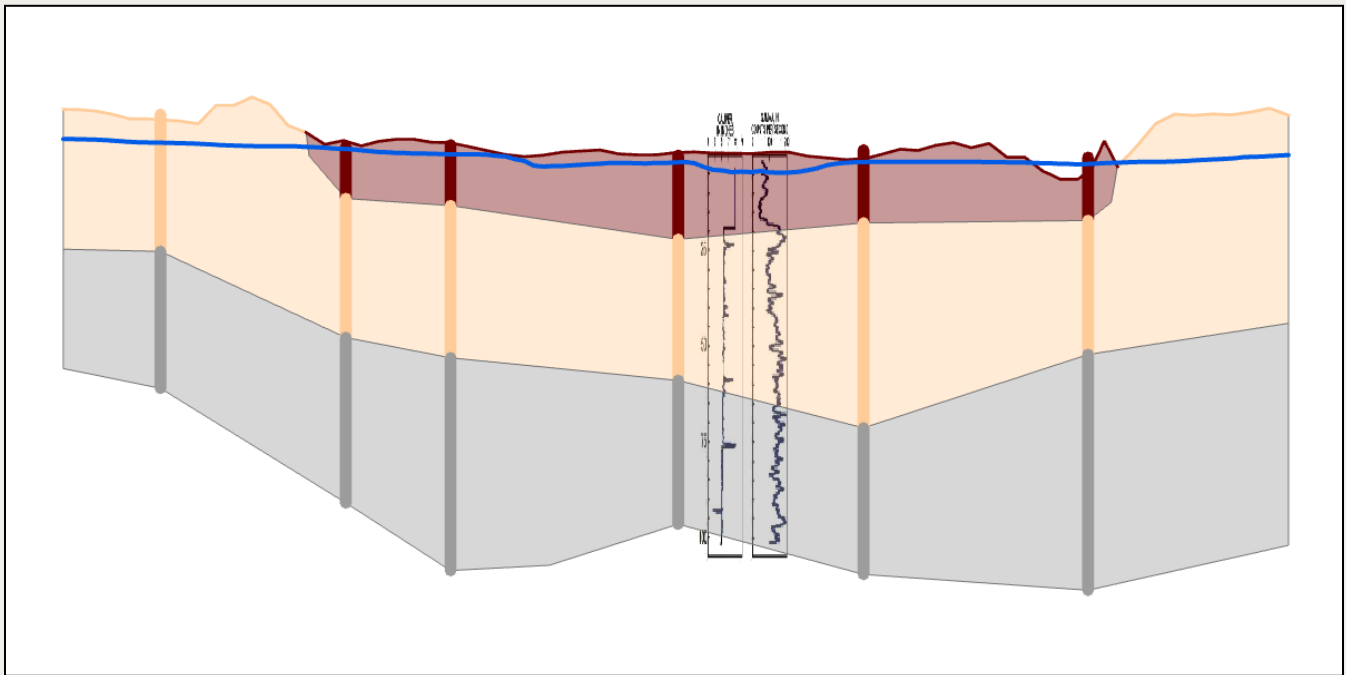




AHGW Pro 1.0 Tutorial

Subsurface Analyst – Adding Borehole Images to Cross Sections

Add borehole images to cross sections in ArcGIS Pro



Objectives

Learn how to use Arc Hydro Groundwater Pro tools to add borehole images to an existing cross section.

Prerequisite Tutorials

- Subsurface Analyst – Creating 2D Cross Sections

Required Components

- ArcGIS Pro
- Subsurface Analyst

Time

- 10–25 minutes

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1 Introduction

Arc Hydro Groundwater Pro (AHGW Pro) is a geodatabase design for representing groundwater datasets within ArcGIS Pro. The data model helps to archive, display, and analyze multidimensional groundwater data. It includes several components to represent different types of datasets, such as representations of aquifers and wells/boreholes, 3D hydrogeologic models, temporal information, and data from simulation models.

The *Arc Hydro Groundwater Pro Tools* help to import, edit, and manage groundwater data stored in an AHGW Pro geodatabase. *Subsurface Analyst* is a subset of the AHGW Pro Tools that is used to manage 2D and 3D hydrogeologic data, and create subsurface models including generation of borehole representations, cross sections, surfaces, and volumes.

This tutorial will show how to add borehole images to an existing cross section.

1.1 Background

Data used in this tutorial are from a study in the city of Woburn conducted by the USGS. The data were modified for the purposes of the tutorial. A separate tutorial (Creating 2D Cross Sections) shows how to create cross section in ArcGIS Pro, and its results are a map with cross sections describing hydrogeologic units in the Woburn area (Figure 1).

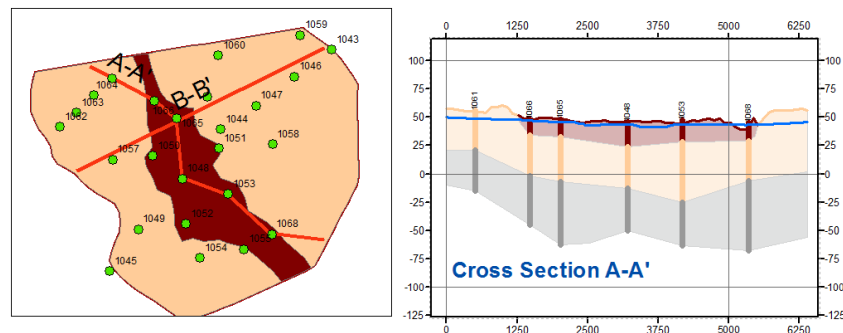


Figure 1 Map and cross section created in ArcMap as part of a separate tutorial

1.2 Outline

The objective of this tutorial is to introduce the wizard for adding borehole images to cross sections. It will cover the following tasks:

1. Select the well related to a borehole image.
2. Run the wizard that registers the borehole image.
3. View the registered image in the cross section data frame.

1.3 Required Modules/Interfaces



The following components should be enabled in order to complete this tutorial:

- ArcGIS Pro license.
- Arc Hydro Groundwater Pro Tools.
- Arc Hydro Groundwater Pro Tutorial Files.

The AHGW Pro Tools require that there is a compatible ArcGIS Pro service pack installed. Check the AHGW Pro Tools documentation to find the appropriate service pack for the version of the tools. The tutorial files should be downloaded and saved on a local drive.

2 Getting Started

Begin by opening a project containing the cross section of the Woburn area:

1. If on the ArcGIS Pro start page, select  **Open another project** in the bottom right corner of the window to open the *Open Project* dialog.
2. If already in the user interface, use the  **Open** macro to open the *Open Project* dialog.
3. Browse to the *Tutorials\subsurface analyst\XS2D_Borehole_Image* folder.
4. Select “XS2D_Borehole_Image.aprx” and
5. Click **OK** to exit the *Open* dialog and import the model file.

Once the file has loaded, a map of the model area will appear (Figure 2). The map includes an overview data frame showing the borehole locations and cross section lines, and a cross section (A-A') data frame showing the cross section for section line A-A'.

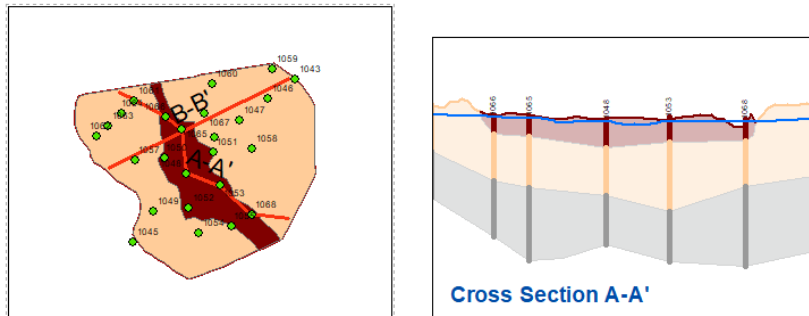




Figure 2 The initial project show in layout view

Before continuing, ensure that the AHGW Pro tools are correctly configured.


1. In the *Catalog* pane, expand the  **Toolboxes** folder.

The *ArcHydroGroundwater.pyt* toolbox should appear under the list of toolboxes. If toolbox is not visible, complete the following:

2. In the *Catalog* pane, right-click on  **Toolboxes** and use the  **Add Toolbox** command to open the *Add Toolbox* dialog.
3. Browse to the location of *C:\Program Files\Aquaveo\AHGW_ArcGIS_Pro_Python_Toolbox* directory and select and open the *ArcHydroGroundwater.pyt* file.

- Click **OK** to close the *Add Toolbox* dialog.

With the *ArcHydroGroundwater.pyt* toolbox available, access the Groundwater Analyst tool.

- Expand “ ArcHydroGroundwater.pyt”.

When using geoprocessing tools, it’s possible to set the tools to overwrite outputs by default, and automatically add results to the map/scene. To set these options:

- At the top of the *ArcGIS Pro* window, select the *Project* tab. From the list on the left, select **Options** to open the *Options* dialog.
- Select *Geoprocessing* from the list under *Application* on the left of the dialog.
- Ensure that *Allow geoprocessing tools to overwrite existing datasets* and *Add output datasets to an open map* are turned on.
- Select **OK** to exit the *Options* dialog.
- Using the arrow in the upper left corner, return to the main screen.

3 Adding Borehole Images to Cross Sections

The first step will be to select the appropriate Well (borehole) feature.

- Using the **Select**  tool, select Well 1048 as shown in Figure 3.

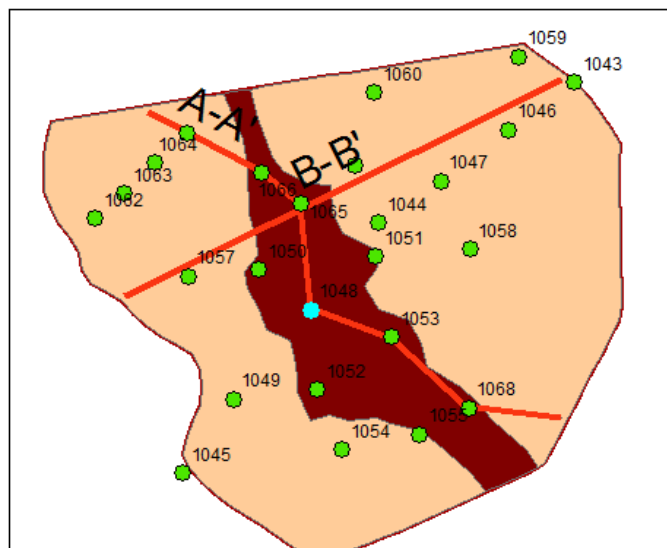





Figure 3 Selected well in the overview map. The borehole image added to the cross section will be related to the selected well.

To add a borehole image to the cross section we will use the *Add Borehole Image* tool available in the AHGW Pro toolbar.

- Select the *Arc Hydro Groundwater* tab in the toolbar.
- In the AHGW Pro toolbar in the *Subsurface Analyst* section, select the **Add XS2D Borehole Image**  tool to open the *Add XS2D Borehole Image* pane.
- Using the **Select**  tool located in the *SelectLine* section, click on A-A' SectionLine feature.

Make sure that the A-A' section line was selected by looking at the *Section Line Properties* section at the top of the wizard.

5. For the *Well layer* select “Well”.
6. For the *Unique ID field* select “HydroID”.
7. For the *XS2D Catalog Table* select “XS2D_Catalog”.
8. For the *Image File*, click the browse  button to bring up the *Choose XS2D Image* dialog.
9. Browse to the tutorial folder and select the “Log.jpg” file.
10. Click **Open** to close the *Choose XS2D Image* dialog and open the *Borehole Image* dialog.

In the Borehole Image dialog, vertically register the image. Use the sliding bars on the left and right to define top and bottom elevations on the image.

11. Move the ZTop sliding bar onto the 0 tick mark and the ZBottom sliding bar onto the 100 tick mark.

The land elevation at the location of the selected well is 45.7 ft. (This can be seen by looking at the LandElev attribute of the selected Well feature). Thus, the 0 tick mark is actually at an elevation of 45.7 and the 100 tick mark represents an elevation of -54.3 ft.

12. For *Z Top* enter “45.7”.
13. For *Z Bottom* enter “-54.3”.

At this point the dialog should be similar to the one shown in Figure 4.

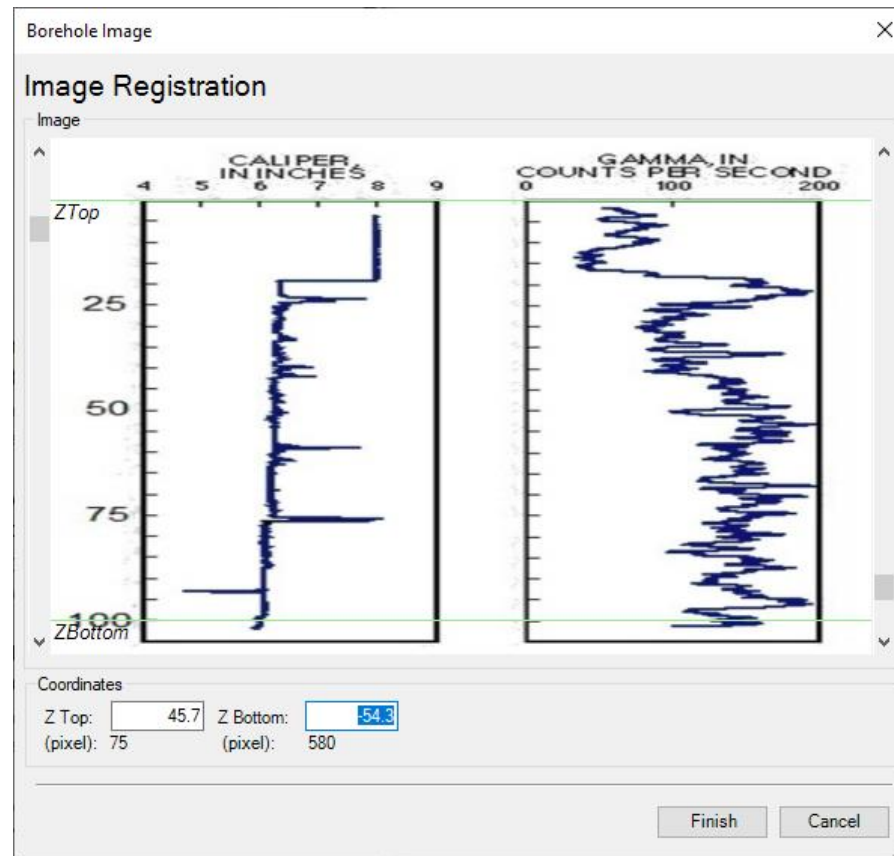


Figure 4 Step 2 of the Add Borehole Image Wizard - image registration

14. Select **Finish** to close the *Borehole Image* dialog.

Back in the *Add XS2D Borehole Image* pane, control the positioning and width of the image when it is added to the cross section.

15. Set the *Offset* to “100”.
16. Set the *Plot Width* to “500”.
17. Set the *Map* option to “Section A-A”.
18. Select **Create XS2D Data** to run the tool.

Once the tool has finished, view the registered image in the A-A' cross section.

19. Switch to the “ Section A-A'” view.

The registered image in the A-A' data frame should appear similar to Figure 5.

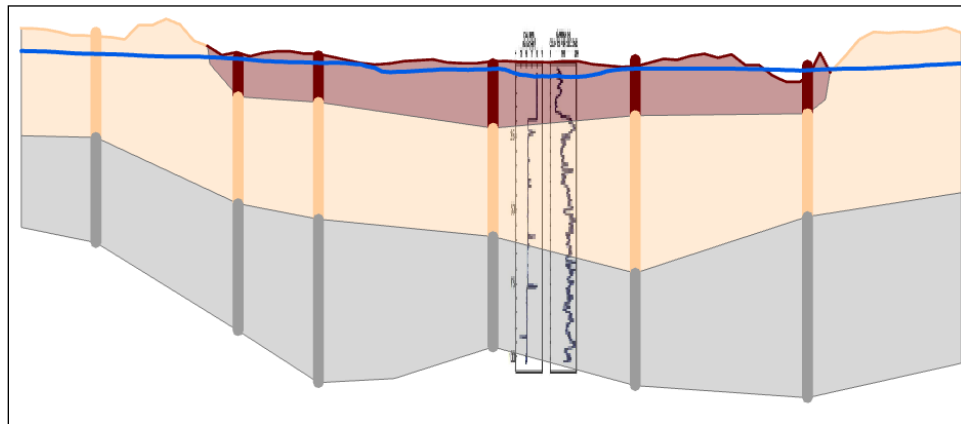


Figure 5 Cross section with registered borehole image

4 Conclusion

This concludes the tutorial. The key concept demonstrated in this tutorial is the ability to add borehole images to existing cross sections using the *Add Borehole Image Wizard*.