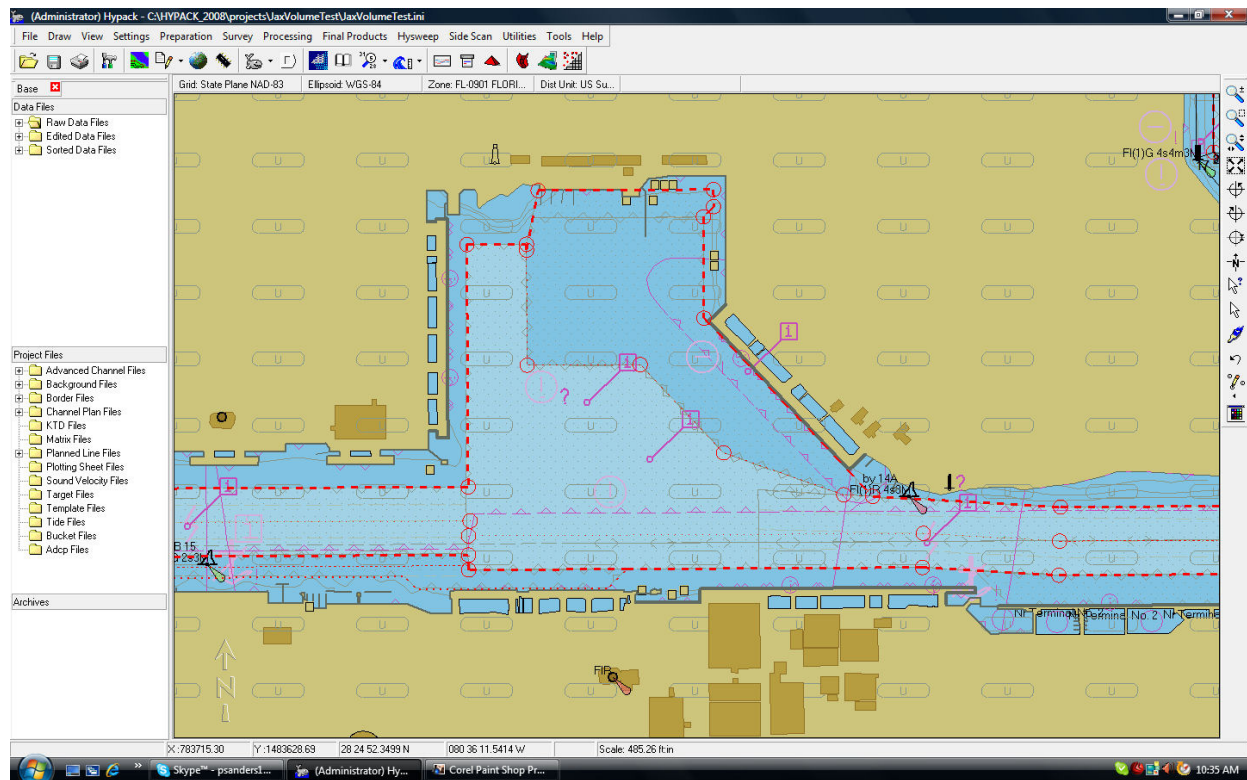


Modeling a Complex Basin in ADVANCED CHANNEL DESIGN

By Pat Sanders



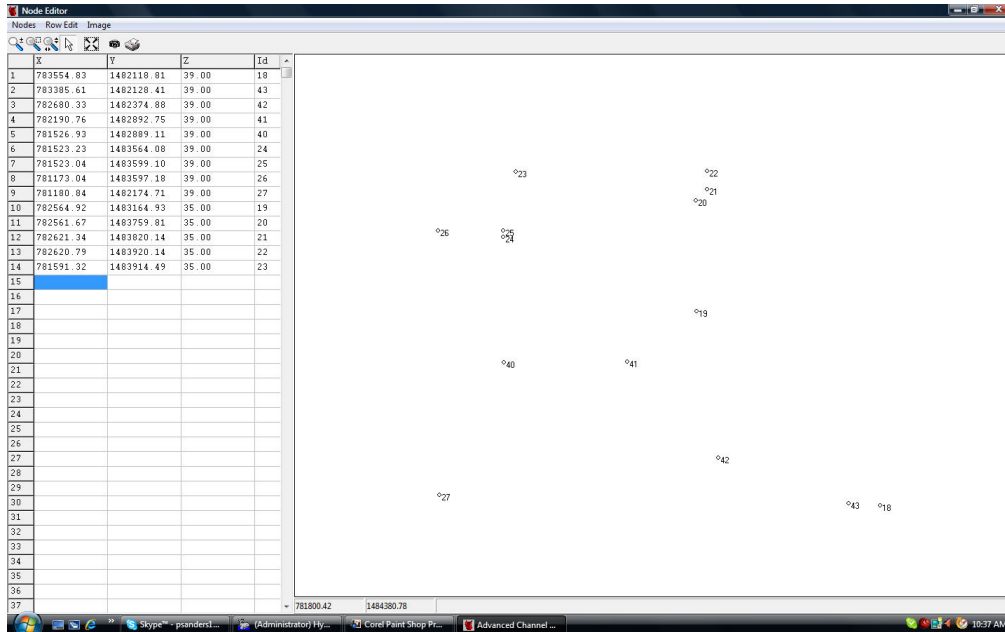
Sample Complex Channel

The Corps of Engineers group in Jacksonville, FL recently showed me some complex turning basins that they needed to model in order to generate volume quantities. One of their basins is shown in the screen capture above. The light blue area has a design depth of 39' and the darker blue area has a design depth of 35'. There are 4:1 side slopes all around the outside (ignore the pier for now) and for the transition between the 39' and 35' areas.

This is a job for ADVANCED CHANNEL DESIGN!

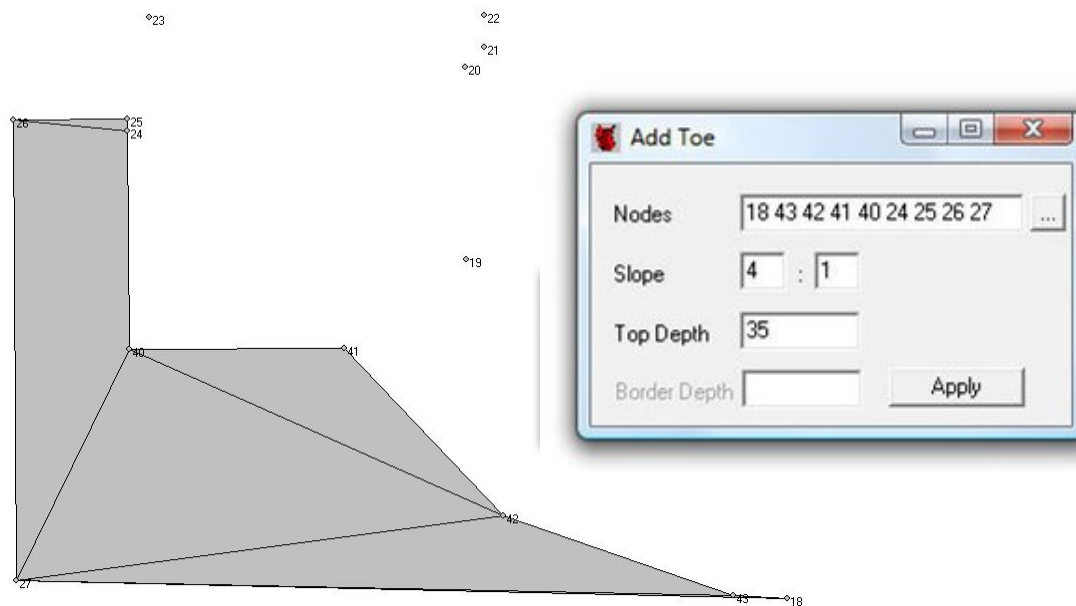
1. **Open ADVANCED CHANNEL DESIGN (ACD).**
2. **Enter the XYZ data points.** They had a published list of 39' points and 35' points that I entered into the 'Nodes' list of ACD. Their list only included the 39' points for the transition from 39' to 35' that runs through the center of the channel. It did not include any 'top of bank' points. A view of the nodes that I entered is shown below.
3. **Save the nodes and go into the 'Faces' window of ACD.**

Tip: I have always found that things work out best if I work from deep to shallow when making faces.



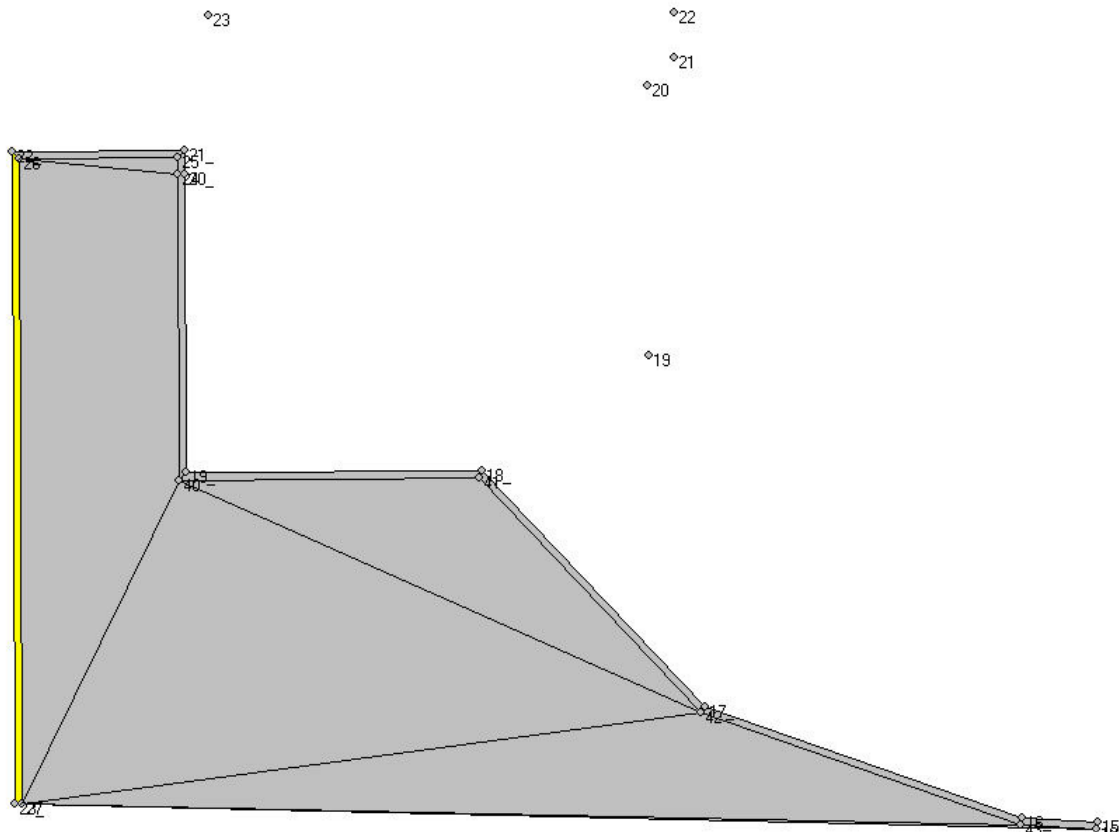
Entering the Nodes in Advanced Channel Design

4. Connect up the 39' nodes.
5. Use the 'Add Toes' menu to generate the 39' to 35' transition through the middle of the area.
 - a. Click 'Faces – Add Toes' and the 'Add Toe' window appears.
 - b. Enter the 39' toe points. Try to remain aware that it creates the toe to the right of the point list. I told it to generate at 4:1 up to the 35' point. The window below shows the 'Add Toes' window and my entries.



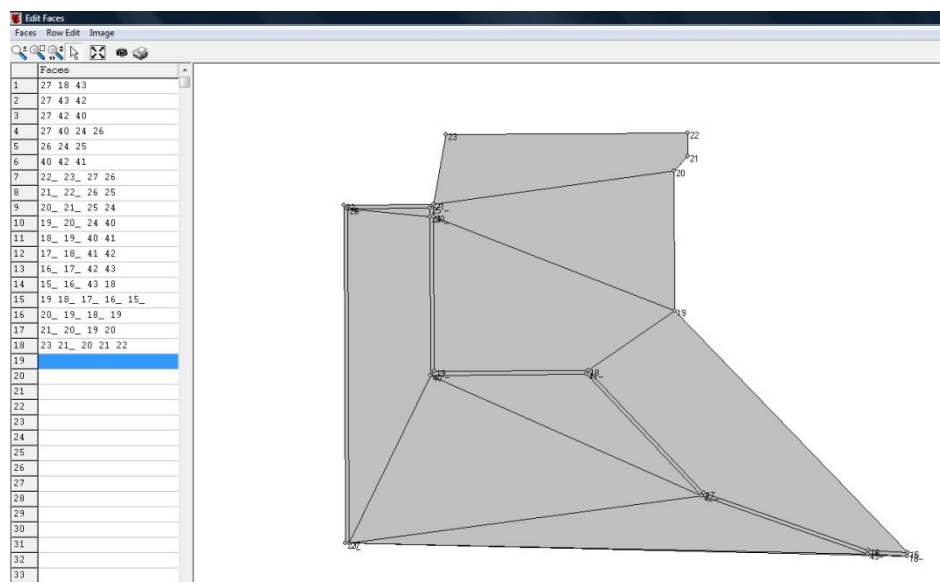
Adding Toes in ADVANCED CHANNEL DESIGN

- c. Click 'Apply'. The program automatically generates the 'nodes' for the 35' points and combines them into 'Faces'. I zoomed the extents, to see the result of my work:



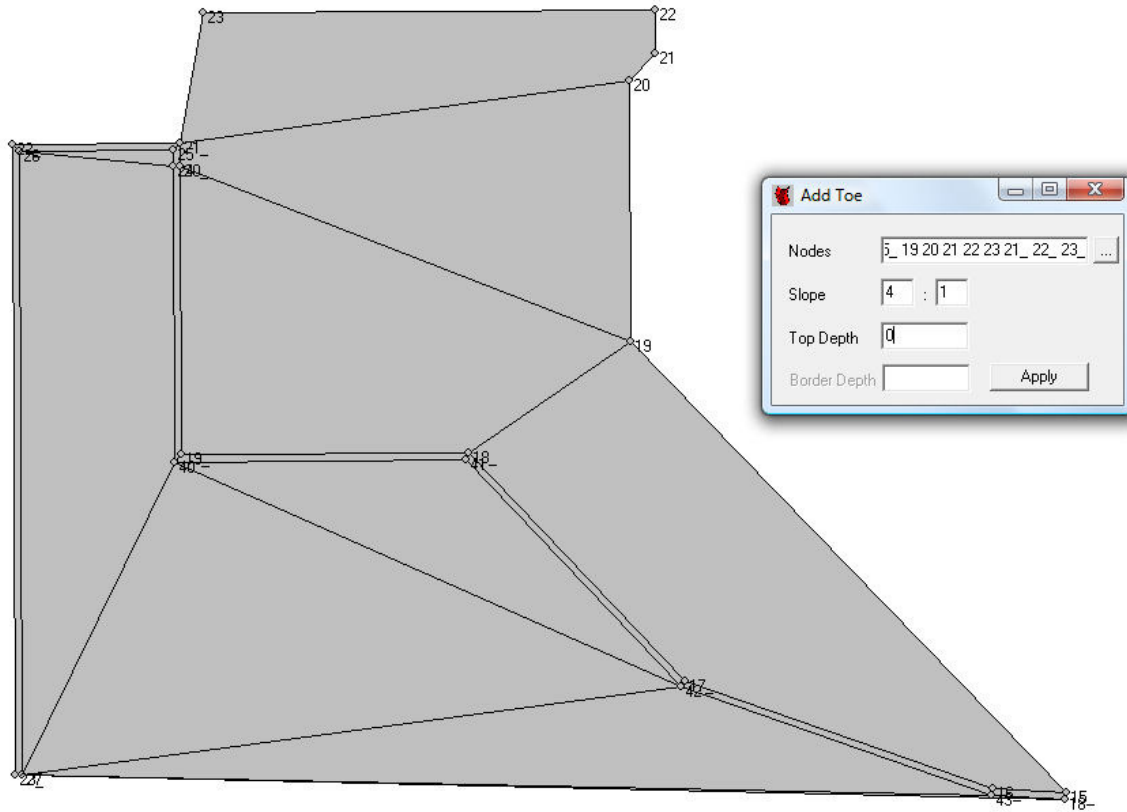
Resulting Channel with Transition Areas Complete

6. **Connect the 35' nodes into faces** remembering the rules (no convex faces, work in a counter-clockwise direction around the polygon). My results are shown below.



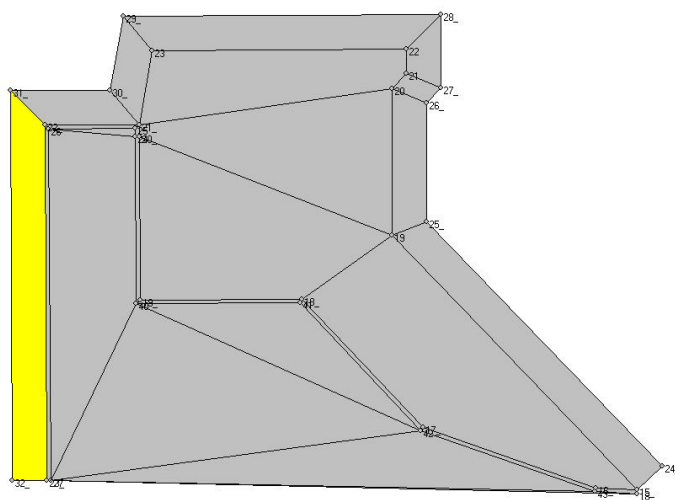
Resulting Channel with the 35' Faces

7. **Add the 35' to 0' side slope**, all of the way around the area, with the exception of the southern edge, which abuts the main channel at 39'. I again selected 'Faces – Add Toe' and entered the nodes, remembering that the side slope that it creates will be to the right of the polyline.



Adding the Side Slopes from the Turning Basin to the 0' Level

The result is shown below.

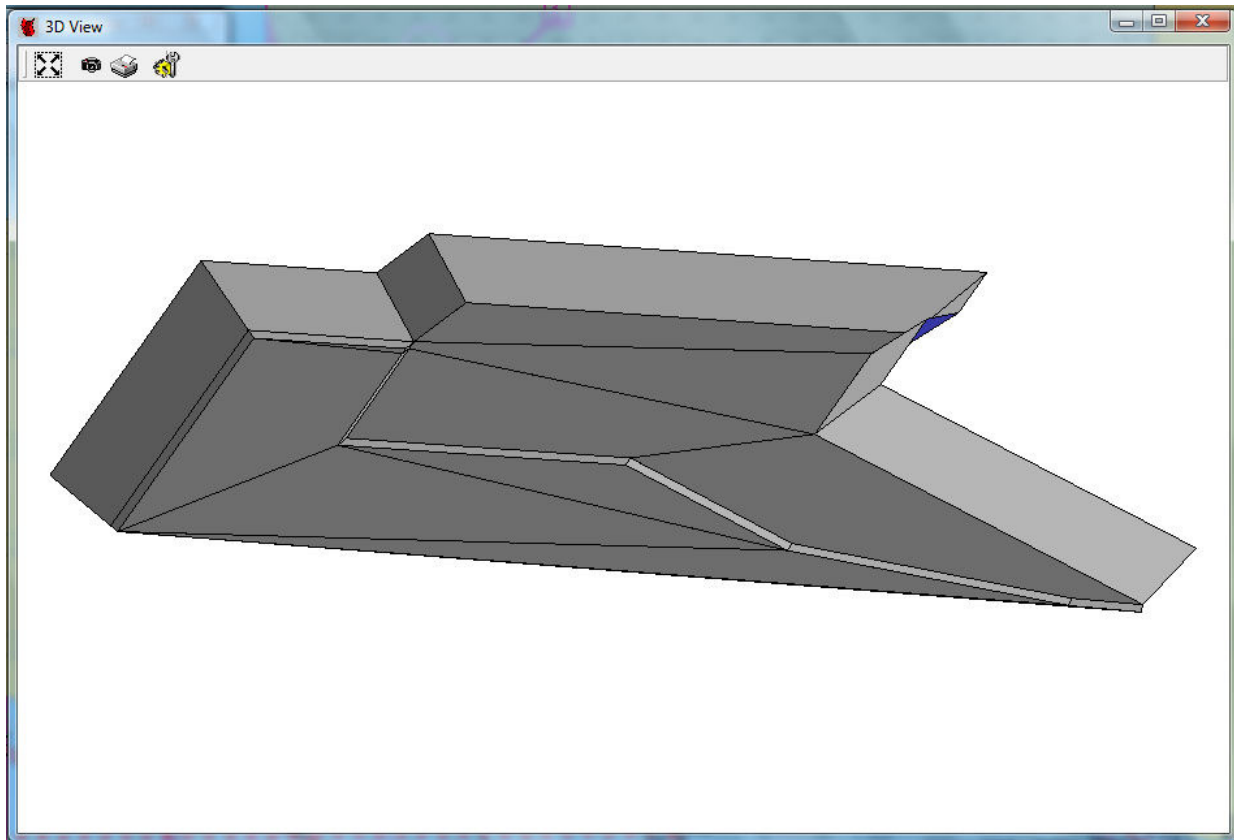


Finished Channel

8. **Save the 'Faces.'**

9. **Save the CHN file.**

Inside ACD, I can go to the 3D window to take a look at it. It looks great!



I can now take the CHN file into DREDGEPACK® and use it as a real-time digging plan, or take it into TIN MODEL and compute volume quantities for the area.

We plan to make modifications to ACD to allow you to select faces and export them to BRD files. This will allow you to easily delineate separate 'reporting areas' for computing volumes in the TIN MODEL. For example, I'll be able to create one polygon about the 39' area. I can make another polygon for the basin area that includes the transition from 39' to 35' and the 35' area. I can make another polygon for the outside side slopes. Once I have the BRD files, I can load them into the TIN MODEL and have it report the material available for each reporting area.