

Digitize geological interpretations on Target for ArcGIS drillhole maps

This document provides a description of the workflow to digitize geological interpretations on Target for ArcGIS section and plan maps. Using a combination of real data plotted on the map and expert knowledge, geologists can use their expertise to draw interpretations on drillhole maps. The 2D interpretations for all the features on all the section maps can be saved to the same Interpretations Geodatabase. The single file solution makes it easy to manage the interpretations and to share your work with others. The interpretations can later be joined to create 3D surfaces and bodies.

This document will guide you through the workflow to digitize geological interpretations on drillhole section and plan maps, including:

- › Setting up a new Wireframing Project
- › Starting to Digitize Geological Interpretations
- › Using the various Snapping modes
- › Editing Existing Interpretations
- › Viewing Interpretations in the 3D Viewer

A companion [how-to guide](#) explains how to build wireframes in 3D from the digitized interpretations.

Getting Started

 *When creating drillhole section or plan maps, be sure to select the **Load to separate data frame(s)** option from the Output tab. When several maps are loaded into an existing dataframe (e.g. when using the Current data frame option) that was not created by Target for ArcGIS plan or section tools, the location of the plane and the unique coordinates for the individual sections are not maintained. Using separate dataframes ensures that each dataframe has the correct coordinates needed for digitizing into an interpretations geodatabase.*

 *If one of the dataframes in your MXD contains multiple maps then you will not be able to digitize interpretations on dataframes in that MXD.*

Before you begin digitizing geological interpretations that will be joined into a wireframe, you must first create a series of section maps for your drillhole project. When creating the section maps, specify the downhole data to plot that you will use as a guide when digitizing your interpretations on the map. After you have created your section maps, use the *Target Wireframing Toolbar* to create the Interpretations Geodatabase, digitize interpretations, and manage the feature classes and interpretations in the Interpretations Geodatabase.

 *When creating the drillhole maps, plot the downhole data from composite databases to simplify digitizing and snapping.*

 *If you are plotting downhole lithology, you may also want to use Post text or Text bands from the Data tab. Offset*

from the rock patterns, these items can be used to highlight lithologies of interest.



Decreasing the distance between section maps and trying to position the holes as close to the centre of the section as possible will enable you to create more accurate interpretations and wireframes.

Target Wireframing Toolbar

The *Target Wireframing Toolbar* drives the digitizing workflow for drawing interpretations on your section maps. If the toolbar is not loaded in your MXD, right-click in the toolbar area under the menus, and select **Target Wireframing Toolbar**. Alternatively, you can load the toolbar from *Customize | Toolbars*.



Create a new Interpretations Geodatabase and Add Feature Classes

Target Interpretations Geodatabases are a special version of an Esri File Geodatabase that stores digitized interpretations drawn on section maps. Both polygon and polyline features can be stored in the same file geodatabase.

Interpretations Geodatabases store the following information:

- XYZ locations
- Coordinate system
- Attributes including feature names and feature templates



*The Coordinate system for your Interpretations Geodatabase will automatically be set based on the current Target drillhole database. It is recommended that you set the Coordinate system for your drillhole project before you create your section maps, Interpretations Geodatabase and any other output from your project. The Coordinate system for a drillhole project is set through **Data | Coordinate System**.*

To create a new Interpretations Geodatabase:

1. From the *Target Wireframing Toolbar*, select **New Interpretations Geodatabase** . The *New Interpretations Geodatabase* dialog appears.
2. Enter an **Output geodatabase name**.

To add a feature class to an Interpretations Geodatabase:

1. In the *New Interpretations Geodatabase* dialog, to the right of the *Feature classes* list, select **Add new feature class** . The *Add New Feature Class* dialog appears.
2. Enter a new feature class **Name**.
3. The *Type of feature* stored is set to **Polygon Features** by default. Change it to **Polyline Features** if required. Wireframing polygons will create a closed body (e.g., an alteration or lithology body). Wireframing polylines will

create an open surface (e.g., fault or vein)

4. Select the Feature Template **Default tool** and **Drawing symbol Colour** for the Feature (this colour will be used when you are creating interpretations on section maps, and can be changed later).
5. You can optionally enter a **Description** for the Feature class.
6. Click **Add**.
7. Continue adding as many Feature classes as you require for your project to the Interpretations Geodatabase. An Interpretations Geodatabase can store many polygon and polyline feature classes.
8. Click **OK** on the *New Interpretations Geodatabase* dialog.



If you need to change the Name, colour, digitization type or description for a feature class that you have added to an Interpretations Geodatabase, select the Feature class name from the list in the New Target Interpretations

*Geodatabase dialog and click **Edit selected feature class** .*

Open Interpretations Geodatabase

If you are returning to a project and would like to continue digitizing and managing interpretations in an existing Interpretations Geodatabase, click **Open Interpretations Geodatabase**  from the *Target Wireframing Toolbar*. The interpretations in the Geodatabase will automatically display on the section maps they were drawn on, if present in the current MXD.

Start Digitizing

Now that you have created a New Interpretations Geodatabase, and one or more feature classes to store interpretations in, you are ready to start digitizing.

To start digitizing features into an Interpretations Geodatabase:

1. Select one of the section data frames in your MXD, and switch to *Data View* mode. It is possible to digitize in *Layout View* mode, but it is usually much easier to do so in *Data View* mode.
2. On the *Target Wireframing Toolbar*, from the Editor menu, select the **Start Editing** menu. This enables the ArcGIS Edit mode, so that you can use the various Editing tools.
3. On the *Target Wireframing Toolbar*, select **Start Digitizing** . You will notice the *Create Features* panel appear on the right hand side of the ArcGIS application. The feature templates for each of the feature classes will be visible within this panel. Select the feature template that you wish to begin digitizing.
4. If **Use Snapping** is turned on (a check mark will appear next to the Use Snapping option in the *Snapping* dropdown menu), you will automatically be in the ArcGIS Shapefile Snapping mode. You can snap to True Drillhole Locations by enabling the **Snap to DH Database** option from the *Snapping* menu of the *Target Wireframing Toolbar*. You can turn Snapping off by clicking on the *Use Snapping* option (remove check mark) if you prefer to digitize without it.
5. If Snapping is on, hover the mouse over different parts of the section and observe how the cursor and the tooltip change when it comes within 10x10 pixels of various map layers.
6. Use the left mouse button to add Vertices for the polygon or polyline feature.

7. To end the interpretation (i.e. to close the polygon or end the polyline), right-click and select **Finish Sketch** (or short cut key F2).
8. Use steps 1 – 7 to digitize geological features on the same map, or to digitize features on other section maps. You can easily switch between section maps by activating other data frames listed in the Table of Contents (you will be prompted to save your edits when switching to another data frame).



*While digitizing, you can use the **Undo/Redo** options from the Standard ArcGIS toolbar, or from the Edit menu at the top of the screen, or use the Ctrl+Z or Ctrl+Y shortcut keys, respectively.*



To pan and zoom while digitizing, use any of the navigation buttons on the ArcGIS Tools toolbar, or use the assigned shortcut keys for (i.e. "C" for Pan, "Z" for Zoom In, "X" for Zoom Out).



Don't double-click to end the polyline or polygon as this adds two vertices at or near the very same location.



Digitizing more points will create smoother interpretations which will also create smoother wireframe surfaces once the 2D interpretations are joined into 3D surfaces.



If you recreate a section map using the same map location parameters, the interpretations in the Interpretations Geodatabase will remain visible on the map.



In Target for ArcGIS, a interpretation geodatabase can already be closed. Note that closing the TfA drillhole project in TfA will also close the interpretation layer. This is by design.

Snapping

ArcGIS Shapefile Snapping is enabled by default while digitizing geological features on a section map in Target for ArcGIS. You can disable or enable the Snapping mode by clicking on the *Use Snapping* menu item in the Snapping menu of the *Target Wireframing Toolbar*.

ArcGIS Shapefile Snapping

This is the native snapping behavior and tools which is available in ArcGIS. You are able to use this type of snapping with any of the Shapefile or Feature Class layers that might exist in your section or plan map data frames.

- The cursor will snap to the X, Y, Z location of the specified map layer projected onto the centre plane of the section. Only vector layers (shapefiles & feature classes) can be snapped to, not raster layers.
- If you enable the snapping cursor to remain still at a location, a tooltip will show the map layer (shapefile or feature class) that is being snapped to and the type of snapping being used (for example, vertex, edge).

Target Drillhole snapping

When creating geological features from section maps, geologists sometimes need to snap to the true 3D drillhole location of the data, rather than the projected map layer, such as a Shapefile. In this case, you can enable the *Snap to DH Database* menu item from the Snapping menu of the *Target Wireframing Toolbar*.

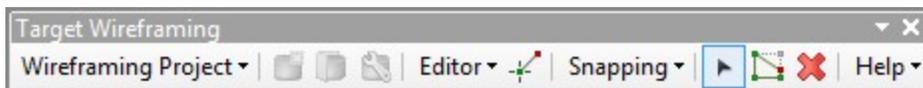
- ▶ The cursor will snap to the true X, Y, Z location along the drillhole trace for the top or bottom of the from-to intervals in the specified drillhole database.
- ▶ If you enable the snapping cursor to remain still at a location, a tooltip will show the database and hole ID being snapped to, the distance away from the centre plane of the section and the true X, Y, Z position at that position.

Edit Existing Features

Now that you have created a set of interpretations, you may need to perform various edits to these interpretations, either to fix some mistakes made in the initial digitizing or to update the interpretations after new drillhole data has been added to the project.

Manage Feature Classes in an Interpretations Geodatabase

The *Manage Interpretations Geodatabase* option  on the Target Wireframing Toolbar enables you to add new feature classes, edit existing feature classes (change the name, colour and description) and delete feature classes for an Interpretations Geodatabase. Use this option should you need to make any changes to the feature classes in the current Interpretations Geodatabase.



Select Features to Edit Vertices or Delete a Shape

Before you can Edit Vertices or Delete an existing drawing, you must first select the feature that you want to modify.

1. Select the *Edit Tool*  from the *Target Wireframing Toolbar*.
2. Click on an interpreted shape on the section map to select it. Once selected, it will be bounded in cyan. Once you have selected an interpreted shape you can:
3. Click *Edit Vertices*  to start editing the vertices of the selected shape. The *Edit Vertices* toolbar will appear.
4. Click *Delete*  to delete that shape.



Any saved wireframe progress that is stored in the Geodatabase will be deleted for the feature. This operation cannot be undone.

Copy an interpretation from one feature class to another

If you digitize an interpretation on to a section map but realize that it was added to the wrong feature class, you can copy and paste the interpretation into the correct feature class by following these steps.

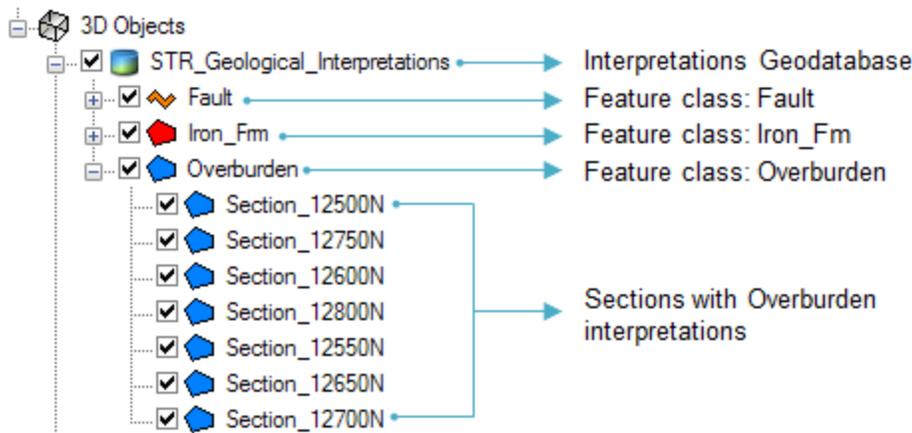
1. Select the *Edit Tool*  from the *Target Wireframing Toolbar*.
2. Click on an interpreted shape on the section map to select it. Once selected, it will be bounded in cyan.
3. **Right-click | Copy**, or from the Edit menu, select **Copy**, or use the shortcut keys Ctrl+C (copy) or Ctrl+X (cut).

4. **Right-click | Paste**, or from the Edit menu select **Paste**, or use the shortcut key Ctrl+V.
5. You will be asked which feature class you want to paste the shape into. Select the feature class to which you originally intended to add the interpretation.
The copied shape will be pasted into the selected feature class.
 - This method can be used to copy interpretations from one feature class to another, within an Interpretations Geodatabase, or it can be used to copy shapes that were originally drawn into another shapefile or feature to the Interpretations Geodatabase, so that they do not have to be re-digitized.

View the Interpretations Geodatabase in the 3D Viewer

Before you can start to wireframe the interpretations to create a single solid body, you might first want to view the interpretations in 3D, as a final quality control check on the individual interpretations.

1. Open the 3D Viewer for an existing 3D map, or to create a new 3D map, use **3D | Generate 3D Drillhole Plot**.
2. From the *Add to 3D* menu, select **Interpretations Geodatabase**.
3. Select the **Interpretations Geodatabase** and click **OK**. Your interpretations will display in the 3D Viewer. In the tree list, you will see the *Interpretations Geodatabase* as the top layer; your feature classes will be listed below this. Below each feature class, the section maps with interpretations for that feature class are listed.
4. You can optionally toggle items on or off in the tree list to help you visualize your model.



Any edits made to the interpretations on your section maps will automatically appear in the 3D Viewer when you re-open the 3D Viewer – there is no need to re-load the Interpretations Geodatabase.



Resize the 3D Viewer and a section map so you can see them side-by-side. Viewing the interpretations in the 3D Viewer, together with other 3D datasets, will give better context and help you understand which interpretations need to be recreated.

To wireframe your interpretations to create 3D bodies and surfaces, see the [Wireframe Geological Interpretations in 3D How-To](#) guide.