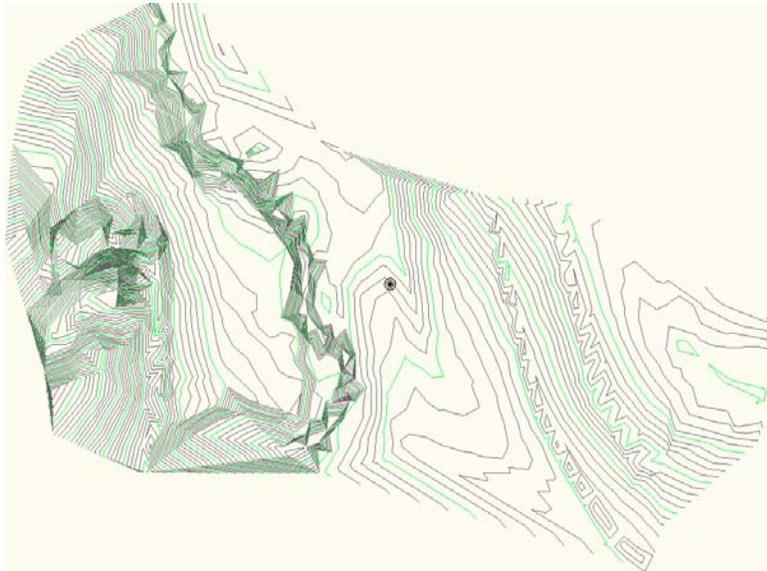


The appearance of a surface created from point data will often appear choppy in areas where there is a

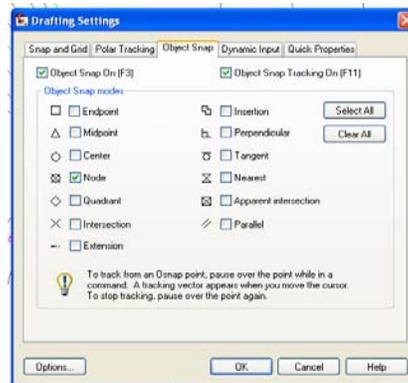
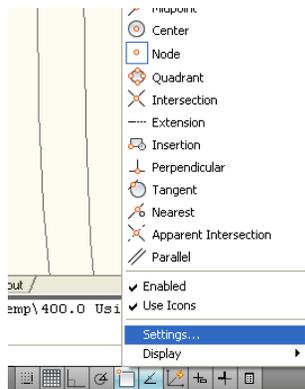


significant change in grade such as channels and the top and bottom of banks. This is illustrated in the graphic to the left. The surface can be refined in these areas by using breaklines to define these grade change locations. Breaklines force the surface model's triangulation lines to orient along the grade break rather than crisscrossing across breaks, which causes potholes in channel areas and choppy ridge lines along banks.

A breakline is a 3D polyline that has elevation values assigned to its vertices. The easiest and most accurate way to create a 3D polyline to be used as a breakline is to create a 3D polyline by snapping to survey points taken at grade breaks, top or bottom of bank locations, or other points where the terrain changes significantly.

The procedure below outlines the steps that can be followed to create a 3D polyline that will be used as a breakline.

1. Make sure the points that you want to use to create the 3D polyline are displayed in the drawing.
2. You will want to be able to snap to the nodes of the points in the drawing in order to pick up the points elevation, but you do not want to accidentally snap to any other objects in the drawing. To restrict the object snapping to selecting only point nodes, right click on the *Object Snap* icon on the *Application Status Bar* at the bottom right hand side of the window and click on *Settings...*

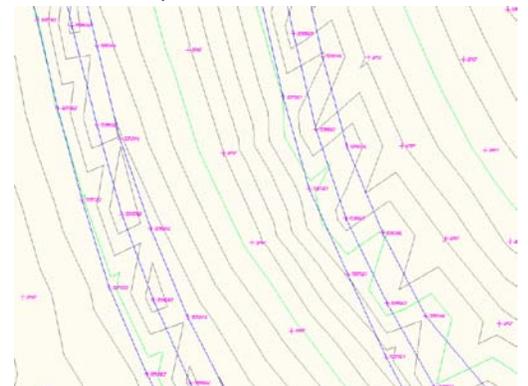


In the Drafting Settings window, click on the *Clear All* button and then select only *Node*. Click on the *OK* button.

3. Draw the 3D polyline using the 3D polyline command  located on the *Draw* panel of the *Home* ribbon. You will need to click on the down arrow on the *Draw* panel to expand the command list and find the 3D Polyline command. Click on points in the drawing to set the nodes for the 3D Polyline object. When you reach the end of the 3D Polyline, right click and select *Enter*.

If you click the wrong point you can back up by right clicking and selecting *Undo* from the shortcut menu.

The graphic to the right shows 3D polyline breaklines that have been created along a set of terraces. These 3D polylines will be used to clean up the terrain model along these terraces.

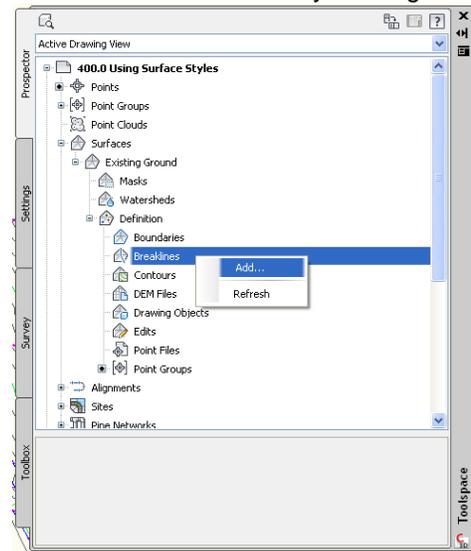


Breaklines are added to a surface in the *Definition* area under the surface name in the Toolspace. The following commands are used to add breaklines to a surface definition.

1. On the *Prospector* tab of *Toolspace*, go to the surface name and expand the list of commands by clicking on the + sign to the left of the surface name.
2. Expand the list under *Definition*, right click on *Breaklines* and select *Add...*
3. The *Add Breaklines* window will appear. The following selections can be made in this window
 - a. You can provide a description for the breakline(s)
 - b. Make sure the breakline type is set to *Standard*

The most commonly used type of breakline is the Standard breakline. This is used for breaklines created from a 3D polyline that follows surveyed point data along a grade break, such as the top of a bank. Another type of breakline is the proximity breakline. This type of breakline will interpolate a three dimensional breakline along a 2D polyline based on the elevations of a surface.

 - c. You can specify weeding factors for the breakline(s). Weeding factors are used to simplify a complex breakline by removing vertices along the breakline. Weeding factors are not typically needed.
 - d. You can also specify Supplementing factors for the breakline(s). Supplementing factors are used to add extra vertices on long sections of the breakline, but again are not usually needed.



The graphic below shows the same surface that was shown on page 1, but it has been refined by adding breaklines along the channel, diversion and terraces.

