

Exercise 5:

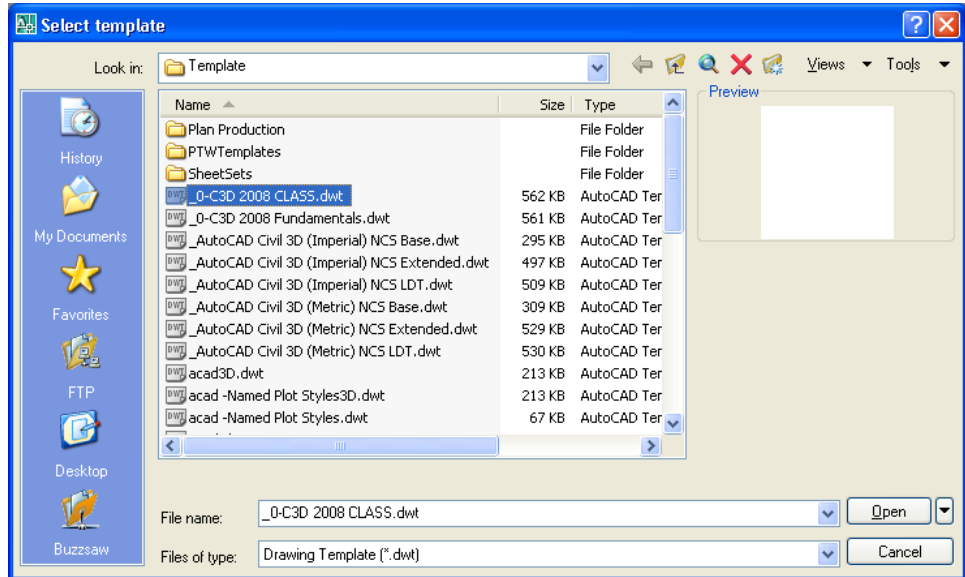
Build and Edit Surfaces

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Start a New Drawing



1. Close any open drawings.
2. Select **File>New**. In the Select Template dialog box, highlight the **_0-C3D 2008 CLASS.dwt** template you just created.



3. Click **Open**.
4. Select **File>Save As**.
5. Browse to *C:\Civil 3D 2008 Intro to Corridor Design Exercise Files\Mackinaw Estates*.
6. Save this drawing as **Mackinaw Estates Site Plan 08.dwg**.

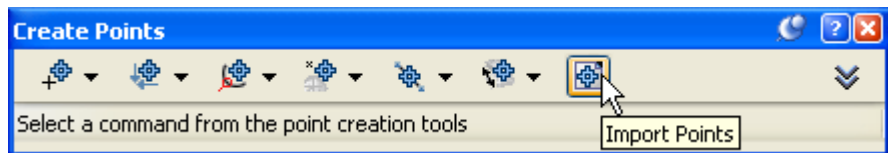
Import a Coordinate Point File

The Mackinaw Estates project includes creating a road and lots on a 30 acre site. A survey team collected the existing conditions and you have been provided with a comma delimited ASCII coordinate file in a Point number, Northing, Easting, Elevation, Description format.

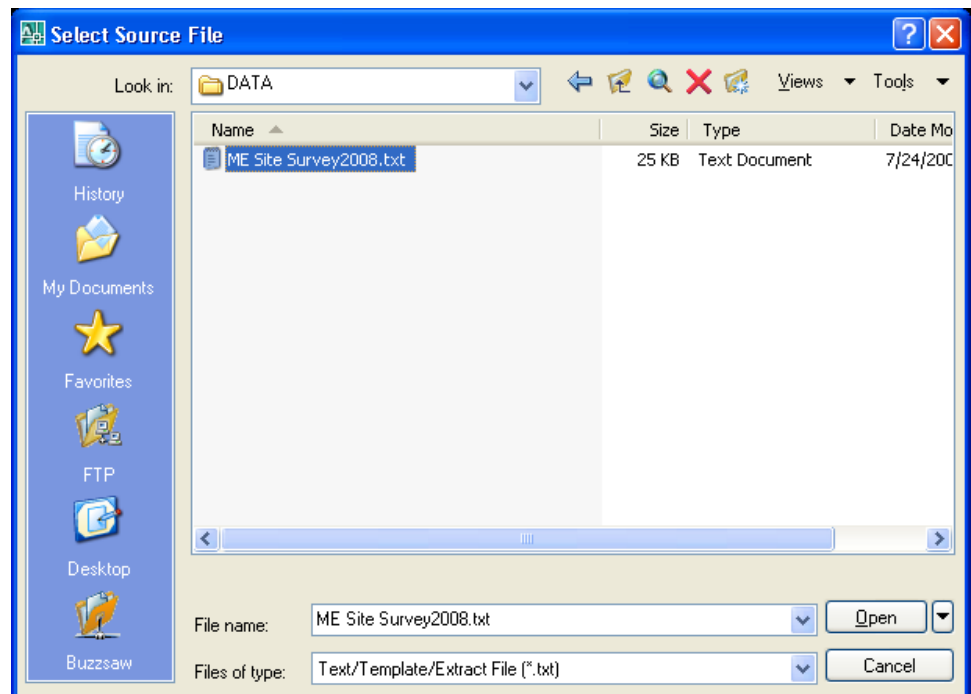
The first task is to create an existing conditions base map for this site.



1. Select **Points>Create Points**. Click  (Import Points).

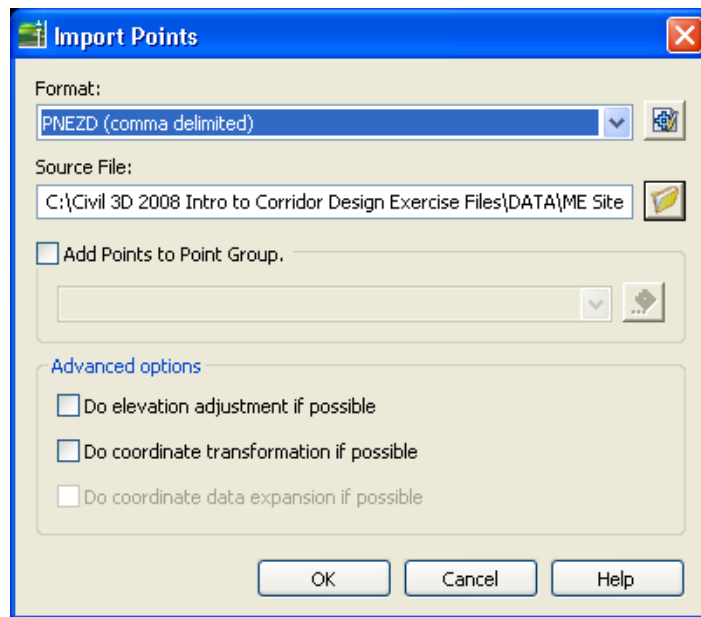


2. Set the *Format* as **PNEZD (comma delimited)**.
3. Browse to *C:\Civil 3D 2008 Intro to Corridor Design Exercise Files\Data* directory and select **ME Site Survey2008.txt**. You might have to change the File Type to **(.TXT)**.

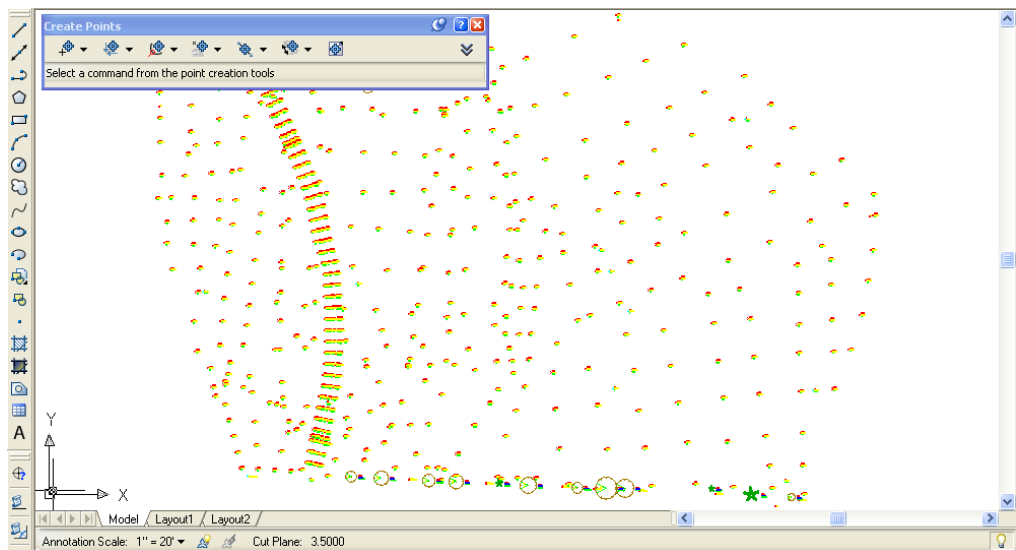


4. Click **Open**.

5. Clear the options under the *Advanced options* area.



6. Click **OK**.
7. **Zoom Extents**.

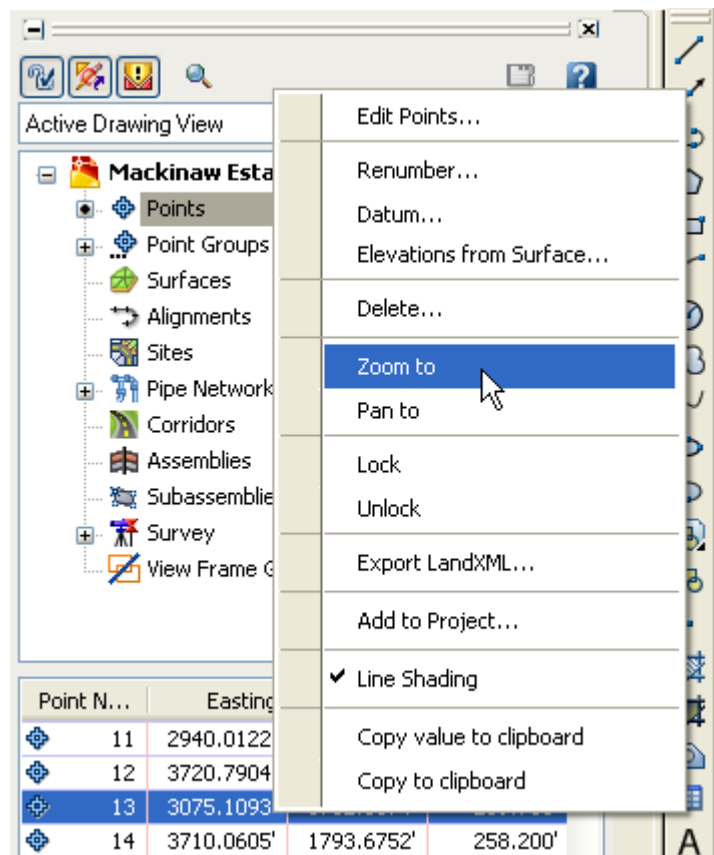


The points are imported and the Description Keys provide symbols as required.

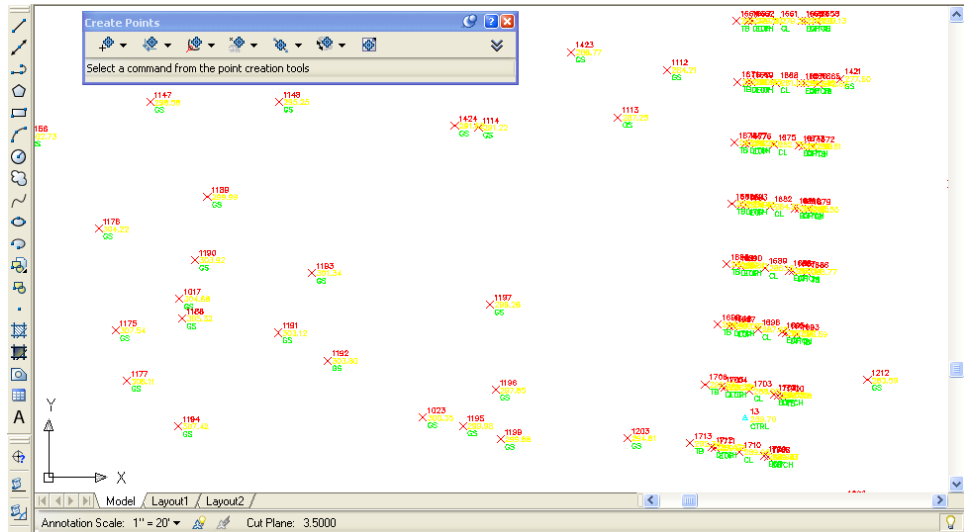
Note the existing dirt road. You would normally create breaklines along the road, but in this case, they are not required. There is also a stream running south to north on the site. The stream requires a breakline for the surface to generate properly.

Since the original ground survey there has been a change. A groundwater well has been drilled and installed. The surveyors returned to the site and gathered the information needed to locate the well. They set up from an existing control point and recorded the bearing, distance, and elevation for the well.

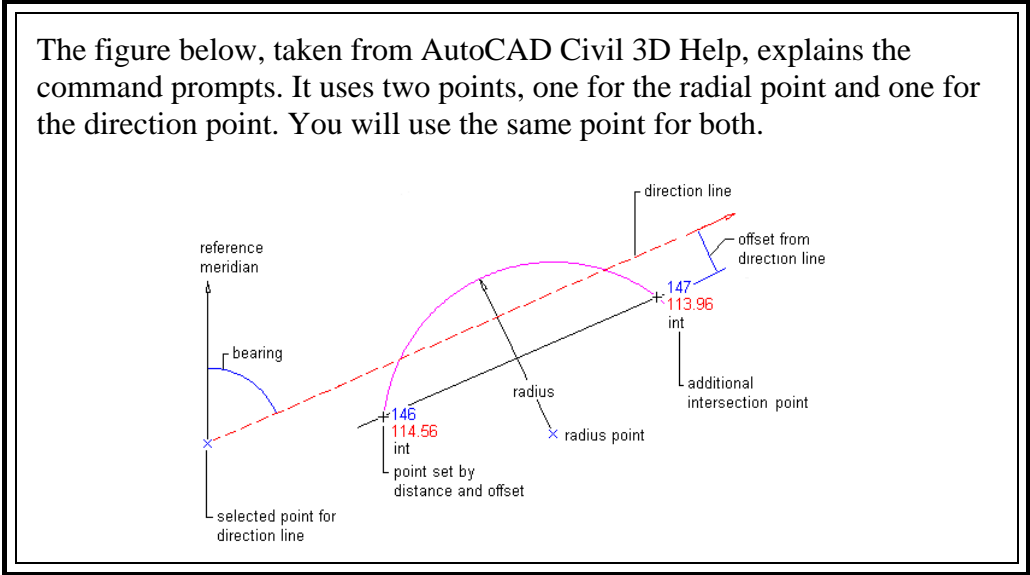
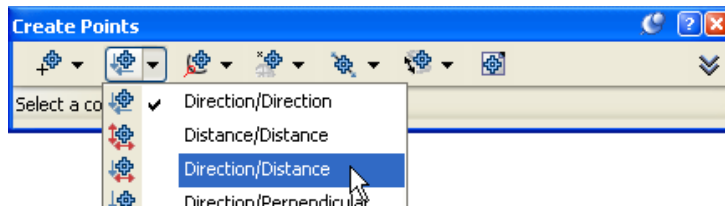
8. In the *Prospector* tab, select once on **Points** to highlight it.
9. In the Item View, right-click on point number 13 and select **Zoom to**. This was the point used to locate the well.



10. Use **Zoom Center** and a height of **300** to see the well point. You can also use the wheel on your mouse to zoom out. Your screen should look similar to the one displayed below.



11. Click on the **Intersection** drop-down menu and select **Direction/Distance**.



12. Follow the command prompts:

>>Please specify a location for the radial point: *pick _node of CTRL point# 13*

>>Enter radius <0.0000>: **198.30**

>>Specify start point: *pick _node of CTRL point# 13*

>>Specify direction at start point or [Bearing/aZimuth]: **B**

>>Quadrants - **NE = 1, SE = 2, SW = 3, NW = 4**

>>Specify quadrant (1-4) or [aZimuth/Angle]: *enter a number or pick in a quadrant - 4 - NW*

>>Specify bearing or [aZimuth/Angle]: **55.1106**

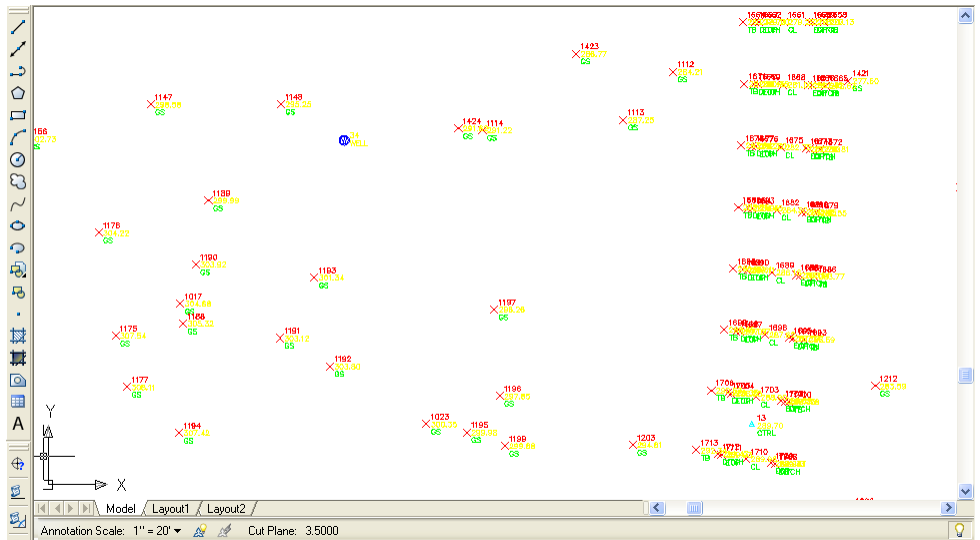
>>Specify an offset <0.0000>: **0**

>>Enter a point description <.>: **WELL**

>>Specify a point elevation <.>: **295.05**

>>Please specify a location for the radial point: <Esc>

13. Close the Create Points toolbar. Your screen should look similar to that shown below.

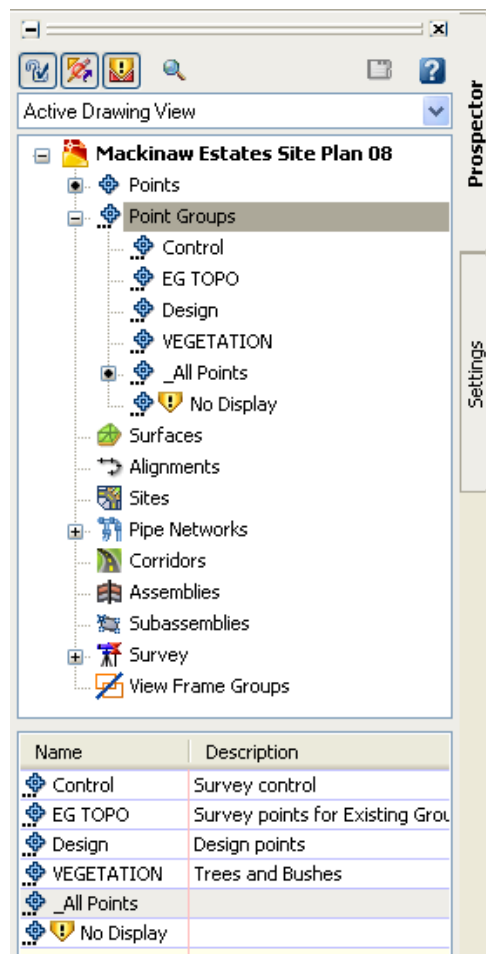


Update Point Groups

You will use Point Groups EG TOPO and VEGETATION as part of the data for this surface. Therefore, the Point Groups must be updated to include the points permitted by their filters.



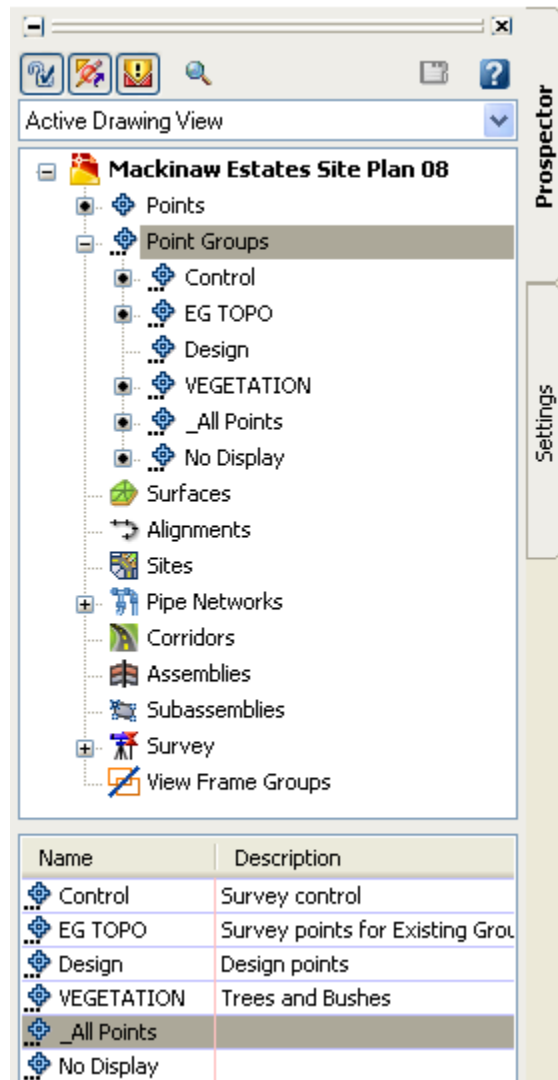
1. In the *Prospector* tab, select **Point Groups** to see its collection in the Item View or expand **Point Groups** to see its collection directly in the Tree View.



The symbol in front of each Point Group indicates that the Point Group is out of date. The Point Group `_All Points` has no symbol, because it automatically contains all of the points in the drawing regardless of any filters.

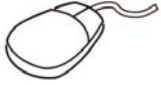


2. Right-click on Point Groups and select **Update**. The Point Groups are now current.

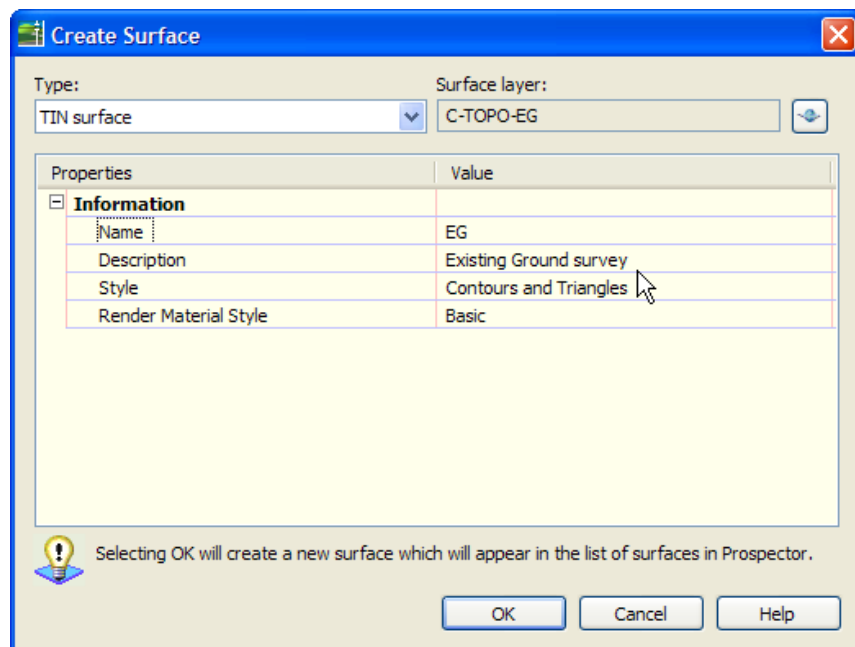


3. **Zoom Extents.**

Create a New Surface



1. In the *Prospector* tab, right-click on Surfaces and select **Create Surface...**
2. Type **EG** as the *surface Name* and type a Description as shown below, as needed. The Surface Layer Name is **C-TOPO-EG** and the Surface Style is pre-set to Contours and Triangles. You can also change the Style here.

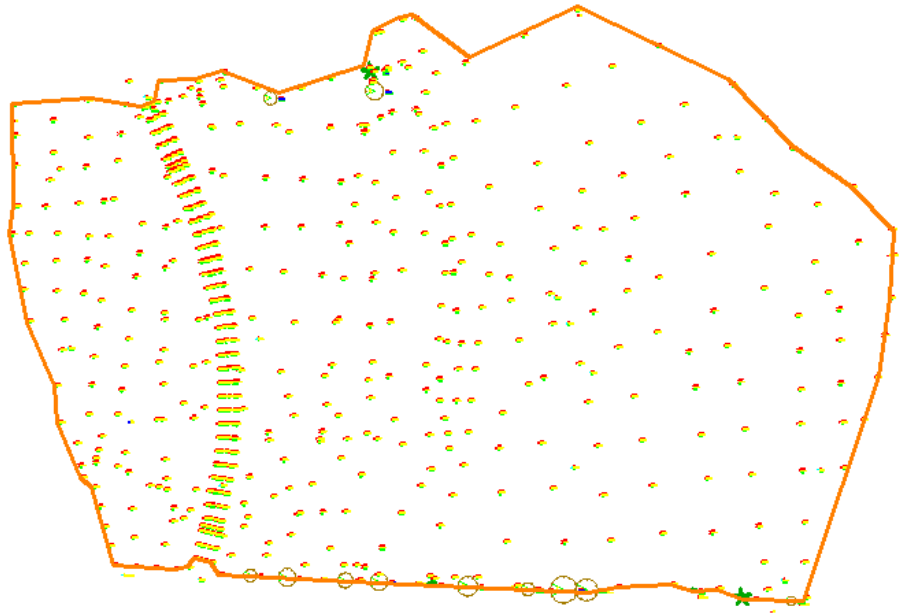


3. Click **OK**.

You will need a boundary to control the triangulation of the surface around its perimeter. This surface requires some manual editing, but a boundary reduces the number of edits required.

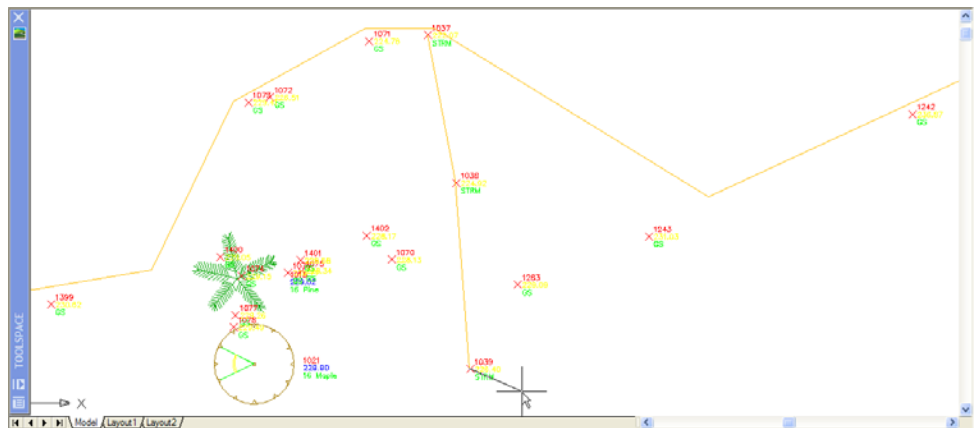
4. Set layer **C-TOPO-FALT** to be current.

- Use the **Polyline** command to create a closed polyline around the points, as shown below.



You need to define a breakline along the stream to control the triangulation of the surface in that area. Begin by drawing a polyline connecting the points that represent the stream. You can draw the polyline or create a Point Group to isolate the stream points.

- Zoom into the north central area of the site, as shown below.



- Start the **Polyline** command. Start at the northern most point with a description of **STRM (#1037)**. You do not need to snap to the points.

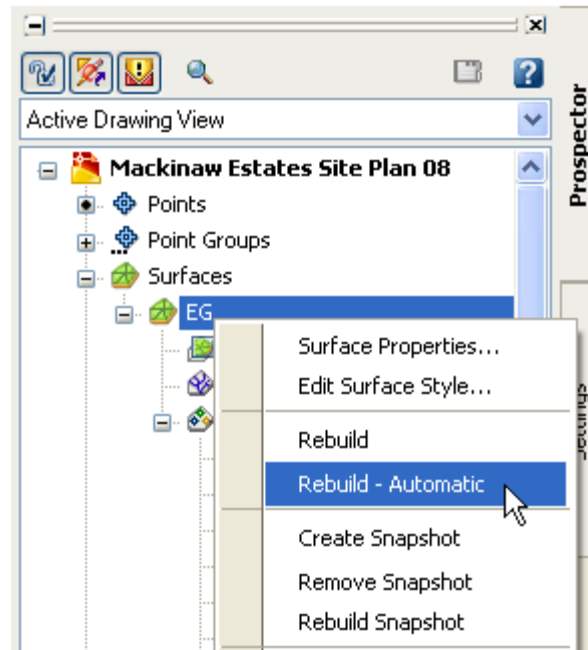
8. Work south, picking near each STRM point. To make this process a little easier, the points are numbered sequentially from 1037 in the north to 1057 in the south. You now have the three components you will use to define the surface.



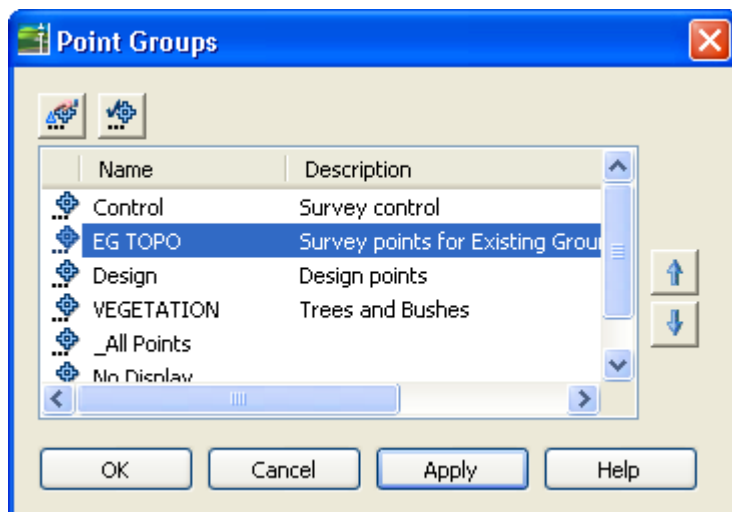
Add Point Groups



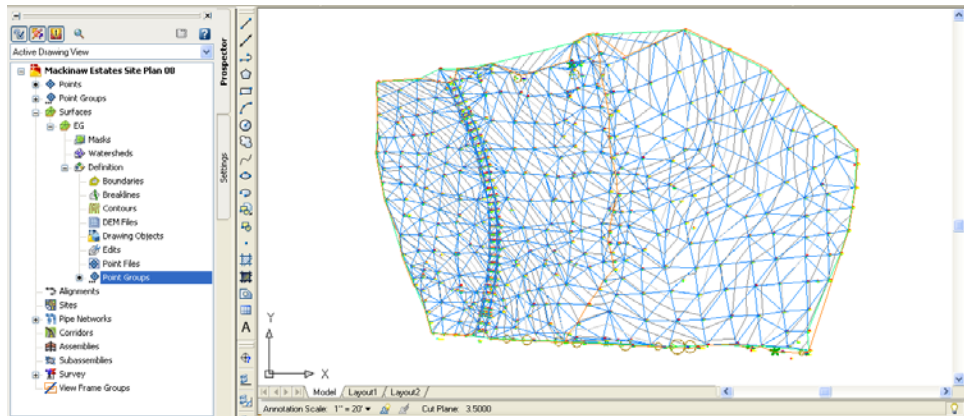
1. Expand Surfaces, EG, and Definition.
2. Right-click on EG and select **Rebuild Automatic**.



3. Right-click on Point Groups and select **Add**.
4. Select **EG TOPO** and click **OK**.



The surface is displayed.



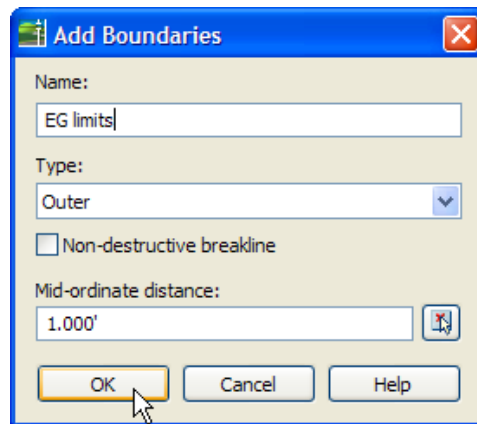
5. Add the Point Group **Vegetation**.

Create a Boundary

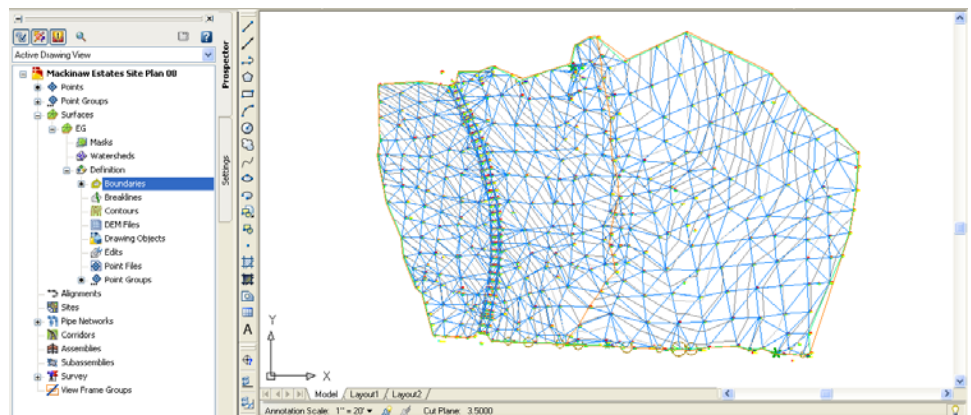
The surface extends beyond the polyline for the boundary. You will now define the boundary.



1. Right-click on Boundaries and select **Add**.
2. Enter the *Name* **EG Limits**.
3. Select **Outer** for the *Type*.
4. Leave the **Non-Destructive Breakline** option cleared.
5. The Mid-ordinate distance value is irrelevant.



6. Click **OK**.
7. Select the polyline. Note how the surface border has changed.

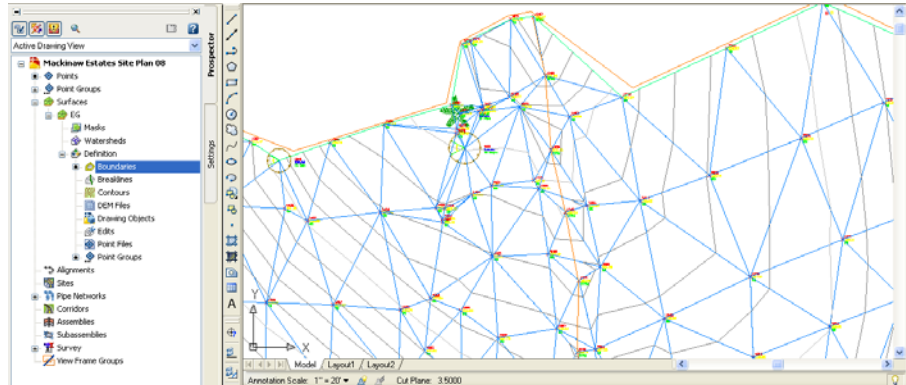


Create a Breakline

You will now add the breakline for the stream. The polylines for breaklines must be drawn before selecting this command.

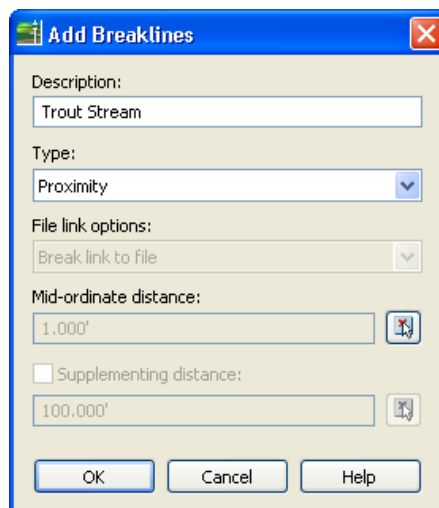


1. Zoom to the northern half of the stream.

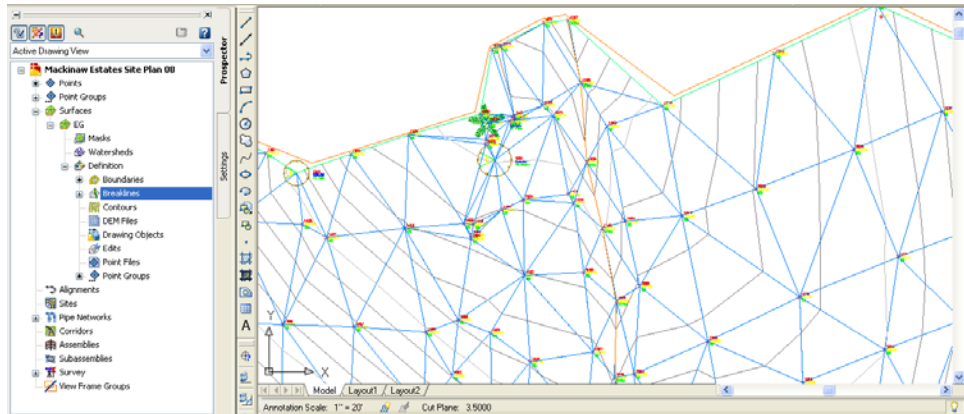


Some of the triangulation crossed the stream. This means a point on the top of one bank is interpolating to a point on the top of the other bank. You want the triangulation to follow the stream. A breakline resolves this.

2. Right-click on Breaklines and select **Add**.
3. Enter a *Description* of **Trout Stream**.
4. Set the *Type* to **Proximity**. The **File link** options and Mid-ordinate distance value are irrelevant. Click **OK**.



5. Select the polyline and press <Enter>.



The triangulation revises to follow the stream. The contours represent the stream more accurately.

Breaklines created by Proximity leave the original polylines in the drawing even though they are defined as a Standard breakline. This Standard definition can be inserted into the drawing and manipulated. The original line can be deleted.

A breakline created as a Standard breakline is linked to the original line in the drawing. If this line is deleted, the breakline definition is deleted. The different breakline definitions are described below.

| Breakline Type | Description |
|-----------------|--|
| Standard | Creates a breakline that is defined by selecting 3D lines, grading feature lines, and 3D polylines. |
| Proximity | Creates a breakline that is defined by drawing or selecting a grading feature line or polyline within the extents of the surface boundary. The location and elevation of each vertex is determined by the nearest surface point. |
| Wall | A wall breakline is stored as a standard breakline but is defined differently. You provide an offset side, elevation difference at a vertex or entire breakline. |
| Non-destructive | Creates a breakline that is defined using grading feature lines and open or closed AutoCAD objects. A non-destructive breakline does not affect the original surface. |