud-based file storage options like Egnyte will also work seamlessly in AutoCAD.

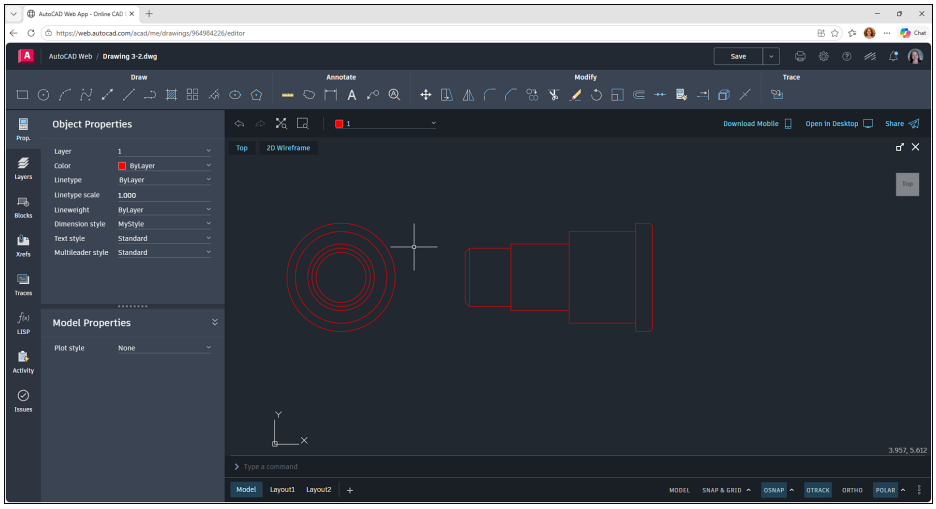
AutoCAD Web and AutoCAD Mobile Apps

Cloud-based storage providers make it possible to access your drawing files from any device and make it easy to share them with others. There will be times when you are away from your desk, out in the field, or in a meeting, and you need to perform a measurement or even make a quick edit. If you have your drawings available online, you can utilize the AutoCAD web or AutoCAD mobile apps to access them.

The AutoCAD web app, shown in Figure D-12, can be displayed by browsing to https://web.autocad.com/ with a web browser. It offers a

number of 2D drafting features that are like the AutoCAD desktop application. The AutoCAD web app isn't free but is available as part of an AutoCAD or AutoCAD LT subscription. All you need to do is log in with your Autodesk account. If you or someone on your project needs access to the AutoCAD web app but doesn't have it, it's possible to purchase a monthly or annual subscription.

Figure D-12
AutoCAD Web App



Along the left side of the AutoCAD web app are tools used to edit object properties, create and manage layers, insert blocks, manage xrefs and traces, and even utilize AutoLISP programs to automate workflows. At the top, you will find tools to create 2D objects, annotate, and modify objects. The main area of the AutoCAD web app is where you view and edit the open drawing file. This is similar to the drawing area of the AutoCAD desktop application.

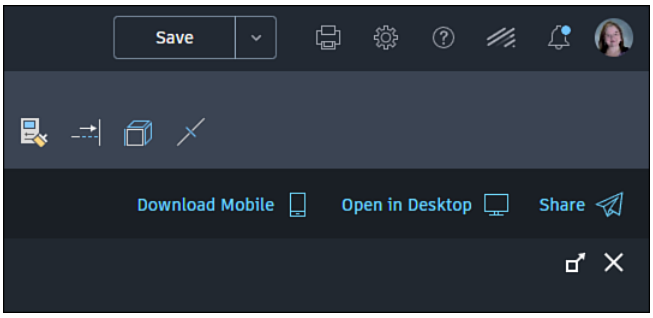
Below the Draw, Annotate, and Modify tools are navigation tools used to zoom and pan in the drawing, as well as Undo, Redo, and a Layer drop-down list to see and change the current layer. Below the drawing area is the command line where you can type available commands, and below that are the controls to work with layouts and a status bar–like interface that is used to enable/disable drafting aid modes. The upper-right area of the AutoCAD web app contains tools that allow you to save, print, and share the current drawing file.

One of the unique features of the AutoCAD Web App is that Autodesk uses it to preview new technology they are developing, even before the technology is ready for AutoCAD! If you see a feature that is labeled as "Tech Preview," you will know it's a feature that's in development.

TIP

When viewing a drawing in the AutoCAD web app, you can open the drawing for editing in the AutoCAD desktop application if it's installed on your device. Click the **Open in Desktop** button located in the upper-right area of the AutoCAD web app, as shown in Figure D-13, to download and open the drawing in the AutoCAD desktop application.

Figure D-13
Open in Desktop button



In addition to the AutoCAD web app, you can view and edit objects in a drawing with the AutoCAD mobile app. The AutoCAD mobile app is supported on devices that run the iOS, Android, and Windows operating systems. For more information on the AutoCAD mobile app, browse to https://www.autodesk.com/mobile-apps.

Identify and Communicate Design Changes

In addition to the abilities to view, edit, and print drawing files with the AutoCAD web app, it also provides a feature named Trace that helps to facilitate the digital marking up of a design without modifying the drawing file. Traces can also be created and viewed with the AutoCAD desktop application and AutoCAD mobile apps. Along with marking up a drawing file with the use of traces, you can import a photograph of a paper copy of a design after it has been marked up with a red pen or even a digital image of the design that was marked up with a program other than the AutoCAD desktop application, AutoCAD web app, or AutoCAD mobile app.

Traces

Collaboration is an important workflow, whether you are designing a mechanical part, a building, or even a landscaping project. The AutoCAD desktop application, AutoCAD web app, and AutoCAD mobile app play vital roles in this workflow with revision clouds, annotation, and more. These applications have a special feature that allows collaborators to communicate design changes in a separate space from the main design in a drawing file.

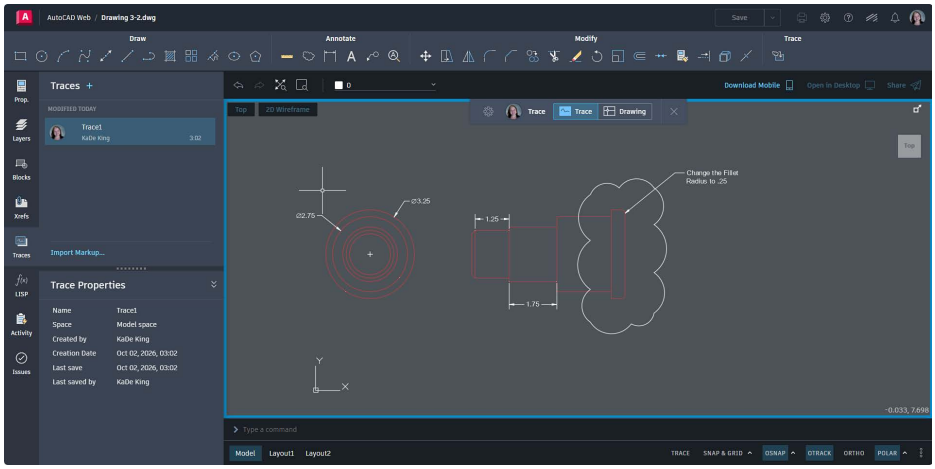
The Trace feature allows collaborators to create what is known as a *trace*. You can think of a trace in AutoCAD similar to its real-world counterpart, a sheet of tracing paper that allows you to see objects below it. When a trace is added, the drawing in which the trace is added is left unaltered. The design below the trace can be seen, and revision clouds and annotations can be added to inform the designer which parts of a design require attention or some form of updates.

The following workflow adds a trace with the AutoCAD web app to a drawing and then views that same trace in the AutoCAD desktop application:

✔ In the AutoCAD web app, open the drawing file in which you want to add a trace.

✔ On the left-side, click the **Traces** tab.
*The **Traces** tab shown in Figure D-14 is active. This tab enables you to create and switch between traces associated with the open drawing.*

Figure D-14
Traces tab in the AutoCAD Web App



✔ On the **Traces** tab, click **New Trace**.
*A new trace named **Trace1** is created and associated with the open drawing.*

✔ Make sure the layer to which you want to add your markups is the current layer.

✔ In the lower-left corner, switch to the **Annotate** tools and add some annotation objects.

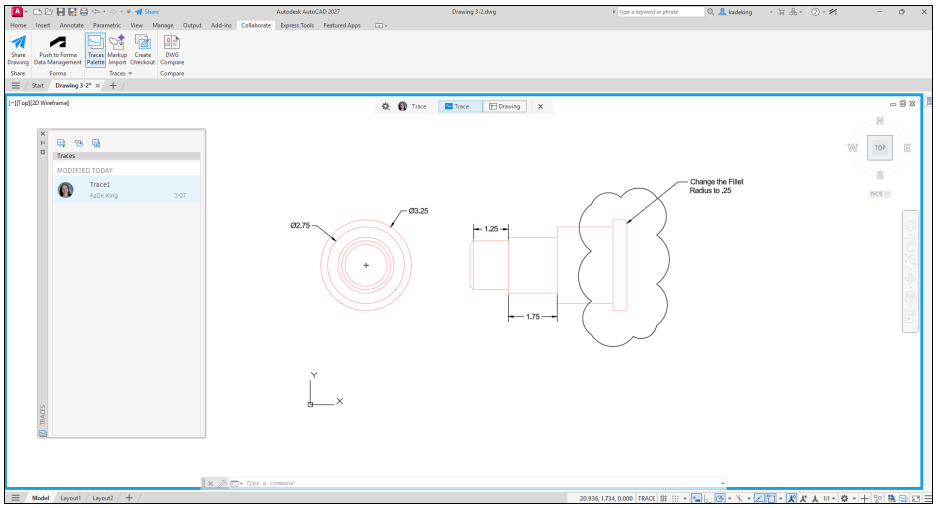
✔ On the **Trace** toolbar, near the top-center of the drawing area, click the **X** (Done).
The changes to the trace are saved. Next, you open the drawing and view the trace in the AutoCAD desktop application.

✔ In the upper-right corner of the AutoCAD web app, click **Open in Desktop** to open the drawing in the AutoCAD desktop application.
The drawing opens in the AutoCAD desktop application.

✔ In the AutoCAD desktop application, at the command-line prompt type **trace <Enter>** or click **Collaborate** > **Traces** > **Traces Palette** on the ribbon.
*The **Traces** palette opens. Traces are created and managed from this palette.*

✔ On the **Traces** palette, click **Trace1** to view it.
The drawing window switches to the Trace mode and displays the markups of the Trace1 trace. Figure D-15 shows the trace and markups created with the AutoCAD web app in the AutoCAD desktop application.

Figure D-15
Trace displayed in the AutoCAD desktop application



- ✔ On the **Trace** toolbar, near the top center of the drawing window, click the **TRACEFRONT is On** tool.
  *The **Trace** toolbar should now read **Trace (Back)**. When **Trace Front** is enabled, objects are added and modified in the trace. However, when disabled and **TRACEBACK is On** is enabled, objects are added or modified in the current drawing.*
- ✔ With **TRACEBACK** enabled, make the changes to the drawing per the markups in the trace.
- ✔ On the **Trace** toolbar, click **Close Trace** to exit the trace and return to the normal drawing state.
  Any changes to the trace are saved.
- ✔ Save the drawing file if any changes were made.

Markup Import and Assist

While having all collaborators provide markups and review feedback in a digital form using the Trace feature of the AutoCAD desktop application, AutoCAD web app, and AutoCAD mobile app is ideal, it isn't always an option. The AutoCAD desktop application and AutoCAD web app allow you to import markups and review feedback made in a PDF or raster image file into a drawing. Raster image files that contain markups and comments could come from a program like Microsoft Paint or even a photograph of a paper drawing marked up with a red pen.

Markups can be imported using the Markup Import tool in either the AutoCAD desktop application or AutoCAD web app. When markups are imported, they're added to a new trace. The trace can then be viewed over the drawing by selecting it from the **Traces** palette in the AutoCAD desktop application or the **Traces** tab of the AutoCAD web app, as covered in the previous section. The Markup Assist feature of the AutoCAD desktop application uses machine learning (ML) to identify markups and convert them into AutoCAD objects.

The Markup Assist feature not only helps to convert markups into AutoCAD objects but can also understand some instructional text that is

part of the markups themselves. For example, markup text might mention moving or erasing objects; in this situation, the AutoCAD program makes a command suggestion to modify the objects in your drawing.

Here are the basic steps to import markups from a file and then work with those markups:

✔ In the AutoCAD desktop application, click **Collaborate** > **Traces** > **Markup Import** on the ribbon.

You're prompted for the file that contains the markups to import.

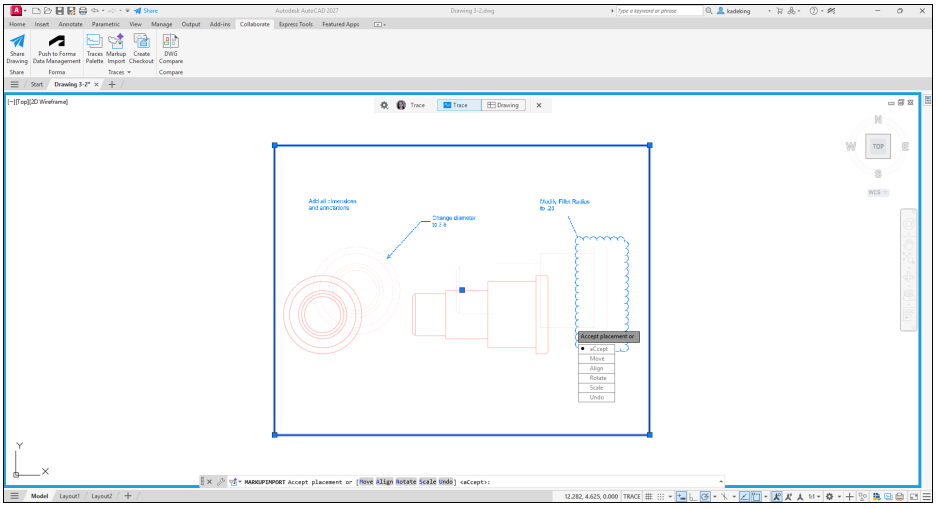
✔ In the **Select a Markup File to Import** dialog box, browse to and select the file that contains the markups to import. Click **Open**.

The markups are imported into the drawing, and you're prompted to align the markups with the objects in the current drawing.

✔ Position, scale, and rotate the markups in the trace as needed.

Once the markups have been imported and aligned, you can move the trace to the back to work with the objects in the drawing while viewing the markups. Figure D-16 shows the markups imported from a PDF file.

Figure D-16
Imported markups



✔ On the **Trace** toolbar, near the top center of the drawing window, click the **TRACEFRONT is On** tool.

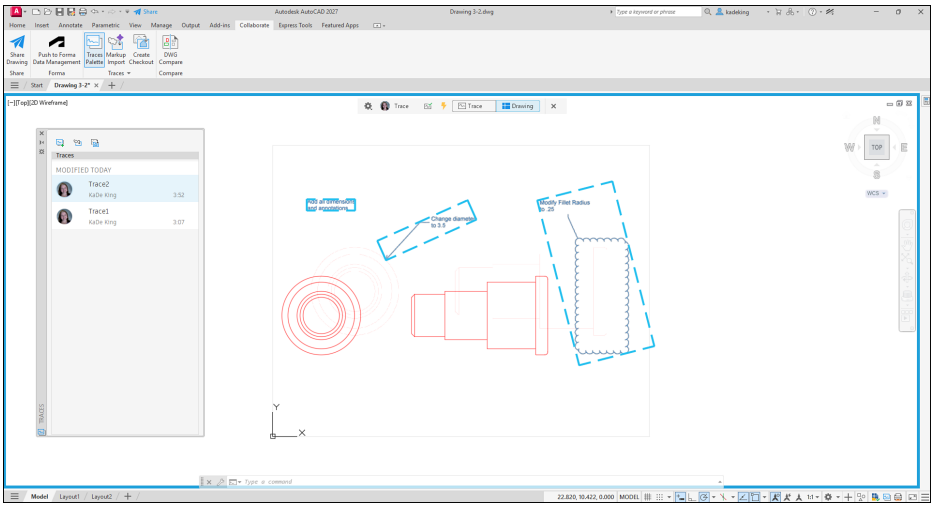
✔ With **TRACEBACK** enabled, markups are identified, and you can edit the objects in the drawing accordingly.

The AutoCAD desktop application tries to identify each markup object as text, leaders, revision clouds, or even instructional text. Identified markups are shown with a dashed box around them, and a lightning bolt badge is shown next to the cursor when over a markup.

✔ Move the cursor over one of the markups in a dashed box and select it to display a dialog box of options.

The dialog box, as shown in Figure D-17, gives you options to convert the markup into an AutoCAD object or fade it. Fading a markup is a way of keeping track of which markups you have resolved.

Figure D-17
Markup Assist identified markups



- ✔ In the dialog box, complete any of prompts for information and click one of the available options.
- ✔ Follow any prompts in the drawing area to create the annotation, leader, or revision cloud.
- ✔ Repeat the previous steps for any and all imported markups. Fade the markups that don't require any changes to the drawing.
- ✔ When done making changes, click **Close Trace** on the **Trace** toolbar.

Share Drawings with Non-AutoCAD Users

Not all individuals whom you collaborate with on a project are users of the AutoCAD desktop application. Storing drawing files on a cloud-based storage provider and having collaborators access those drawings with the AutoCAD web app or AutoCAD mobile app is a possibility, but in some situations, this might not be allowed because of security policies/concerns. In these situations, you can share a version of a drawing file that can be viewed via a secure link as well as provide drawing files to be downloaded from a secure location for viewing and plotting offline.

SHARE Command

Collaboration with other designers often requires the ability to share and comment on drawing files. The **SHARE** command is a simple method of sharing files through a link that can be sent to anyone who has Internet access. The link will be good for seven days, but you can extend that. To share files, as the originator, you must have an Autodesk account along with the AutoCAD desktop application, and the receiving party must have an Autodesk account to view the file.

When the invitee clicks the link, the AutoCAD web app starts, and the drawing file opens. Based on the type of link shared, features might be limited in the AutoCAD web app. View-only links allow the user to view the geometry in a drawing; they can't make changes to the drawing, add traces,

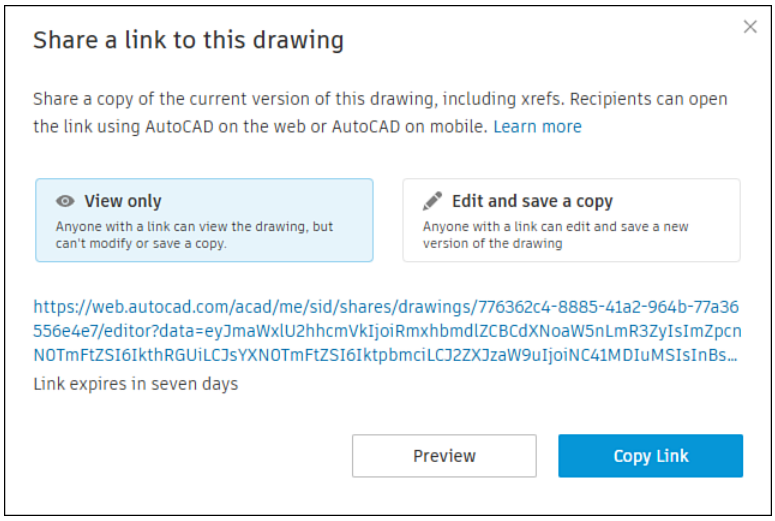
plot the drawing, or even open it in the AutoCAD desktop application if they have it installed.

Following are the steps for creating a file sharing link, assuming you are signed into an Autodesk account:

✔ In the AutoCAD desktop application, open the drawing that you want to share and click the **Share** tool on the **Quick Access** toolbar.

*This starts the **SHAREVIEW** command. You're presented with a dialog box similar to Figure D-18.*

Figure D-18
Share View dialog box



✔ Select the type of link you want to create.

✔ Click **Copy link**.

✔ Optionally, click **Preview to view the drawing file in the AutoCAD web app**.

The shared view opens in the AutoCAD web app after you sign in, allowing you to preview exactly what the collaborator will see.

✔ Click the **X** to close the dialog box.

Autodesk Viewer

The Autodesk Viewer is a file viewer used by many Autodesk online applications. You can use it to share drawing files after they have been uploaded. You can reach this site by browsing to it outside of the AutoCAD desktop application using your default web browser. You will need an Autodesk account to use Autodesk Viewer. It's free to use, although it offers less functionality than the AutoCAD web app. The URL to access the Autodesk Viewer, at the time of this publication, is https://viewer.autodesk.com/.

When you first visit the Autodesk Viewer site and sign in, you can upload a single drawing file or a folder of drawings to share with others. The uploaded files can't be downloaded from the site, and they expire after 30 days of being uploaded. As you upload a drawing file, you are asked if there are any referenced files that need to be uploaded to properly view the

file. If there are any referenced files, upload them and then click **No more files** when done.

Once the drawing has been loaded into the viewer, the main tools of the viewer are made available as shown in Figure D-19. On the left are options for viewing separate views, layers, and properties. The accessibility of these options depends on how the file has been shared by the originator (you). Along the bottom are tools for viewing, measuring, and marking up the drawing. On the right are the options for adding comments, printing the image, and taking a screenshot of the image. Most important is the **Share** button. With the exception of **Share**, these options are available to anyone with an Autodesk account and the file link you send them. **Share** is only available to the originator of the file, who is automatically the administrator of all pages related to this file. **Share** is the option that is the most interesting at this point. The whole purpose of uploading a file to the viewer is to be able to share it.

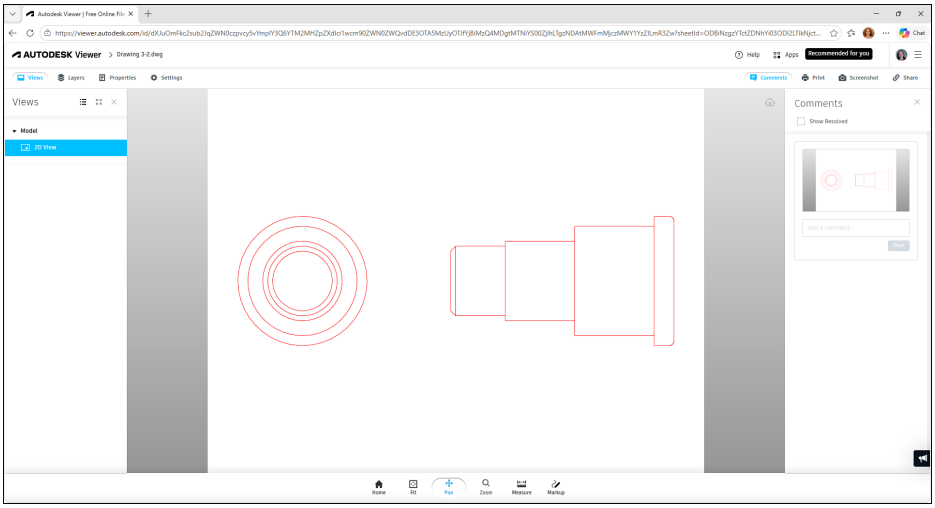


Figure D-19
Options at the top of the **Autodesk Viewer**

The steps to share a file, once you have it uploaded to the **Autodesk Viewer**, are as follows.

✔ Click the **Share** button at the far right.
Once again, you are asked to sign up or sign in to your Autodesk account.

✔ Click the **Sign in** button.

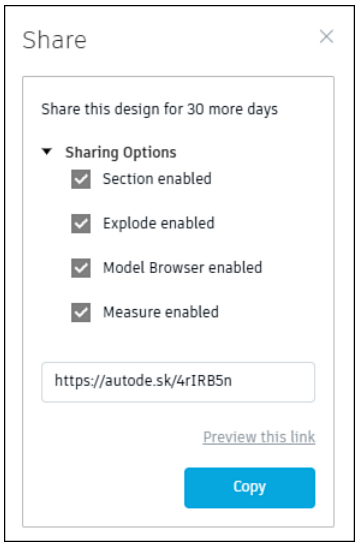
✔ Enter the email address associated with your Autodesk account and click **Next**.

✔ Enter your password and click **Sign in**.
*A Share message box opens on the right side of the page with the sharing link in the middle, as shown in Figure D-20. You can highlight and copy this link or simply click the **Copy** button below the link. Either way, the link is stored temporarily on your clipboard and can be copied into an email, text message, or other sharable document.*

- ✔ Click the **Copy** button.
- ✔ Leave the **Autodesk Viewer** window and open your email or text program.
- ✔ Paste the link into an email or text message.
- ✔ Send the email or text to collaborators, coworkers, clients, or potential clients.

Anyone receiving the link can then open the link in the **Autodesk Viewer**.

Figure D-20
Share message box in **Autodesk Viewer**



Design Review and DWG TrueView

There is no doubt that the future of collaboration is online tools; they allow for real-time marking up and commenting, easy sharing, and enabling permission controls. You can accessed them from anywhere on most devices. Even with all of this flexibility, there will be times when you need to collaborate with others who can't access files online and don't have access to the AutoCAD desktop application or AutoCAD web app.

In these situations, your collaborators could download and install Autodesk Design Review or Autodesk DWG TrueView. These applications are free and don't require an Autodesk account. Both Design Review and DWG TrueView allow for the viewing, measuring, and plotting of drawing files, and Design Review also allows for marking up drawing files. These applications can be downloaded from the Autodesk website at https://www.autodesk.com/viewers.