Practice Workbook

This workbook is designed for use in Live instructor-led training and for OnDemand self study.
OnDemand videos for this course are available through *CONNECT Advisor* and on the *LEARN Server*.

QuickStart using gINT Civil Tools

CONNECT Edition (10.01.00.xx)

- This PDF file includes bookmarks providing an overview of the document. Click on the bookmark to quickly jump to any section in the file.
- The dataset uses Imperial units.
- This training uses an *Example* workspace delivered with the software. It is important that you select the appropriate workspace and workset when working the exercises in this course.
- The terms *Left-click, Click, Select* and *Data Point* are used interchangeably to represent pressing the left mouse button. The terms *Right-click* and *Reset* are also used interchangeably. If your mouse buttons are assigned differently, such as for left-handed use, you will need to adjust accordingly.

Have a Question? Need Help?

If you have questions while taking this course, submit them to the Civil Design Forum on Bentley Communities where peers and Bentley subject matter experts are available to help.

TRNC02884-1/0002

Exercise 1: Overview and Settings

Description

gINT Civil tools is a power product (standalone application based on the MicroStation platform) that will be delivered with gINT. It allows gINT users to load gINT data in 2d models (mapping workflow for drilling plan creation and preliminary studies) as well as in 3d for subsurface interpretation and BIM workflows.

The data files for this course are included in a zip file that can be downloaded from the Bentley LEARNserver. We recommend you unzip the files to the *c:\Bentley Training* folder but it can be stored to a different location if you choose.

In this module you will review the gINT Civil Tools interface and settings.

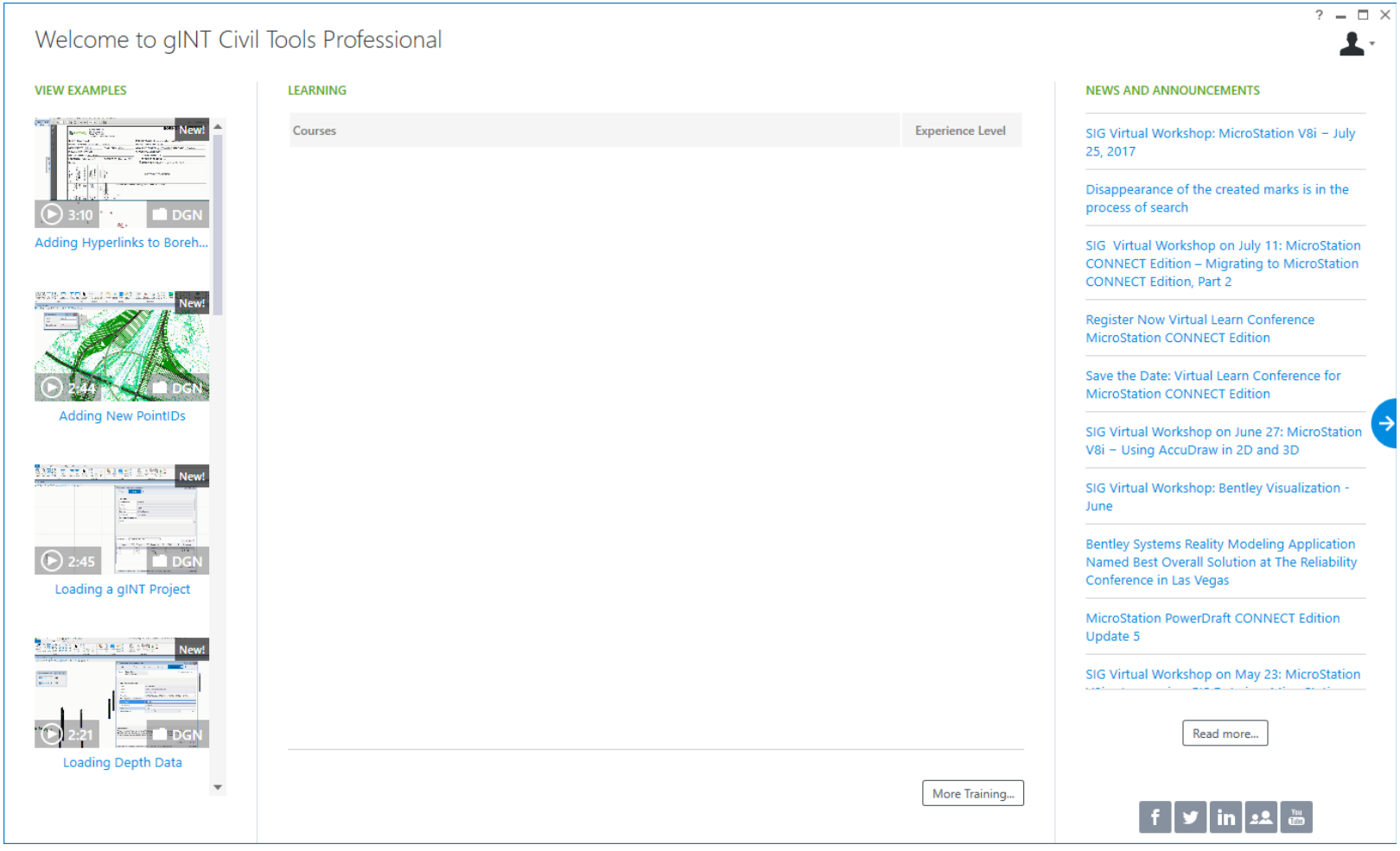
Skills Taught

- Become familiar with user interface
- Become familiar with backstage settings

Start gINT Civil Tools and Select Workspace

1. Start the **gINT Civil Tools** or **OpenRoads Designer** software.

   Note: The Startup Screen appears where example videos, learning courses, news, and announcements appear.



2. Click the **Start a Work Session** arrow on the right side of the screen.

3. Set the Workspace and Workset.

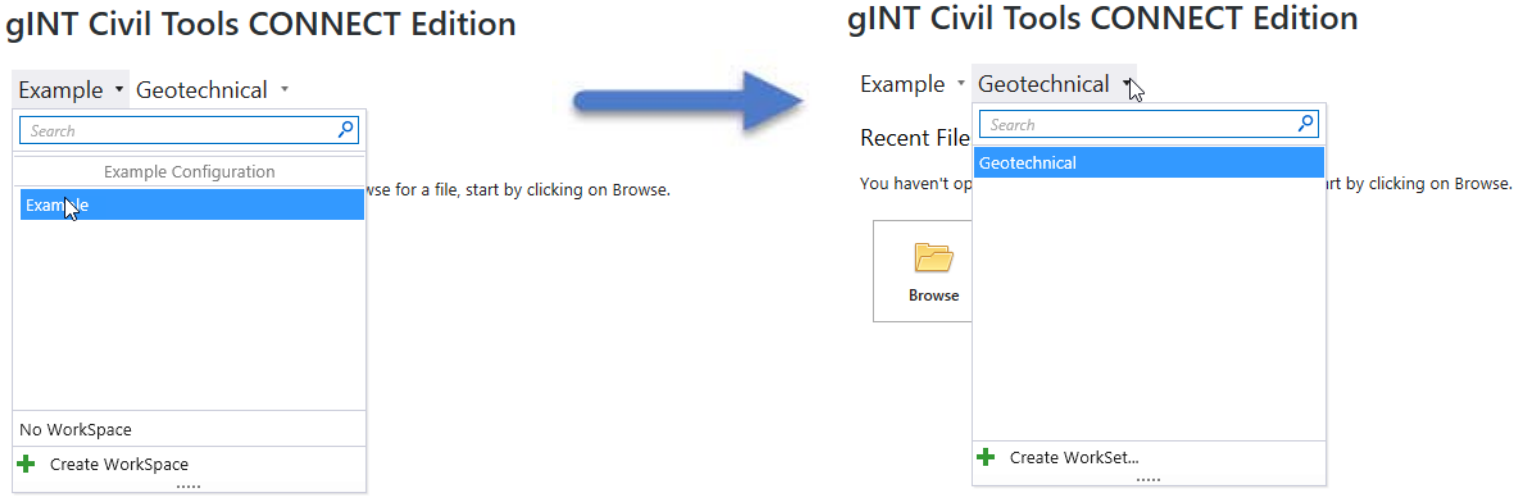
   This workshop requires the *Example* WorkSpace and *Geotechnical* WorkSet installed with the gINT Civil Tools or OpenRoads Designer software. The workspace and workset define standards that are used by the gINT tools.

   It is very important that a proper WorkSpace and WorkSet are selected for the software to operate properly.

   Setting up WorkSpaces and WorkSets are beyond the scope of this course but there are other courses that cover this topic.

   a. Select **Example** (if using the **gINT Civil Tools** software) or **Training and Examples** (if using the **OpenRoads Designer** software) from the *WorkSpace* menu.

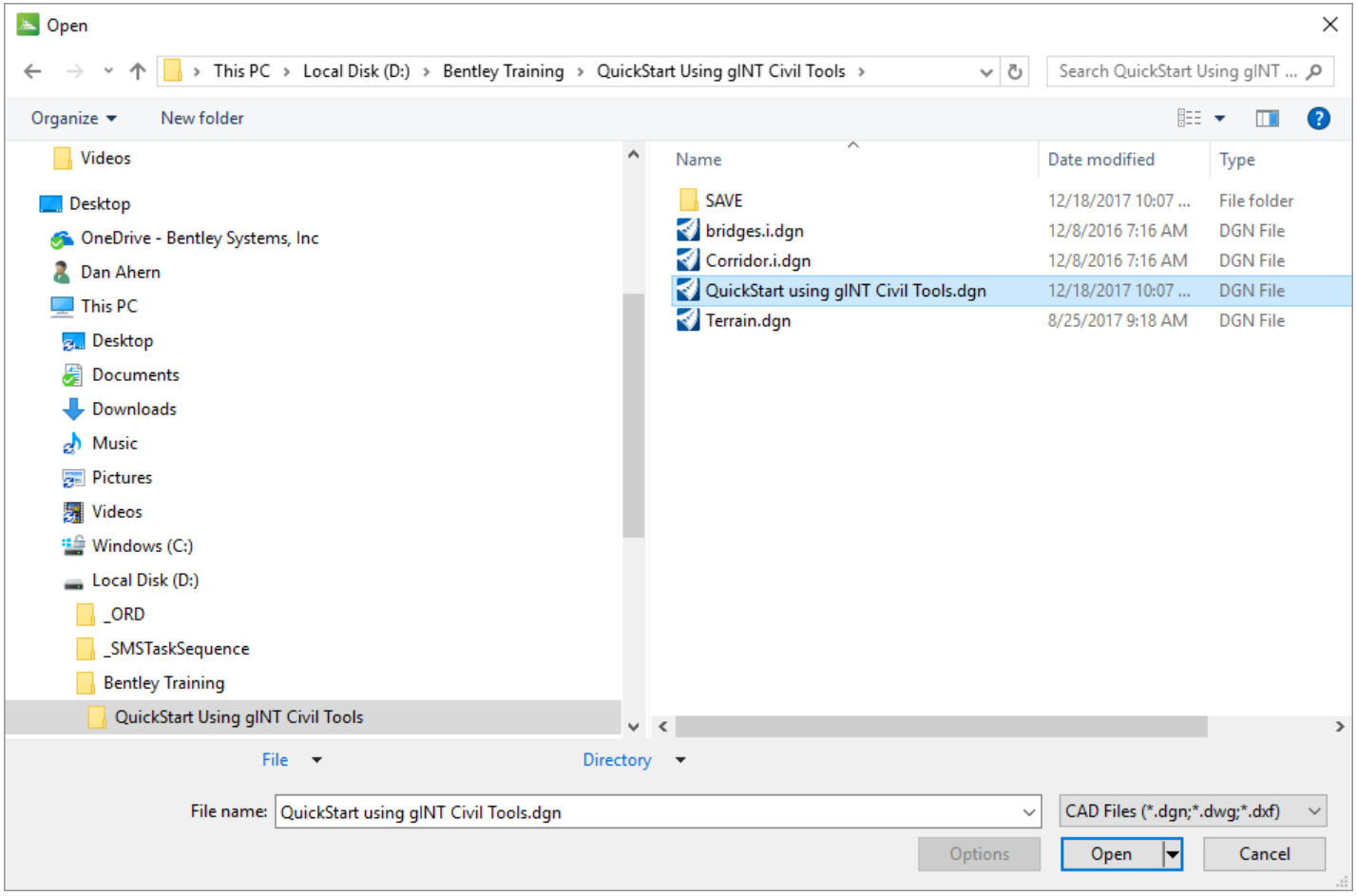
   b. Select **Geotechnical** from the *WorkSet* menu.



4. Open a 3D dgn file that will be used to display the geotechnical data.

   a. Select **Browse**.

   b. Browse to *c:\Bentley Training\QuickStart using gINT Civil Tools* or other folder where you unzipped the dataset files. This is the folder where the new dgn file will be stored.



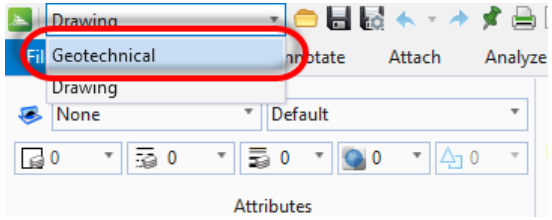
   c. Select the file named *QuickStart using gINT Civil Tools* and select **Open**.

Review the Interface

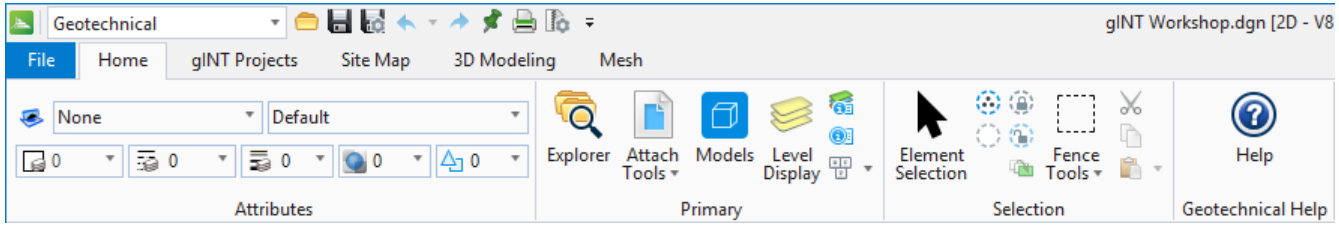
The user interface has multiple workflows (ribbons), the *Drawing* workflow hosts the CAD drawing (MicroStation) tools, and the *Geotechnical* workflow hosts the gINT tools.

---

1. Activate the **Geotechnical** *workflow* from the pick list in the upper left corner if it is not already active.



The ribbon menu changes to Geotechnical tools organized into familiar categories called *ribbon tabs*.



- **Home** - Common tools such as attributes, Explorer, references, models, element selection, and fences.
- **gINT Projects** - Tools to connect to gINT projects and load data.
- **Site Map** - Tools for the 2d mapping workflows (preliminary study, drilling plan creation)
- **3D Modeling** - Tools for creating 3d modeling (subsurface, section views.)
- **Mesh** - Tools for creating mesh surfaces

2. Searching the ribbon.

   When you are not sure where to find a tool on the ribbon interface the Search Ribbon field in the upper right corner is your best friend.

   a. Type **Database** in the search field.

      The matches found in the ribbon menus appear. The search is across all ribbon menus, not just the currently active ribbon.

   b. Hover over **Database Connectivity**.

      The search results expand showing where this tool is located on the ribbon.

   c. Select **Database Connectivity** to start that tool.

      Notice that the *Database Connectivity and Mapping* tool started but the ribbon menu did not change.

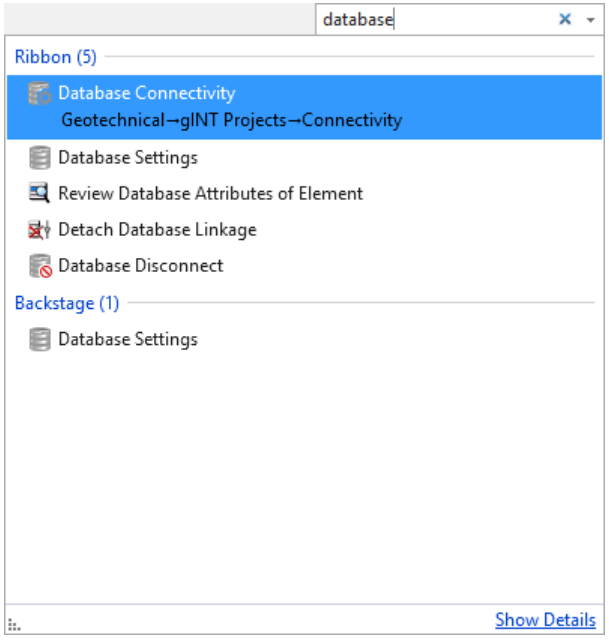
   d. Close the *Database Connectivity and Mapping* window.

   e. Type **Database** in the search field again.

   f. Hover over **Database Connectivity** to expand the search options.

   g. Select **Geotechnical → gINT Projects → Connectivity**.

      The ribbon changes to the selected menu which contains the Database Connectivity tool.



3. Introduction to the Backstage.

   a. Activate the *Back Stage View* by clicking **File** in the ribbon menu.

   b. Select **Settings**.

      Design File settings, preferences, customizations, etc. are found in the Backstage, keeping the ribbon menus focused on the tools.

   c. Select **User > AccuDraw Settings**.

   d. Disable the **Auto Load** option.

   e. Click the **Arrow** in the upper left corner to return to the design canvas.

4. Close AccuDraw if it is currently open.

Exercise 2: Database Connectivity and Mapping

Description

In this exercise you will learn to connect to a gINT database and define how those fields and properties are mapped to the borehole graphic elements.

Skills Taught

- Connect to gINT database
- Define how borehole cells will appear in 2D view
- Define which properties from the gINT database are stored on the borehole graphics

Database Connectivity and Mapping window

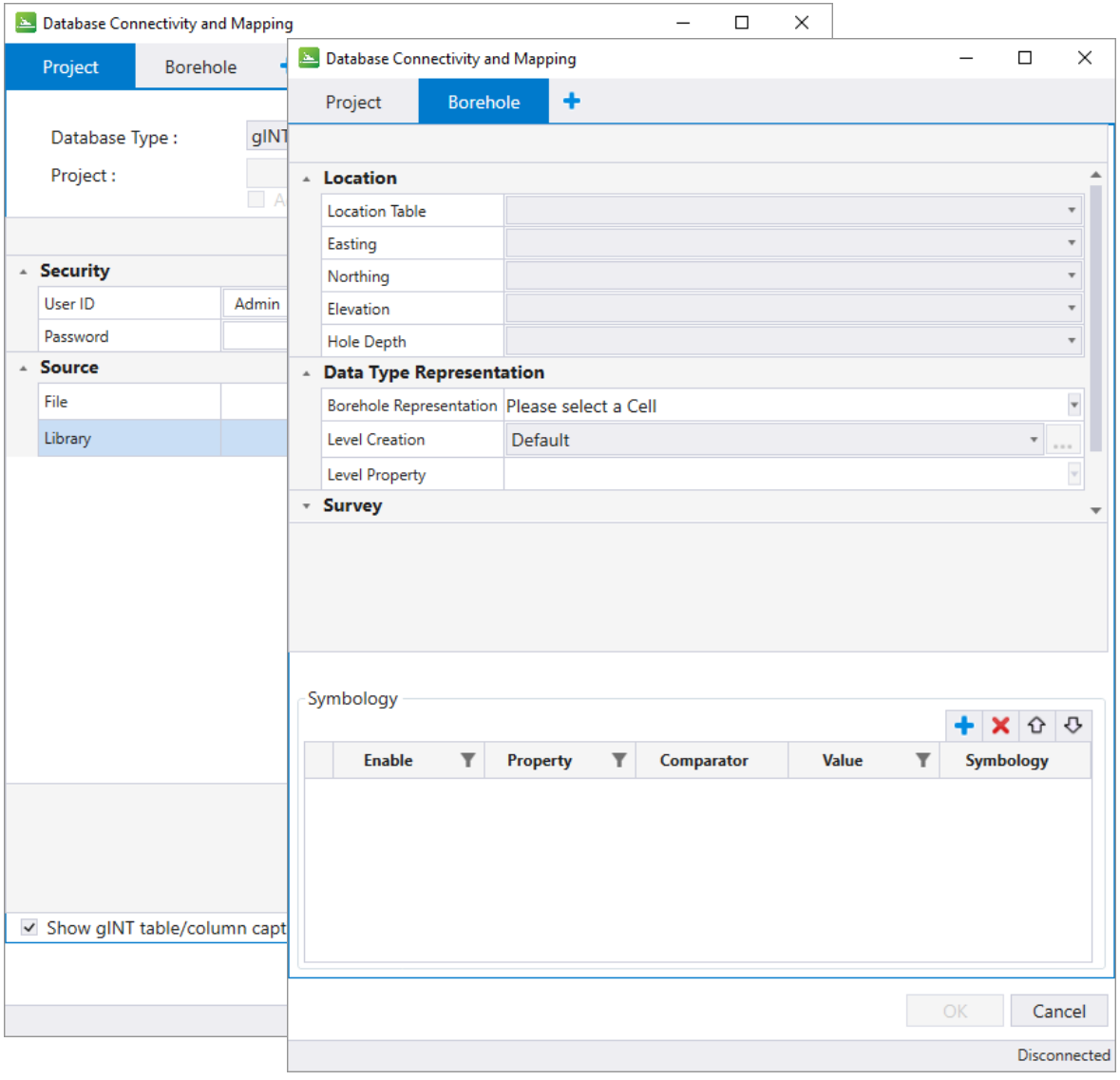
The *Database Connectivity and Mapping* window is the starting point of the product. It is used to connect to a gINT project and to define the mapping between the gINT Civil Tools data model and gINT project data. This is necessary because the gINT project data is flexible and it can be different for each organization.

There are two tabs in this window.

The **Project** tab defines the type, either a Microsoft Access based (.gpj) file, Microsoft Excel, or a SQL Server database, and path to a gINT project. Once a connection is made, it is stored in the design file and can be reused next time the DGN file is opened. Once saved, it can also be loaded in other files.

The **Borehole** tab defines the point table name and the different columns for the points. Optionally definitions such as the following can also be defined.

- an orientation and a plunge (even with curved boreholes)
- a set of additional properties that will be loaded with each point
- a custom cell (symbol) for the 2d symbolization, or property based symbolization (cell based on point's properties)



Loading a gINT Project

1. Load the project database.

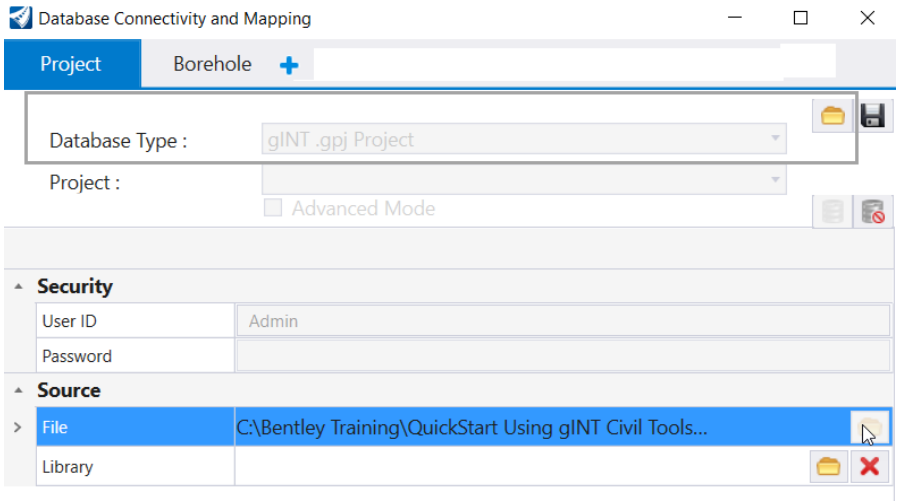
   a. Activate the **Geotechnical** *workflow* from the pick list in the upper left corner if it is not already active.

   b. Select *gINT Projects > Connectivity* > **Database Connectivity**.

   c. Select the **Project** tab.

   d. Set the *Database Type* to **gINT .gpj Project**.

   e. Set the *Source > File* to **gINT SampleDataset_Update1.gpj** file from the *c:\Bentley Training\QuickStart Using gINT Civil Tools* folder or other location where the workshop files are installed.



   f. Select the **Borehole** tab.

   g. Review the mappings defined in the *Location* section.

      The software automatically maps these fields to fields in the loaded project as best it can. In this situation the mappings are correct and no adjustments are needed. However, if the project used different field names it might be necessary to define proper mappings.

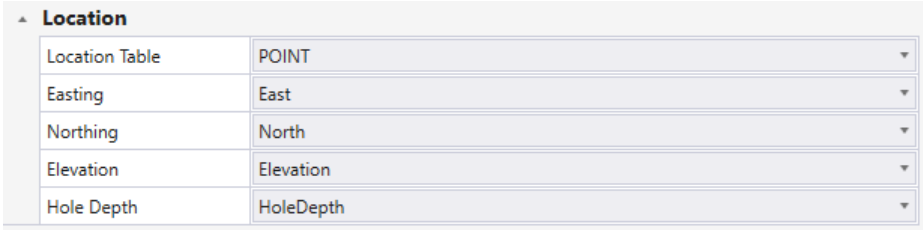
2. Define how point tables and columns are named.

   a. Select the **Project** tab.

   b. Disable the *Show gINT table/column Captions* option.

   c. Select the **Borehole** tab

   d. Notice that the names in the *Location* section changed.



   gINT tables and columns can be captioned to display recognizable, user-friendly names instead of the actual table names. For example, in gINT Workshop.gpj, the actual table name is *POINT*, but the caption name for the Location Table is *Borehole*. When the Show gINT table/column Captions option is enabled, the caption names will appear. When disabled, the database names will appear.

3. Define how boreholes are displayed.

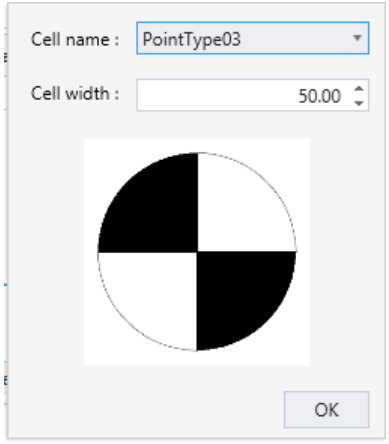
   a. Select the **Borehole Representation** field in the *Data Type Representation* section.

   b. Set the *Cell Name* to **PointType03**.

      Hint: Typing a letter in a list often advances the list to that letter. Here, you could type P rather than scroll.

      A cell is a graphic or dgn drawing that is frequently reused such as a borehole symbol.

   c. Set the *Cell Width* to **50**.



   d. Click **OK** to close the cell properties window.

      NOTE: The actual size of the borehole cell in the graphics is equal to the cell width multiplied by the *Annotation Scale Factor*. For example, if the Annotation Scale Factor is set to 1:1, the cells will be 50 feet or meters wide. However, if the Annotation Scale Factor is set to 1":100', the cells will be 60,000 feet wide (50' wide * 100 (scale factor) * 12 (inch to foot adjustment of scale factor). The Annotation Scale factor is not used in this QuickStart course but can be found by activating the **Drawing** *workflow* and selecting the **Utilities** tab.

4. Click **OK** to close the *Database Connectivity and Mapping* window.

Display the Points in the DGN file

1. Select *gINT Projects* > *Connectivity* > **Query All**.

   The Project Boreholes window appears showing all of the points in the projects.

2. Click **Retrieve** to display the points in the DGN file.

3. Select **Fit View**.

   The points are loaded and displayed as 2d cells.

4. Review the level where the borehole cells are displayed.

   a. Select *Home* > *Primary* > **Level Display**.

      The level named *Boreholes* was created when the points were loaded.

   b. Close the *Level Display* window.

5. Review the borehole properties.

   a. Select *Home* > *Selection* > **Element Selection**.

   b. Data point (left click) on any borehole graphic (cell) to select it.

   c. Reset (right click) and pause until the popup menu appears and select **Properties**

      NOTE: A “quick” right-click will clear the selection. A “long” right-click will open the popup menu.

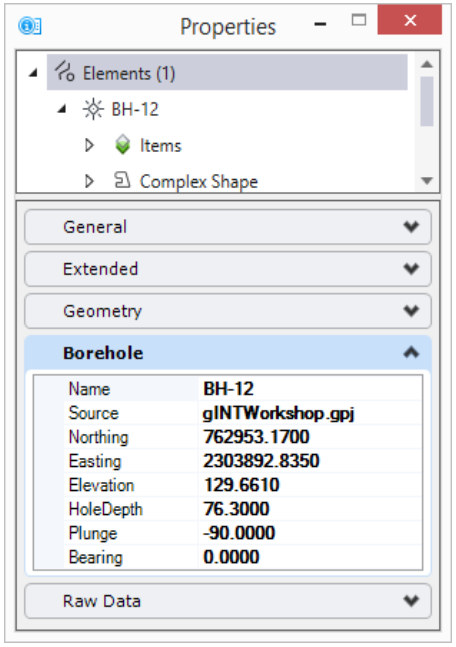
      Holding the cursor over a selected graphic (“clicking-and-hovering”) will show a Context Menu.

   d. OR select *Home* > *Primary* > **Properties** from the ribbon menu.

   e. Review the properties in the *Borehole* section.

   f. **Close** the *Properties* dialog.

      NOTE: The Context Menu (by clicking-and-hovering) provides a quick view of the properties at the cursor.



6. Annotate the Boreholes

A

a. Select *gINT Projects > Connectivity >* **Annotate Boreholes**.

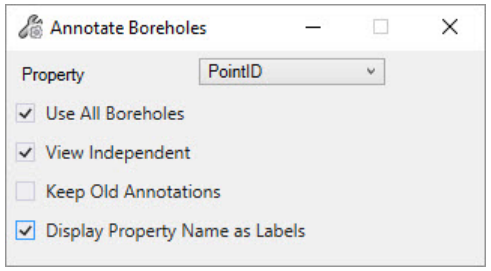
b. Select **PointID** for the *Property*.

c. Enable the **Use all Boreholes** check box.

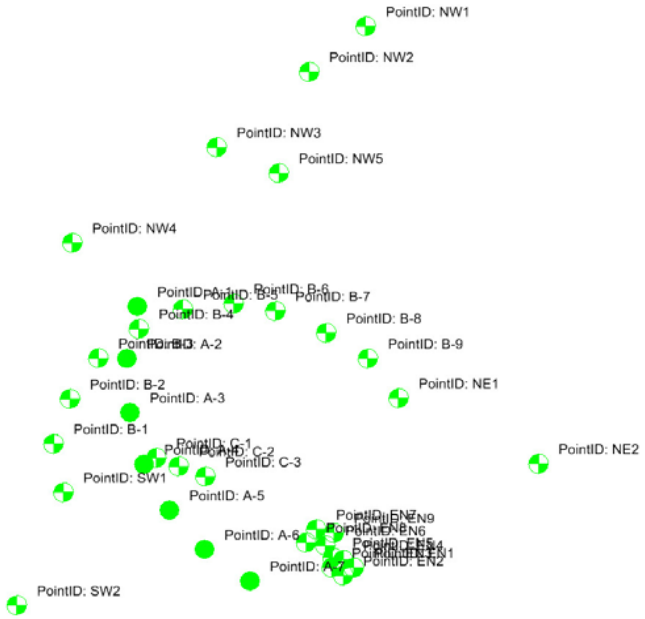
d. Enable the **View Independent** check box.

e. Enable the **Display Property Name as Labels** check box.

f. Data point to annotate the points.



The according Point IDs will now be displayed with each borehole. The *View Independent* option insures the annotation stays upright even when the view is rotated.

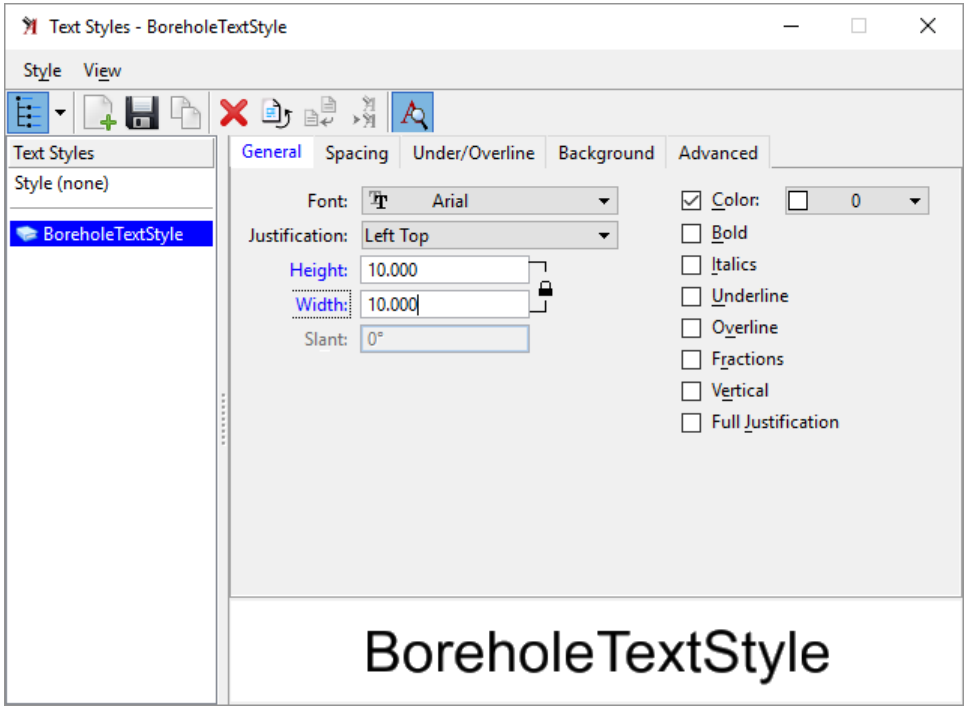


HINT: A shaded box may appear behind the annotation text. This box is a visual indicator of a text field. The display of this box can be turned off by selecting *File > Settings > User >* **Preferences**. In the Preferences dialog select the **Text category** and then enable the **Hide Field Background** option.

7. Editing the text style

Once the annotations are created, you can edit how they display using the Text Style tools.

a. Type **Text Styles** in the *Search Ribbon* field and press **Enter**.



b. Select the **BoreholeTextStyle** from the list on the left.

c. Set the *Height* and *Width* to **10**.

d. **Save** to apply the changes.

Adding Additional Borehole Properties

Additional properties can be added to the bore hole cells.

1. Add additional properties to the borehole.

   a. Select *gINT Projects* > *Connectivity* > **Database Connectivity**.

   b. Select the **Borehole** tab.

   c. Scroll to the **Other Properties** section.

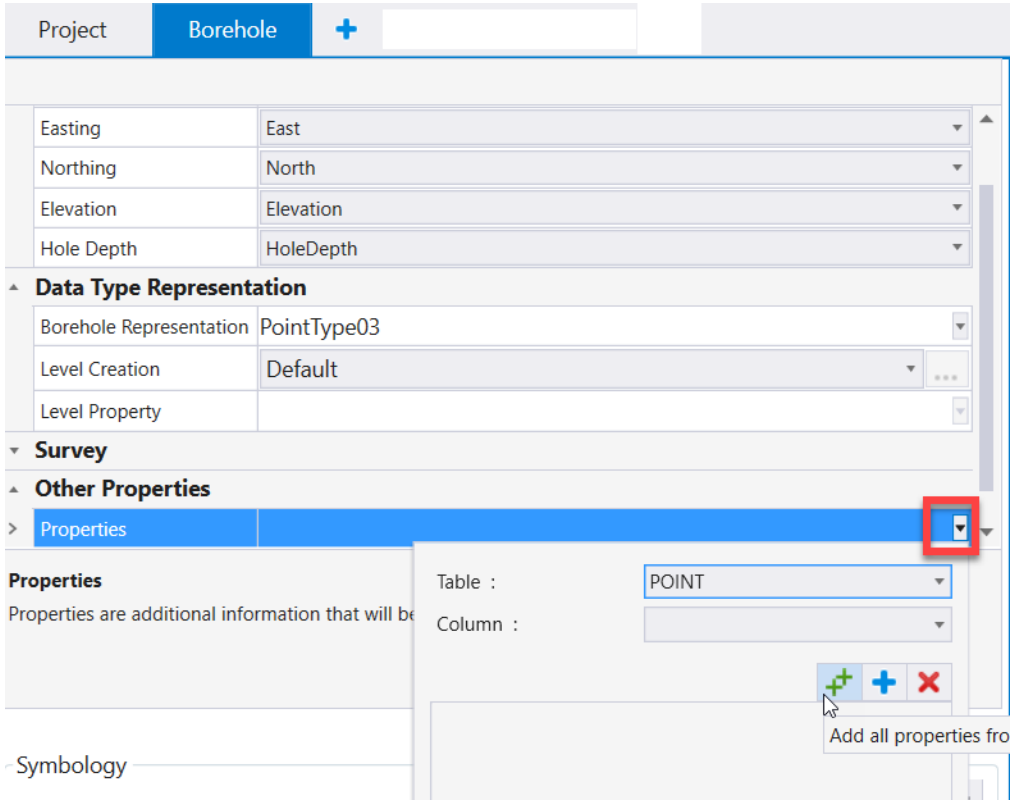
   d. Click the Down Arrow in the *Properties* field.

   e. Set the *Table* to **POINT** (or Borehole if captions are enabled).

   f. Click **Add all properties from selected table** to add all the properties from the selected table (POINT).

   g. Click **OK** to accept the property selections.

   h. Click **OK** to close the *Database Connectivity and Mapping* window.

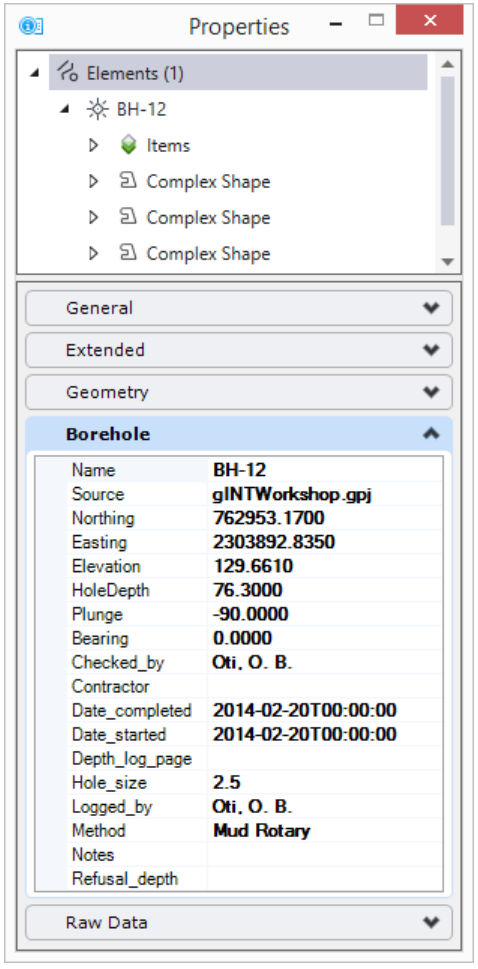


2. Update the borehole cells.

a. Select *gINT Projects* > *Connectivity* > **Query All**.

The Project Boreholes window appears showing all of the points in the projects.

b. Click **Retrieve** to display the points in the DGN file.



3. Add a symbolization rule to display borehole based on a property.

a. Select *gINT Projects* > *Connectivity* > **Database Connectivity**.

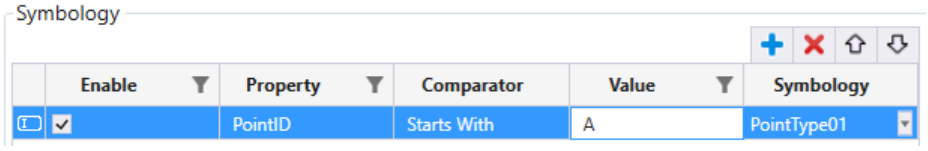
b. Select the **Borehole** tab.

c. Click **Add a Rule** by clicking the Blue **+** icon in the *Symbology* section near the bottom of the dialog.

Note: There are two Blue + icons on this dialog. The + icon at the top of the dialog is for adding a new table mapping. We will learn to use this later in the course.

d. Set the following settings for the new rule that will display the borehole different if the PointID property starts with “A”.

- *Property* =**PointID**
- *Comparator* = **Starts_With**
- *Value* = **A**
- *Symbology* = **PointType01**



e. Click **OK** to save and close the *Database Connectivity and Mapping* window.

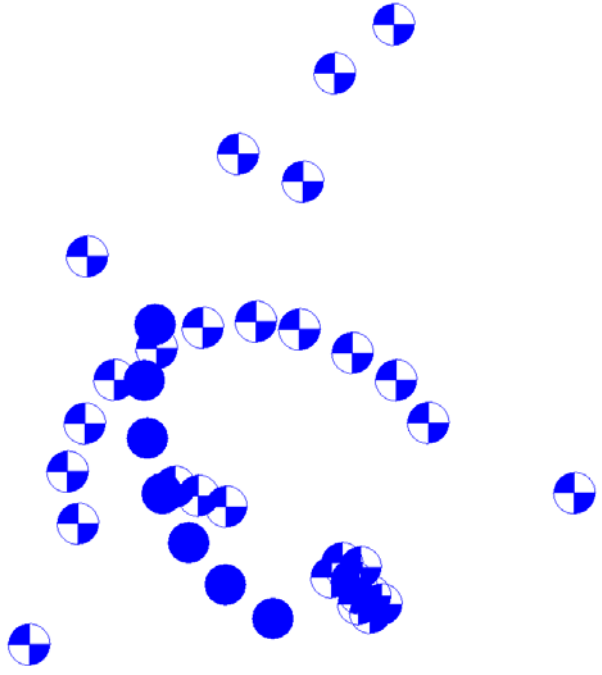
4. Update the borehole cells.

a. Select *gINT Projects* > *Connectivity* > **Query All**.

The Project Boreholes window appears showing all of the points in the projects.

b. Click **Retrieve** to display the points in the DGN file.

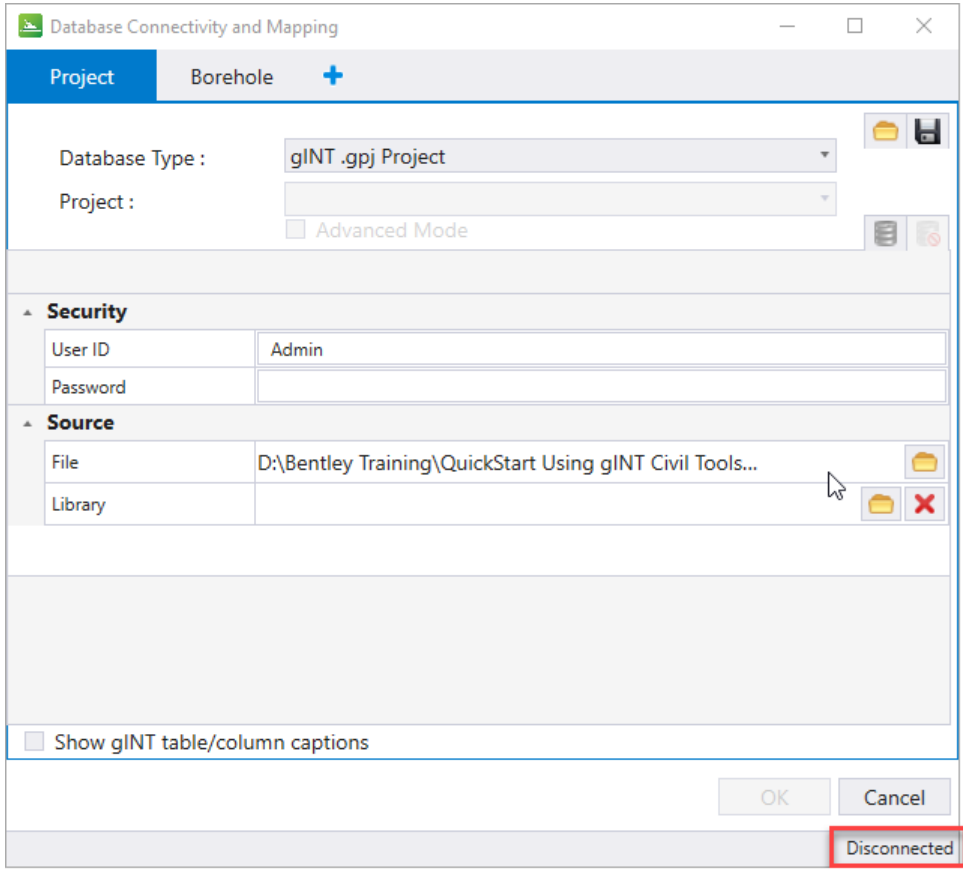
Notice that the boreholes that have PointIDs that begin with A are now shown as solid circles.



Connecting and Disconnecting the Database

The gINT database does not need to be connected at all times. In order to run Queries and perform other functions, the gINT database must be connected. You can be disconnected and and connect as needed.

1. Exit the **gINT Civil Tools** or **OpenRoads Designer** software.
2. Start the **gINT Civil Tools** or **OpenRoads Designer** software and open the *QuickStart using gINT Civil Tools.dgn* file.
3. Select *gINT Projects* > *Connectivity* > **Database Connectivity**.
4. Notice in the lower right corner that the database is currently *Disconnected*.
5. Click **Cancel** to close the Database Connectivity and Mapping dialog.
6. Select *gINT Projects* > *Connectivity* > **Open** to reconnect the database.
7. Select *gINT Projects* > *Connectivity* > **Database Connectivity** and verify in the lower right corner that the database is connected.
8. Click **Cancel** to close the *Database Connectivity and Mapping* dialog.



Exercise 3: Attaching Imagery

Description

The gINT Civil Tools CAD environment can load many data types like raster imagery, vector data like ESRI shape files or DWG files, as well as on line mapping service. Adding layers of different data type will allow users to perform preliminary study, and build drilling plans. In the following exercise, we will add some local and remote data types.

Skills Taught

- Attach aerial imagery
- Attach terrain model

Attach Aerial Imagery

1. Attach aerial imagery.

   a. Select *Site Map* > *Reference* > **Attach Reference**.

      Multiple raster images have already been attached to another dgn file named Imagery.dgn. We can easily attached all of those images in one step by referencing that dgn file. The images could also be attached directly using the Attach Raster tool.

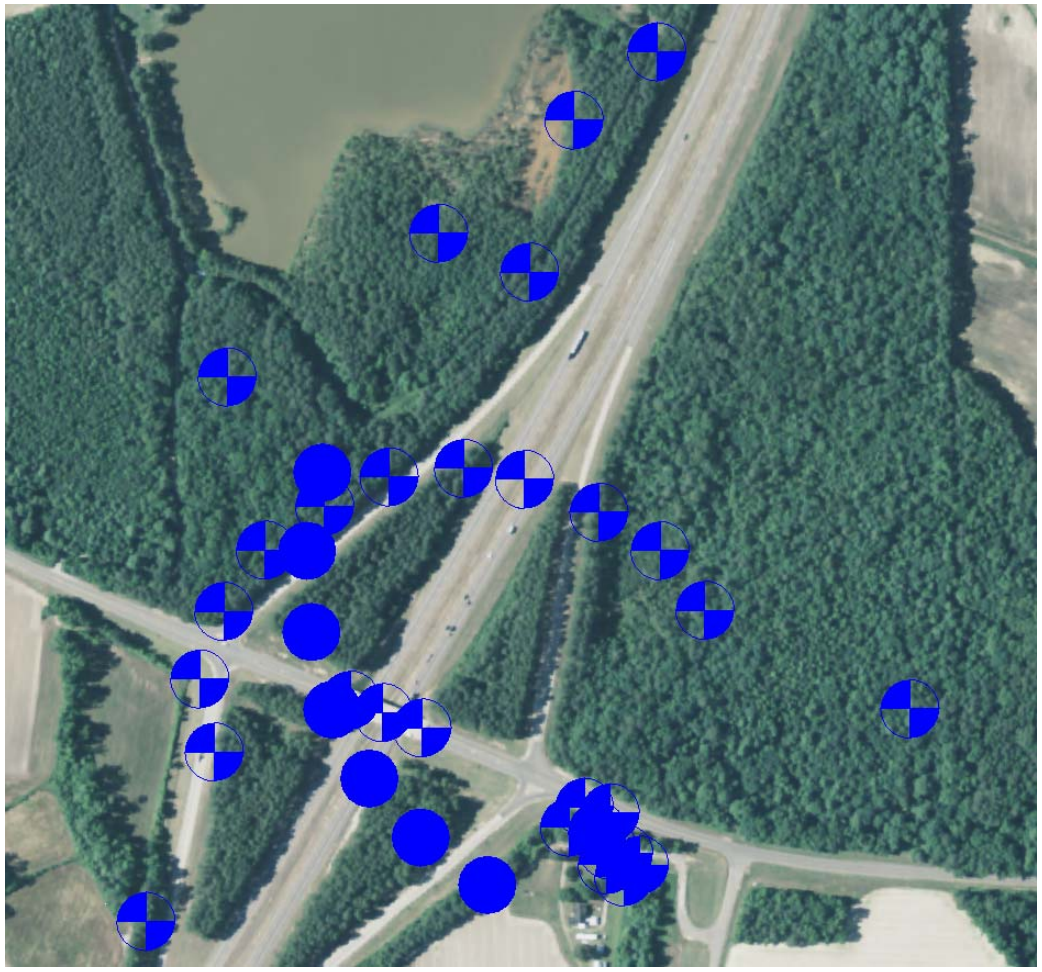
   b. Select the file **Imagery.dgn** as reference and click **Open**.

      HINT: The Imagery.dgn file is located in *c:\Bentley Training\QuickStart using gINT Civil Tools* or other folder where you unzipped the dataset files.

   c. Select the Orientation named **Coincident - World**.

      The orientation determines how the reference is adjusted to line up with the gINT data.

   d. Click **OK**.



Attaching Terrain Model

1. Attach terrain model.

   a. Select *Site Map* > *Reference* > **Attach Reference**.

   b. Attach **Terrain.dgn** as reference using a *Coincident - World* attachment method.

      HINT: The Terrain.dgn file is located in *c:\Bentley Training\QuickStart using gINT Civil Tools* or other folder where you unzipped the dataset files.

      The terrain model would typically be created by the survey or civil team using OpenRoads Designer or one of the other Bentley civil applications.

Exercise 4: Adding a New Borehole Location

Description

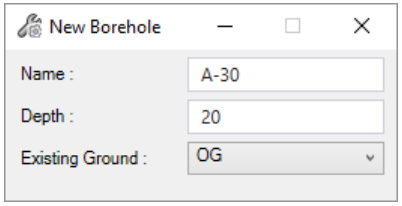
Borehole Locations can be added manually. In this exercise, we will add one.

Skills Taught

- Add a new borehole location

Adding a New Borehole Location

1. Select *Site Map* > *Borehole* > **New Borehole**
2. Set the following values.
   - *Name* = **A-30**
   - *Depth* = **20**
   - *Existing Ground* = **OG**



   The existing ground parameter specifies a terrain model that will be used to calculate the elevation of the borehole. In this exercise we are using the terrain model that was referenced in the previous exercise. That terrain model had a name of OG for Original Ground which is why OG appears in the Existing Ground pick list.
3. Data point (left click) on the drawing at the location of the new borehole. You can identify any location.
4. Data point a second time to accept the new borehole and add it to the database.

Exercise 5: Loading Data in 3D

Description

gINT Civil Tools can also model boreholes, create surfaces, and create meshes in 3D.

In gINT there are different ways to have a distance between two points: a Depth - Bottom Depth combination as found most often in the Lithology Table in the Standard gINT US files (as well as others). One can also have a Depth - Length configuration which is often used in the Sample table (and also found in the Standard gINT US files).

In this section, as mentioned, we will be adding lithology tables to the 3D model. We will also show how you can change the symbolization of a level, add additional properties from a table, rename item types, dynamically symbolize data, and use the Project Explorer to navigate to specific boreholes.

Skills Taught

- Add Lithology data to the boreholes
- Display boreholes and lithology data in 3D
- Define how boreholes and lithology data are displayed

Open a 3D Model

The dgn file contains one or more models. Each model is an independent 2D or 3D drawing space. The current model you have been working with during this course is a 2D. A 3D model is needed to view 3D models of the boreholes.

1. Open a 3D Model.
   a. Select *Home* > *Primary* > **Models**.
   b. Double click on the model named **3D Model** to make it active.
   c. Close the *Models* dialog.

Display the Points in the 3D Model

1. Select *gINT Projects* > *Connectivity* > **Query All**.

   The Project Boreholes window appears showing all of the points in the projects.

2. Click **Retrieve** to display the points in the DGN file.

3. Select **Fit View**.

   The points are loaded and displayed in the 3d model.

4. Select **View Rotation** and use the mouse to rotate the view such that the depth of the boreholes are visible.

5. Add hyperlink to boreholes

   a. Select *gINT Projects* > *Connectivity* > **Database Connectivity**.

   b. Select the **Borehole** tab.

   c. Expand the **Hyperlink** section.

   d. Set the Prefix to the *c:\Bentley Training\QuickStart using gINT Civil Tools* folder or other folder where you unzipped the dataset files.

   e. Set the *Variable Field* to **PointID**.

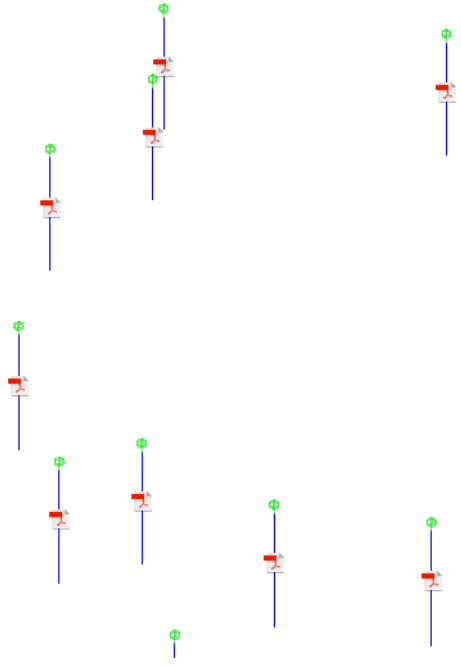
   f. Set the *Suffix* value to **.pdf**

   g. Click **OK**.

   h. Select *gINT Projects* > *Connectivity* > **Query All**.

   i. Click **Retrieve** to display the points in the DGN file.

      Each borehole should now have their pdf hyperlink.



6. Annotate the Boreholes

A

a. Select *gINT Projects* > *Connectivity* > **Annotate Boreholes**.

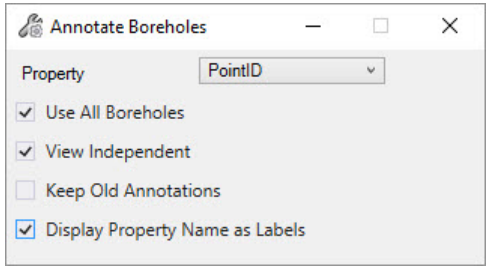
b. Select **PointID** for the *Property*.

c. Enable the **Use all Boreholes** check box.

d. Enable the **View Independent** check box.

e. Enable the **Display Property Name as Labels** check box.

f. Data point to annotate the points.



Adding Lithology Data (Depth - Bottom)

So far only the Project and Point tables have been mapped in the Connectivity and Mapping window. For 3D, additional depth information is also needed. In this exercise the lithology table and applicable fields will be added.

This exercise uses the Depth - Bottom Depth data types. Specifically, we will be importing data from the Lithology table from our example gINT project.

---

1. Select *gINT Projects* > *Connectivity* > **Database Connectivity**.

   The *Source* should still be set to **gINTSampleDataset_Update1.gpj**. A prompt in the lower right shows if the database is *Connected* or *Disconnected*.

2. If the database is *Disconnected*, click the **Connect to the Database** button to connect to the database, otherwise skip to the next step.

3. Define a new Lithology table

   a. Click the **Plus** icon next to the Borehole tab to add a table.

   b. Set the *Name* to **Lithology**.

   c. Set the *Type* to **Depth - Bottom**.

   d. Click **OK**.

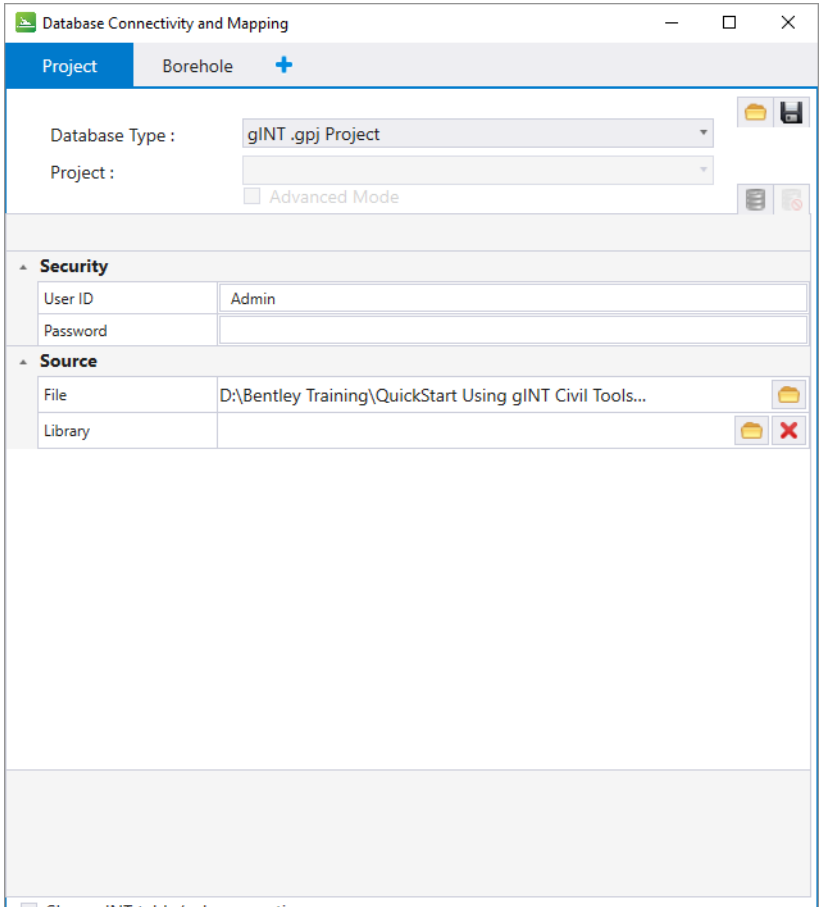
   e. Use the drop down lists for each field to enter the following values

      - *Top Depth* = **Depth**
      - *Bottom Depth* = **Bottom**
      - *Identifier* = **Graphic**

   f. Set *Level Creation* to **Identifier**.

   g. Set *Graphic Type* as **Cylinder** and *Fixed Size* at **7**.

4. Click **OK** to close the *Database Connectivity and Mapping* window.



5. Display the Lithology Data.

   a. Select *gINT Projects > Connectivity >* **Query All**.

   b. Click **Retrieve** to display the points in the DGN file.

6. View the 3D Lithology Data.

   a. Zoom and Rotate the view such that the depth of the borehole cylinders are visible.

   b. Select **View Attributes**.

   c. Set the *Display Style* to **Illustration: Ignore Lighting**.

   Each borehole has a center pin to represent the borehole (top, bottom), and there are cylinders around each pin. The cylinders are the lithology information imported in to the database. If you hover your cursor over any of the elements, a small flag with information appears.

7. Annotate the Lithology Data

   a. Select *gINT Projects > Connectivity >* **Annotate Item Types**.

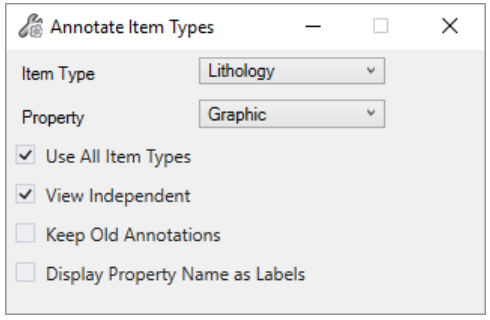
   b. Select **Lithology** for the *Item Type*.

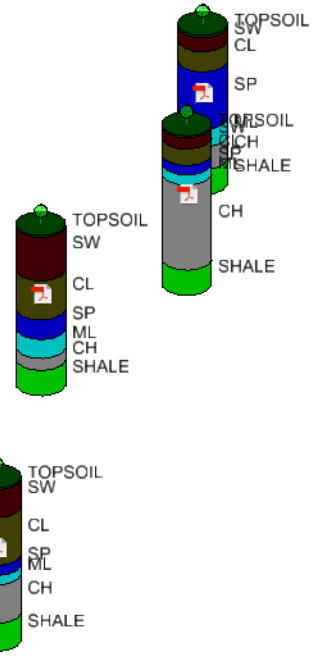
   c. Select **Graphic** for the *Property*.

   d. Enable the **Use All Item Types** check box.

   e. Enable the **View Independent** check box.

   f. Data point to accept.

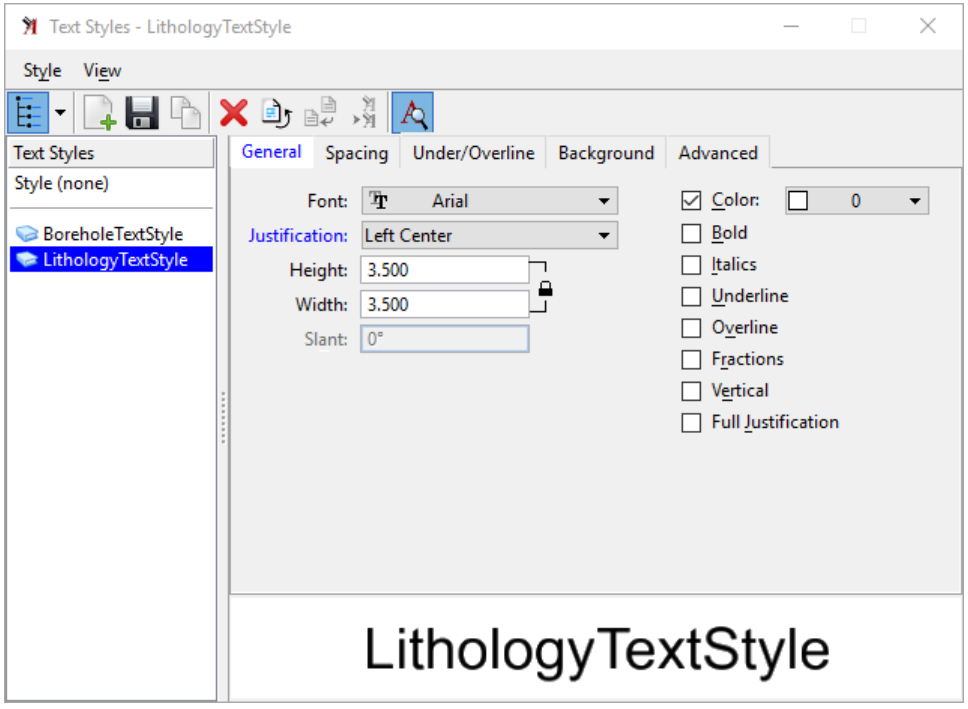




8. Editing the text style

Once the annotations are created, you can edit how they display using the Text Style tools.

a. Type **Text Styles** in the *Search Ribbon* field and press **Enter**.



b. Select the **LithologyTextStyle** from the list on the left.

c. Set the *Justification* to **Left Center**.

d. Adjust the Height and the Width as necessary.

e. **Save** to apply the changes.

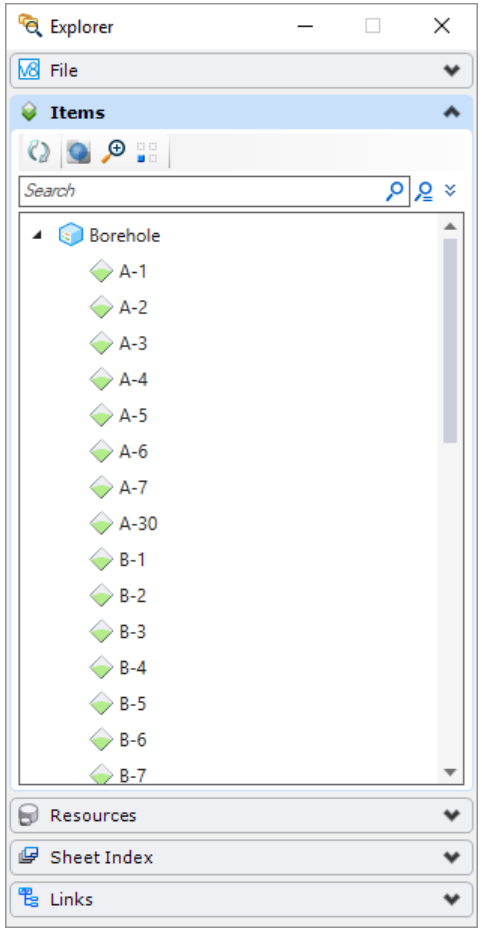
Review and Control Display of Boreholes

1. Select *Home* > *Primary* > **Explorer**.
2. Expand the **Items** section.

   You should see condensed lists for the *Borehole* and the *Lithology* tables.
3. Data point on the arrow to the left of **Borehole** to expand the list
4. Right click on *B-1* and select **Zoom** to center B-1 on the screen.
5. Right click on *B-1* and select **Isolate**.

   The display is updated to only show borehole B-1. Notice that the lithology data is no longer visible, just the borehole pin.
6. Right click again on *B-1* and select **Clear Isolate**.
7. Right click on *Borehole* and select **Details**.

   A table with the properties of the borehole appears. This table includes the Point table information that was imported into gINT Civil Tools.
8. Close the *Details* window.



Exercise 6: Using Levels to Control Borehole Data Display

Description

In this exercise you will explore how levels are created when data is imported into gINT Civil Tools, and work flows you can use to gather information from the 3D model.

The borehole pins are created on the Borehole_Decoration level in gINT Civil Tools. Other data imported in to gINT Civil Tools is created on a level specific to the Identifier. This means that each item in the identifier will have its own level. For example, when the lithology graphics are imported there is a level for each material type. Having a unique level for each identifier creates a simple workflow for reviewing and evaluating data. Levels can be used to visualize spatially where materials are located or create tables with data summaries and export to excel.

Skills Taught

- Control display using levels
- Define colors displayed by adjusting level definitions

Changing What Data is Displayed

1. Zoom in to a view so that 3-5 boreholes are visible.
2. 
   Select *Home* > *Primary* > **Level Display**.
3. In the *Level Display* window right click on the level named **CL**.

   A pop up menu appears.
4. Select **Set Active**.

   The level CL is now highlighted in a different color, indicating that it is active. Elements drawn will be placed on the active level.
5. Right click on any level in the *Level Display* window and select **All Off** from the pop up window.

   All levels except the active level (CL in this example) are now off meaning the elements on those levels are not displayed.
6. Right click again and select **All On**.

   All levels are now back on and the elements on those levels are displayed.
7. Right click again in the *Level Display* window and select **Off By Element**.

   Notice the prompt in the lower left says *Identify Element*.
8. Click on a graphic borehole pin.

   The level named Boreholes_Decoration is turned off and the borehole pins are no longer displayed.
9. Try selecting a few other items and notice the changes after each click.
10. Right click in the Level Display window and select **All On**.

    All levels and elements are once again displayed.

Changing How Data is Displayed and Symbolized

1. Select *Home* > *Primary* > **Level Manager**.

   The Level Manager window appears.

   There are several icons and menu options. This class does not cover all of these functions. For more information on the Level Manager please refer to other Bentley training courses or the Bentley MicroStation Communities group.

2. Review the level definitions and notice that CL and SW levels use colors that appear very similar to each other. You can change these colors so differences are more apparent.

   Note: Users can create a custom library so that the material settings by level are established before data import. This is a standard MicroStation operation and many organizations using MicroStation may have such libraries already established. For more information please check with your CADD manager or refer to Bentley's MicroStation Communities group.

3. Set the CL level to a Light Yellow color.

   a. Right click on **CL** in the *Level Manager* and select **Properties**.

   b. In the *Symbology ByLevel* section, select **Color**.

   c. Select the third tab and select **gINT Standard Colors** from the pick list.

   d. Set the *Color* to **Light Yellow**.

   e. Click **OK** to accept the color.

   f. Click **OK** on the *Level Properties* window to apply and save the change.

4. Close the *Level Manager*.

5. Review the changes in the model.

Exercise 7: Loading Additional Data

Description

With gINT Civil Tools, additional tables and properties can be added to the Connectivity and Mapping window at any time and saved for use on future projects. When properties are queried again, the original query is overwritten, and additional data added. Information already queried is not doubled or repeated.

In this exercise you will change the Data Connection and Mapping query to import samples. You will also add properties after the initial sample query.

Skills Taught

- Add sample data
- Add water table data
- Adjust display colors and sizes

Adding Sample Data (Depth - Length)

1. Select *gINT Projects* > *Connectivity* > **Database Connectivity**.
2. Select the **Lithology** tab.
3. Disable the *Include In Query* option.

   The Include in Query option, when not checked, means the item remains mapped, but the results are not included in the query. It is a simple way to limit a query result to specifics. For example, you can import several tables at one time. However, the lithology cylinders and sample cylinders will overlap so for simplicity we are querying one item at a time in this lesson

4. Define a new Sample table

   a. Click the **Plus** button to add a table.

      The Table Mapping window appears.

   b. Set the *Name* to **Sample**.

   c. Set the *Type* to **Depth - Length**.

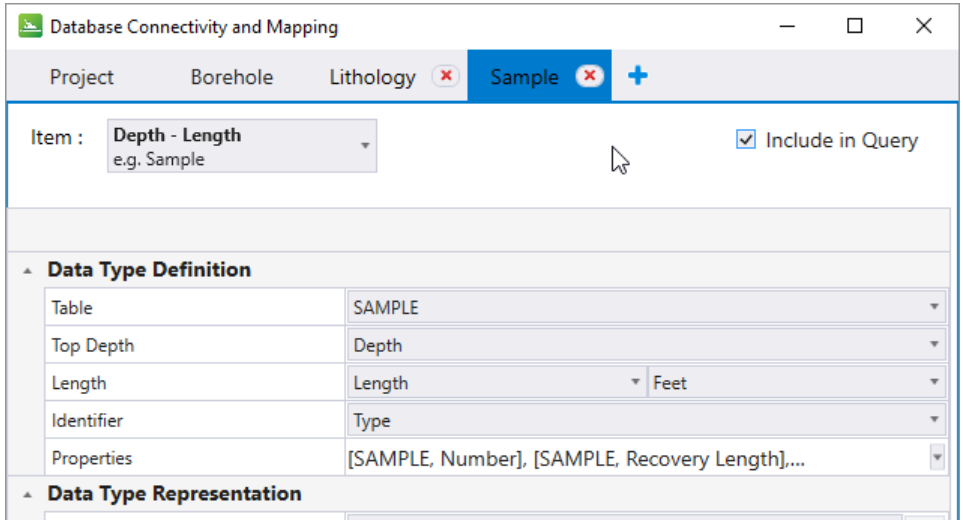
   d. Click **OK**.

      A new tab named Sample appears in the Database Connectivity and Mapping window.

   e. Use the drop down lists for each field to enter the following values.

      - *Top Depth* = **Depth**
      - *Length* = **Length**
      - *Identifier* = **SampleType**

   f. Set *Level Creation* to **Identifier**.



   g. Click **OK** to close the *Database Connectivity and Mapping* window.

5. Display the Sample Data.

   a. Select *gINT Projects* > *Connectivity* > **Query All**.

      The Project Boreholes window appears showing all of the points in the projects.

   b. Click **Retrieve** to display the points in the DGN file.

6. View the Sample Data.

   a. Select *Home* > *Primary* > **Explorer** if it is not already open.

   b. Expand the **Items** section.

   c. Data point on the arrow to the left of **Borehole** to expand the list

   d. Right click on **A-3** and select **Zoom**.

   e. Zoom out to expand the view so that several boreholes are visible.

7. Review Sample Details.

   a. In the *Explorer* window, right click on *Sample* and select **Details**.

   The details window doesn't have much information about the samples, only sample type, borehole name, and depth. To get a more detail of what is present, we want to return to the Connectivity and Mapping window and add additional details.

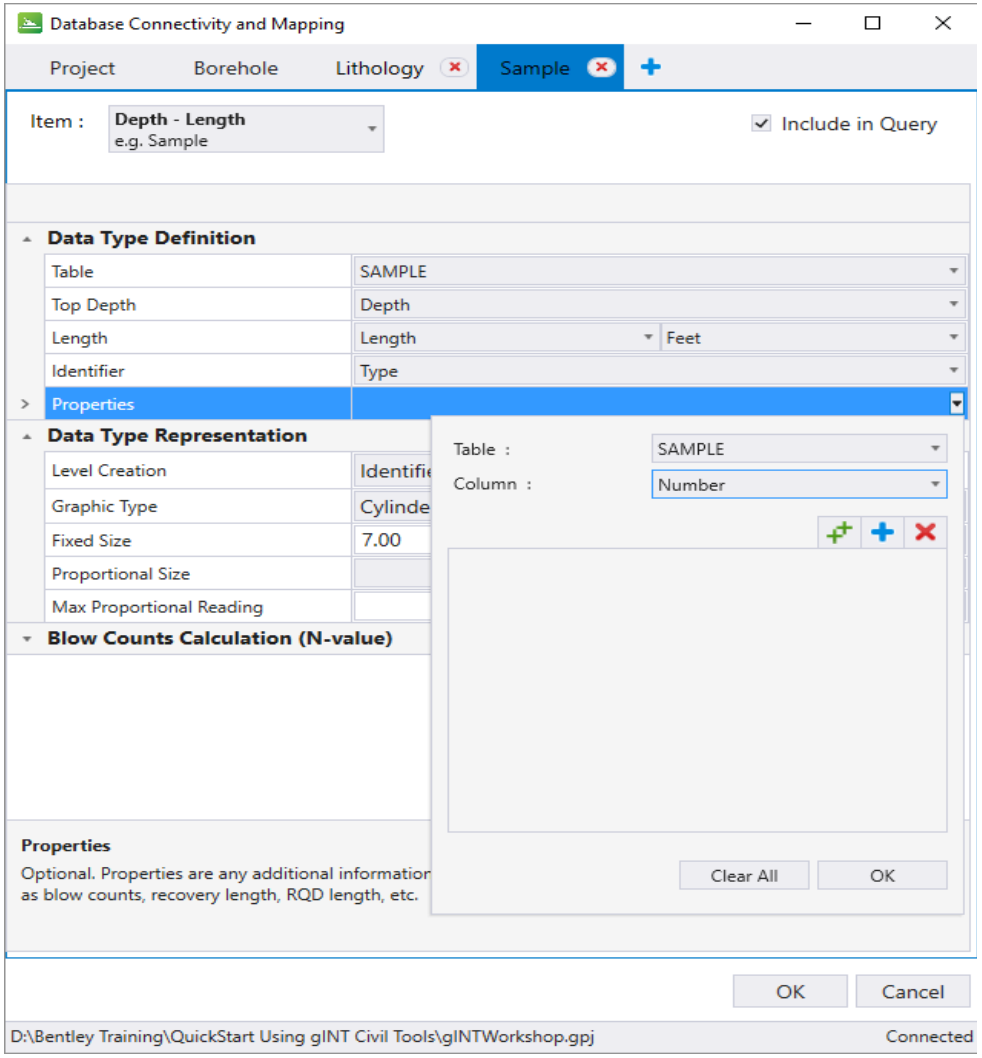
8. Close the *Details* window.

Adding Additional Sample Properties

1. Select *gINT Projects* > *Connectivity* > **Database Connectivity**.
2. Select the **Sample** tab.
3. Add additional properties to the borehole
   b. Click the Down Arrow in the *Properties* field.

      Selecting *Add all properties from selected table* as we did in an earlier exercises adds all fields in the gINT database to the gINT Civil Tools query. We want to be more specific than that.

   c. Set the *Table* to **SAMPLE**.
   d. Set the *Column* to **Number**.
   e. Click the **Plus** icon below the *Column* field to add the new property to the query.
4. Repeat step 3 to add the following properties to the query.
   - **Recovery Length**
   - **Blows 1st**
   - **Blows 2nd**
   - **Blows 3rd**
   - **Blows 4th**
5. Click **OK** to accept the property selections.
6. Click **OK** to close the *Database Connectivity and Mapping* window.



7. Update the borehole graphics and sample data stored on the graphic elements.

   a. Select *gINT Projects* > *Connectivity* > **Query All**.

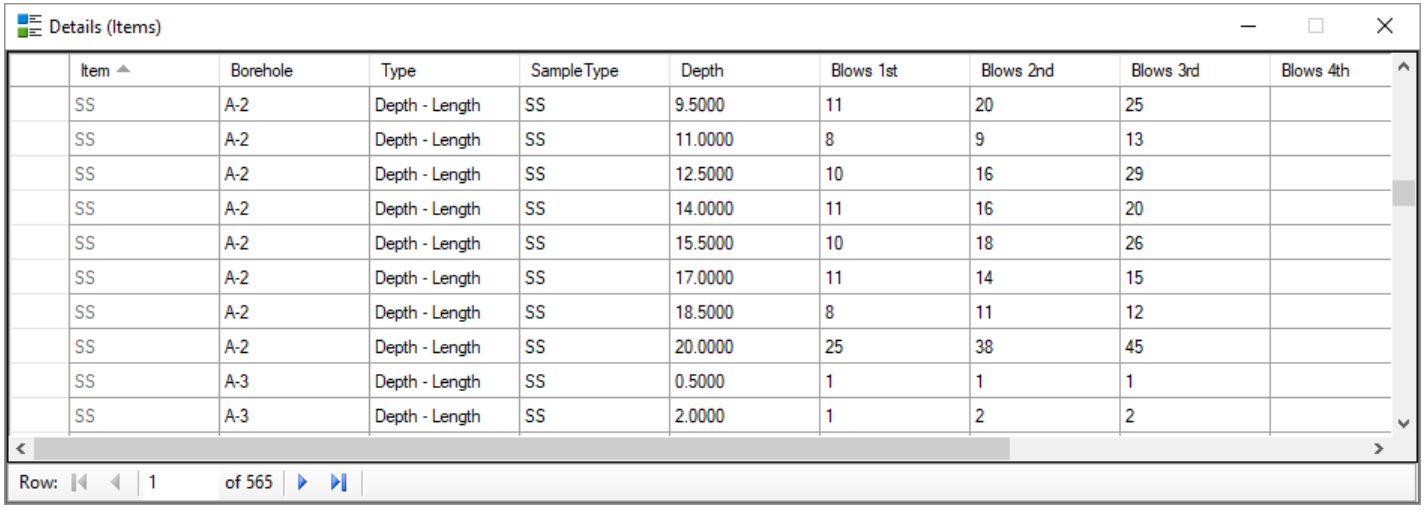
   b. Click **Retrieve** to display the points in the DGN file.

8. Review the updated Sample properties.

   a. Select *Home* > *Primary* > **Explorer** if it is not already open.

   b. Right click on *Sample* and select **Details**.

   Notice the table now has the additional fields and any data in those fields for the items queried.



Adding Water Level Event Data (Depth only)

The last standard type of import in gINT Civil Tools is depth only elements. This can be lab results, or water, or environmental test results.

Depth only element can be displayed as spheres or discs.

---

1. Select *gINT Projects > Connectivity >* **Database Connectivity**.
2. Define a new Water Level table
   a. Click the **Plus** icon next to the Sample tab to add a table.

      The Table Mapping window appears.

   b. Set the *Name* to **WaterLevelEvent**.

   c. Set the *Type* to **Depth Only**.

   d. Click **OK**.

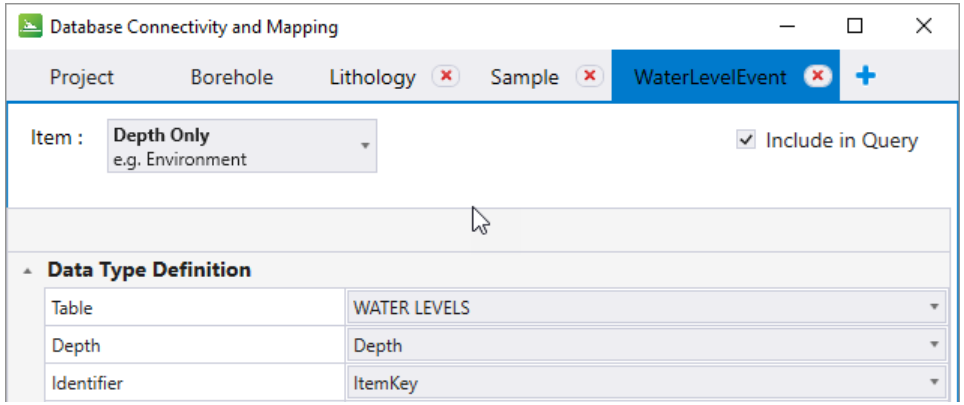
   e. Use the drop down lists for each field to enter the following values.

      - *Depth* = **Depth**
      - *Identifier* = **ItemKey** (this is the name of the Reading Event)

   f. Set *Level Creation* to **Table Name**.

   g. Set *Graphic* as **Disk** and *Fixed Size* at **10**.

   h. Click **OK** to save and close the *Database Connectivity and Mapping* window.



3. Display the Sample Data.
   a. Select *gINT Projects > Connectivity >* **Query All**.

      The Project Boreholes window appears showing all of the points in the projects.

   b. Click **Retrieve** to display the points in the DGN file.

Exercise 8: 3D Modeling

Description

In this exercise you will create terrain models, meshes, cross sections, and fence diagrams.

Skills Taught

- Create water surface terrain models
- Control display of terrain models
- Create Top and Bottom Meshes from Lithology data
- Create Cross Sections
- Create a Fence Diagram

Creating Terrain Model at Water Level

This lesson is an introduction in to the 3D modeling possible with gINT Civil Tools. In this exercise you will create a terrain model at the water level.

---

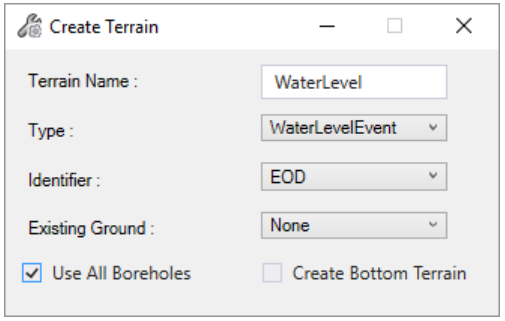
1. Create a terrain model for the Water Level data.

   a. Select *3D Modeling > 3D >* **Create Terrain**.

      The Create Terrain window appears.

   b. Enter the following values:

      - *Terrain Name* = **Water Level**
      - *Type* = **WaterLevelEvent**
      - *Identifier* = **EOD**
      - *Existing Ground* = **None**
      - Enable the *Use all Boreholes* option
      - Disable the *Create Bottom Terrain* option



      The prompt in the lower left hand corner provides instructions for the next actions to create the terrain. Since the *Use all Boreholes* option is enabled, the prompt is stating “Data point to accept selection, reset to cancel command”.

   c. Data point on the active model to create the terrain.

      A terrain model for the water surface is created and displayed.

Reviewing Terrain and Displaying Contours

1. Change the display of th Water Level terrain to show contours.

   a. Open the *Properties* of the **Water Level** terrain model.

      This can be done by selecting and a “long right-click” to get to the context menu; or by selecting with the Properties dialog open.

   b. Expand the **Calculated Features Display** classification in the *Properties* window.

   c. Set the *Major Contours* option to **On**.

   d. Set the *Minor Contours* to **On**.

   e. Set the *Triangles* to **Off**.

      Notice that the surface changes to show major and minor contours. Take some time to explore what the other drop down options do to the image, and the information you can obtain from them.

Create Mesh from Vertical Boreholes

In this exercise we will create mesh surfaces from the lithology data.

Currently the display does not include lithology because it was not included in the query when we added samples. We need to bring the lithology data back into the drawing before creating the surface.

---

1. Define what data to include in the query.

   a. Select *gINT Projects* > *Connectivity* > **Database Connectivity**.

   b. Select the **Lithology** tab.

   c. Enable the *Include In Query* option.

   d. Select the **Sample** tab.

   e. Disable the *Include In Query* option.

   f. Select the **WaterLevelEvent** tab.

   g. Disable the *Include In Query* option.

   h. Click **OK** to close the *Database Connectivity* window.

2. Display the Lithology Data.

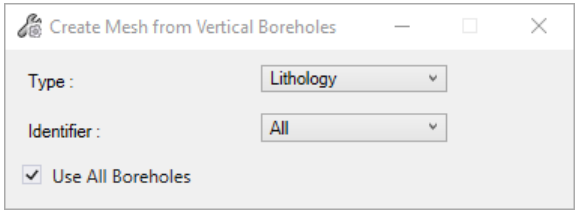
   a. Select *gINT Projects* > *Connectivity* > **Query All**.

   b. Click **Retrieve** to display the data in the DGN file.

3. Create a Mesh.

a. Select *3D Modeling* > *3D* > **Create Mesh**.

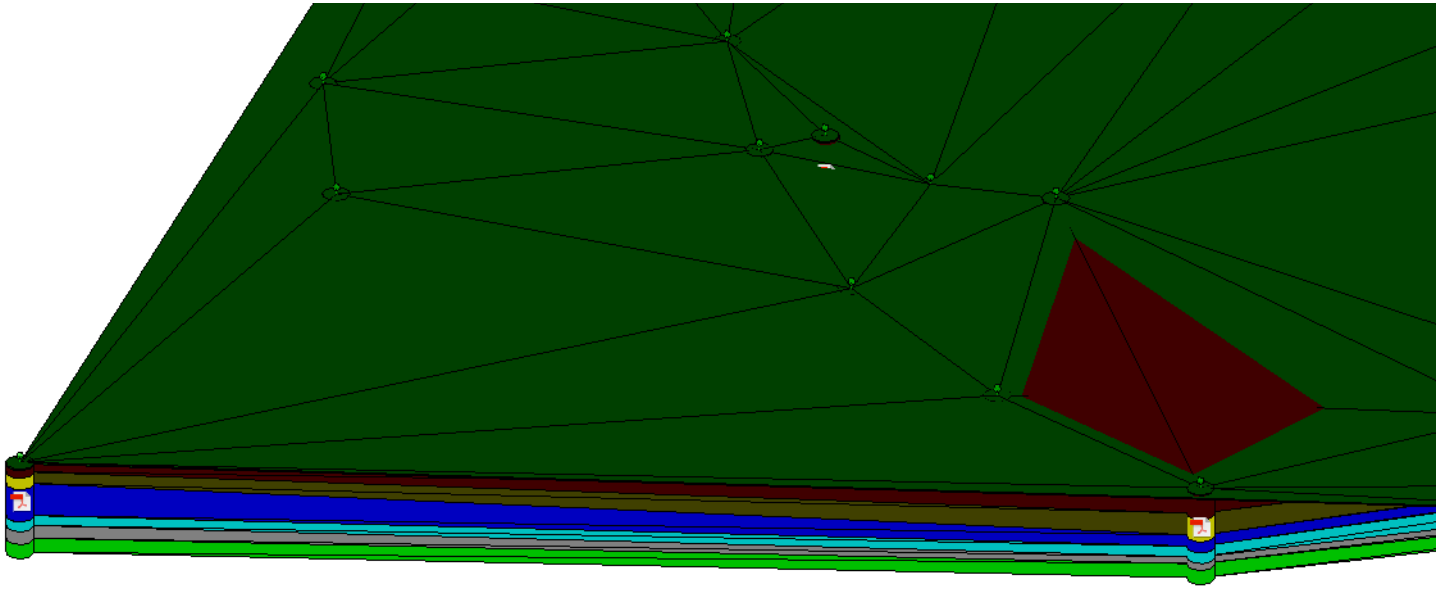
The Create Mesh window appears.



b. Enter the following values:

- *Type* = **Lithology**
- *Identifier* = **All**
- Enable the *Use all Boreholes* option

c. Data point on the active model to create the meshes.



Create Cross Section

In this exercise we will create a cross section through the lithology data.

---

1. Display paths where cross sections will created.

   a. Select *Home > Primary >* **Level Display**.

   b. In the *Level Display* window right click on the level named **XSection Lines** and select **Set Active**.

   c. Right click on any level in the *Level Display* window and select **All Off** from the pop up window.

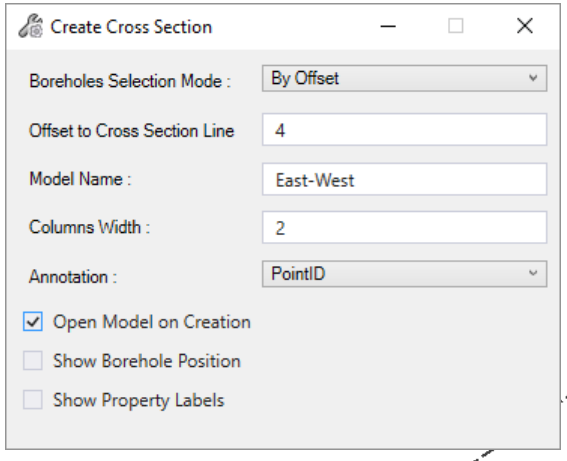
2. Create a Cross Section.

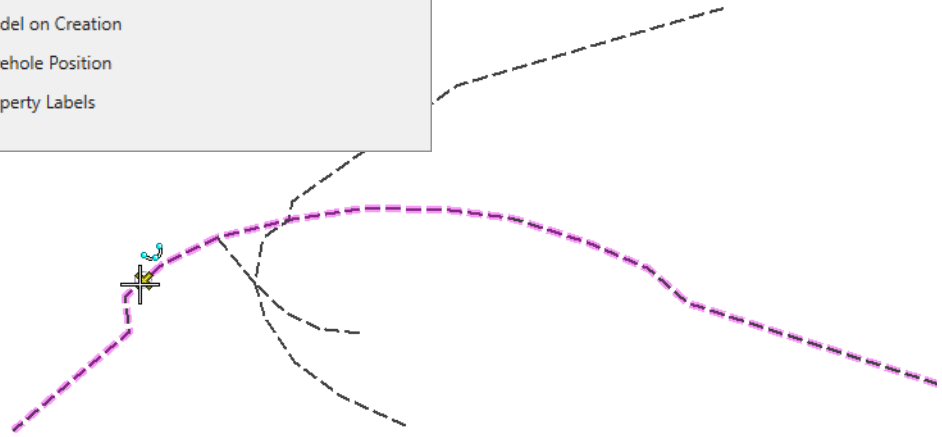
   a. Select *3D Modeling > Cross Section >* **Create Cross Section**.

   b. Enter the following values:

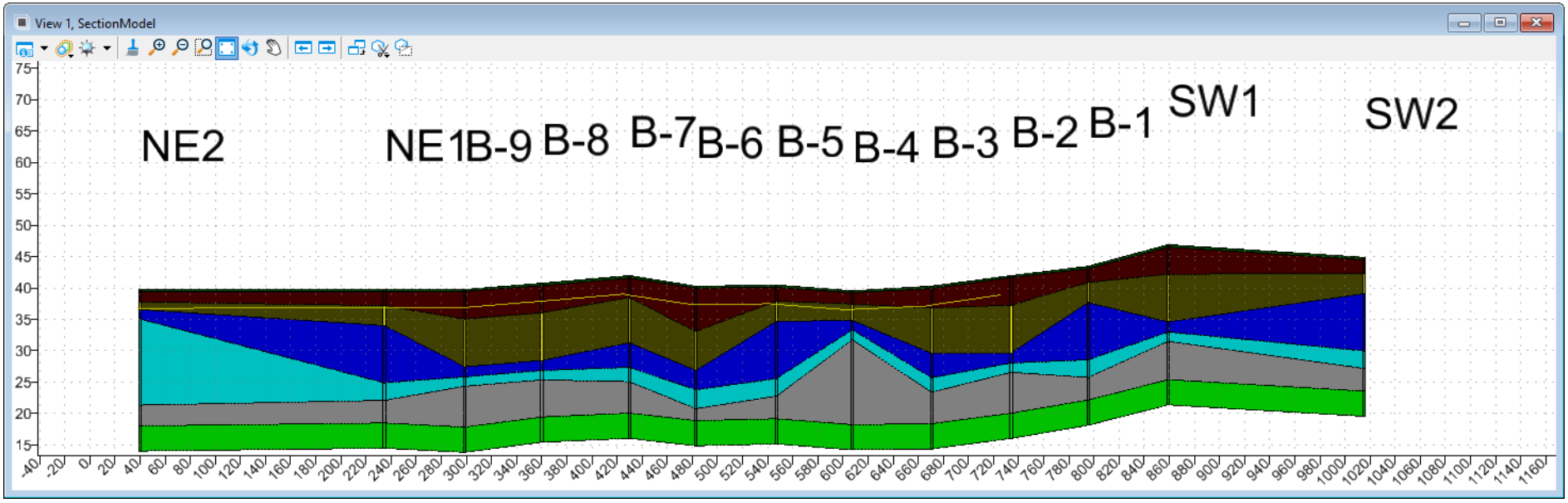
      - *Boreholes Selection Mode* = **by Offset**
      - *Offset to Cross Section Line* = **4**
      - *Model Name* = **East-West**
      - *Columns Width* = **2**
      - *Annotation* = **Borehole ID** or **PointID**
      - Enable the *Open Model on Creation* option

   c. Data point on the cross section line running roughly east to west.





d. Data point again to accept and create the cross section.



Create Fence Diagram

A Fence Diagram is a cross section *model* attached in 3D space to the constituent boreholes. Cross Section Models must exist.

1. Return to the 3D Drawing model.

   a. Click **Go to Previous View Group** in the lower left corner to return to the 3D Model.

      HINT: The 3D Model View can also be selected from the pick list next to the Go to Preview View Group icon.

2. Create a Fence Diagram.

   a. Select *3D Modeling* > *Cross Section* > **Create Fence Diagram**.

   b. Set *Cross Section Selection Mode* to **List**.

   c. Select **East-West** from *Cross Section List*.

   d. Data point to accept and create the fence diagram.