

Chapter 13

Working with Plan Production Tools and Data Shortcuts

Learning Objectives

After completing this chapter, you will be able to:

- *Understand the plan production tools*
- *Create view frames*
- *Create sheets and sheet sections*
- *Create data shortcuts*
- *Create data references*
- *Promote and synchronize references*

PLAN PRODUCTION TOOLS

AutoCAD Civil 3D provides you with comprehensive tools that help you create construction documents and sheet sets containing the layout of plan and profile views. These tools are known as plan production tools. Sheet sets display the alignment sections and the profile views.

There are various tools in Civil 3D that you can use to create a view frame, a view frame group, and a match line. These features along with the in-built Civil 3D templates and viewports help you to generate the required sheets sets in an organized and easy way.

In AutoCAD Civil 3D, drawing templates, namely *Civil 3D (Imperial) Plan over Plan.dwt*, *Civil 3D (Metric) Plan over Plan.dwt*, *Civil 3D (Imperial) Profile over Profile.dwt*, and *Civil 3D (Metric) Profile over Profile.dwt*, have been added to create plan/plan and profile/profile sheets. In addition, new plan production tools are introduced that enable you to create construction documents more quickly by allowing you to create plan(s) only, profile(s) only sheets.

Creating View Frames

Ribbon: Output > Plan Production > Create View Frames
Command: CREATEVIEWFRAMES

Before explaining the process of creating a view frame, the objects view frame and match lines that are created by using the tools in the **Plan Production** panel are discussed first.

View Frame

View frames are rectangular frames that are placed along the alignment, aligned to north direction, or rotated at a specific angle. These frames divide the alignment into different regions, as shown in Figure 13-1. These regions are displayed separately in different sheets. The prerequisites of drawing a view frame are alignment, profiles, and drawing templates.

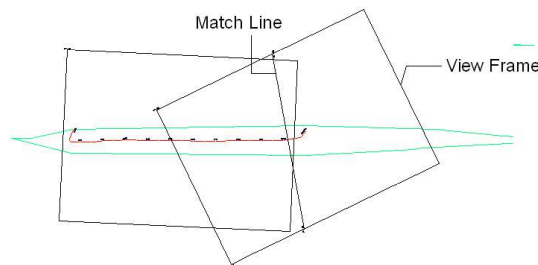


Figure 13-1 The view frames dividing the alignment into different regions



Tip

In **plan(s) only** sheets, the sheets created will contain plan views only (no profile views). Similarly, in **profile(s) only**, the sheets created will contain profile views only.

The first important requirement for creating a view frame is an alignment. View frames are primarily designed to create the alignment plan and profile views on a sheet. If you want to create a sheet with both the plan and profile views, you should create the required profile views. The next requirement for creating a view frame is a drawing template. The drawing templates are the in-built AutoCAD based sheet templates with predefined viewports in which the alignment section or regions created by the view frames will be displayed.

View frames have their own styles and label styles. Each view frame has a default label attached to one of its corners. AutoCAD Civil 3D has some default view frame styles and label styles. However, you can create your own view frame style and view frame label styles. View frame styles are created and managed in the **Settings** tab of the **TOOLSPACE** palette. To access the default view frame styles and view frame label styles, expand **View Frame > View Frame Styles** in the **Settings** tab; the default view frame style will be displayed in the **View Frame Styles** sub-node of the **View Frame** node. To create a new style, right-click on the **View Frame Styles** sub-node and choose the **New** option from the shortcut menu displayed; the **View Frame Style - New View Frame Style** dialog box will be displayed. You can use this dialog box to create a new frame style as required.

Similarly, expand **View Frame > Label Styles > View Frame** in the **Settings** tab to view the default label style of the view frame. To create a new label style, right-click on the **View Frame** sub-node and choose the **New** option from the shortcut menu displayed; the **Label Style Composer - New View Frame Label Style** dialog box will be displayed. You can use this dialog box to create a new label style for view frames.

Label styles are used to define the display settings for label in the view frame such as the name, group name, and view frame number. They are also used to display the alignment station from which the view frame starts or ends.

View Frame Groups

A collection of view frames is called view frame group. View frame groups are automatically created when you create view frames in a drawing. These groups are listed in the **View Frame Groups** node in the **Prospector** tab of the **TOOLSPACE** palette.

Match Lines

A match line is a line that indicates the location where one frame matches or intersects with the other in a view frame group, refer to Figure 13-1. Match lines are only displayed in paper space and plans. They are designed to visually indicate locations (start and end stations) along an alignment. These lines are created automatically and have labels attached to them by default. They have their own object styles and label styles like the view frames have.

The styles and the label styles of match lines are created and listed in the **Match Line** node in the **Settings** tab of the **TOOLSPACE** palette. You can create your own match line labels to display the name and number of the match line, view frame group, and match line station. Now, you will learn the procedure of creating a view frame.

The first step for generating sheets is to create the view frames along an alignment. To create view frames, choose the **Create View Frames** tool from the **Plan Production** panel of the **Output** tab; the **Create View Frames - Alignment** wizard will be displayed, refer to Figure 13-2. There

are different pages in this wizard. By default, the **Alignment** page is displayed in the **Create View Frames** wizard. Different pages and options in the wizard are discussed next.

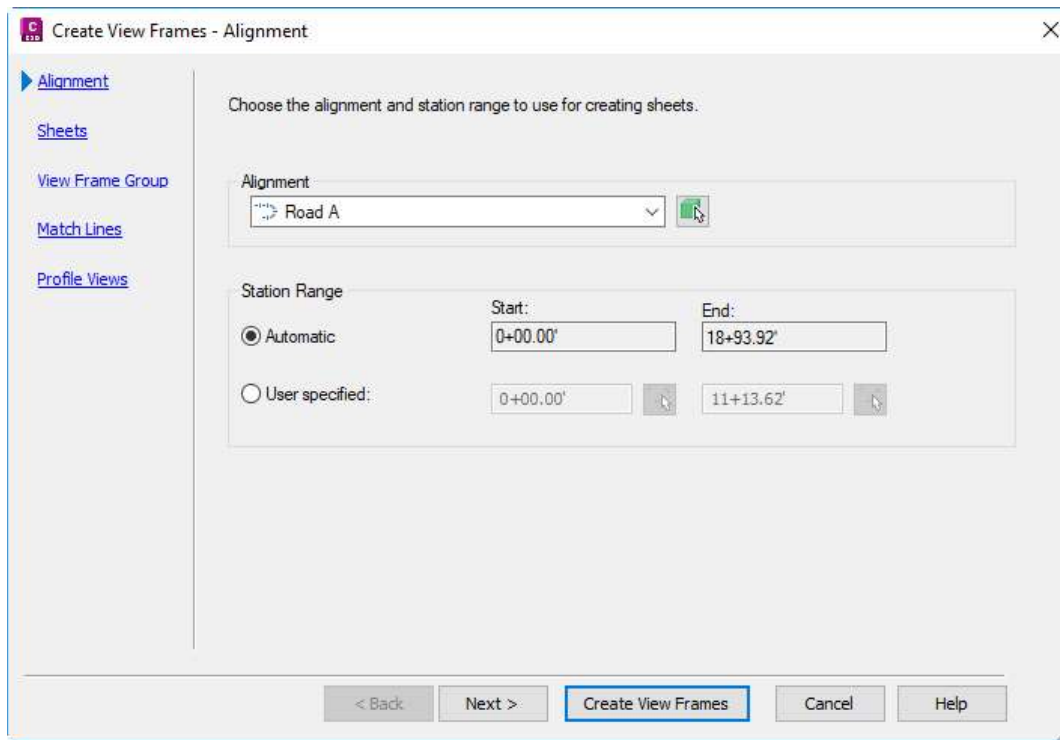


Figure 13-2 The Alignment page of the Create View Frames wizard

Alignment Page

This page is used to specify the required alignment and the station range to create view frames. Select the desired alignment from the drop-down list available in the **Alignment** area. Alternatively, choose the **Select from the drawing** button to select the alignment from the drawing.

In the **Station Range** area, specify the station range by selecting the **Automatic** or **User specified** radio button. By default, the **Automatic** radio button is selected and therefore, the view frames are automatically created along the complete station range. On the other hand, selecting the **User specified** radio button will allow you to specify the required station range over which the frames will be created. You can specify the range either by entering the start and end station values in the respective edit boxes or by choosing the buttons to select the stations directly from the drawing, refer to Figure 13-2. After specifying the settings in the alignment page, choose the **Next** button to display the **Sheets** page.

Sheets Page

This page is used to select the type of sheets to be created, the required template for the selected sheets, and set the placement of the view frames in the drawing.

In the **Sheet Settings** area, select a radio button to specify the sheet type. To draw both the plan and profile views of the drawing, select the **Plan and Profile** radio button; the two viewports will be created in the sheet, one for the plan view and the other for the profile view. The preview of the sheet will be displayed on the right in this page. Select the **Plan(s) only** radio button if you want to draw only the plan view in the sheet. In this case, there will be two viewports to display the plan/plan sheet. To draw only the profile/profile view in the sheet, select the **Profile only(s)** radio button.

Next, choose the browse button on the right of the **Template for Plan and Profile sheet** edit box; the **Select Layout as Sheet Template** dialog box will be displayed. Note that the name of the edit box depends upon the radio button selected. You can use this dialog box to select the template (.dwt) file that will be used to create a view frame group. In the **Select Layout as Sheet Template** dialog box, you can use various options to define the folder path, drawing template (.dwt) file, and a layout name that will be used for creating new sheets.

To define a folder path and the template file in the **Select Layout as Sheet Template** dialog box, choose the browse button next to the **Drawing template file name** edit box; the **Select Layout as Sheet Template** dialog box will be displayed. In this dialog box, browse to the location *C:\Users\<user name>\AppData\Local\Autodesk\C3D 2027\enu\Template\Plan Production*. Next, select the required template file and then choose the **Open** button; the dialog box will be closed and the path and name of the selected sheet will be displayed in the **Drawing template file name** edit box.

Now, you can specify the name of the layout in the drawing template file that will be used for the new sheet(s). To do so, select a layout from the list displayed in the **Select a layout to create new sheets** area of the **Select Layout as Sheet Template** dialog box. Then, choose the **OK** button to exit this dialog box. After selecting the sheet and template, you need to set the options to orient and place view frames in the **View Frame Placement** area. If you select the **Along alignment** radio button from this area, the view frames will be oriented along the alignment. If you select the **Rotate to north** radio button, the view frames will be oriented toward the north direction of the drawing. You can select the **Set the first view frame before the start of the alignment** by check box to set the first view frame at a distance before the start of the alignment. This is done to display all the necessary data near the start of the view frame. You can specify the offset distance in the edit box that will be activated when you select this check box. Now, choose the **Next** button to display the **View Frame Group** page.

View Frame Group Page

This page is used to specify the group name, description, label style, and other information of the view frame group. In the **View Frame Group** area, enter a name of the view frame group in the **Name** edit box or choose the **Edit View frame Group name** button on the right of this area to display the **Name Template** dialog box. You can use this dialog box to specify the name of the view frame group then close the dialog box. Optionally, enter the description about the view frame group in the **Description** text box in the **View Frame Group** page.

The **Layer** text box in the **View Frame** area displays the default layer on which the frame will be drawn. Choose the button on the right of the **Layer** text box; the **Object Layer** dialog box will be displayed. You can use this dialog box to select a different layer. In the **Name**



edit box in the **View Frame** area, you can specify a name for the view frame that will be drawn in the drawing. Next, select an option from the drop-down list in the **Style** text box. You can also create your own view frame style or edit the existing view frame style. To do so, choose the down arrow on the right of the drop-down list in the **Style** text box; a flyout will be displayed. Choose the option from the flyout to create a new style or edit the default style. Next, select an option from the **Label style** drop-down list. The **Label location** drop-down list on this page displays the different locations to place the view frame. Select an option from this drop-down list to place the view frame. For example, on selecting the **Top right** option from the drop-down list, the view frame labels will be placed at the top right corner of each view frame. After selecting the parameters, choose the **Next** button; the **Match Lines** page will be displayed.

Match Lines Page

Match lines are only displayed in model space and plan views. This page of the wizard displays various options that determine how the match lines will appear in these views. Select the **Insert match lines** check box in this page to insert match lines on the view frames. If you select the **Plan and Profile** sheet or **Profile only** for the sheet settings in the **Sheets** page then the **Insert match lines** check box will be automatically selected and then you will not be able to clear this check box.

Using the options available in the **Positioning** area, you can specify the location of the match lines and also adjust their position, if required. In this area, select the **Snap station value down to the nearest** check box; the edit box below this check box will be activated, as shown in Figure 13-3. Enter the required value in the edit box; the location of the match lines will be adjusted and rounded off according to the value specified in the edit box. In the **Positioning** area, you can also select the **Allow additional distance for repositioning (Increases view overlap)** check box to specify the maximum distance by which you can move the match lines from their original position and the distance to which the views on the adjacent sheets will overlap.

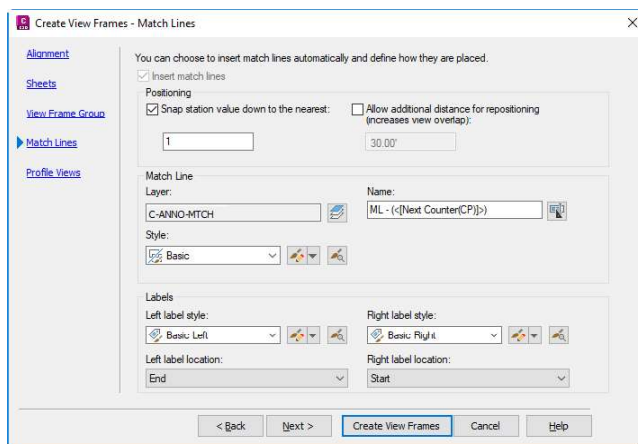


Figure 13-3 The edit box below the **Snap station value down to the nearest** check box activated in the **Positioning** area

The options in the **Match Line** area are used to specify the name, layer, and style of match lines. In this area, choose the button on the right of the **Layer** text box to display the **Object layer** dialog box. In this dialog box, select the layer on which the view frames will be created. Next, choose the **Edit View Frame Match line name** button on the right of the **Name** edit box; the **Name Template** dialog box will be displayed. Enter a name of the match line in this dialog box and choose the **OK** button to close it. Note that if you do not specify a name for the match line, Civil 3D will name the match lines automatically and number them accordingly. Select the required option from the **Style** drop-down list.

The **Labels** area on the **Match Lines** page provides you with the options to specify the style and location of the match line. Each match line has two labels, one on the right side and the other on the left side. In the **Left label style** or **Right label style** drop-down list, select the option to specify the label on the left or right side of the match line. You can also create a new style for the left or right labels, or edit the existing style. To do so, choose the down-arrow either on the right of the **Left label style** or **Right label style** drop-down list; a flyout will be displayed. Choose the required options from the flyout.

Next, you can specify the location for the label that will be placed on the left or right side of a match line. To do so, select an option from the **Left label location** or **Right label location** drop-down list in the **Labels** area. Now, choose the **Next** button from this page; the **Profile Views** page will be displayed.

Profile Views Page

This page is used to specify the profile view style and the band set style displayed in the profile views that are created on the sheets. In the **Profile View Style** area, select an option from the **Select profile view style** drop-down list. You can also create a new profile view style by choosing the **Create New** option from the flyout that will be displayed on choosing the down-arrow button on the right of the **Select profile view style** drop-down list.

Next, in the **Band Set** area, select an option from the **Select band set style** drop-down list. You can create a new band set style by choosing the **Create New** option from the flyout displayed on choosing the down arrow on the right of the **Select band set style** drop-down list.

After you have specified the required options in the **Create View Frames** wizard pages, choose the **Create View Frames** button; the wizard will be closed and the rectangular view frames will be created along the selected alignment. Note that the match lines will be labeled at both the ends and will be added under the **View Frame Groups** node in the **Prospector** tab, refer to Figure 13-4.



Figure 13-4 The **ML - (1)** match line added to the **Stephen group** view group sub-node

The next step after creating the view frame group and match lines is to create sheets. The method of creating sheets is discussed next.

Creating Sheets

Ribbon: Output > Plan Production > Create Sheets
Command: CREATESHEETS

To create a sheet, choose the **Create Sheets** tool from the **Plan Production** panel; the **Create Sheets** wizard with the **View Frame Group and Layouts** page selected by default will be displayed, as shown in Figure 13-5. The pages and their options in the **Create Sheets** wizard are discussed next.

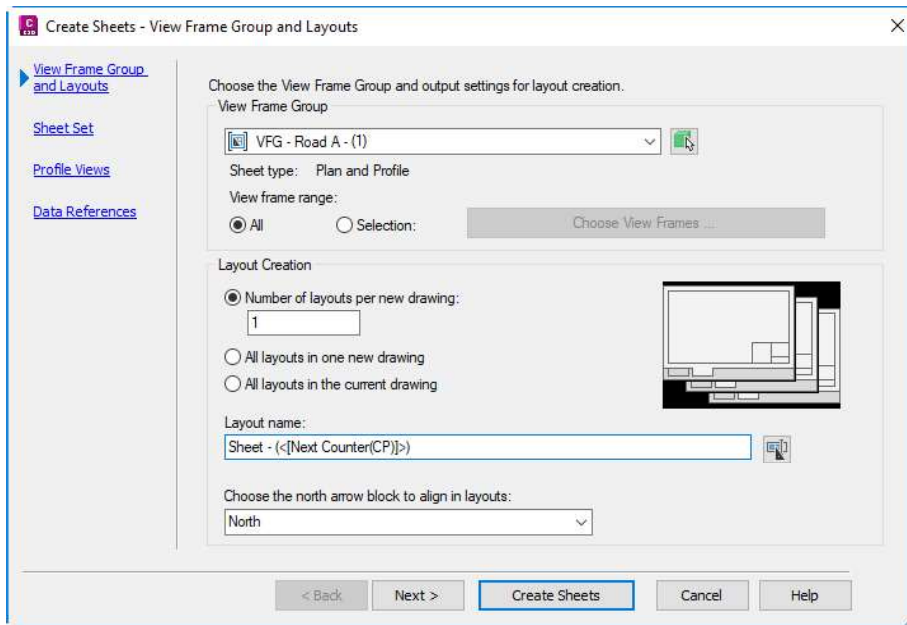


Figure 13-5 The **View Frame Group and Layouts** page of the **Create Sheets** wizard

View Frame Group and Layouts Page

This page is used to select the required view frame group and specify layout settings for the sheet. In the **View Frame Group** area, select an option from the drop-down list to create the sheet. Alternatively, choose the **Select from the drawing** button on the right of this drop-down list and select the required view frame directly from the drawing. The **All** radio button is selected by default in this area. As a result, the sheet is created for each view frame in the view frame group selected. To select one or more view frames, select the **Selection** radio button; the **Choose View Frames** button will be activated. Choose this button; the **Select View Frames** dialog box will be displayed. Select the required view frames from this dialog box and choose the **OK** button to close it.



Note

Use the **CTRL** key to select more than one view frame in the **Select View Frames** dialog box.

The options in the **Layout Creation** area of this page are used to specify the settings for creating the layouts. In this area, the **Number of layouts per new drawing** radio button is selected by default and **1** is specified as the default value in the edit box below the radio button. As a result, one new sheet is created in each new drawing. This option is useful if different people are working on different sheets. You can change the value in the edit box according to the number of layouts required in each new drawing. For example, if you enter **2**, you can create two new layouts (sheets) for each new drawing. The total number of sheets to be created depends upon the length of the alignment selected and the size of the viewport in the template referenced.

**Note**

*You can create from 1 to 255 layouts in a new drawing by specifying required value in the edit box below the **Number of layouts per drawing** radio button.*

Select the **All layouts in one new drawing** radio button to create all the layouts (sheets) in new drawing. This option is useful only if you want to create 10 or less than 10 sheets. The number of sheets created in the drawing depends upon the length of the alignment and the size of the viewports. If you want to create less than 10 sheets, select the **All layouts in the current drawing** radio button.

Next, enter a suitable name for the layouts in the **Layout name** edit box or choose the **Edit layout name** button; the **Name Template** dialog box will be displayed. Enter the required name in the **Name** edit box of this dialog box and then choose the **OK** button to exit. The **Choose the north arrow block to align in layouts** drop-down list displays names of all the blocks existing in the template selected. Select the required block from this drop-down list to align it to the north of the sheet. After specifying the required values and parameters in the **View Frame Group and Layouts** page, choose the **Next** button from the **Create Sheets** wizard; the **Sheet Set** page will be displayed. The options in the **Sheet Set** page are discussed next.

Sheet Set Page

This page is used to specify the name and location of the sheet set, sheet set file, and sheet file. The options in the **Sheet Set** area are used to create a new sheet set or select the existing set to add the sheets to the drawing. Select the **New sheet set** radio button and enter a suitable name for the sheet set in the **New sheet set** edit box below it.

**Note**

*By default, the name in the edit box below the **New sheet set** radio button will be the same as selected in the drop-down list in the **View Frame Group** area of the **View Frame Group and Layouts** page in the **Create Sheets** wizard.*

To add sheets to an existing sheet set, select the **Add to existing sheet set** radio button and choose the browse button on the right; the **Browse the Sheet set file** dialog box will be displayed. Browse to the required location, select the existing sheet set and choose the **Open** button; the dialog box will be closed. The **Sheet files storage location** edit box in the **Sheets** area of the **Sheet Set** page is used to specify the location of the sheet set. You can use this edit box to select a location for the new sheet set. To select a location for the new sheet set, choose the browse button on the right of this edit box; the **Browse for Sheet Set Folder** dialog box will be displayed.

In the dialog box, select the folder in which the new sheet set will be placed and then choose the **Open** button to close this dialog box. On doing so, the location of the new sheet set will be updated and will be displayed in the **Sheet files storage location** edit box.

**Note**

1. If you select the **Add to existing sheet set** radio button, the location of the existing sheet set will be displayed in the **Sheets files storage location** edit box provided there is an existing sheet set in the drawing.

2. If you select the **Add to existing sheet set** radio button then all other options in the **Sheet Set** page will become inactive.

The options in the **Sheets** area are used to specify the name of the sheet file and the location to save the sheet file. The **Sheet files storage location** edit box displays the path and location where the current sheet files will be saved. Alternatively, you can choose the browse button on the right of this edit box and select the location to save the files in the **Browse for Folder** dialog box displayed. Next, enter the name in the **Sheet file name** edit box and then choose the **Next** button in the wizard; the **Profile Views** page will be displayed. The options on this page are discussed next.

Profile Views Page

The options in this page are used to edit some of the profile view options. You can also view the profile view and data band styles selected during the view frame creation using the options in this page. The **Profile view settings** area on this page displays the name of the profile view style as well as the name of the data band style to be used to create sheets. The options in the **Other profile view options** area are used to edit some profile view settings. Select the **Get other settings from an existing profile view** radio button to use the profile view settings from another profile view in the current drawing. On selecting this radio button, the drop-down list below this radio button will become active. Select the required option from the drop-down list. Alternatively, choose the **Select from the drawing** button on the right of the drop-down list to select the required profile view directly from the drawing.

Select the **Choose settings** radio button in the **Other profile view options** area of this page; the **Profile View Wizard** button will be activated. Next, choose this button; the **Create Multiple Profile Views - Profile View Height** wizard will be displayed. You can use this wizard to create multiple profile views and add them to the model space in the file containing the sheets.

The options in the **Align views** area are used to align the data of the plan and profile views. Note that these options will not be available if you are creating only the plan or profile views. Select the required option from this area to align the data. Preview of the alignment of the data of the plan and profile views will be displayed on the right in the **Align Views** area, refer to Figure 13-6. After selecting the parameters in this page, choose the **Next** button to display the **Data References** page.

Data References Page

This page is used to select the data that you want to reference in the sheet. In the list box of this page, the check boxes corresponding to the objects required for creating the sheets are selected

by default and cannot be cleared. However, you can select additional set of data by selecting the corresponding check box, refer to Figure 13-7.

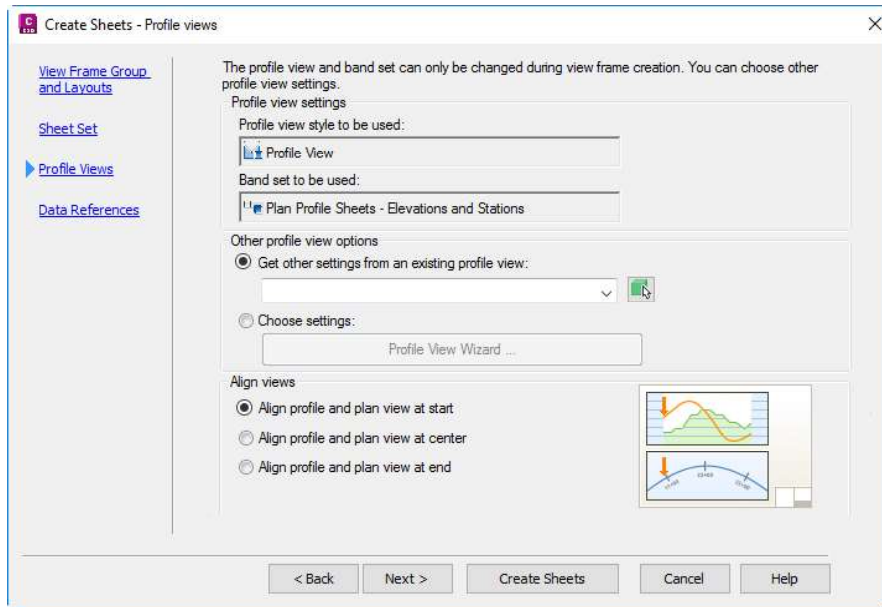


Figure 13-6 The Profiles Views page of the Create Sheets wizard

You can also choose the **Pick from drawing** button and then select the required objects from the drawing. After selecting the objects, choose the **Create Sheets** button from the **Create Sheets** wizard; the **AutoCAD Civil 3D 2027** message box will be displayed. This message box will inform you that the drawing will be saved in order to complete the current process of creating the sheets. Next, choose the **OK** button from the message box to proceed; the wizard will be closed and you will be prompted to specify the origin of the profile view, if you have selected the option to create sheets with profile views. Now, click at the required location in the drawing to specify the origin of the profile view; the **Create Sheet Progress Dialog** dialog box will be displayed. Once the process of creating the sheet is completed, the **PANORAMA** window will be displayed with the **Events** tab chosen and the **Sheet Set Manager** palette displayed. The **Events** tab of the **PANORAMA** window displays the information about location and number of the sheet sets created. The **Sheet Set Manager** palette displays the new sheets created in a sheet set. To view a particular sheet, double-click on the name of the sheet in the **Sheet Set Manager** palette.



Note

*If you have selected the **All layouts in the current drawing** radio button in the **Layout Creation** area of the **View Frame Group and Layouts** page, the profile views will be displayed in the current drawing when you specify the origin.*

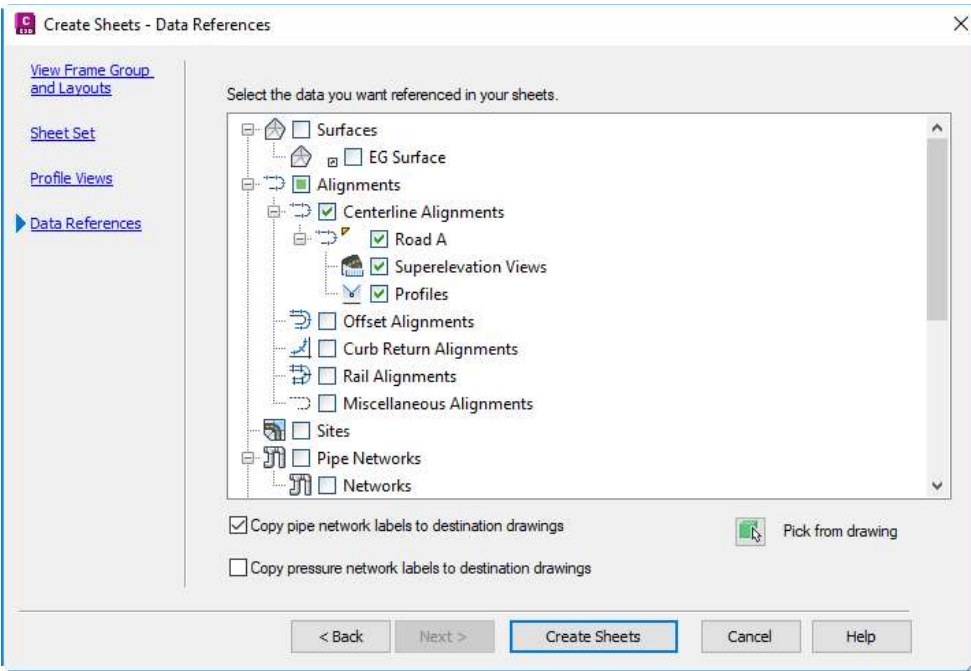


Figure 13-7 The Data References page of the Create Sheets wizard

DATA SHARING

Any Civil Engineering project requires a team of engineers to work simultaneously for effective implementation and management of the project. This would require effective data management and data sharing tools. AutoCAD Civil 3D provides you with such effective tools. These tools help the team members to access the project data simultaneously and work independently on the project. These tools are discussed next in detail.

Data Shortcut

The data shortcut is a method that allows you to create external references for different Civil 3D objects. These references can be inserted into one or more drawings and can be worked upon by multiple users simultaneously. The references or data shortcuts are XML files representing a shortcut to Civil 3D objects and contain information about the objects for identifying them in the source drawings. Using the data shortcut, you can divide a project or model into separate drawings. These drawings are called source drawings and contain the objects that you can share. Prior to AutoCAD Civil 3D, data shortcuts can only be created for alignments, surfaces, profiles, view frame groups, and pipe networks. Now, you can create data shortcuts for corridors also. When a data shortcut is created for corridors, the data shortcuts for alignments and profiles related to the corridors are automatically created. Additionally, you can save the geometry of the referenced surface into the current drawing. The objects in the source drawings can be used in other drawings provided you create a data reference for it.



Note

*The data shortcuts are created and managed in the **Master View** of the **TOOLSPACE** palette.*

Working with Data Shortcuts

Before creating data shortcuts, you need to set a working folder. The working folder is the parent folder which contains all project folders for data shortcuts. This folder is stored at a location that is accessible to all users. The default location of the working folder for the data shortcut projects is *C:\Civil 3D Projects*. The same working folder is used for Vault Projects as well.

Setting a Working Folder

Ribbon: Manage > Data Shortcuts > Set Working Folder
Command: SETWORKINGFOLDER

To set a working folder, choose the **Set Working Folder** tool from the **Data Shortcuts** panel of the **Manage** tab; the **Browse For Folder** dialog box will be displayed, as shown in Figure 13-8. Select the required working folder from the **Set Working Folder** list box and then choose the **OK** button; the working folder will be set.

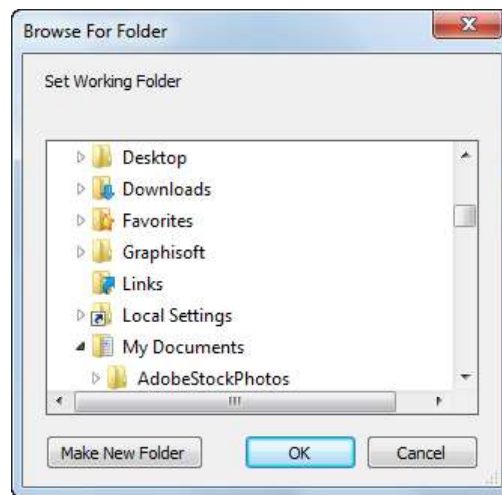


Figure 13-8 The Browse For Folder dialog box

Creating a New Data Shortcut Folder

To create a new data shortcut folder, right-click on the **Data Shortcuts** node in the **Prospector** tab of the **TOOLSPACE** palette and choose the **New Data Shortcuts Project Folder** option from the shortcut menu displayed; the **New Data Shortcut Folder** dialog box will be displayed, as shown in Figure 13-9.

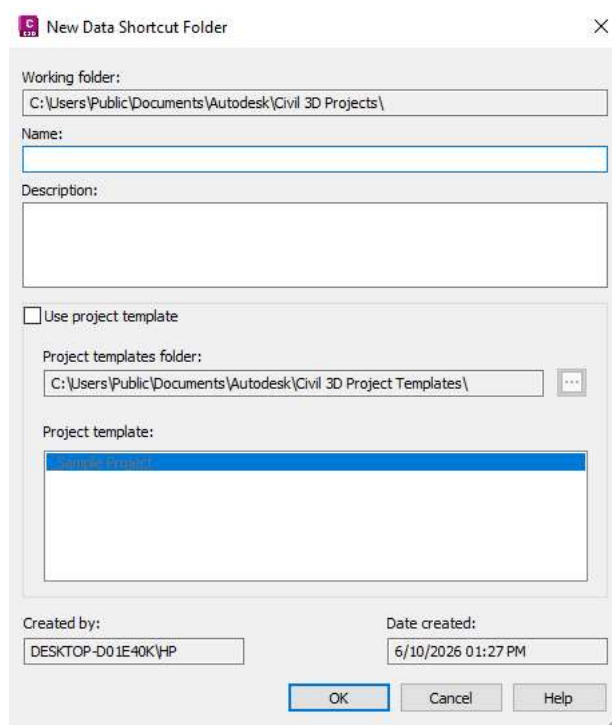


Figure 13-9 The New Data Shortcut Folder dialog box

In this dialog box, the **Working folder** text box displays the name of the parent working folder where all the project folders containing the data shortcuts will be saved. Enter the name of the data shortcut folder in the **Name** edit box. Optionally, enter a short description in the **Description** text box. Next, select the **Use project template** check box to use the default template that contains a set of subfolders. The **Project templates folder** edit box displays the path and name of the default project template folder. You can select some other project template folder. To do so, choose the browse button on the right of this edit box; the **Browse For Folder** dialog box will be displayed. Select the required folder and choose the **OK** button to exit this dialog box. The **Project template** text box in the **New Data Shortcut Folder** dialog box displays the name of the default project template, **_Sample Projects**. Note that you can also create your own project template. Now, choose the **OK** button; the **New Data Shortcut Folder** dialog box will be closed and the data shortcut folder will be created. To browse to the working folder and the data shortcut folders, use the explorer of the operating system. After creating the new data shortcut folder, you can create data shortcuts of the required Civil 3D objects in the drawing.



Note

While browsing a folder in the data shortcut folder, separate subfolders are created for source drawing and other data.

**Tip**

You can also invoke the **Browse For Folder** dialog box by right-clicking on the **Data Shortcuts** node in the **Prospector** tab and then choosing the **Set Working Folder** option from the shortcut menu displayed.

Creating Data Shortcuts

Ribbon: Manage > Data Shortcuts > Create Data Shortcuts

Command: CREATEDATASHORTCUTS

To create a data shortcut, choose the **Create Data Shortcuts** tool from the **Data Shortcuts** panel; the **Create Data Shortcuts** dialog box will be displayed, as shown in Figure 13-10. Select the check boxes corresponding to the objects whose shortcuts you want to create in the **Object** column of this dialog box. For example, to create a data shortcut for alignment, select the check box next to the **Alignments** node; all existing alignments in the current drawing will be selected automatically. You can clear the check box if you do not want to create data shortcut for a particular alignment. Similarly, select the required objects from the dialog box and choose the **OK** button; the dialog box will be closed and data shortcuts will be created and added in the **Data Shortcuts** node in the **Prospector** tab of the **TOOLSPACE** palette. In AutoCAD Civil 3D, you can create sub folders within the **Data Shortcuts** node in the **Prospector** tab. To do so, right-click on the data shortcut node for surfaces, alignments, etc. and choose the **Create Folder** option; the **Create Folder** dialog box will be displayed. In the **Create Folder** dialog box, enter the sub folder name in the **New Folder Name** edit box and choose **OK**; a sub folder with the specified name will be created, as shown in Figure 13-11.

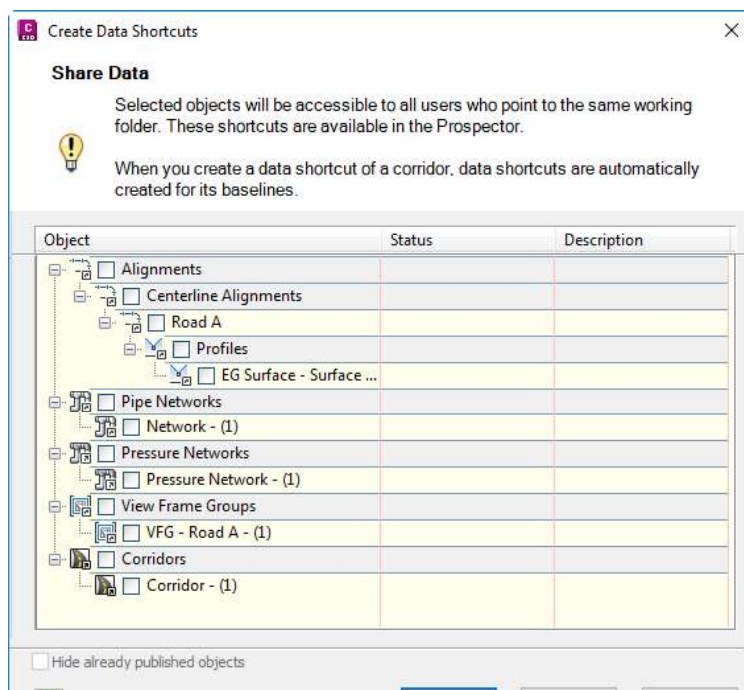
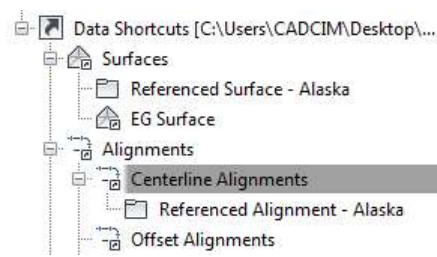


Figure 13-10 The Create Data Shortcuts dialog box



*Figure 13-11 Data shortcuts and sub folders created within the **Data Shortcuts** node in the **Prospector** tab*

You can also view the data shortcuts that have been created. For example, to view the shortcut created for an alignment object, expand **Data Shortcuts > Alignments** in the **Prospector** tab, refer to Figure 13-11. The names of the objects for which the data shortcuts have been created will be displayed in their respective nodes.

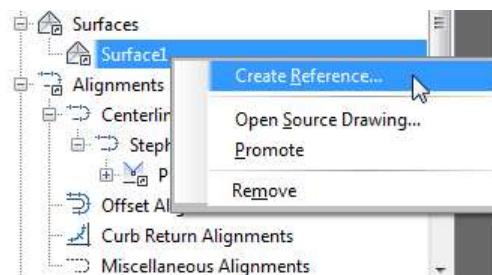
Data Reference

A data reference is a link to use data shortcut objects in a new drawing. The referenced objects provide you with the flexibility to apply a temporary object style, annotation, and perform various analyses with them. The properties of these referenced objects can also be viewed in the drawing.

Data reference is a two step process, first is to create a data shortcut and second is to create a data reference. The procedure of creating a data reference is explained next.

Creating Data Reference

Data references help you to import references of objects created in data shortcuts into other drawings. Data references are lightweight copies of original objects and need very little space. When you import the referenced data shortcuts into an active drawing, you can edit objects to some extent without actually affecting the source drawings. The referenced data shortcut objects can only be imported into the active drawings. These objects are also called consumer drawings. Note that you can import only one such copy into an active drawing. To reference a data shortcut for a surface into a new drawing, expand **Data Shortcuts > Surfaces** in the **Prospector** tab. Next, right-click on the data shortcut created for the surface and choose **Create Reference** from the shortcut menu displayed, as shown in Figure 13-12.



*Figure 13-12 Choosing the **Create Reference** option*

On doing so, the **Create Surface Reference** dialog box will be displayed, as shown in Figure 13-13. Enter a new name of the surface, if required. Select an option from the **Value** field of the **Style** property and then choose the **OK** button; the **Create Surface Reference** dialog box will be closed and the surface will be displayed in the drawing according to the surface style selected. Thus, you have created a data shortcut, data reference, and imported the surface object in a new drawing or a consumer drawing.

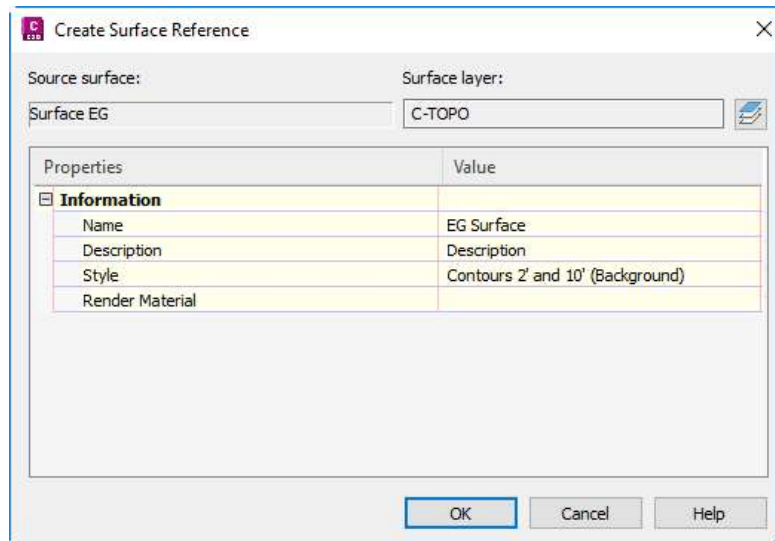


Figure 13-13 The Create Surface Reference dialog box

Similarly, you can import alignments, pipe networks, view frame groups, and profiles in the consumer drawing and work on them without affecting the source drawings. After creating the data references, choose **File > Save As** from the **Application Menu**; the **Save Drawing As** dialog box will be displayed. Navigate to the location *C:\Civil 3D Project Templates_Sample Project\Production Drawings* and save the drawing. All data shortcut project drawings can be saved in the **Production Drawings** subfolder of the data shortcut folder.

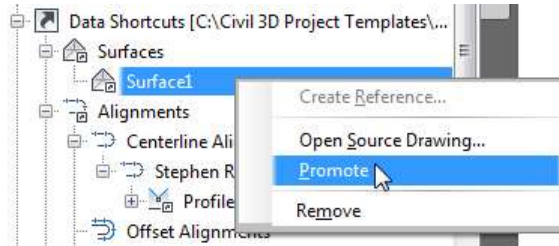
Promoting References

Ribbon: Manage > Data Shortcuts > Promote All Data References
Command: PROMOTEALLREFERENCES

When a reference is promoted, the copy of the object referenced in the current drawing becomes an independent and editable object. Also, the promoted object is not affected by any updation in the original object in the source drawing.

To promote all the references in a drawing, choose the **Promote All Data References** tool from the **Data Shortcuts** panel; the **Promote All Data References** message box will be displayed. This message box informs that you have chosen to replace all the data references in the current file with the objects that they reference. Next, you can choose the **Promote all referenced objects into the current file** button to promote all referenced objects in the drawing.

To promote only one or two referenced objects to the current file, expand the **Data Shortcuts** folder and then the required object folder. For example, if you want to promote a surface object, expand the **Surfaces** folder and right-click on the reference surface and choose **Promote** from the shortcut menu displayed, as shown in Figure 13-14; the **Create Surface Reference** dialog box will be displayed. Enter the required information in this dialog box and choose the **OK** button; the individual surface will be promoted.



*Figure 13-14 Choosing the **Promote** option to promote the surface reference*

Similarly, you can promote individual reference objects such as alignments, profiles, pipe networks, and so on.

Synchronizing Data References

Ribbon: Manage > Data Shortcuts > Synchronize References
Command: SYNCHRONIZEREFERENCES

When the source drawing is updated or modified, you need to synchronize or update the referenced object. To do so, choose the **Synchronize References** tool from the **Data Shortcuts** panel; the reference object will be updated according to the changes made in the original surface in the source drawing. Alternatively, to synchronize or update the referenced object, expand the object node such as the **Surfaces** node in the **Prospector** tab of the **TOOLSPACE** palette. Next, right-click on the out-of-date reference surface indicated by the out-of-date symbol and then choose the **Synchronize** option from the shortcut menu displayed. Similarly, you can synchronize and update all other reference objects. Civil 3D will display a message whenever a source object is changed or updated.

TUTORIALS

Before starting the tutorial, you need to download and save the tutorial files on your computer. To do so, follow the steps given below:

1. Log on to www.cadcam.com and browse to *Textbooks > Civil/BIM/GIS > AutoCAD Civil 3D > Exploring AutoCAD Civil 3D 2027 with Videos*. Next, click on **Tutorial Files** in the **Download Resources** area and then click on *c13_c3d_2027_tut.zip* to download it.
2. Now, save and extract the downloaded folder to the following location:

C:\c3d_2027



Note

While opening the tutorial file, the **PANORAMA** window may appear with an error message. Close this window to proceed further.

The following tutorials are available in video format. Follow the instructions given in the preface to access the videos if you have not already accessed them. Once your registration is complete, you will have access to all video tutorials included in this book.

Tutorial 1

View Frames and Sheets

In this tutorial, you will create view frames and sheets using plan production tools, refer to Figure 13-15. **(Expected time: 30 min)**

The following steps are required to complete this tutorial:

- a. Open the file.
- b. Create view frames.
- c. Create sheets.
- d. Save the file.

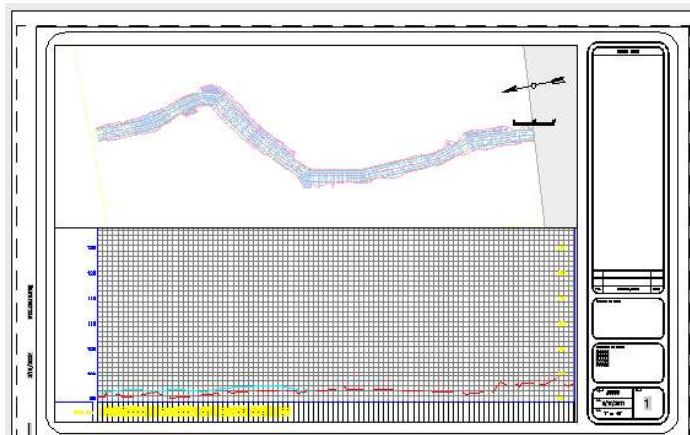


Figure 13-15 The sheet with plan and profile views

Opening the File

1. Open the *c13_c3d_2027_tut.zip* file that you downloaded from <https://www.cadcim.com>, as explained in Chapter 2.
2. Choose **Open > Drawing** from the **Application Menu**; the **Select File** dialog box is displayed.
3. In this dialog box, browse to the location *C:\c3d_2027\c13_c3d_2027_tut* and select the file *c13_c3d_2027_tut01.dwg*.
4. Choose the **Open** button to open the file. Ignore the error message if displayed in the **PANORAMA** window.

Creating View Frames

1. Choose the **Create View Frames** tool from the **Plan Production** panel of the **Output** tab; the **Create View Frames** wizard with the **Alignment** page is displayed.
2. In the **Alignment** page of this wizard, select the **Stephen Road** option from the drop-down list in the **Alignment** area if it is not selected by default.
3. Select the **Automatic** radio button in the **Station Range** area of the **Alignment** page of the wizard.
4. Choose the **Next** button; the **Sheets** page of the **Create View Frames** wizard is displayed.
5. In the **Sheet Settings** area of the **Sheets** page, select the **Plan and Profile** radio button. Next, choose the browse button displayed on the right of the **Template for Plan and Profile sheet** edit box; the **Select Layout as Sheet Template** dialog box is displayed, as shown in Figure 13-16.

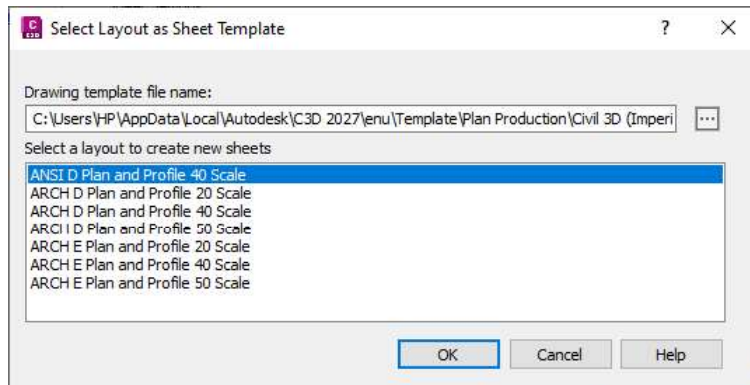


Figure 13-16 The Select Layout as Sheet Template dialog box

6. In this dialog box, choose the browse button on the right of the **Drawing template file name** edit box; the **Select Layout as Sheet Template** dialog box is displayed.

7. In this dialog box, browse to the location *C:\Users\<username>\AppData\Local\Autodesk\C3D 2027\enu\Template\Plan Production* and then select the *Civil 3D (Imperial) Plan and Profile.dwt* template file if it is not selected by default.
8. Choose the **Open** button to return to the **Select Layout as Sheet Template** dialog box. In this dialog box, ensure that the **ANSI D Plan and Profile 40 Scale** option is selected in the **Select a layout to create new sheets** list box. Next, choose the **OK** button; the dialog box is closed.
9. In the **View Frame Placement** area of the **Sheets** page, make sure that the **Along alignment** radio button is selected. Choose the **Next** button; the **View Frame Group** page of the **Create View Frames** wizard is displayed.
10. In this page, enter **Stephen group** in the **Name** edit box of the **View Frame Group** area.
11. Accept all the default values in the **View Frame** area and choose the **Next** button; the **Match Lines** page of the wizard is displayed.
12. Accept the default values in this page and then choose the **Next** button; the **Profile Views** page of the **Create View Frames** wizard is displayed.
13. Retain the default settings in this page and choose the **Create View Frames** button from the wizard; the view frames are created, as shown in Figure 13-17.

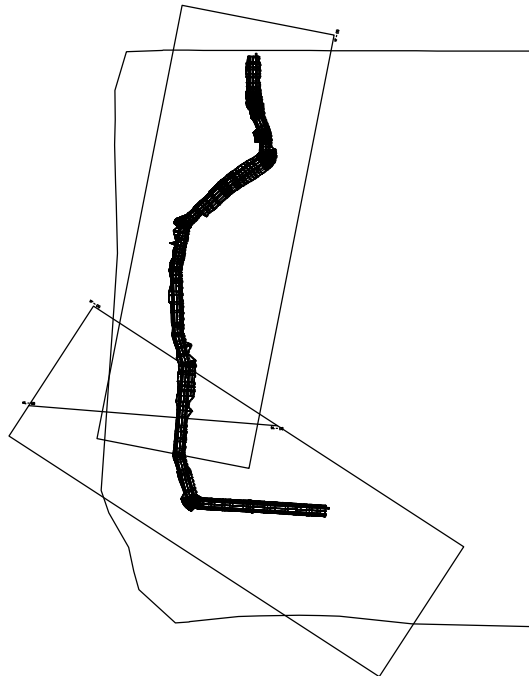


Figure 13-17 The Stephen group view frames

Creating Sheets

1. Choose the **Create Sheets** tool from the **Plan Production** panel of the **Output** tab; the **View Frame Group and Layouts** page of the **Create Sheets** wizard is displayed.
2. In the **Layout Creation** area of this page, enter **Stephen sheet** in the **Layout name** edit box.
3. In the **Choose the north arrow block to align in layouts** drop-down list, select the **North** option.
4. Retain all other default settings in the **View Frame Group and Layouts** page and choose the **Next** button; the **Sheet Set** page of the **Create Sheets** wizard is displayed.
5. In the **Sheet Set** area, ensure that the **New sheet set** radio button is selected. Next, choose the Browse button on the right of the **Sheet set storage location** edit box; the **Browse for Sheet Set Folder** dialog box is displayed.
6. Browse to the location *C:\Users\<user name>\Documents\Autodesk* in this dialog box and select the folder *My Civil 3D Tutorial Data*.



Note

If the My Civil 3D Tutorial Data folder is not available at C:\Users\<user name>\Documents\Autodesk, create a new folder and rename it as My Civil 3D Tutorial Data.

7. Choose the **Open** button; the **Browse for Sheet Set Folder** dialog box is closed and the **Sheet Set** page of the **Create Sheets** wizard is displayed.
8. In the **Sheets** area of the **Sheet Set** page of the wizard, choose the Browse button next to the **Sheet files storage location** edit box; the **Browse for Folder** dialog box is displayed.
9. Navigate to the location *C:\Users\<user name>\Documents\Autodesk\My Civil 3D Tutorial Data* and choose the **Open** button to return to the **Sheet Set** page.
10. Enter **Stephen sheet file** in the **Sheet file name** edit box and choose the **Next** button; the **Profile Views** page is displayed.
11. Retain the default settings in the **Profile Views** page and choose the **Next** button to display the **Data References** page.
12. Ensure that the **Alignments** check box is selected. Select the **Surfaces** check box to draw the surface in the sheet.
13. Choose the **Create Sheets** button in the wizard; the **AutoCAD Civil 3D 2027** message box is displayed, as shown in Figure 13-18.

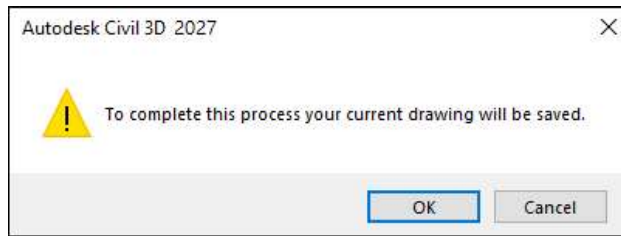
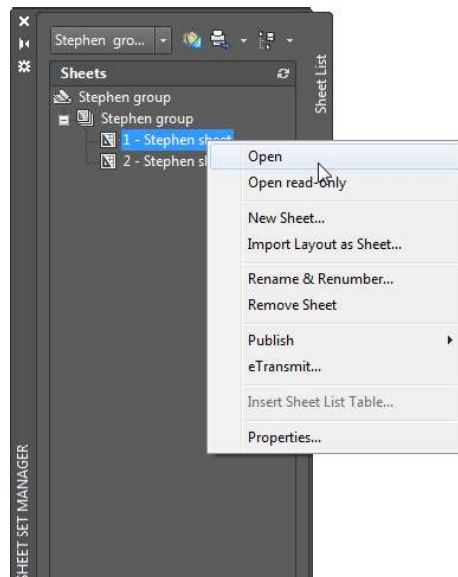


Figure 13-18 The AutoCAD Civil 3D 2027 message box

14. Choose the **OK** button; the message box is closed and you are prompted to specify the origin for the profile view.
15. Click in the drawing area; the **Create Sheets Progress Dialog** window is displayed showing the progress of the sheets creation. After the sheet creation process is completed, the **SHEET SET MANAGER** palette and the **PANORAMA** window are displayed. Close the **PANORAMA** window.
16. Right-click on the first sheet **1-Stephen sheet** in the **SHEET SET MANAGER** palette and then choose the **Open** option from the shortcut menu displayed, as shown in Figure 13-19. On doing so, the sheet is displayed in a new drawing, as shown in Figure 13-20. In addition, the **PANORAMA** window is displayed. Ignore the message and close the **PANORAMA** window.



*Figure 13-19 Choosing the **Open** option from the shortcut menu*

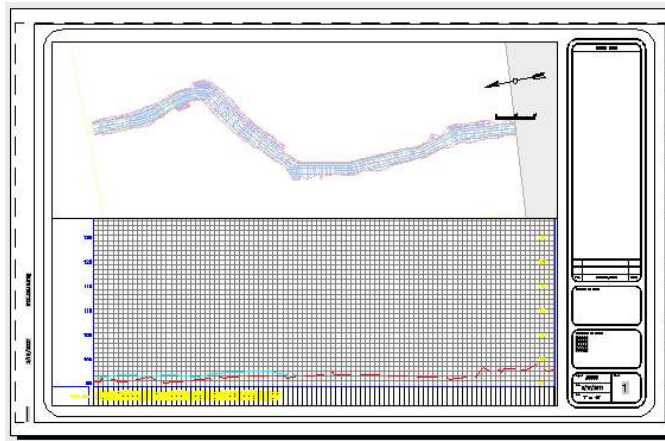


Figure 13-20 The sheet displayed in a new drawing

Saving the File

1. Choose **Save As** from the **Application Menu**; the **Save Drawing As** dialog box is displayed.
2. In this dialog box, browse to the following location:

`C:\c3d_2027\c13_c3d_2027_tut`
3. In the **File name** edit box, enter **c13_tut01a**.
4. Choose the **Save** button; the file is saved with the name *c13_tut01a.dwg* at the specified location.
5. Choose the **Close** button from the **Application Menu**; the file is closed.

Tutorial 2

Data

In this tutorial, you will create data shortcuts for different objects. **(Expected time: 30 min)**

The following steps are required to complete this tutorial.

- a. Open the file.
- b. Set up the Working Folder.
- c. Create new data shortcut folder.
- d. Associate Project to Current Drawing.
- e. Create data shortcuts.
- f. Reference data shortcuts.
- g. Reference the alignment.
- h. Reference the Pipe network.
- i. Save the file.

Opening the File

1. Choose **Open > Drawing** from the **Application Menu**; the **Select File** dialog box is displayed.
2. In this dialog box, browse to the location *C:\c3d_2027\c13_c3d_2027_tut* and select the file *c13_c3d_2027_tut02.dwg*.
3. Choose the **Open** button to open the file.

Setting Up the Working Folder

1. Select **Master View** if not selected by default, from the drop-down list displayed at the left of the **Prospector** tab in the **TOOLSPACE** palette, refer to Figure 13-21.

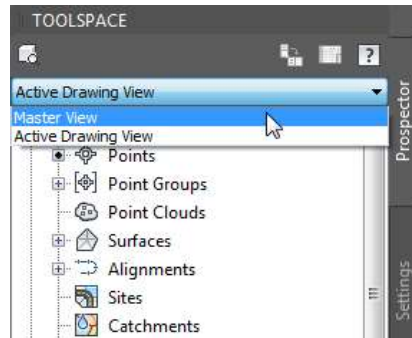


Figure 13-21 Selecting the Master View option

2. In the **Prospector** tab of the **TOOLSPACE** palette, right-click on the **Data Shortcuts** node and choose the **Set Working Folder** option from the shortcut menu; the **Browse For Folder** dialog box is displayed.
3. Browse to *C:\Users\<user name>\Documents\Autodesk\My Civil 3D Tutorial Data* and choose the **OK** button; the **Browse For Folder** dialog box is closed. Note that *My Civil 3D Tutorial Data* is the working or parent folder in which all the project and data shortcut folders will be saved.



Note

*If the **My Civil 3D Tutorial Data** folder is not available, create a new folder and rename it as **My Civil 3D Tutorial Data**.*

Creating a New Data Shortcut Folder

1. Right-click on the **Data Shortcuts** node and choose the **New Data Shortcuts Project Folder** option from the shortcut menu; the **New Data Shortcut Folder** dialog box is displayed.
2. Enter **New Data Shortcut Folder** in the **Name** edit box.
3. Select the **Use project template** check box and then choose the browse button on the right of **Project templates folder**; the **Browse For Folder** dialog box is displayed.

4. Browse to the location *C:\Civil 3D Project Templates* and select the *Civil 3D Project Templates* folder. If the folder is not available at the location, create a new folder and name it as **Civil 3D Project Templates**.
5. Choose the **OK** button to close the **Browse For Folder** dialog box and return to the **New Data Shortcut Folder** dialog box.
6. Choose the **OK** button in the **New Data Shortcut Folder** dialog box to exit it.

Associating Project to Current Drawing

1. Right-click on the **Data Shortcuts** node and choose **Associate Project to Current Drawing** from the shortcut menu displayed; the **Associate Project to Current Drawing** dialog box is displayed.
2. Ensure that the **New Data Shortcut Folder** option is selected in the **Select Project** drop-down and choose **OK**.

Creating Data Shortcuts

1. Save the current drawing file. Next, in the **Prospector** tab of the **TOOLSPACE** palette, right-click on the **Data Shortcuts** node and choose **Create Data Shortcuts** from the shortcut menu displayed; the **Create Data Shortcuts** dialog box is displayed, as shown in Figure 13-22.

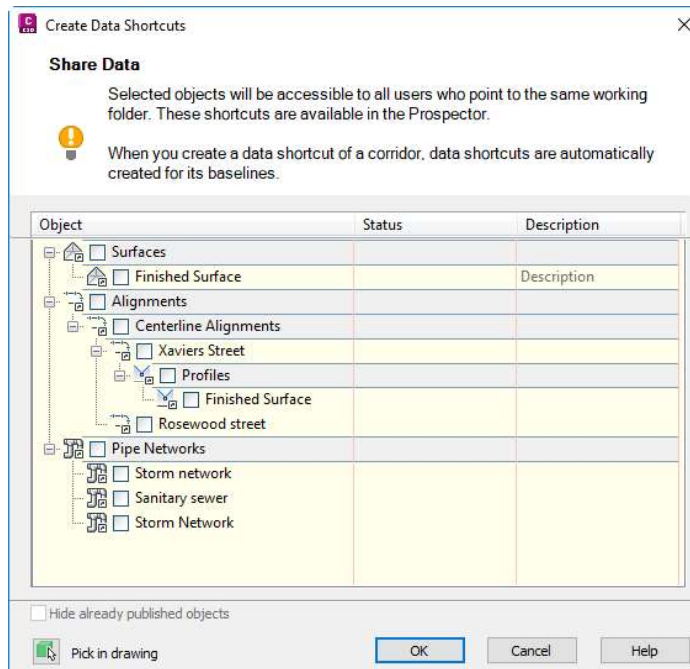


Figure 13-22 Partial view of the **Create Data Shortcuts** dialog box

**Note**

The *AutoCAD Civil 3D* message box is displayed if the current drawing file is not saved.

2. Select the **Surfaces**, **Alignments**, and **Pipe Networks** check boxes in the **Create Data Shortcuts** dialog box. Ensure that the **Rosewood street** and **Storm Network** check boxes are cleared.

The data shortcuts for **Rosewood street** and **Storm Network** will not be created.

3. Choose the **OK** button; the **Create Data Shortcuts** dialog box is closed and the data shortcuts for surface, alignment, and the pipe network objects are created.
4. Expand the **Data Shortcuts** node in the **Prospector** tab, and then expand the **Surfaces**, **Alignments**, and **Pipe Networks** sub-nodes to view the data shortcuts created from the objects, refer to Figure 13-23.

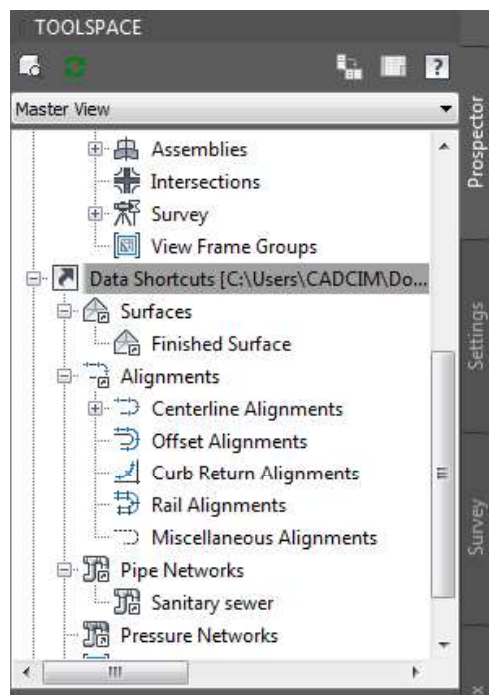


Figure 13-23 The Data Shortcuts node expanded

5. Open the Windows Explorer and browse to the location *Documents\Autodesk\My Civil 3D Tutorial Data\New Data Shortcut Folder_Shortcuts*.

- Click on the **Surfaces**, **Alignments**, and **PipeNetworks** folders and notice that an XML file for the objects is created in these subfolders.
- Close the Windows Explorer.

Referencing Data Shortcuts

- Choose **New > Drawing** from the **Application Menu**; the **Select template** dialog box is displayed.
- Select the *_AutoCAD Civil 3D (Imperial) NCS.dwt* file and choose the **Open** button to open a new drawing.
- Choose **Save As > Drawing** from the **Application Menu**; the **Save Drawing As** dialog box is displayed.
- Browse to *New Data Shortcut Folder* created earlier and then enter **Tutorial 2** in the **File name** edit box.
- Choose the **Save** button; the **Save Drawing As** dialog box is closed and the file is saved with the specified name.
- Expand **Data Shortcuts > Surfaces** in the **Prospector** tab of the **TOOLSPACE** palette if not expanded.
- Right-click on **Finished Surface** and choose the **Create Reference** option from the shortcut menu displayed, as shown in Figure 13-24; the **Create Surface Reference** dialog box is displayed, as shown in Figure 13-25.

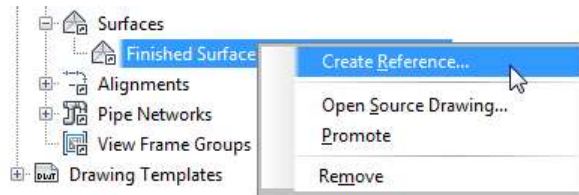


Figure 13-24 Choosing the Create Reference option

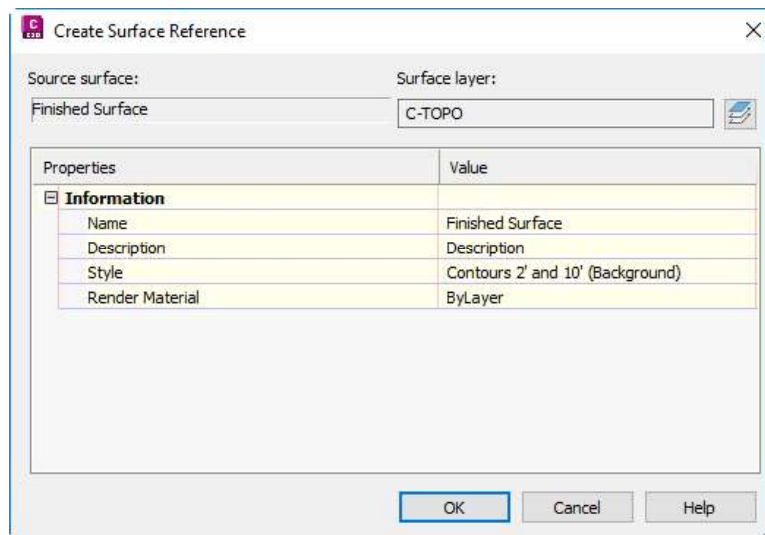


Figure 13-25 The Create Surface Reference dialog box

8. In the **Value** column of the **Name** property, enter **Surface reference** as the name of the surface.
9. Retain the other default settings and choose the **OK** button; the **Create Surface Reference** dialog box is closed. Also, **Finished Surface** will be referenced and displayed in the drawing of Tutorial 2, as shown in Figure 13-26. If the surface is not displayed, enter **ZE** in the command line to zoom and view the surface. The surface is referenced in a new drawing and added to the **Surfaces** node of the **Prospector** tab.

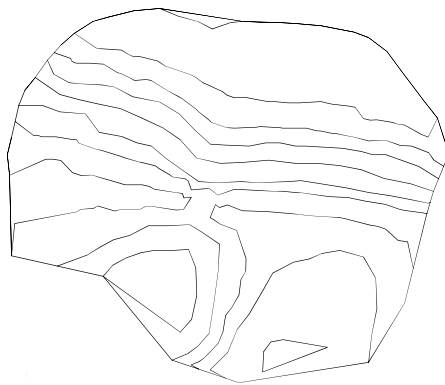
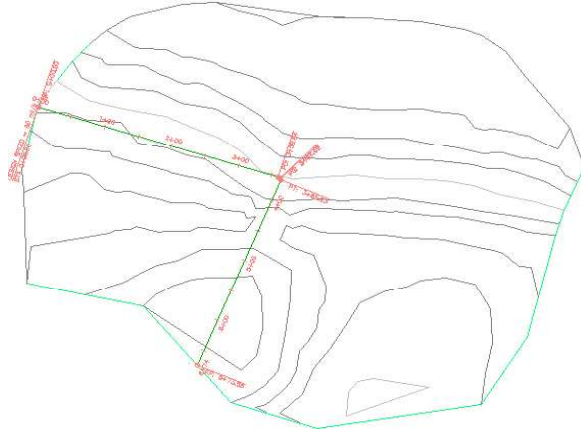


Figure 13-26 The referenced Finished Surface in the drawing of Tutorial 2

Referencing the Alignment

1. Right-click on **Xaviers Street** from **Data Shortcuts > Alignments > Centerline Alignments** in the **Prospector** tab; a shortcut menu is displayed.

2. Choose the **Create Reference** option from the shortcut menu; the **Create Alignment Reference** dialog box is displayed.
3. Enter **Xaviers Street Reference** in the **Name** edit box of this dialog box.
4. Retain the default settings for other parameters and choose the **OK** button to exit the dialog box; the **Xaviers Street** alignment is displayed in the drawing, as shown in Figure 13-27.



*Figure 13-27 The surface with the **Xaviers Street** alignment*

Referencing the Pipe Network

1. Right-click on the **Sanitary sewer** option from the **Data Shortcuts > Pipe Networks** in the **Prospector** tab; a shortcut menu is displayed.
2. Choose the **Create Reference** option from the shortcut menu; the **Create Pipe Network Reference** dialog box is displayed.
3. Enter **Sanitary Sewer Reference** in the **Network name** edit box.
4. Select the **none** option from the **Structure label style** drop-down list if it is not selected by default and then choose the **OK** button to exit the dialog box. On doing so, the sewer reference network is displayed in the drawing, as shown in Figure 13-28. Ignore the warning message displayed in the **PANORAMA** window.

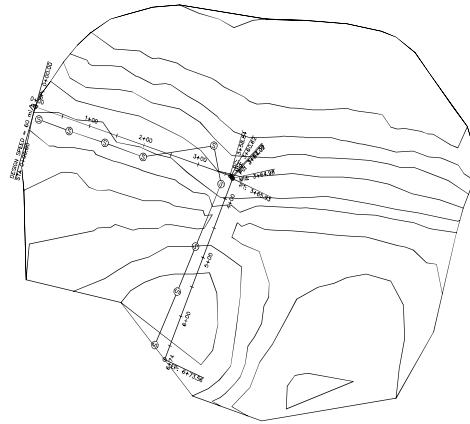


Figure 13-28 The surface with the sewer reference network

Saving the File

1. Choose **Save As > Drawing** from the **Application Menu**; the **Save Drawing As** dialog box is displayed.
2. In this dialog box, browse to the following location:

`C:\c3d_2027\c13_c3d_2027_tut`
3. In the **File name** edit box, enter **c13_tut02a**.
4. Choose the **Save** button; the file is saved with the name `c13_tut02a.dwg` at the specified location.

Self-Evaluation Test

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

1. The _____ tool is used to create the sheets that display the alignment sections and the profile views.
2. The _____ divide the alignment into different sections for visual presentation using sheets.
3. The _____ are used to maintain continuity between the frames of different sheets in a sheet set.
4. When a reference is _____, the copy of the object referenced in the current drawing becomes an independent and editable object.
5. A data shortcut can be defined as an _____ for different Civil 3D objects that can be inserted into one or more drawings.

6. To create data shortcuts, choose the _____ tool from the **Data Shortcuts** panel of the **Manage** tab.
7. The data shortcuts are created and managed in the _____ tab of the **TOOLSPACE** palette.
8. The data shortcuts are _____ files that provide reference copies of AutoCAD objects that can be inserted in drawings.
9. A collection of view frames is called as the _____.
10. The **Sheets** page of the **Create View Frames** wizard provides _____, _____, and _____ options to generate a sheet.
11. The last step in generating sheets is to create the view frames along an alignment. (T/F)
12. To create a view frame, choose the **Create View Frames** tool in the **Plan Production** panel of the **Output** tab. (T/F)
13. A data shortcut is a link that can be used to access the data objects in a new drawing. (T/F)
14. You can assign different label styles to the left and right labels of Match Lines. (T/F)
15. You cannot create view frames for a user specified station range. (T/F)

Review Questions

Answer the following questions:

1. Which of the following is a plan production tool?
 - a) **Create View Frames**
 - b) **Sheets**
 - c) **Data Reference**
 - d) None of these
2. A _____ is a straight line that indicates locations where one frame matches or intersects with the other in a view frame group.
3. The first important requirement for creating a view frame is an _____.
4. The _____ tool is used to synchronize or update reference objects.
5. A sheet is a collection of view frames. (T/F)
6. To set a working folder, choose the **Set Working Folder** tool from the **Data Shortcuts** panel of the **Manage** tab. (T/F)

7. You can create a data shortcut by using the **Create Data Shortcuts** option. (T/F)
8. The **Promote All Data References** tool is used to promote all references in a drawing. (T/F)
9. If you create a reference to an object, you cannot modify the geometry of the object. However, you can access its properties and data, apply styles and annotation to it, and perform some types of analyses on the object. (T/F)

EXERCISE

1. Log on to www.cadcim.com and browse to *Textbooks>Civil/BIM/GIS>AutoCAD Civil 3D>Exploring AutoCAD Civil 3D 2027 with Videos>Exercise Files & Instructor Guide*. Next, click on *c13_c3d_2027_exer.zip* file to download the file.
2. Now, save and extract the downloaded folder to the following location:

C:\c3d_2027



Note

While opening the exercise file, the **PANORAMA** window may appear with an error message. Close this window to proceed further.

Exercise 1

Open the *c13_c3d_2027_ex01.dwg* drawing file and create the view frames shown in Figure 13-29. Also, create the sheets using the view frames. **(Expected time: 30 min)**

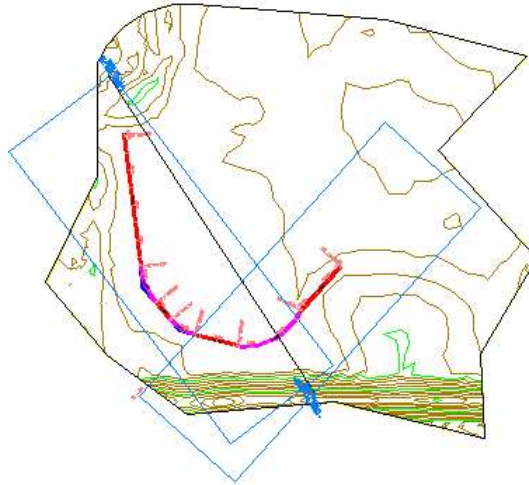


Figure 13-29 Surface with view frames

Answers to Self-Evaluation Test

1. Create Sheets, 2. View Frames, 3. match lines, 4. promoted, 5. external reference, 6. Create Data Shortcuts, 7. Prospector, 8. XML, 9. View Frame Groups, 10. Plan(s) only, Profile(s) only, Plan and Profile, 11. F, 12. T, 13. T, 14. T, 15. F