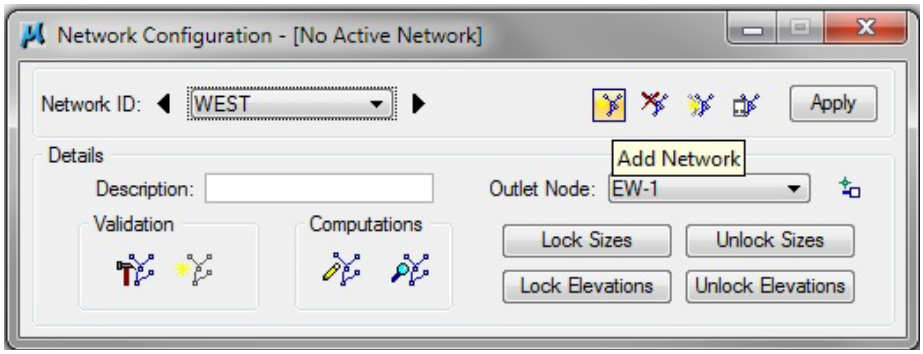
8. Ditch Networks

This exercise shows the user how to setup a network and perform network computations.

The Network computations serve as the final calculation process in the design or analysis of a storm drainage system. A GEOPAK drainage network is defined as a series of interconnected nodes, links and areas which drain to a single outlet. GEOPAK drainage accommodates multiple networks in a single drainage project.

8.1 Ditch Network Design

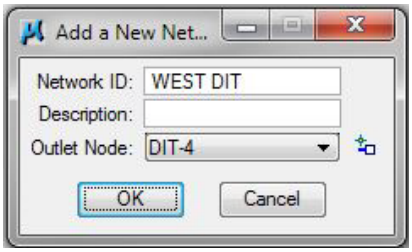
a) Select the **Add Drainage Network** tool, select **Network > Add** from the main drainage menu bar or click the **Add Network** button in the Network Configuration Dialog.



b) In the **Add a New Network** dialog, enter the following information:

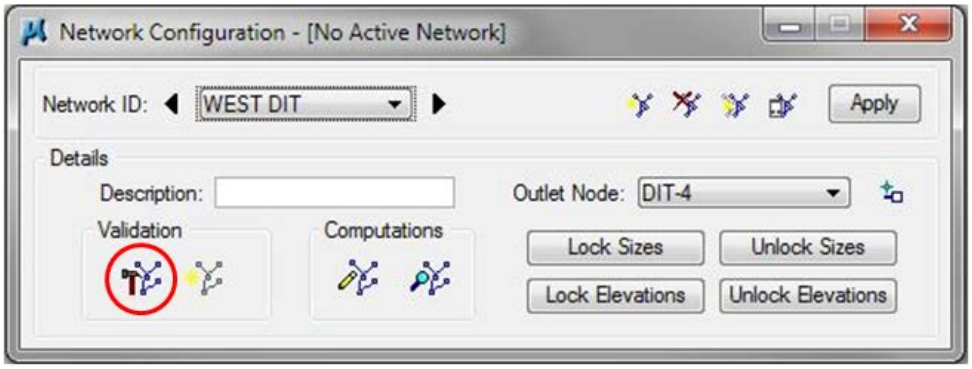
Network ID: WEST DIT

Outlet Node: DIT-4



NOTE: The **Outlet Node** may be selected via the dropdown or by clicking **ID Outlet** and selecting the Node in the plan view.

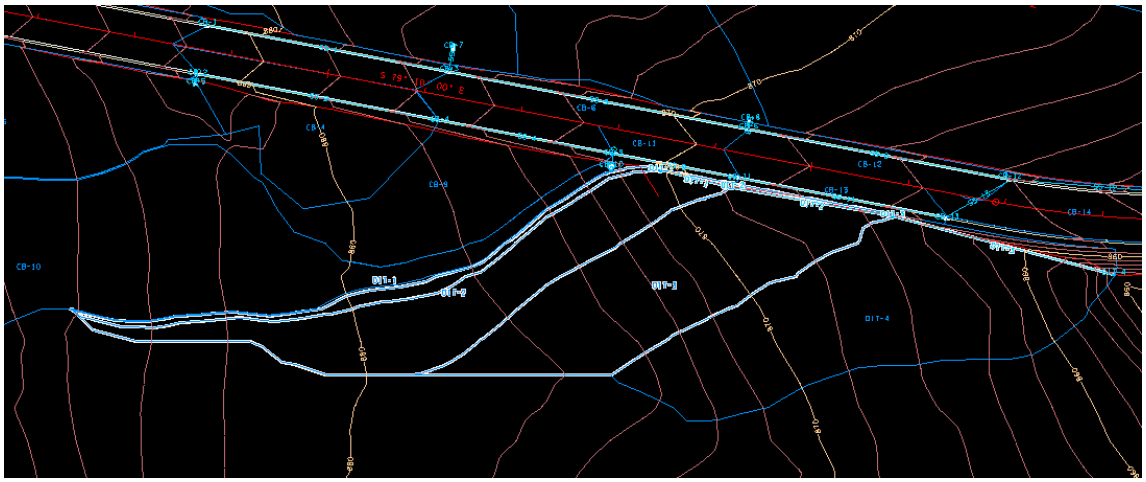
c) Click **OK** in the Add a New Network dialog box.



d) Click the **Build Network** button. Click **OK.**

e) Click the **Highlight Network** feature.

f) Verify that all network components are highlighted.

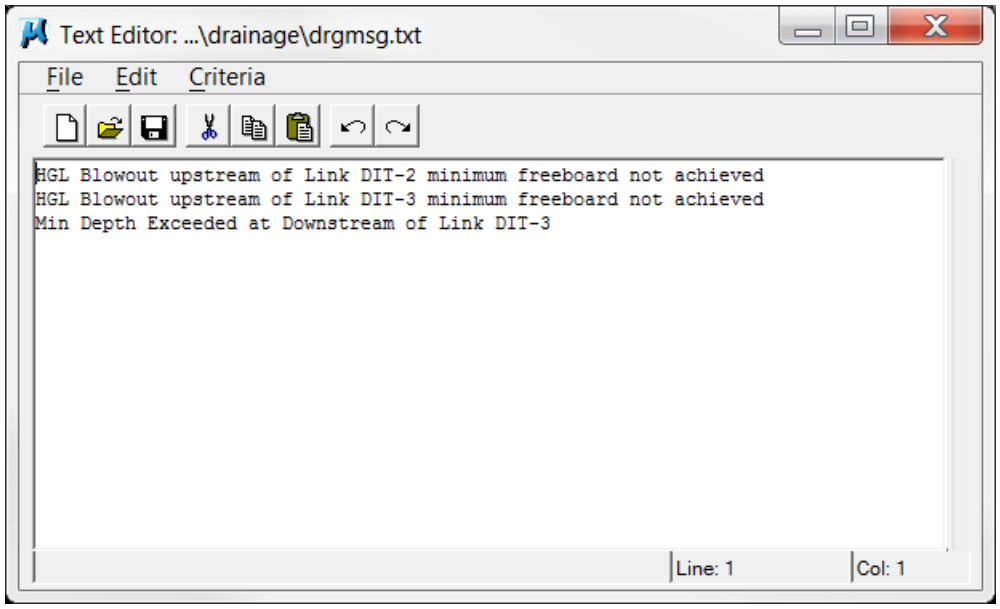


NOTE: The drainage area DIT-4 will not be highlighted since it is built for an outlet node type which does not consider drainage areas. In the previous chapter, we linked that area to node DIT-3 so that it is covered in this ditch drainage analysis.

g) Click the **Apply** button. Network "WEST DIT" has been added to the project.

h) Click the **Design** button, then click **OK.**

i) Review errors to determine steps needed to correct and close the text editor. (See **Appendix C** for common errors and fixes)

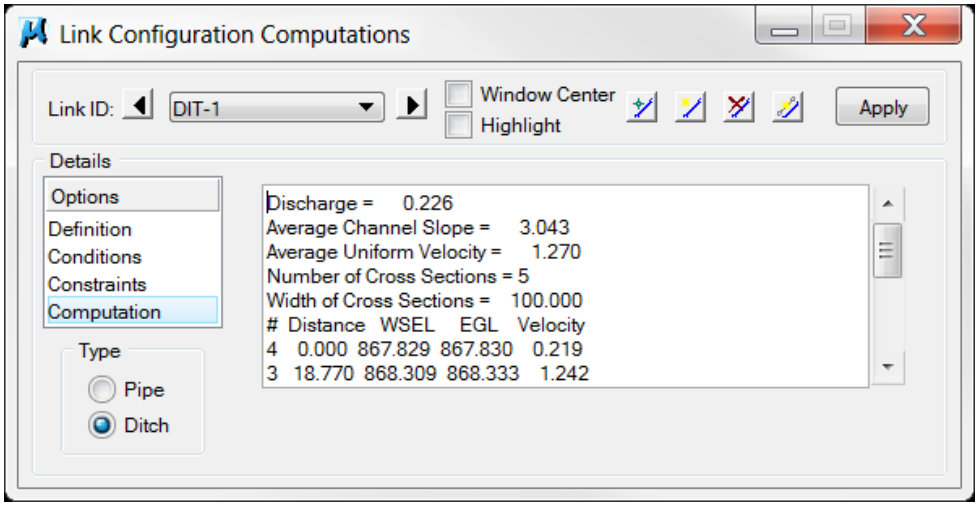


8.2 Ditch Link Review

Now that the ditch network has been built and designed, we can review the computation results for the existing ditch links in the network.

a) Select the **Edit Link** tool, select **Component> Link> Edit** from the main drainage menu bar or click the **Edit Link** button in the Network Configuration Dialog.

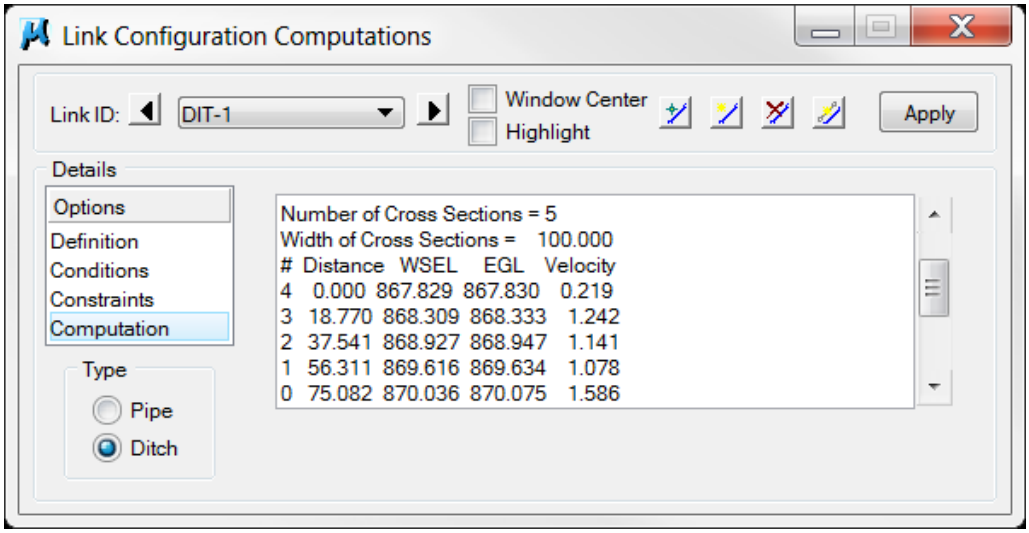
Set to link **DIT-1** and select **Computation**.



b) Scroll down through the computation results to the data following the **Width of Cross Sections**.

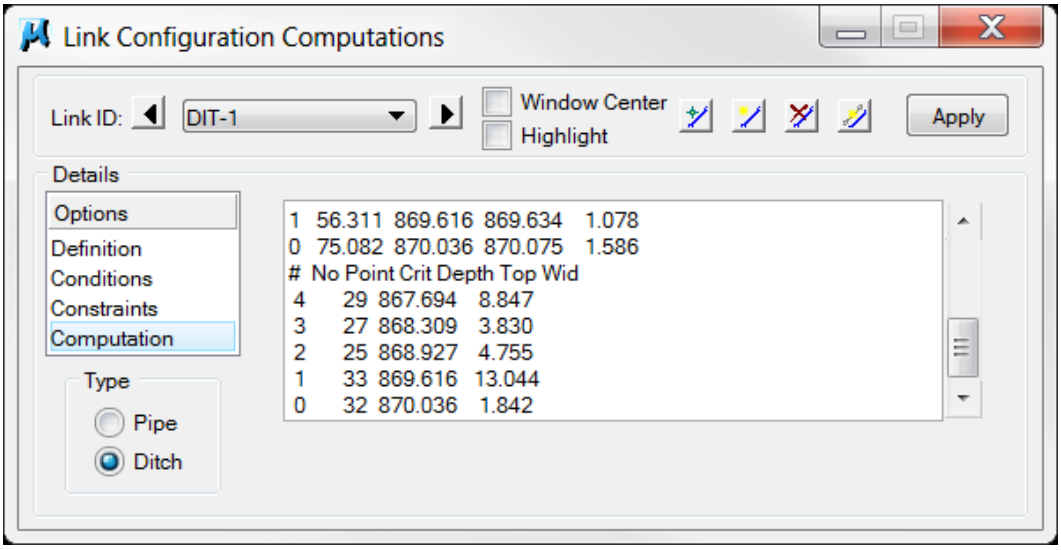
This data represents conditions at each cross section drop along the link. Note that these points start at the end of the link and come back up the link to the beginning.

The first data group provides the cross section number (0-4 in this case with 5 cross sections), distance from end, water surface elevation, energy grade line elevation and velocity.

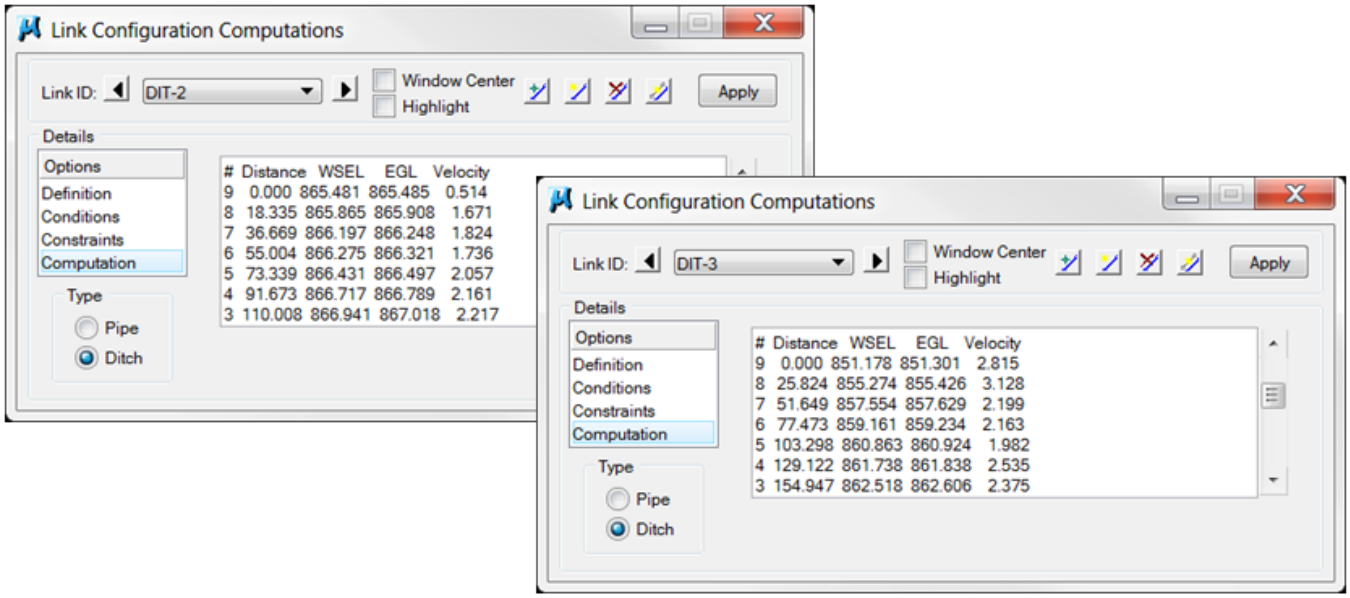


c) Scroll down further to review the second data group.

The second data group provides the cross section number, number of slope break points in cross section, critical depth elevation, and top of water surface width.



d) Switch to our other ditch links, DIT-2 & DIT-3, and review the computed data.



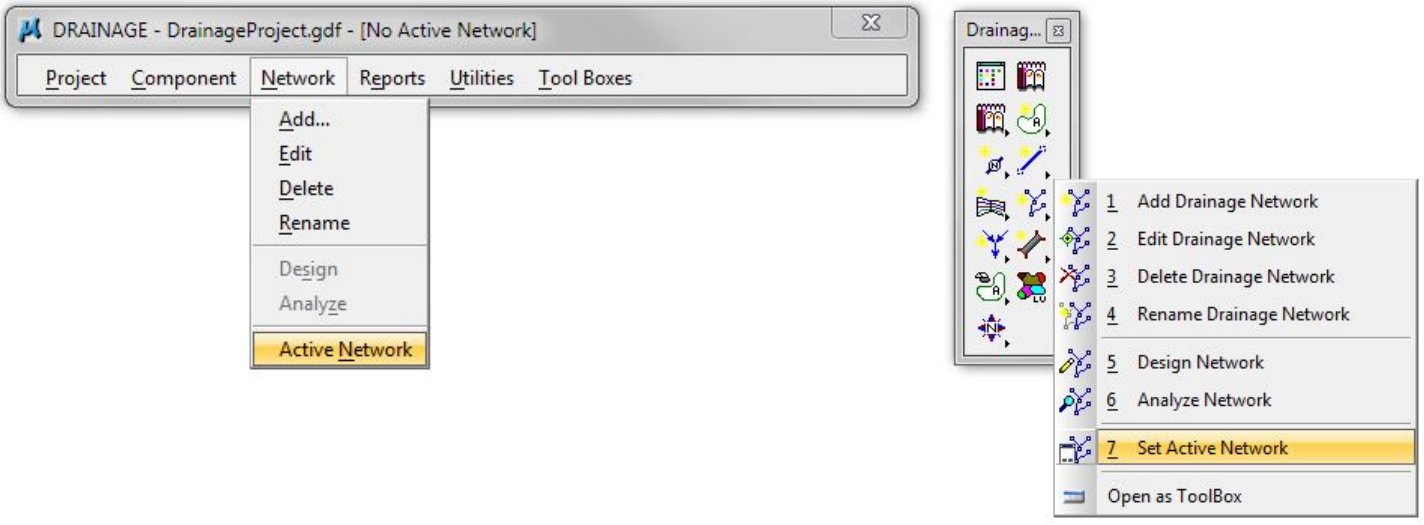
Using this information, we can determine if the existing conditions are adequate to convey the water along the fill line and critical points where more capacity may be required.

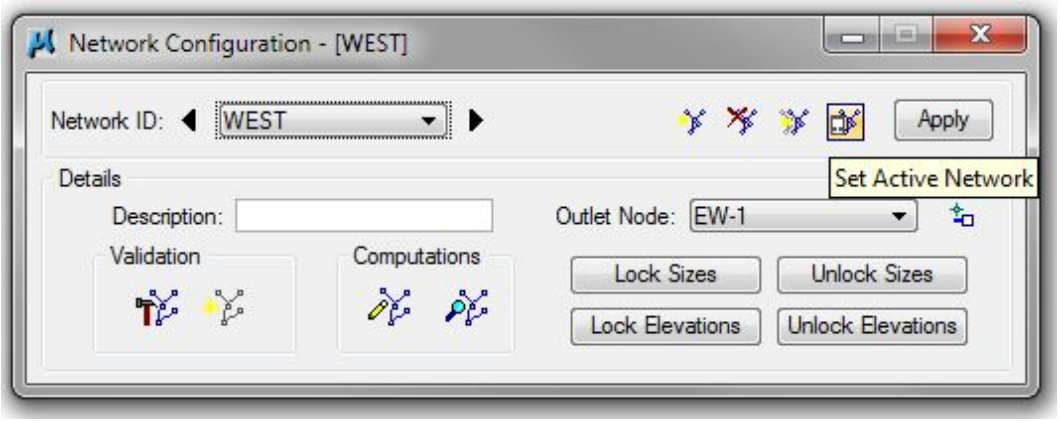
If using this methodology to analyze long proposed roadway ditches, you can determine locations where special ditches may be required as the depth\volume becomes too great for the regular ditch to handle.

8.3 Select Active Network

With the possibility of multiple networks in a single drainage project it may be necessary to choose an Active Network to utilize certain GEOPAK Drainage Features.

a) Select the **Set Active Network** tool, select **Network > Active Network** from the main drainage menu bar or click the **Add Network** button in the Network Configuration Dialog.





b) Select the network **West** and click **OK.**