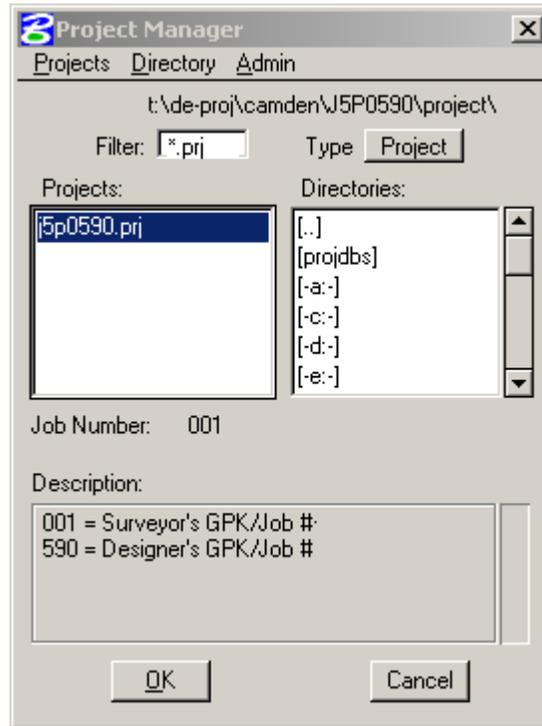
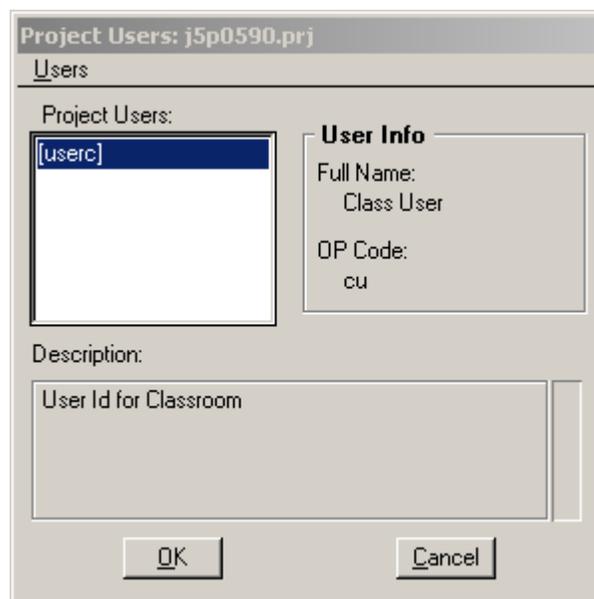


Rock Excavation (End Area Method)

- 1) Open **T:\de-proj\Camden\J5P0590\data\plan_J5P0590.dgn**
- 2) Select the Project Manager and navigate to the **T:\de-proj\Camden\J5P0590\project** folder.
 - a. Make sure the job number is set to the Surveyor's GPK/Job number of **001**



- 3) Select "userc" as the Project User.

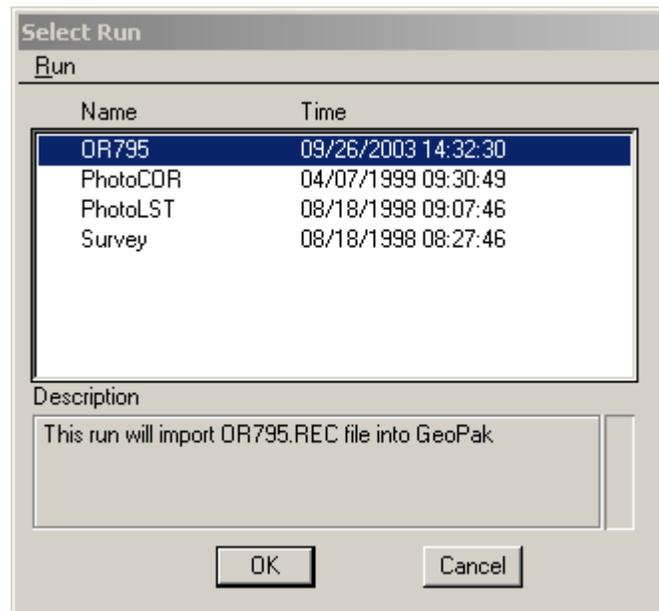


Rock Excavation (End Area Method)

- 4) Then select the Survey Button.



- 5) Copy the default **Survey** run and create a new run called **OR795**. Once the run is created, select the run and go into it.



- Click "OK" to the Information dialog box that states "**WARNING: Unable to open the file. *.rec**"
- What is happening here is that GeoPak is looking on the root directory of the t:\ drive and is not finding any rec file.



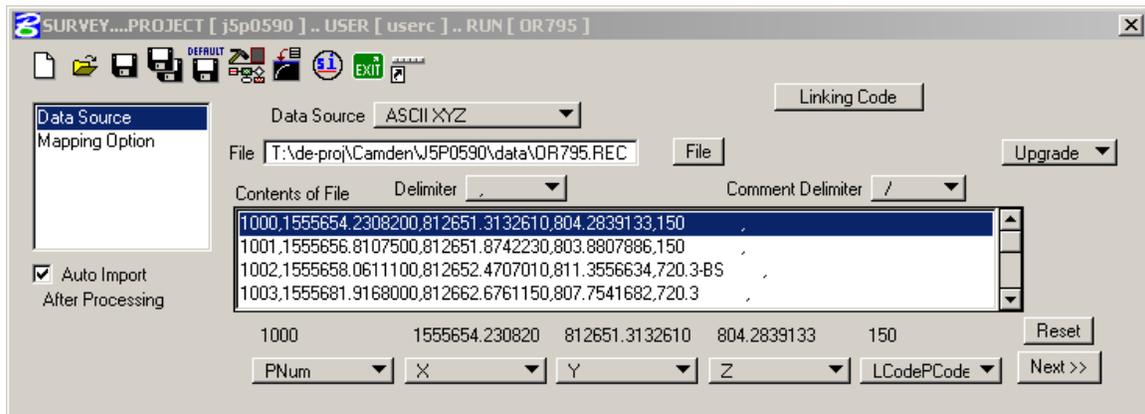
Rock Excavation (End Area Method)

6) In the Survey Project Dialog using the File button select the following REC file:

T:\de-proj\Camden\J5P0590\data\OR795.REC

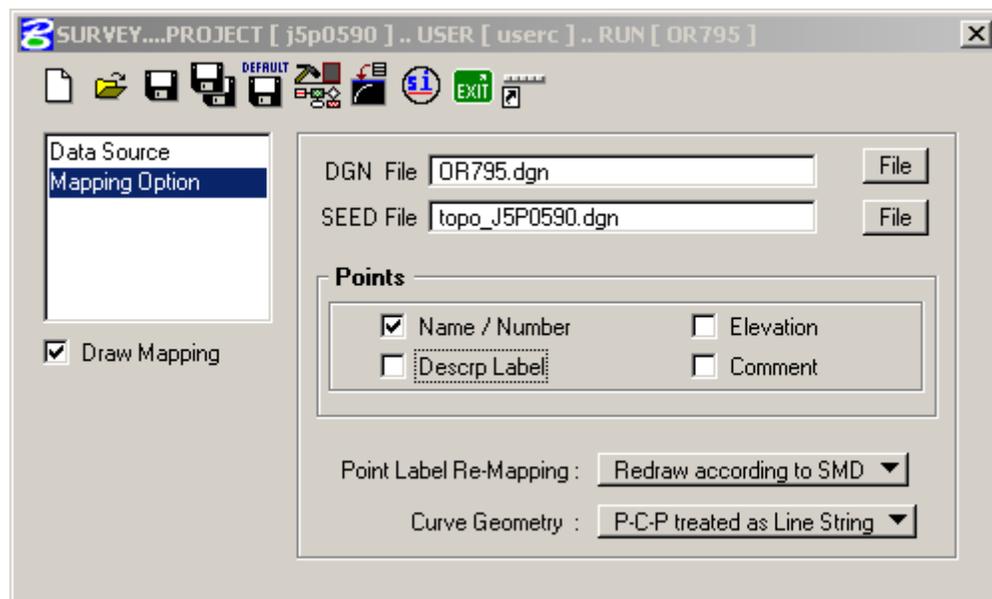
7) Select the **first line** of data from the REC file.

a. Always make sure that the REC file has no header information in it.



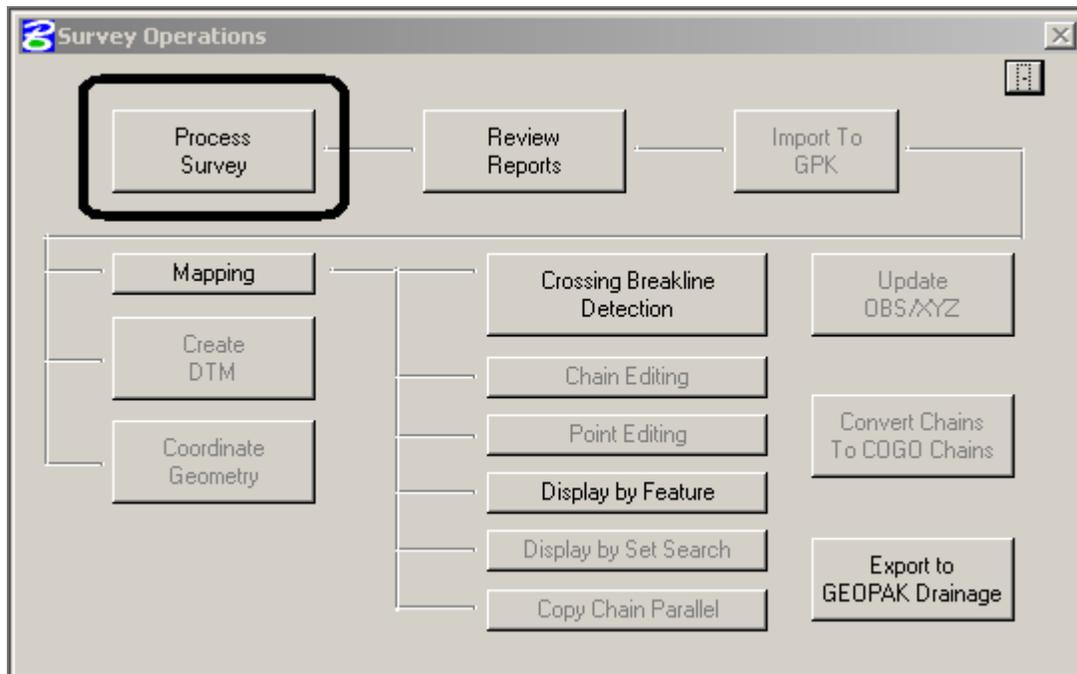
8) Under **Mapping Option**

- Set the DGN File to **OR795.dgn** (you'll need to type this in, the file has not been created yet).
- Set the Seed File to **topo_J5P0590.dgn**
- Uncheck Description Label.
- Save your run for future use by hitting the black diskette icon (3rd icon from the left).

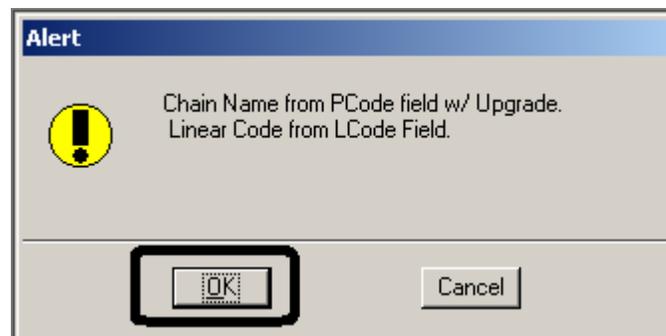


Rock Excavation (End Area Method)

- 9) Select **Process Survey** from the Survey Operations Dialog Box

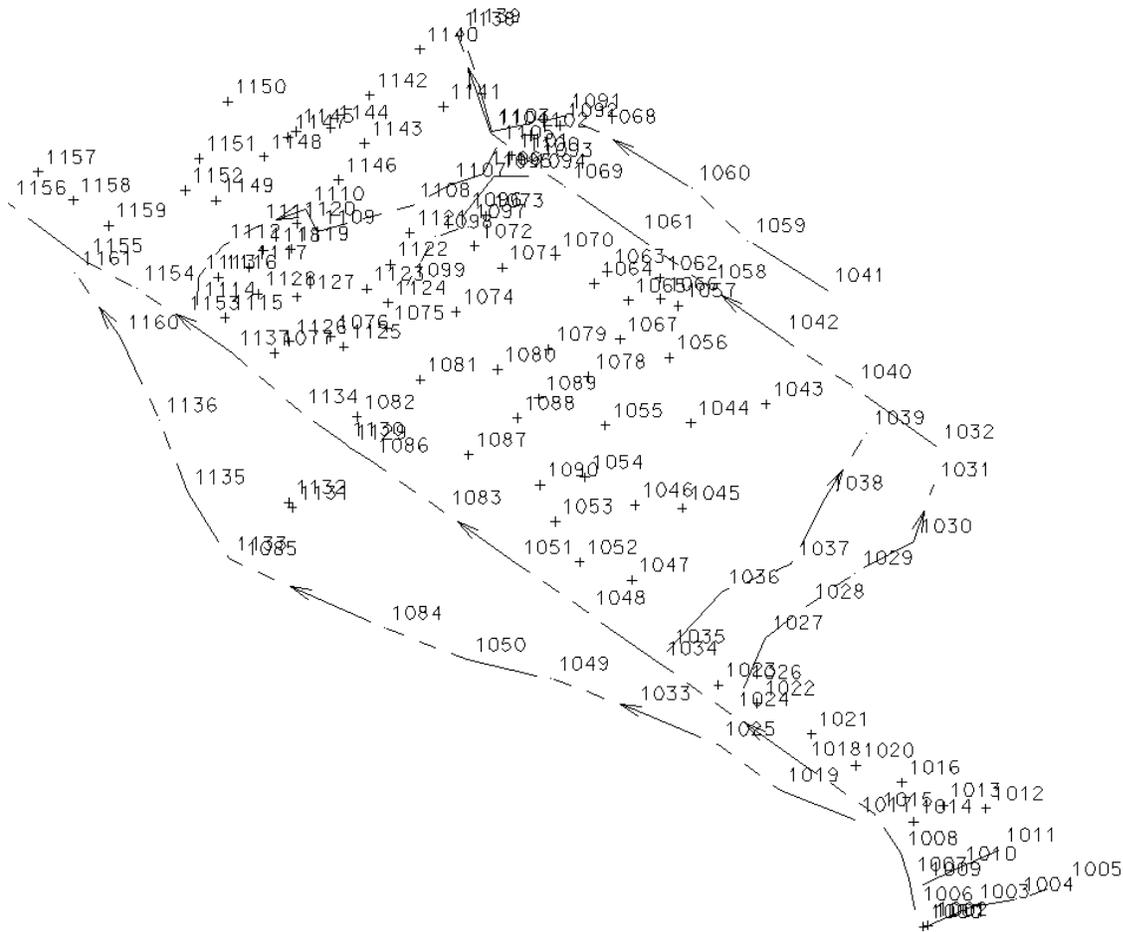


- 10) Select **OK** from the Alert dialog that pops up.

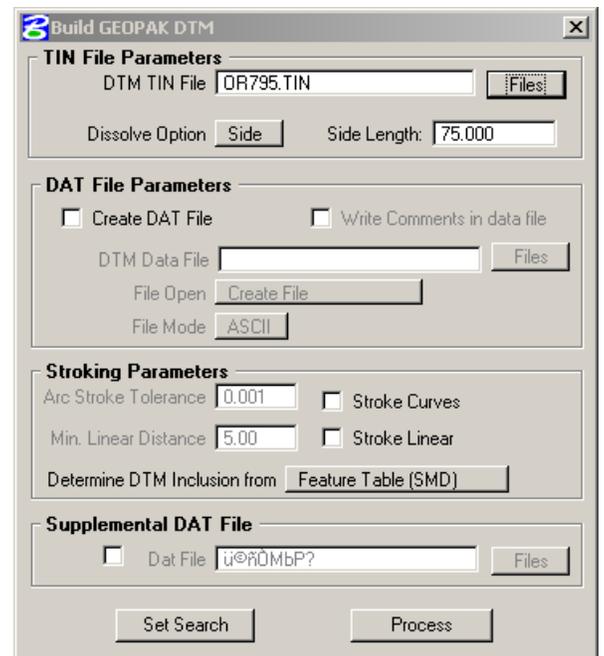
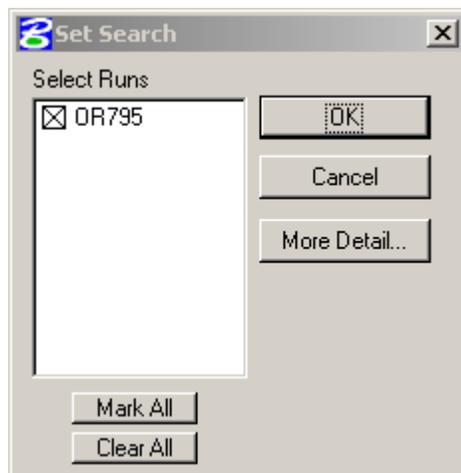


Rock Excavation (End Area Method)

11) Once GeoPak finishes importing and mapping the data, select “Fit View”.

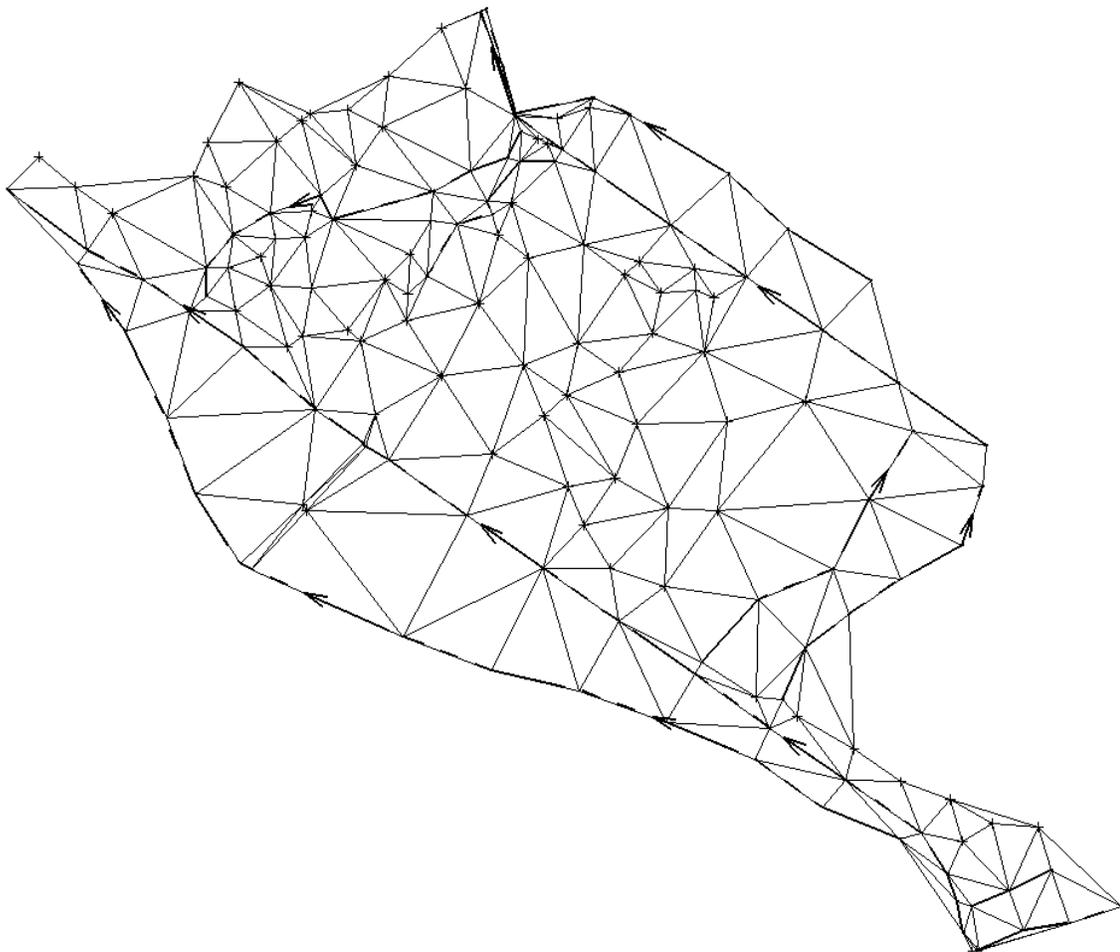
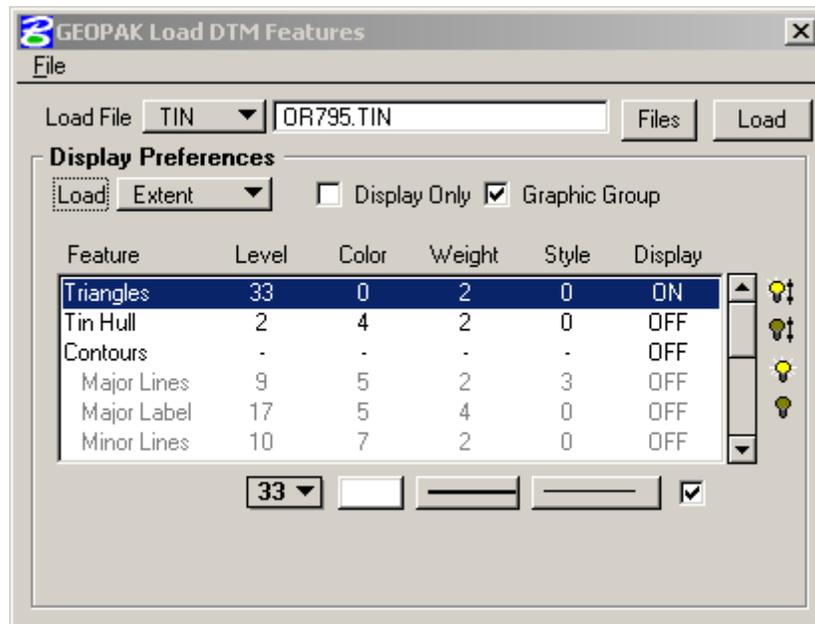


12) Create a tin file called **OR795.tin** for the Survey data that we just imported using the Create DTM button in the Survey Operations Dialog.



Rock Excavation (End Area Method)

- 13) Display the OR795.tin to see if there will need to be any Tin editing done. To do this, select the Load DTM Features icon in the Survey DTM tools.



Rock Excavation (End Area Method)

- 14) If your tin file (triangles) accurately represents the map then skip to step number 16.
If your triangles need some editing select the Edit pull-down from the DTM menu.

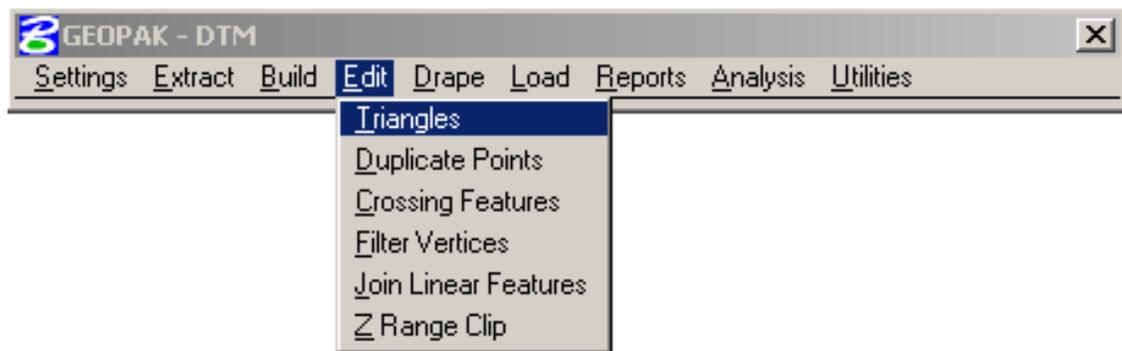
To do this select: Applications > GeoPak Road > DTM Tools.

Create a new run by coping the MoDOT run. Once you open the run you'll get the DTM Tool Palette. → → →

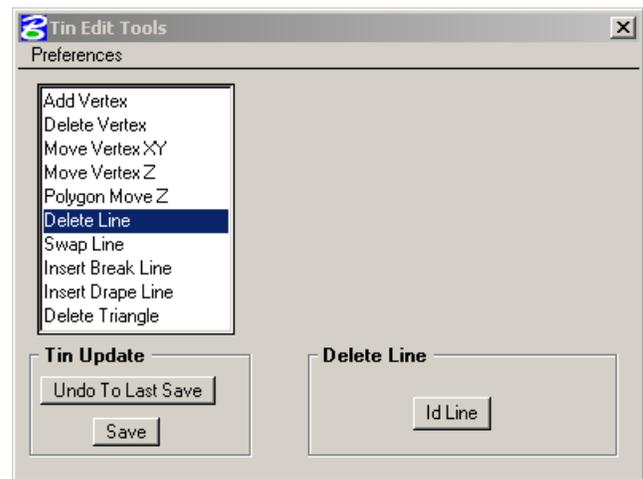
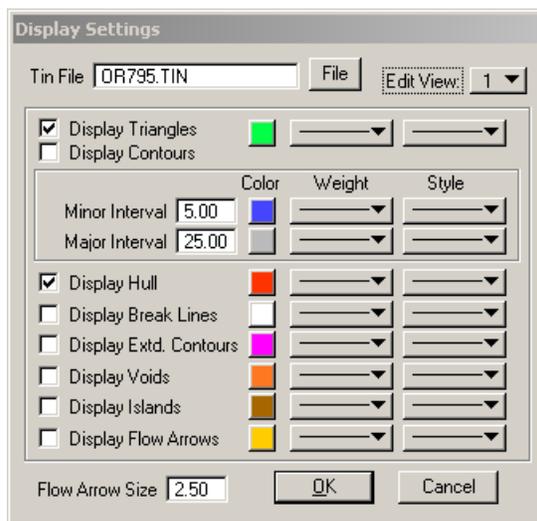


Select the DTM Menu icon in the upper left hand corner.

And then select Edit > Triangles



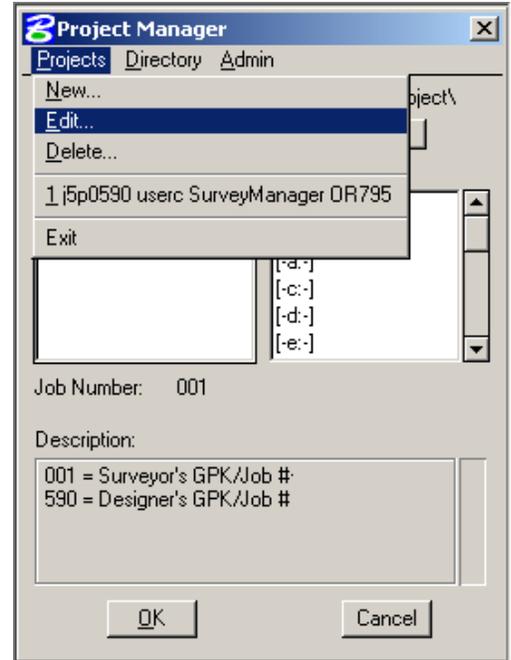
- 15) In the Display Settings Dialog select the tin file that you want to edit and toggle on "Display Triangles". Hit "OK" at the bottom of the dialog. You should now see your triangle and edit them using the "Tin Edit Tools". Most of the times you'll just need to use the "Delete Line" Option. To do this, select the "ID Line" button and then select a triangle leg (line). Once the tin modifications have been made select the save button in the lower left hand corner.



Rock Excavation (End Area Method)

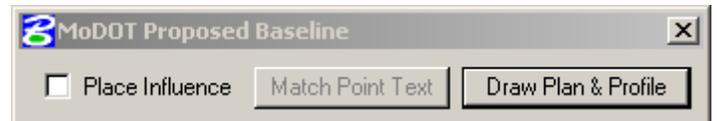
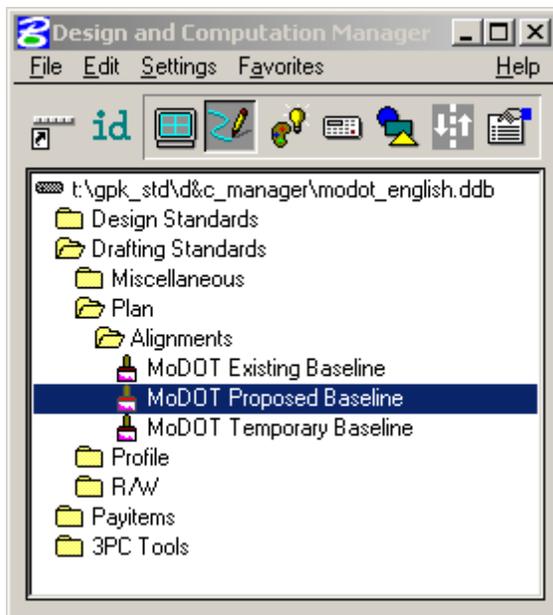
16) Now that we have the Survey Data mapped and the tin file is created, let's compare the survey data to the Route 5 Alignment. To do this let's create a MicroStation dgn file that has the alignment information in it.

- a. Close out of the **Survey Project Dialog**.
- b. Open the file **plan_J5P0590.dgn**
- c. Switch to the **590** GPK file. To do this go to the Project Manager Dialog and in the upper left hand corner select **Project > Edit**



17) Open D&C Manager by selecting **Applications > GeoPak Road > Design and Computation Manager**.

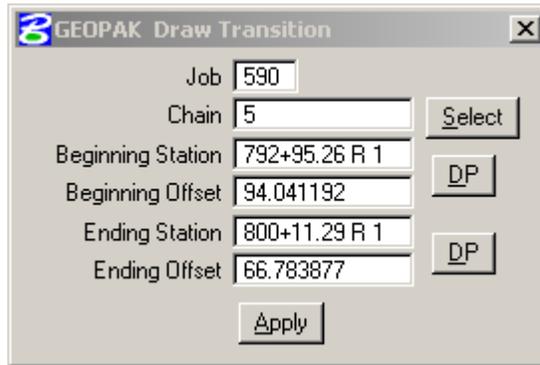
18) In D&C Manager navigate to **Drafting Standards > Plan > Alignments > MoDOT Proposed Baseline**. Then Select **Draw Plan and Profile** from the Operations Box.



Rock Excavation (End Area Method)

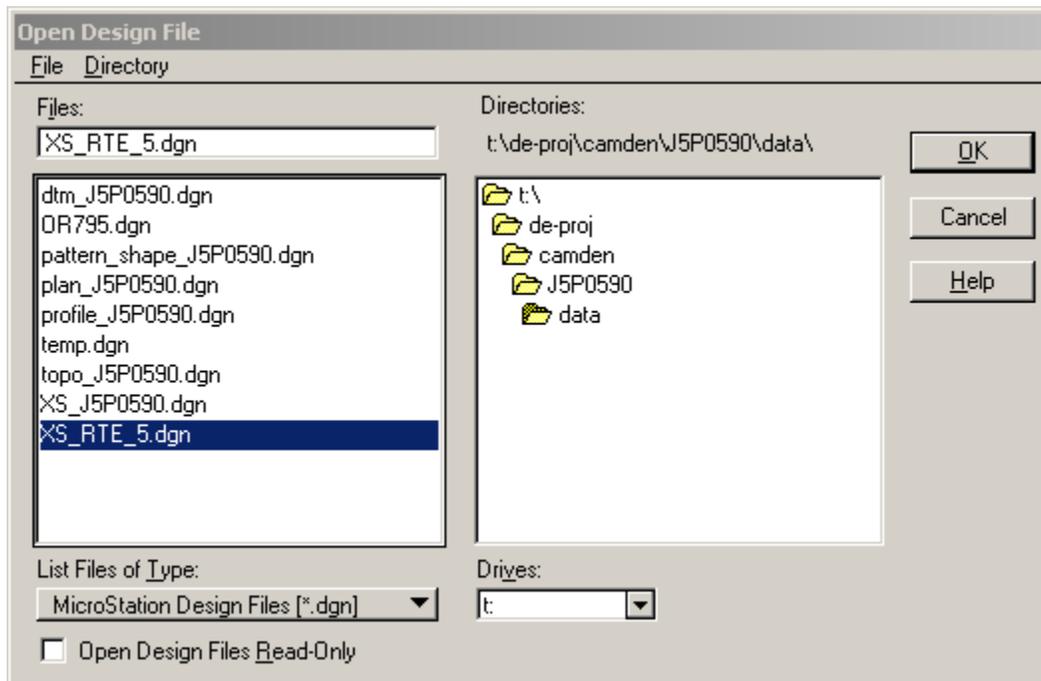
21) Use the GeoPak Road “Draw Transitions” tool to obtain the station values for the “Zero Sections”

- a. To open the **Draw Transition** tool; select **Applications > GeoPak Road > Plans Preparation > Draw Transition**



22) Open T:\de-proj\Camden\J5P0590\data\XS_RTE_5.dgn

This file has the Designer’s Cross-Sections in it.



Rock Excavation (End Area Method)

- 23) Select “XS Navigator” and view the Designer’s Cross-Sections for the area of the survey data.



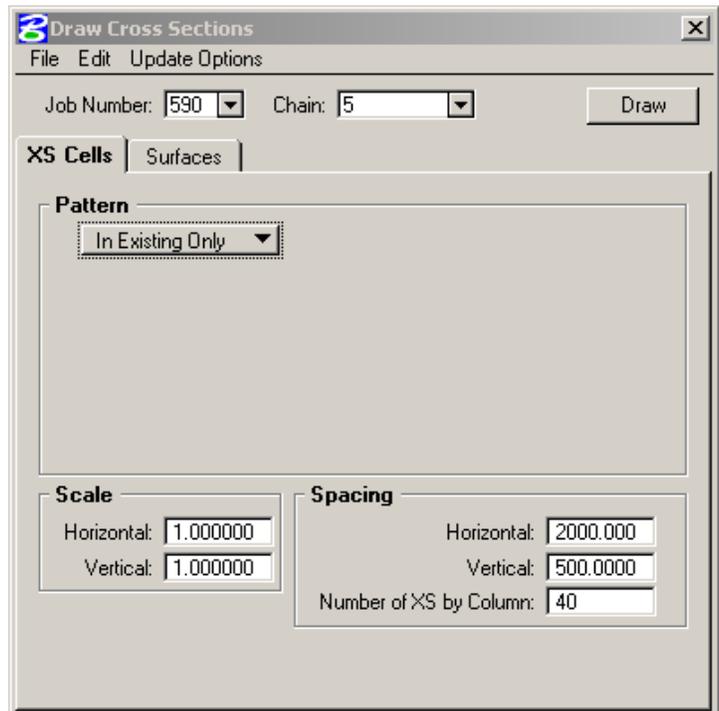
- 24) The next step is to draw the survey data (the rock layer) into the Designer’s Cross Section File. Select “Existing Ground Cross Sections” from the Road Dialog.



- 25) Copy the MoDOT run to OR795.

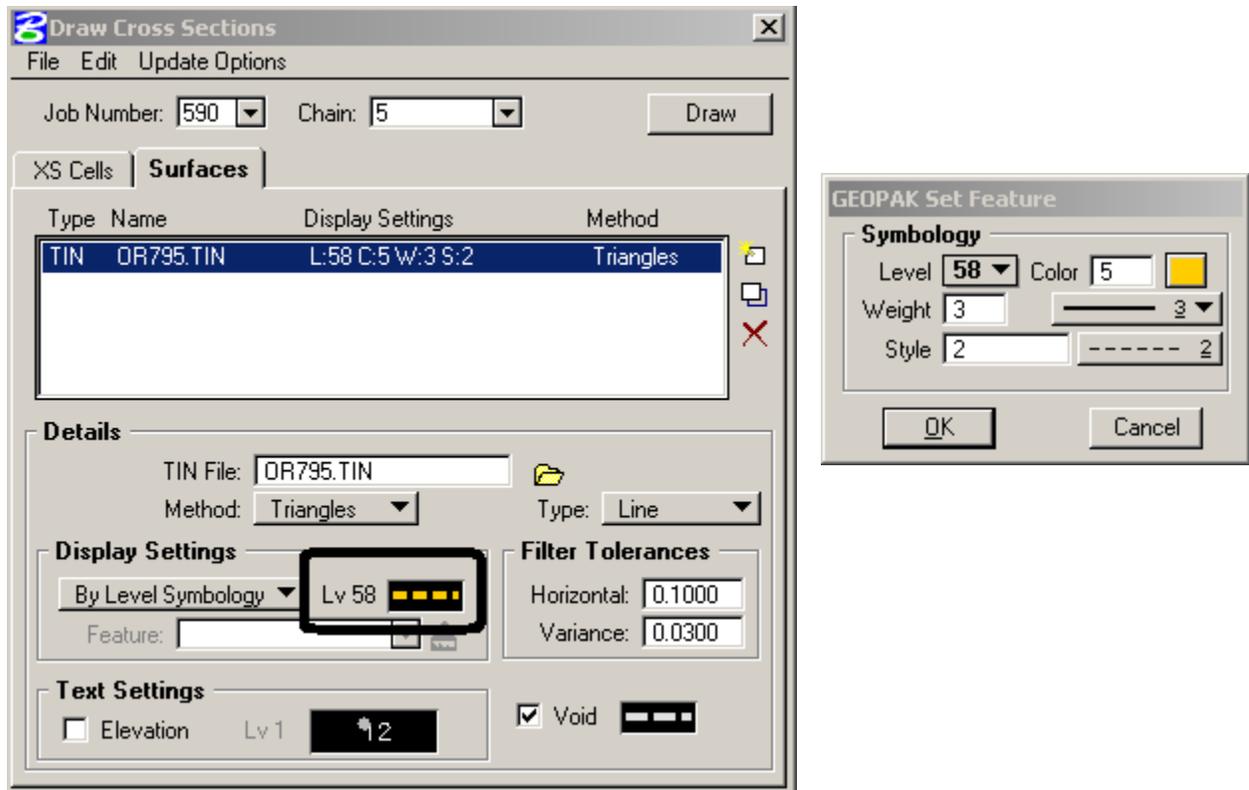
- 26) Under the XS Cells tab change the Pattern option to “In Existing Only”. Also select 5 for the chain

*** The Designer’s Cross Sections are 1200 ft wide, therefore we’ll need to adjust the Horizontal spacing to something larger than that, say 2000 ft.

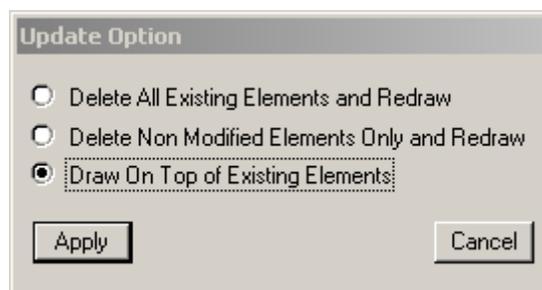


Rock Excavation (End Area Method)

- 27) Under the Surfaces tab check and make sure the following items are set.
- Job Number
 - Chain
 - Tin File
 - Surface symbology – To change the surface symbology Double Click in the Display Setting area that has the black bubble around it and set the attributes the same as below right.



- 28) Once all the items are set in the XS cells & Surfaces tab, save your settings and then hit the draw button. Select the “Draw on top of Existing Elements” option.



Rock Excavation (End Area Method)

- 29) Create Zero Sections – Select the XS Cells tab in the Draw Cross Sections Dialog and change the Pattern method to “By Station”. Enter the station for the zero section. Make sure the beginning and ending station are the same. The left and right offset should be set to the same width as the other cross sections (600 ft. left and right).

The screenshot shows the 'Draw Cross Sections' dialog box with the 'XS Cells' tab selected. The 'Job Number' is 590 and 'Chain' is 5. The 'Pattern' section is set to 'By Station' with 'Begin Station' and 'End Station' both at 792+96.00, 'Increment' at 10.0000, 'Left Offset' at 600.0000, and 'Right Offset' at 600.0000. The 'Scale' section has 'Horizontal' and 'Vertical' both at 1.000000. The 'Spacing' section has 'Horizontal' at 2000.000, 'Vertical' at 500.0000, and 'Number of XS by Column' at 40.

- 30) Under the Surfaces tab check and make sure the following items are set.
- Job Number
 - Chain
 - Tin File

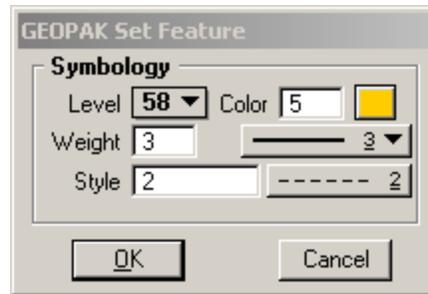
The screenshot shows the 'Draw Cross Sections' dialog box with the 'Surfaces' tab selected. The 'Job Number' is 590 and 'Chain' is 5. A table lists the surface details:

Type	Name	Display Settings	Method
TIN	OR795.TIN	L:58 C:5 W:3 S:2	Triangles

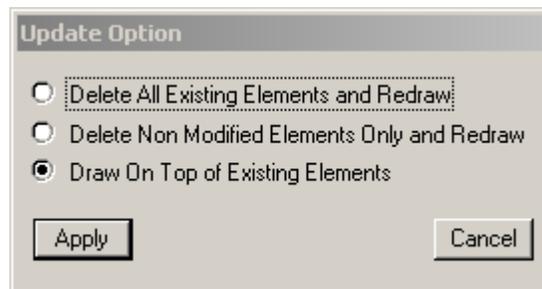
The 'Details' section shows 'TIN File' as OR795.TIN, 'Method' as Triangles, and 'Type' as Line. The 'Display Settings' section has 'By Level Symbology' selected, 'Lv 58' with a color bar, and 'Feature' set to a default. The 'Filter Tolerances' section has 'Horizontal' at 0.1000 and 'Variance' at 0.0300. The 'Text Settings' section has 'Elevation' unchecked, 'Lv 1' with a color bar, and 'Void' checked with a color bar.

Rock Excavation (End Area Method)

- 31) Surface symbology – To change the surface symbology Double Click in the area of the Display Setting and set the attributes as follows:

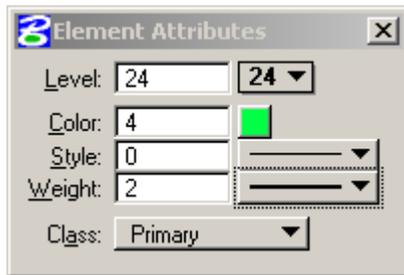


- 32) Once all the items are set in the XS cells & Surfaces tab, save your settings and then hit the draw button. Select the “Draw on top of Existing Elements” option.

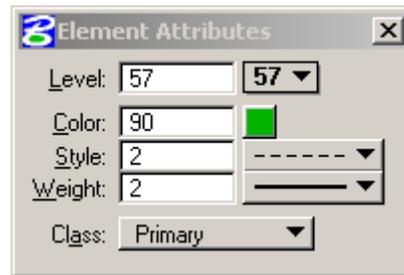


Rock Excavation (End Area Method)

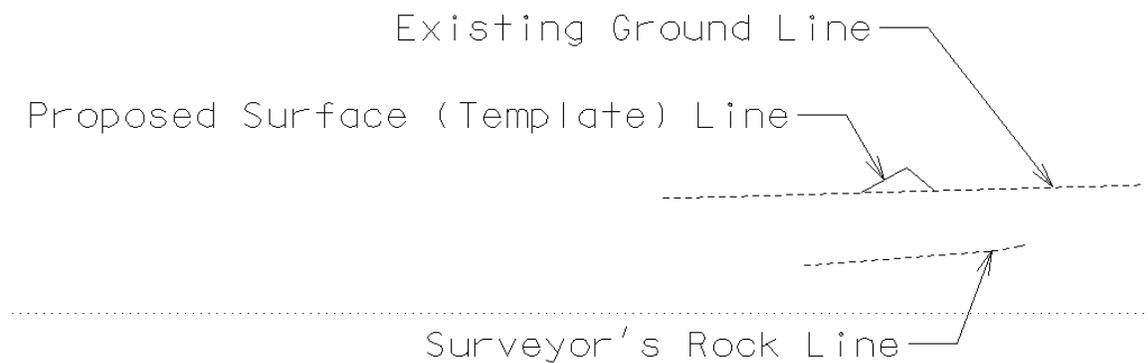
- 33) We need to add Existing Ground line and a Proposed Surface (Template) Line to the Zero Section that's being created. We want the wedge small enough so that when Earthwork is run the area of the wedge will not affect the outcome of the earthwork totals.



Proposed Surface Symbology



Existing Ground Symbology



- 34) Next we need to extend the Surveyors Rock layer out past the slope-stake point in the other sections.

- 35) Match the Surveyors Rock Layer by using the smart match tool. → → →

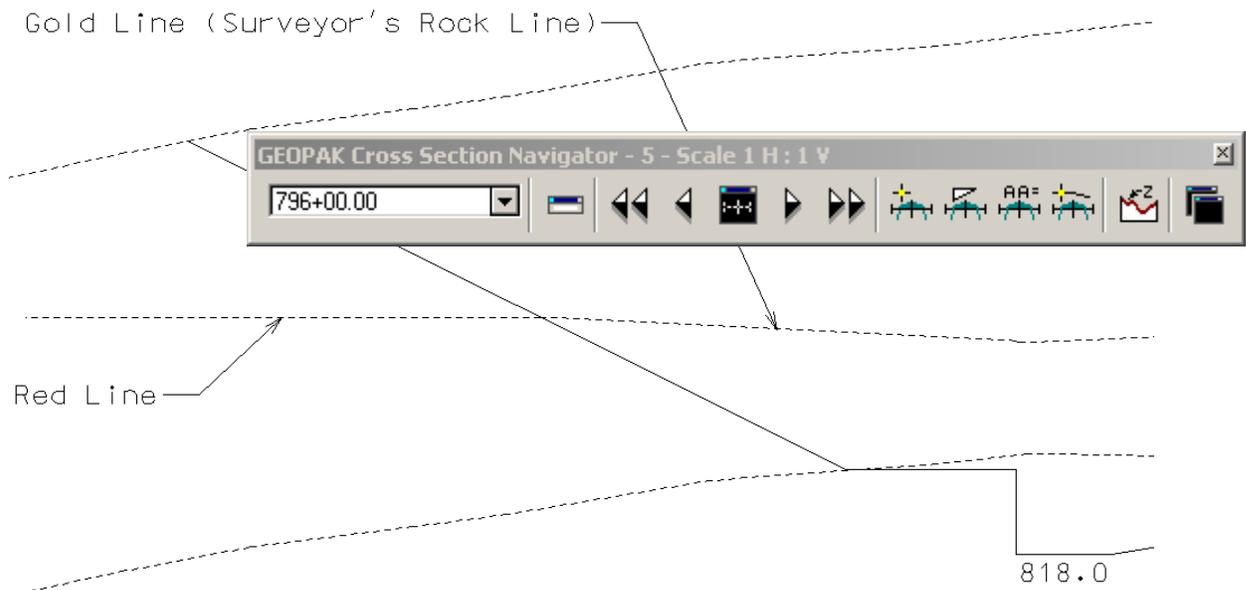


Rock Excavation (End Area Method)

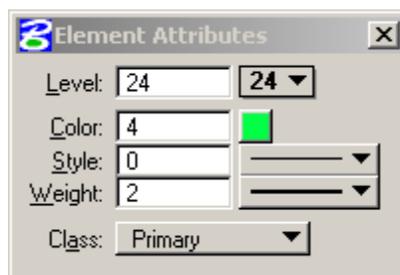
36) Once you do a smart match, the active symbology should be set to the following:



37) Next change the color from yellow (color 5) to Red (color 2). This will help us determine what the original rock line was vs. what we modified. Snap to the Gold line and extend your surface layer out past the slope-stake point.

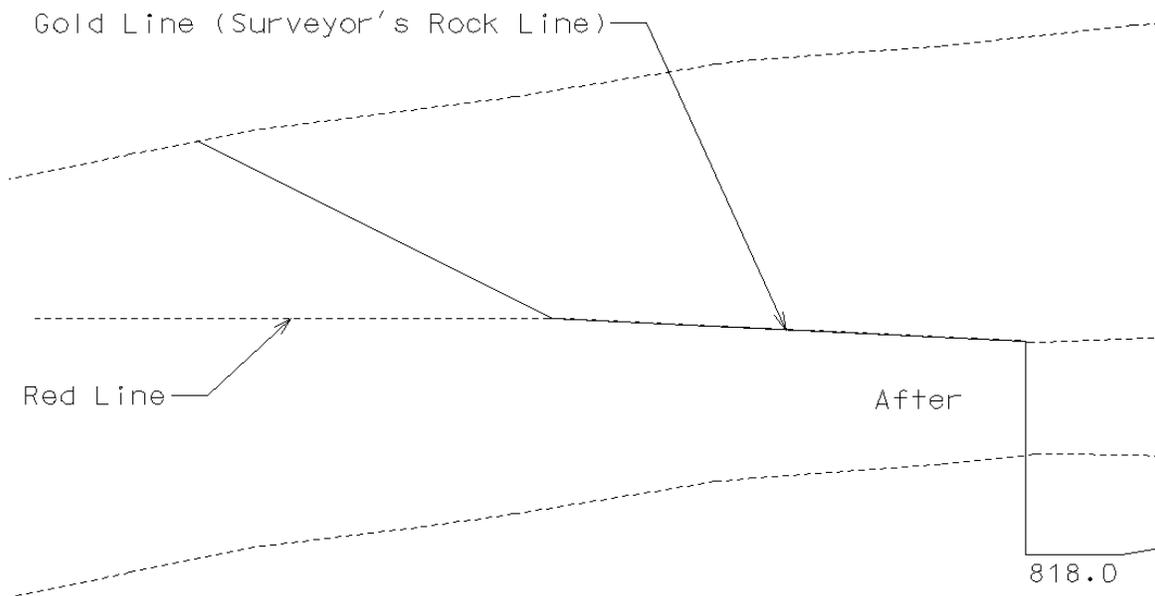
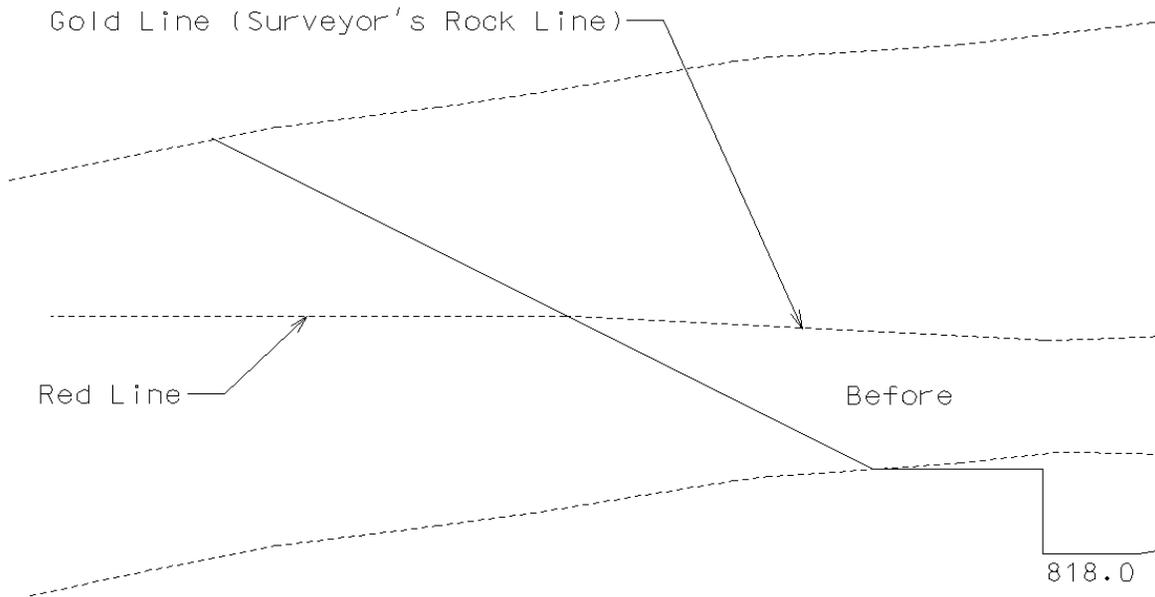


38) Next adjust the XS past the Pre-Split Line. To do this you need to smart match the proposed ground line. Once you do a smart match you active symbology should be the following.



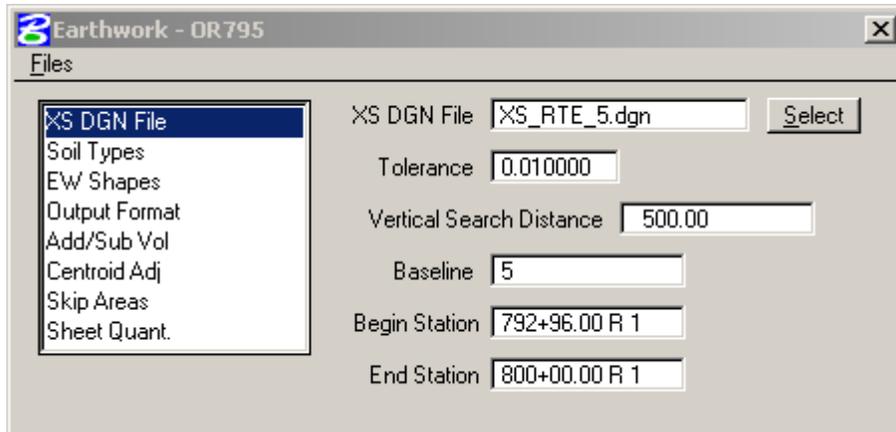
Rock Excavation (End Area Method)

39) Using various MicroStation Tools adjust the proposed finish grade (template) line past the pre-split line (back of ditch).

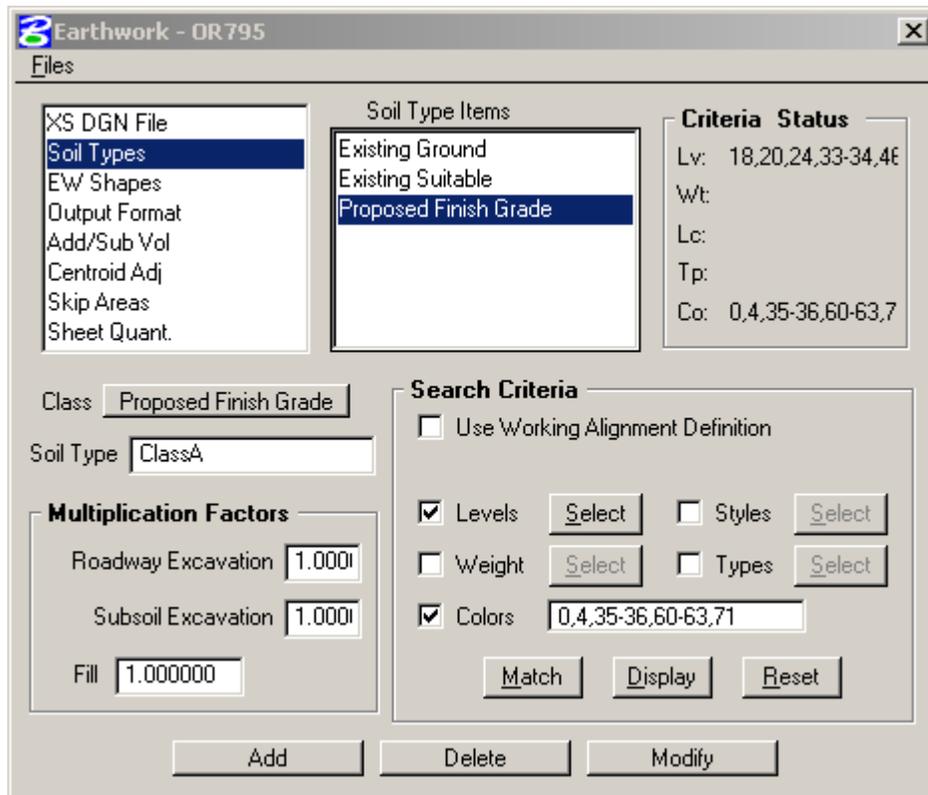


Rock Excavation (End Area Method)

- 40) Once you have every cross section that needs adjustment done, and the dgn file saved, you can then run earthwork.
- 41) From the Road Dialog select “Earthwork” and do a run copy run and copy the MoDOT run. Call the new run OR795.
- 42) Once in the earthwork run adjust the Beginning and Ending Stationing to reflect the Zero Stations.



- 43) Under the “Soil Types” define the soil information (see next page).



Rock Excavation (End Area Method)

Proposed Finish Grade

```
soil type = ClassA
roadway exc mult factor = 1.000000
subsoil exc mult factor = 1.000000
fill mult factor = 1.000000
type = line, line_string
lv = 18,20,24,33-34,46
co = 0,4,35-36,60-63,71
```

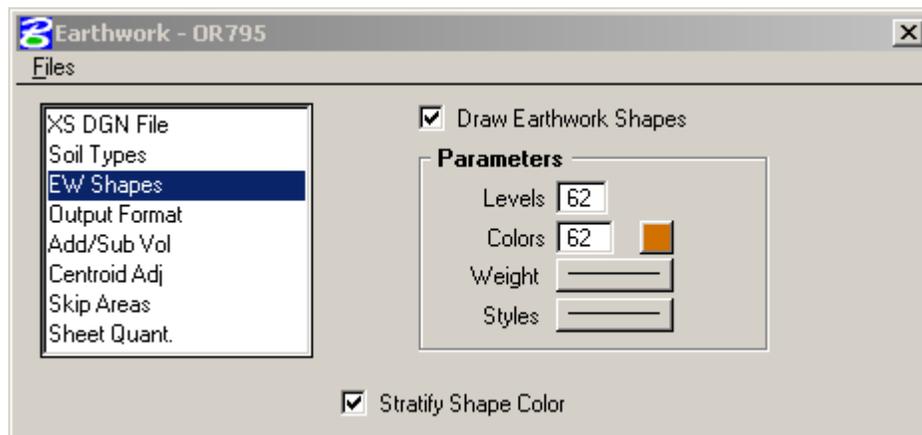
Existing Ground Line

```
soil type = ClassC
roadway exc mult factor = 1.000000
subsoil exc mult factor = 1.000000
fill mult factor = 1.000000
type = line, line_string
lv = 57
co = 90
```

Existing Suitable Material

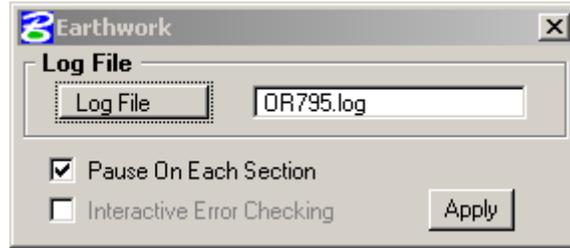
```
soil type = ClassA
roadway exc mult factor = 1.000000
subsoil exc mult factor = 1.000000
fill mult factor = 1.000000
type = line, line_string
lv = 58
co = 2,5
```

- 44) Under the “**EW Shapes**” section toggle on **Draw Earthwork Shapes** and **Stratify Shape Color**.



Rock Excavation (End Area Method)

45) To process the earthwork run go to the files pull down and select “run”



Change the Earthwork Log File Dialog setting from Screen Only to Log File and type in **OR795.log** for the Log file name.

G R A N D		S U M M A R Y		T O T A L S	
Material Name		Unadjusted Volumes (cu. yd.)	Adjusted Volumes (cu. yd.)	Mult Factor	

CLASSA					
	Excavation	103784	103784	1.00	
	Fill	61928	61928	1.00	
CLASSC					
	Excavation	53199	53199	1.00	
	Fill	0	0	1.00	