

GEOPAK Build DTM

Design Manual

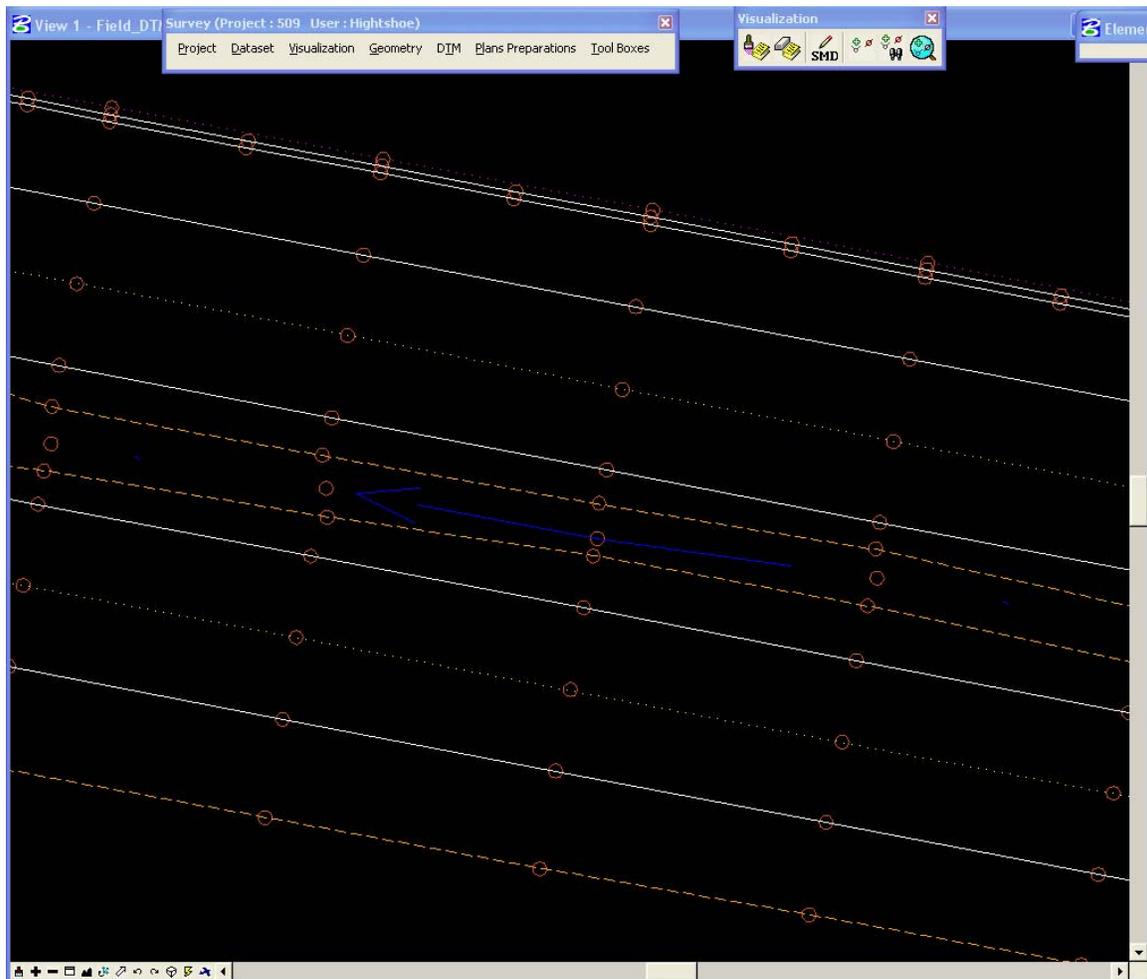
Chapter 40

Survey Information

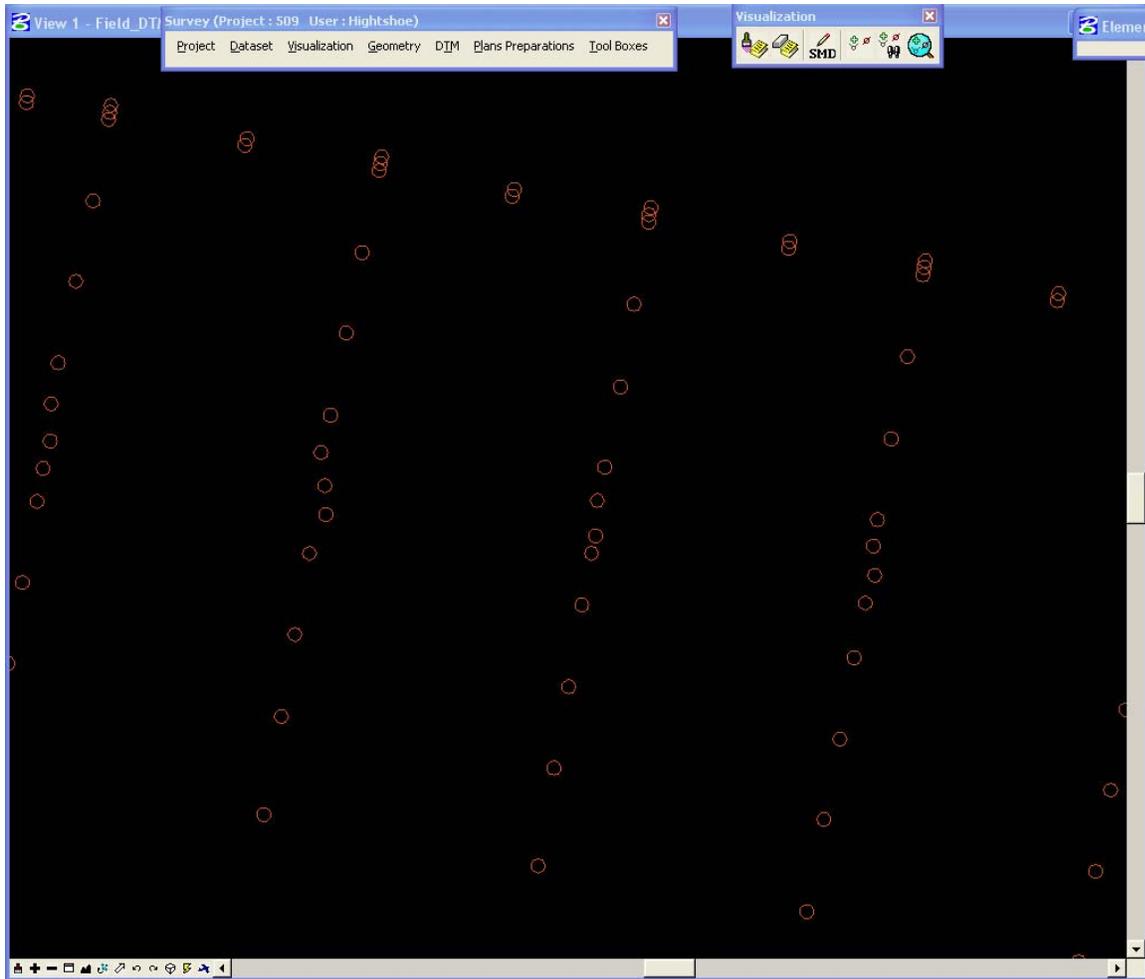
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Building DTM's from Graphical Elements

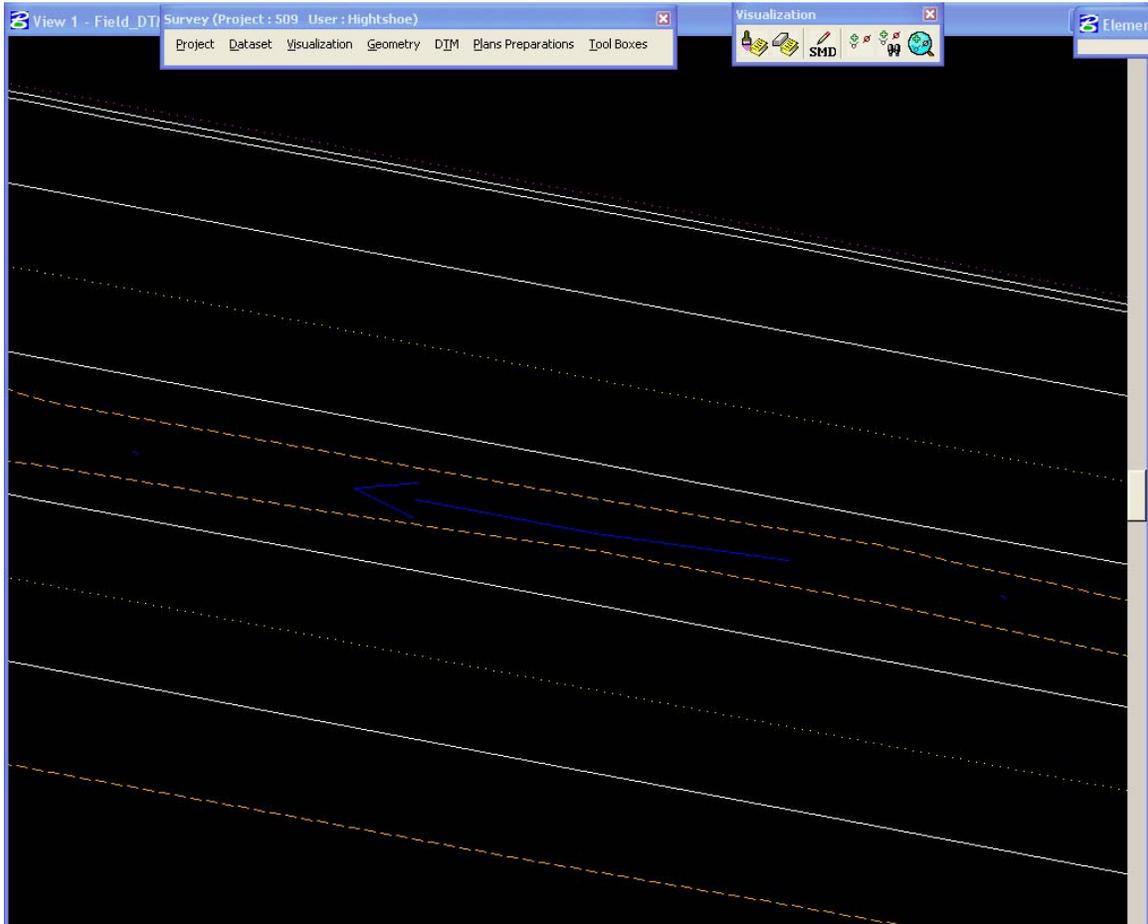
- 1) Shown below is a zoomed-in picture of a DTM model. This model contains all survey elements classified as zone 2 or 3. This means that all of these elements are good for ground elevations. Because these items are drawn into a 3d Microstation model, we can use these graphics to create a digital terrain model (DTM) or in GEOPAK terminology a triangulated model (TIN). Creating a TIN file in GEOPAK is a two-step process: creating a “dat” file that contains all of the XYZ data from file, then converting this information into a TIN.



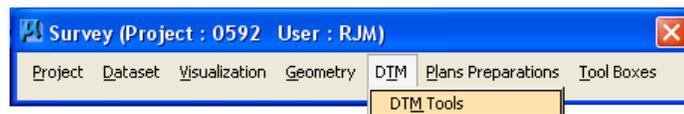
- 2) All of the survey elements in this model are broken down into one of two groups. The first of these groups are the spot shots. These are the locations where every shot that is good for a ground elevation is located. Each of these spot shots will represent the vertices of the triangles created in the TIN file. These spot shots will be drawn on multiple levels but will all be drawn with **color 62**.



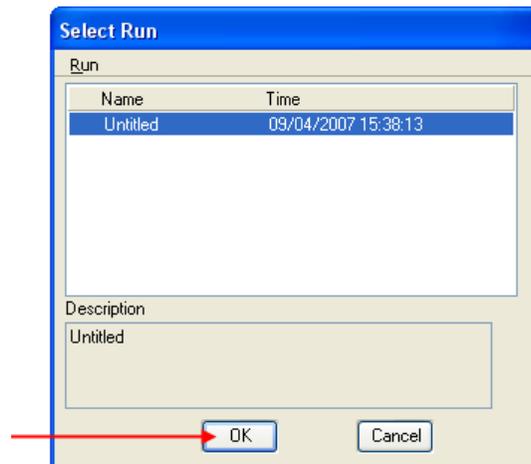
- 3) The second type of element in this model is called a breakline. These breaklines are represented by survey chains that are good for ground elevations and drawn into this model. The breaklines do not allow triangle to cross them and create a smoother and more accurate TIN file. Breaklines are drawn on multiple levels and colors due to the fact that they are used in other models also.



- 4) To begin the process, we will build a “dat” file. Select **DTM>DTM Tools** from the *Survey* tool bar. This will open the *DTM* tool bar.



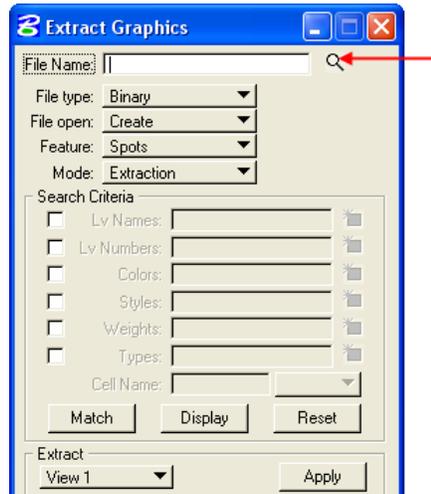
- 5) Press the **OK** button on the *Select Run* dialog box. The *DTM* toolbar will then appear.



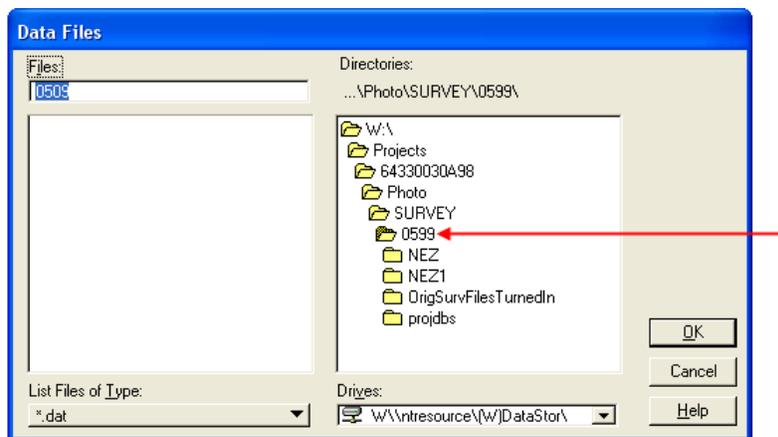
- 6) Press the third button from the left, **Extract Graphics**, on the *DTM* tool bar. This will open the *Extract Graphics* dialog box.



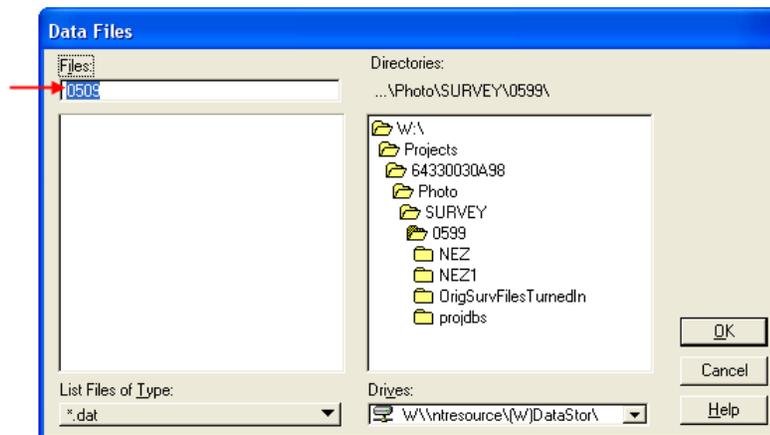
- 7) Press the **Magnifying Glass** to open the *Data files* dialog box.



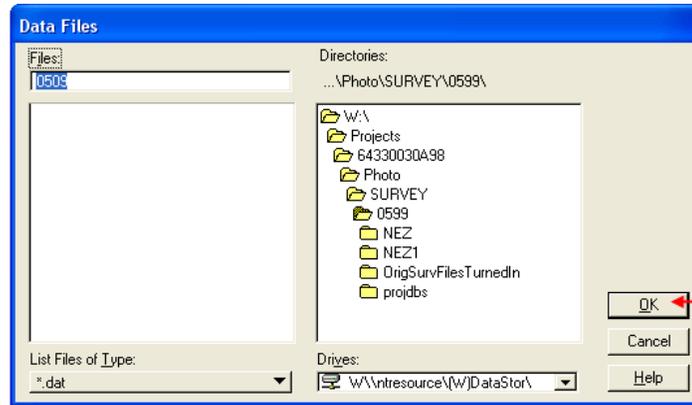
- 8) Double-check that the directory shown in the box is pointing at the correct folder. This should be set correctly if the GEOPAK Survey project has been selected previously.



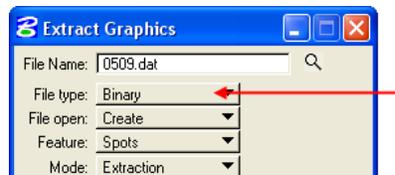
- 9) Type in your **SAP number** for the name of the file you are about to create.



10) Once everything looks how you want it, press the **OK** button.



11) In the *Extract Graphics* dialog box, the *File Type* should be **Binary**.



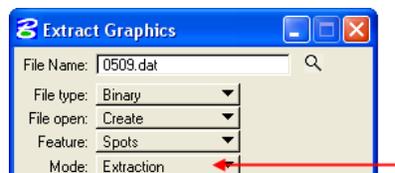
12) *File Open* should be set to **Create**.



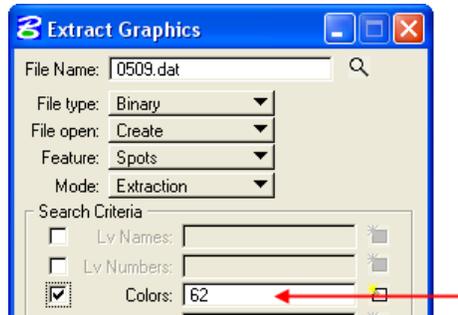
13) Set the *Feature* to **Spots**.



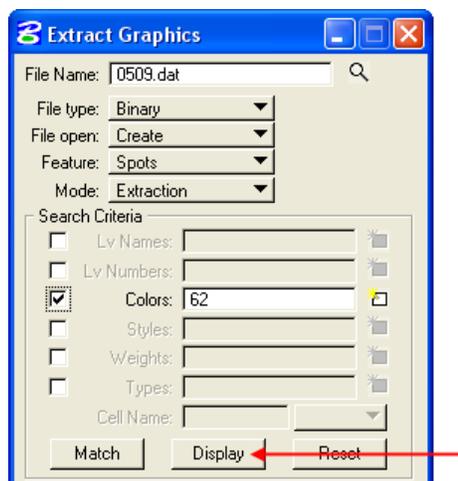
14) The *Mode* should be set to **Extraction**.



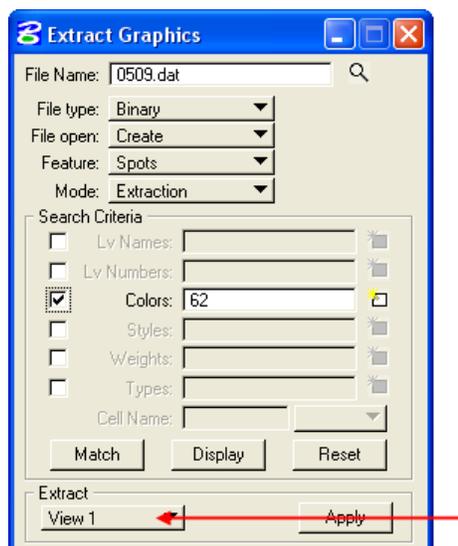
- 15) Place a **check mark** next to *Colors* and then type in **62**.



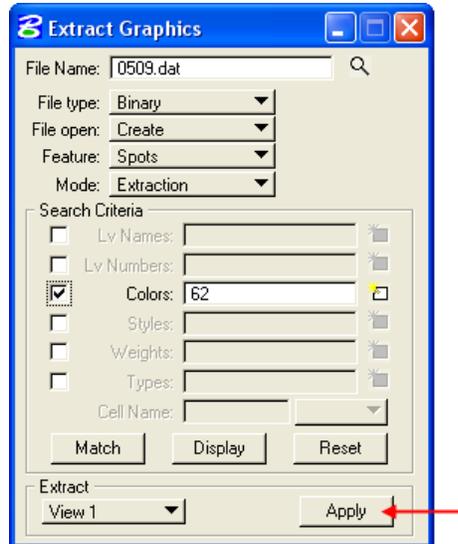
- 16) To verify that all of the spot shots are being selected, you can use the **Display** button to *highlight* and *un-highlight* the items. You can also use turn the MicroStation *levels* on and off to better see what is being selected.



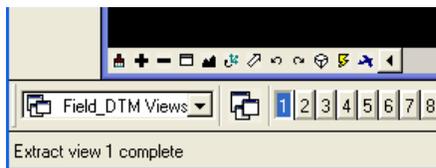
- 17) Under *Extract*, make sure the selection is set to **View 1**. This tells GEOPAK to extract all of the spot shots that are showing in your MicroStation window. Use the MicroStation view tools such as *Fit View* and *Zoom Out* to ensure that all points that you want extracted are showing in the window.



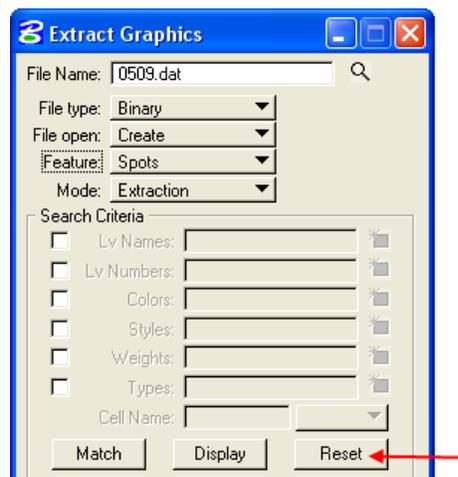
18) Once everything is set to your liking, press the **Apply** button.



19) When GEOPAK is thru extracting all of the spot shots, it will tell you the operation is complete in the lower left corner of the MicroStation window.



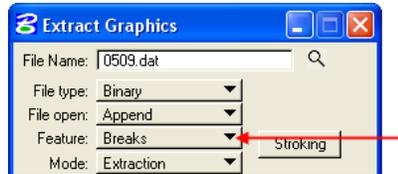
20) We are now ready to extract the breaklines from the file. Press the **Reset** button on the *Extract Graphics* dialog box to clear the *Colors* window.



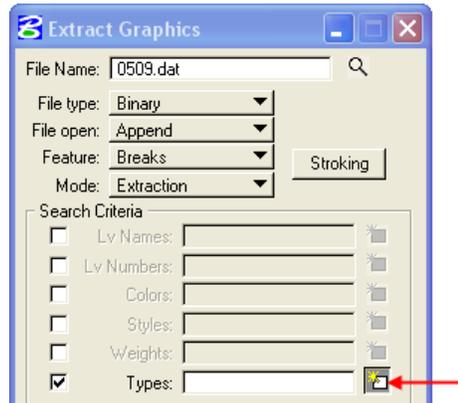
21) We have already created the file *0509.dat* when we extracted the spot shots. We now want to add the breakline information to the same file. Change the *File Open* option to **Append**.



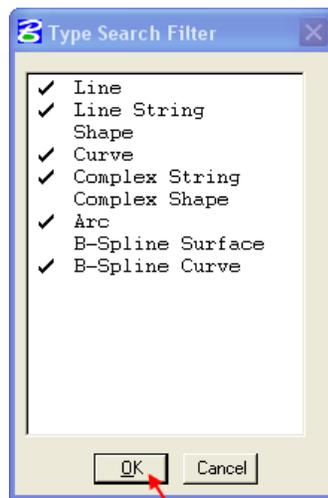
22) Change the *Feature* to **Breaks**.



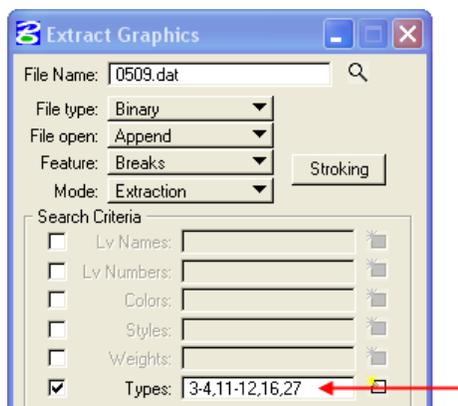
23) Place a **check mark** next to *Types* and then press the **Select Element Types** button.



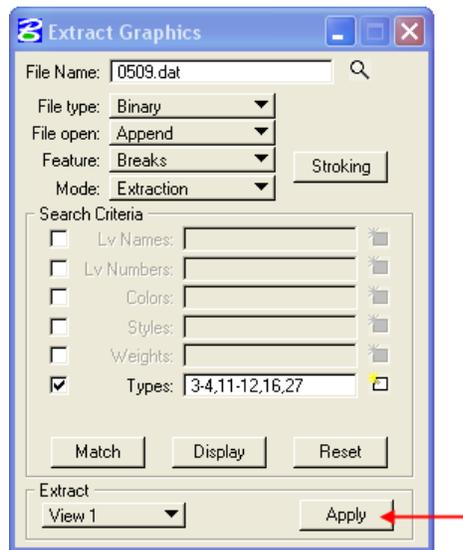
24) In the *Type Search Filter* dialog box, place a **check mark** next to **Line**, **Line String**, **Curve**, **Complex String**, **Arc** and **B-Spline Curve**. Press the **OK** button next.



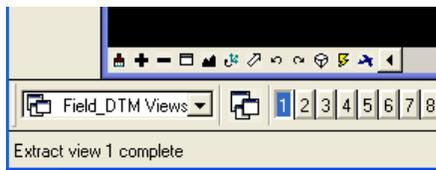
25) The numbers representing the types you placed check marks in front will now be shown in the *Types* window.



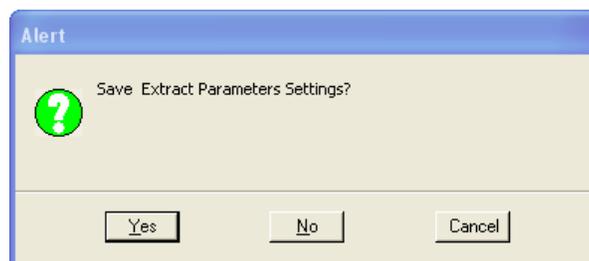
- 26) We are again using **View 1** as the *Extract* boundary so make sure that everything is showing in the MicroStation window. Press the **Apply** button to extract the breaklines.



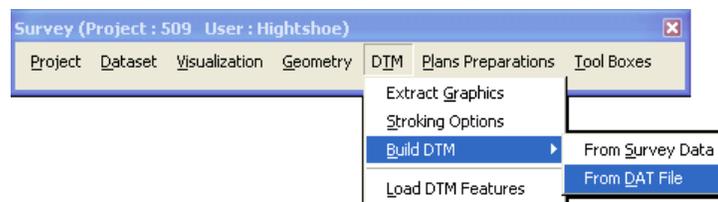
- 27) When the extraction process is complete, MicroStation will show this message in the lower left hand corner of the MicroStation window.



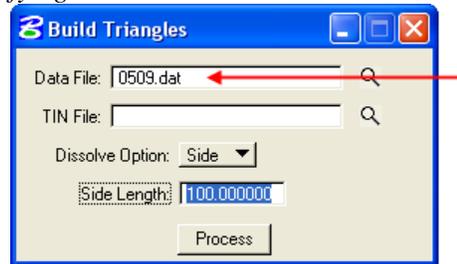
- 28) You can now close the *Extract Graphics* dialog box by clicking on the “X” in the upper right hand corner. After clicking on the “X”, you will be asked if you want to save the setting of the *Extract Graphics* dialog box. You can press any of the buttons as it does not have any affect on the “dat” file we created.



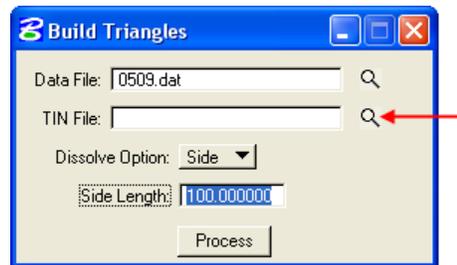
- 29) The file *0509.dat* (your file name will correspond to your SAP number) is now complete. This file contains all of the XYZ data needed to build a TIN from your spot shots and breaklines. We will now make a TIN from this file. On the *GEOPAK Survey* tool bar, select **DTM>Build DTM>From DAT File**. This will open the *Build Triangle* dialog box.



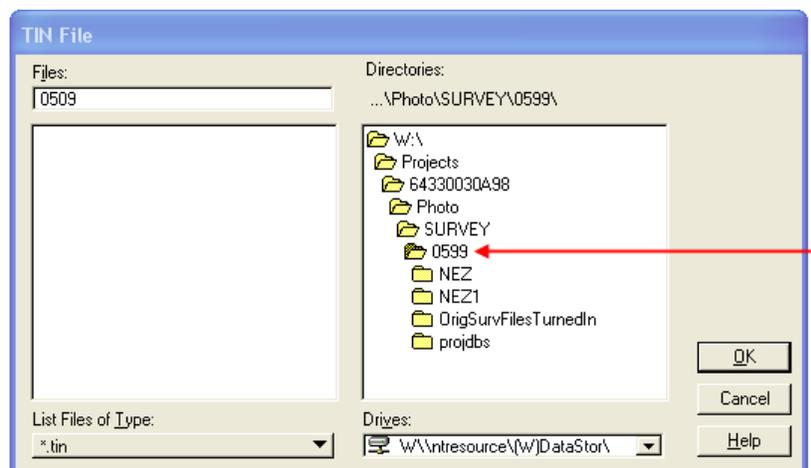
- 30) Make sure that the *Data File* window contains the name of the “*dat*” file you just created. If it doesn’t, click on the *Magnifying Glass* and select the correct one.



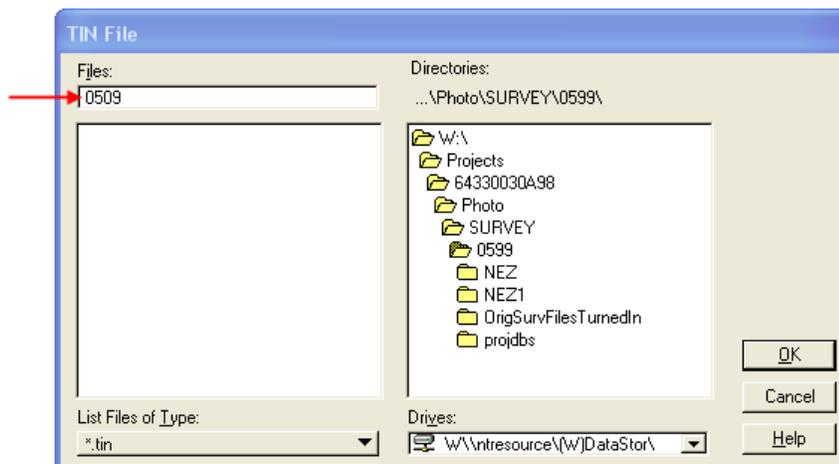
- 31) Press the **Magnifying Glass** next to *TIN File* to select the name of the TIN file you are about to create.



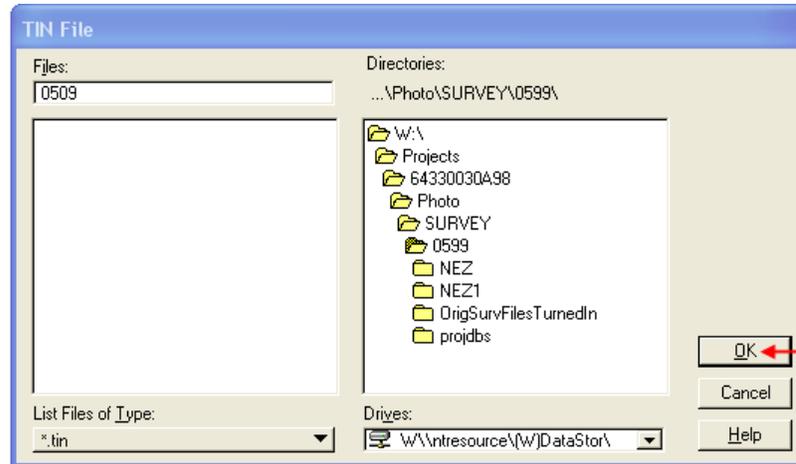
- 32) In the *TIN File* dialog box, make sure that the correct folder is chosen in the *Directories* window.



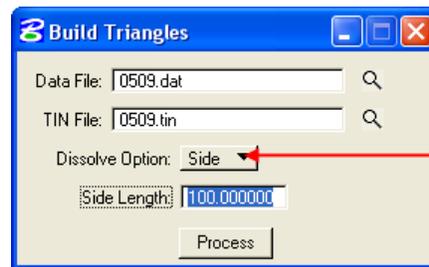
- 33) Type in your **SAP** number to be the *name* of your TIN file.



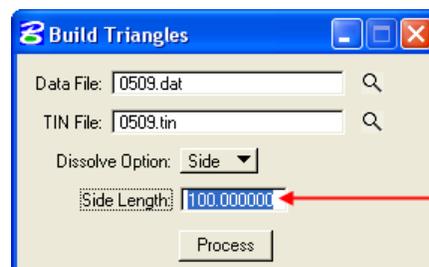
34) Press the **OK** button.



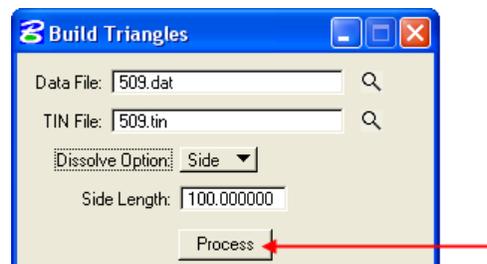
35) Choose **Side** for the *Dissolve Option*.



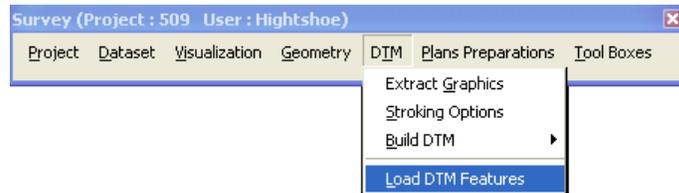
36) Type in 100 for the Side Length. This number represents the maximum length of any side of the triangles about to be created in the TIN file. You can adjust this number to eliminate as many unwanted exterior triangles as possible.



37) Press the **Process** button.



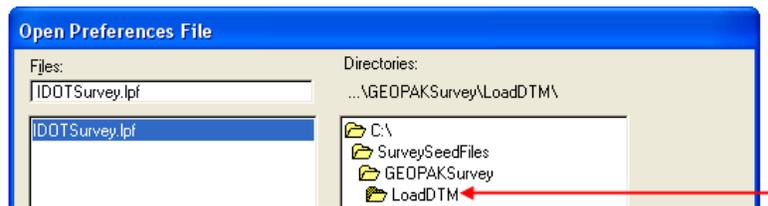
38) To view the TIN file that you just created, select **DTM>Load DTM Features** on the *Survey* tool bar. This will open the *Load DTM Features* dialog box.



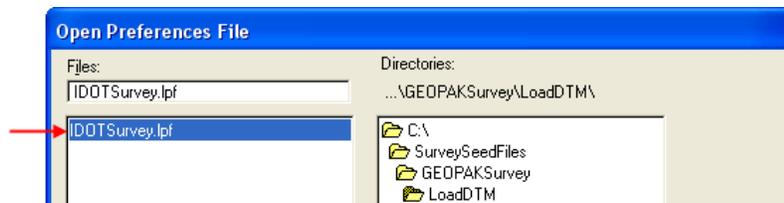
39) On the *Load DTM Features* dialog box, select File>Open.



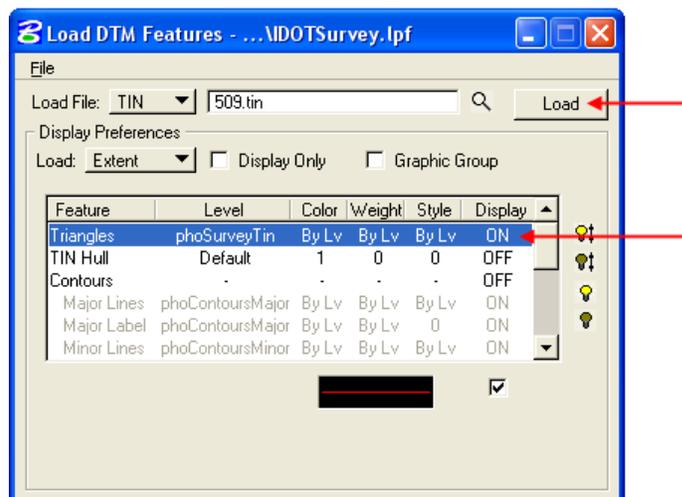
40) If not there already, navigate in the *Directories* window to **C:\SurveySeedFiles\GEOPAKSurvey\LoadDTM**.



41) Select the file **IDOTSurvey.lpf** and then press the **OK** button.



42) All of the defaults for how things should be drawn are now set in the *Load DTM Features* dialog box. Make sure that everything is set to OFF except for **Triangles**, which should be set to ON. You can accomplish this by double-clicking on each item to reverse its setting or by using the light bulbs to the right. When you have this set, press the **Load** button and the triangles will be drawn into your file.



43) Your triangles should show up similar to this.

