Geopak Drainage – Pipes

This section provides instructions on how to add pipes in Geopak Drainage. In Geopak Drainage, pipes are called links.
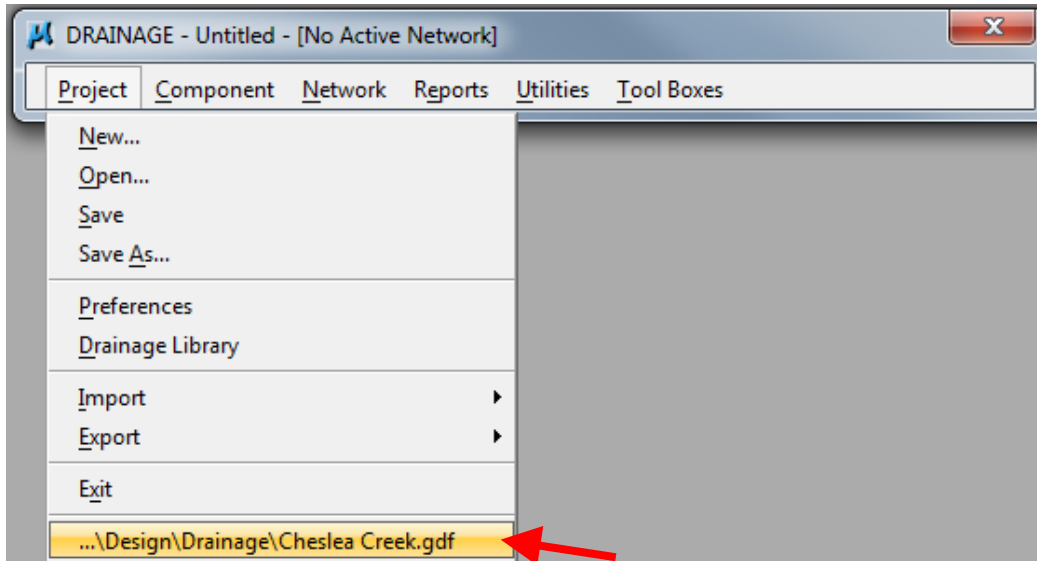
Opening a Project

For instructions on Starting a new Geopak Drainage Project, see Section 4A-52. To open an existing project, start Geopak Drainage as shown in Section 4A-52. In the DRAINAGE dialog box, go to *Project→Open* and browse to the appropriate file:
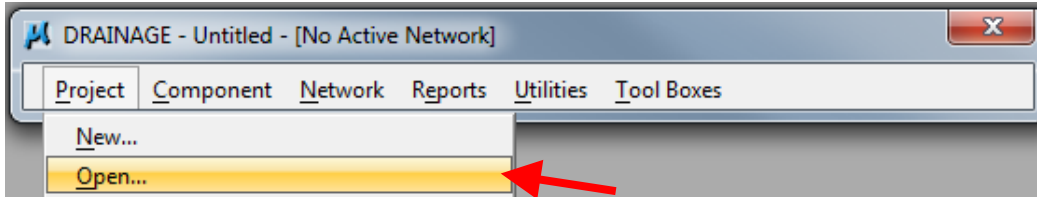
OR

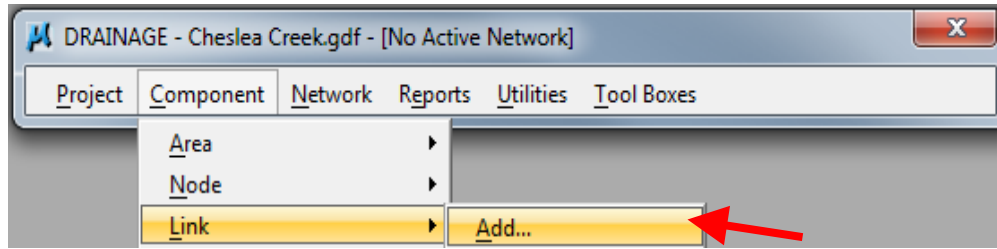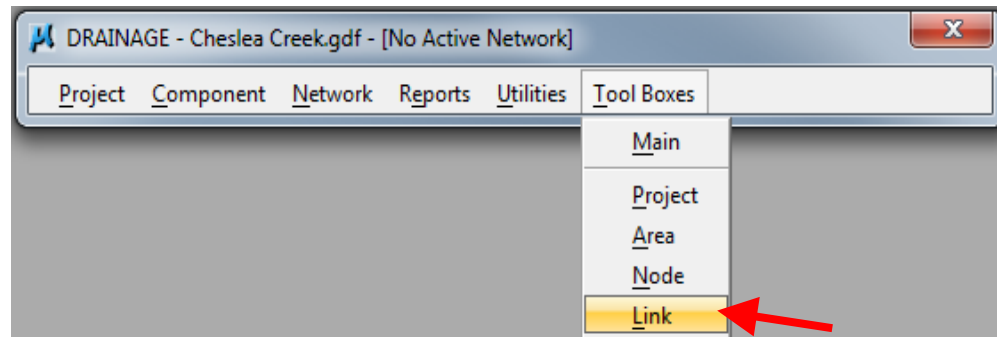Choose a project at the bottom of the Project menu in the DRAINAGE dialog box:

Adding Links

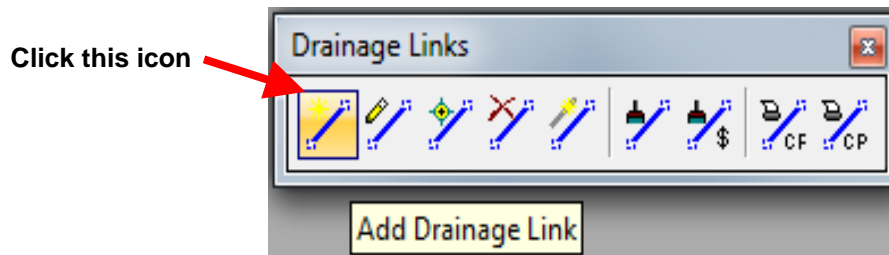Links can be added in several ways:

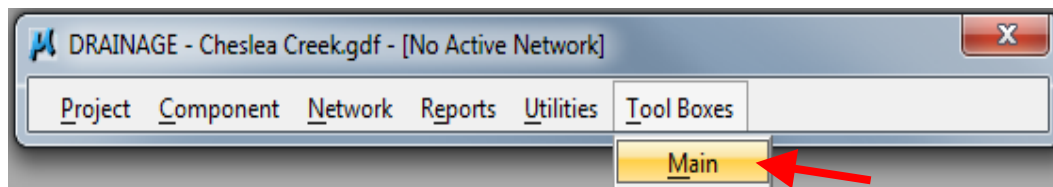- Using the Component menu in the DRAINAGE dialog box:

- Using the Drainage Links toolbox accessed through the DRAINAGE dialog box:
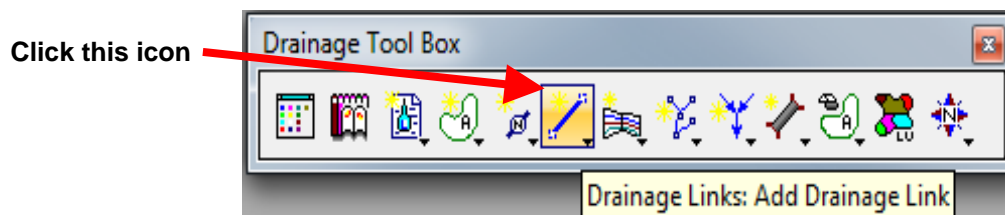

The following tool box will appear:

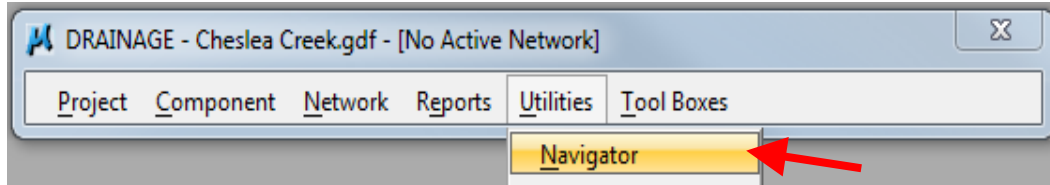- Using the Drainage Tool box accessed through the DRAINAGE dialog box:
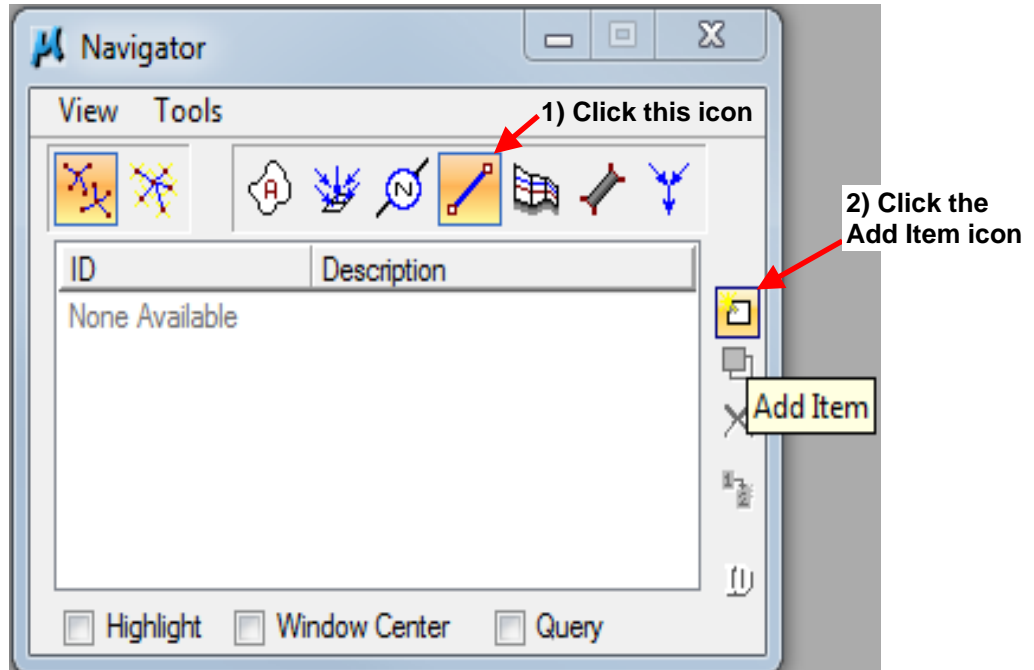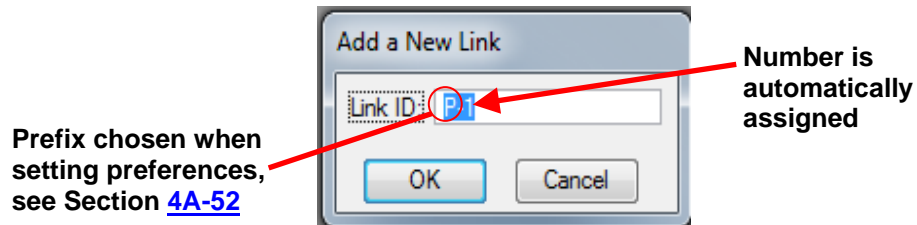

The following tool box will appear:

- Using the Navigator accessed through the DRAINAGE dialog box:
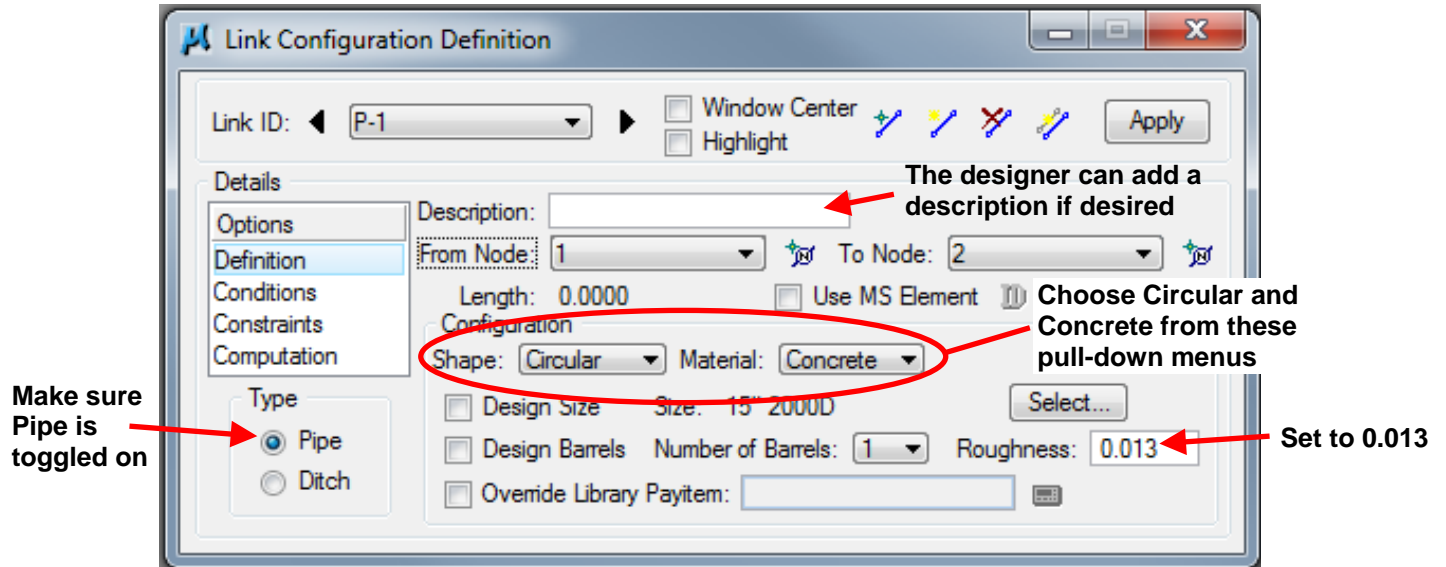

The following dialog box will appear:

Regardless of the method designers use to add a link, the following dialog box will appear:

Prefix chosen when setting preferences, see Section 4A-52

Number is automatically assigned

Click OK and the following dialog box will appear:


Definition

Under *Options*➔*Definition*

Type, *Shape*, *Material*, and *Roughness:* Set as shown in the dialog box above.

From Node and *To Node:* Click on the ID Node tools 📧 and select the appropriate node (intake, junction/manhole, or outlet) in MicroStation for each.

> ⚠ Use the ID Node tool 📧. If the ID Node tool is not used, Geopak Drainage will connect the pipe to the Location Station. This will cause the pipe length to be incorrect.

When selecting a node, click on a spot close to where the pipe should connect.

> **Note:** Midpoint snaps are located on all sides of rectangular intakes and manholes (and at the upstream end of apron outlets), so snapping to a point is not necessary. When connecting pipes to circular intakes and manholes, Geopak Drainage will typically connect the pipe at the point closest to the structure to which the other end of the pipe connects.
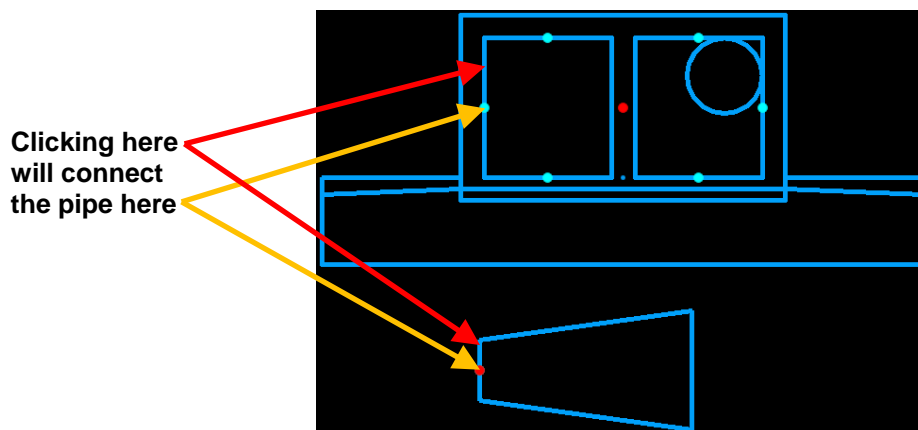
Clicking inside wall of structure connects pipe at closet point to next structure
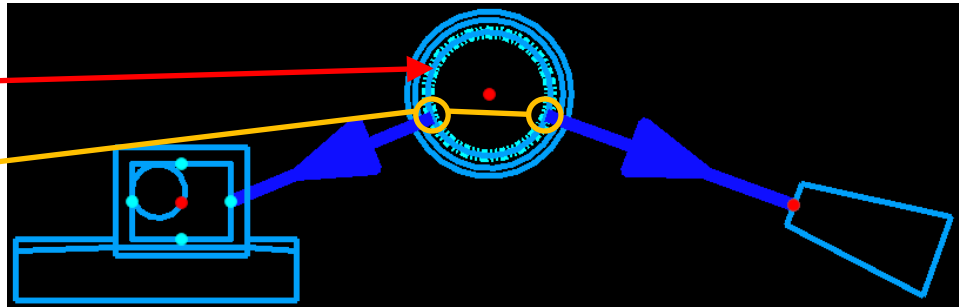
Length: This will fill in automatically after the *From Node* and *To Node* have been selected.

Use MS Element: Toggling this on allows the designer to pick a MicroStation element to use as a link.

Design Size: Checking the box will allow Geopak Drainage to size the pipe. If the pipe has already been sized, do not check the box.

Number of Barrels: Set to 1.

Note: 2 barrels can be used where clearance issues exist or a larger capacity is needed; however, designers should first check to see if a pipe-arch can be used instead.

Clicking on the *Select…* button allows the designer to choose a pipe size and type. The following window will open:
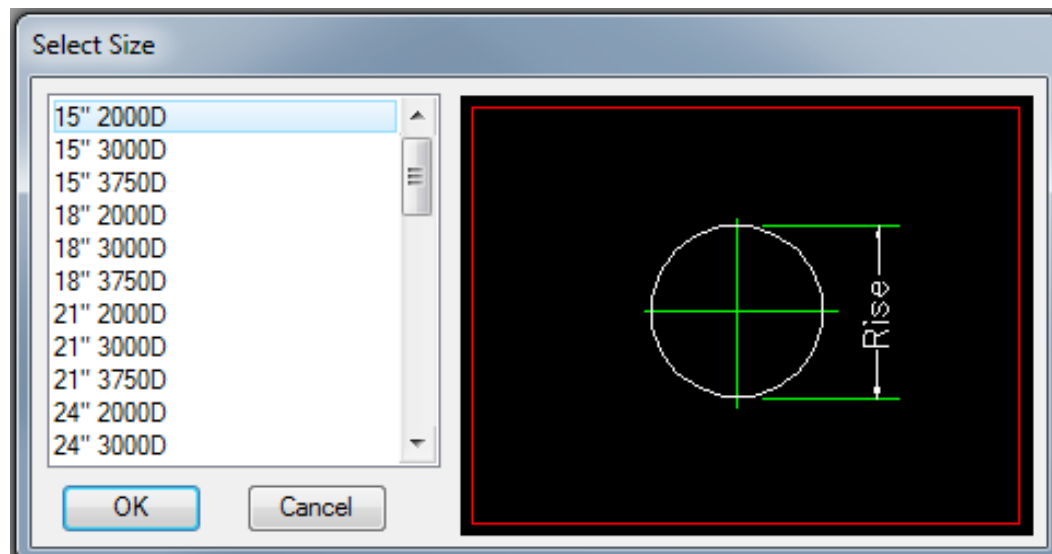
Select the necessary pipe size and type, see Section 4A-10.

Conditions

Under *Options➔ Conditions*

Designers have two options: input calculated values for invert (flow line) elevations and pipe slopes, or allow <u>Geopak Drainage</u> to determine them. If inputting values, at least one invert elevation is required. The designer has the option of inputting either the second invert elevation or the pipe slope. To allow <u>Geopak Drainage</u> to design elevations and pipe slopes, leave all boxes unchecked.


- *Invert:*
  - o *From Node*: Input the Flow Line Inlet Elevation (Tab 104-5B).
  - o *To Node*: Input the Flow Line Outlet Elevation (Tab 104-5B).
- *Soffit:* Input a calculated value for the pipe slope. Pipe slope fills in automatically if Flow Line Inlet and Flow Line Outlet are input.
- Min Cover: Elevations are set automatically by the pipe envelope in Preferences, see Section 4A-52. Slope is based on difference in Min Cover elevation divided by distance between nodes.
- Max Depth: Elevations are set automatically by the pipe envelope in Preferences, see Section 4A-52. Slope is based on difference in Max Depth elevation divided by distance between nodes.

## Constraints

Under *Options➔Constraints*

Fill out the window as follows:

1. *Rise*: This is the inside diameter of the pipe. Minimum pipe diameter is 15 inches (24 inches for Interstates). Maximum pipe diameter depends on the intake, see Standard Road Plans.
2. *Slope*: Minimum slope is 0.4%. There is no maximum slope; however, the pipe envelope (see Section 4A-53) will constrain maximum pipe slope. Maximum velocity may also constrain pipe slope.
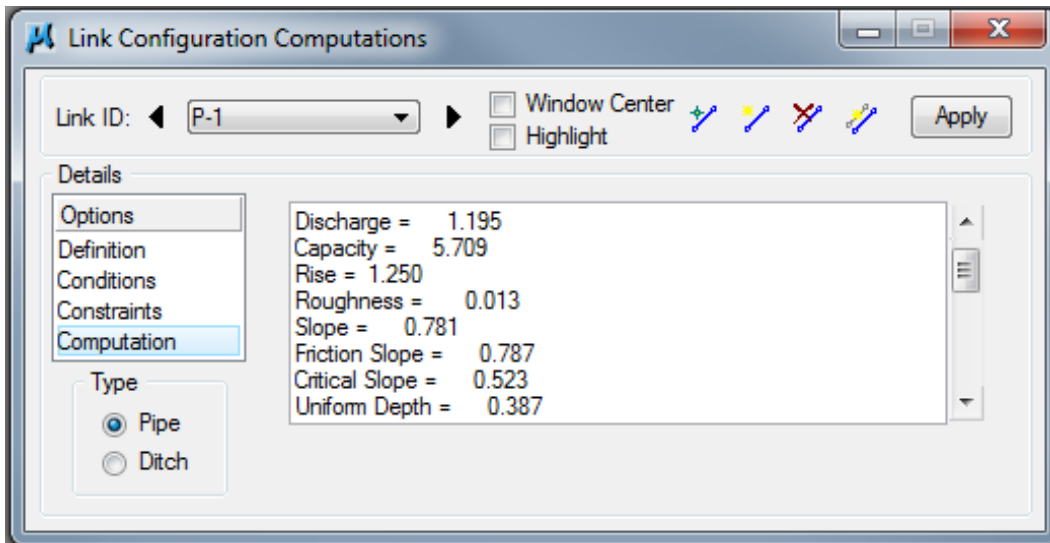3. *Velocity*: Minimum velocity is 3 ft/s and the maximum velocity is 15 ft/s.
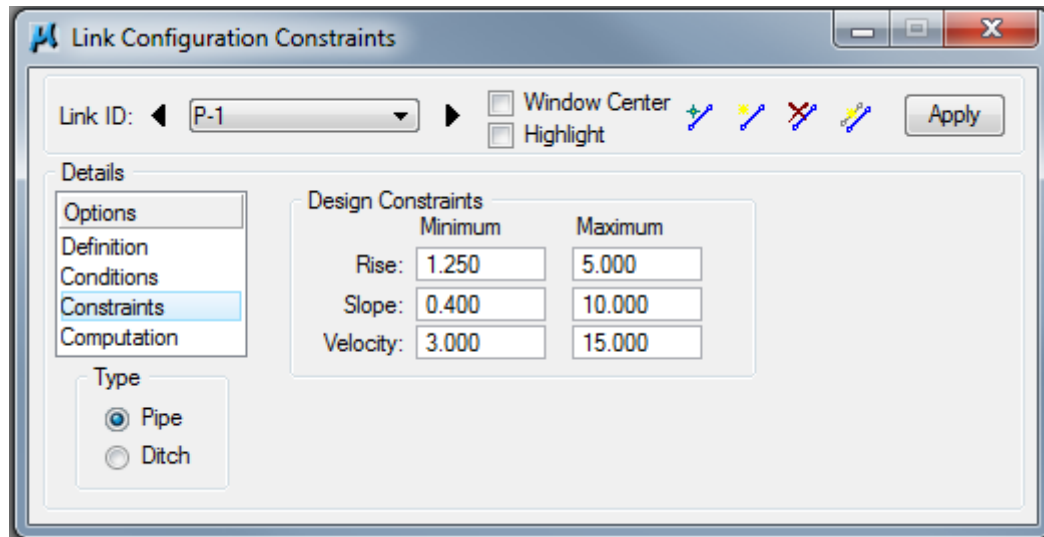
Calculating Discharge

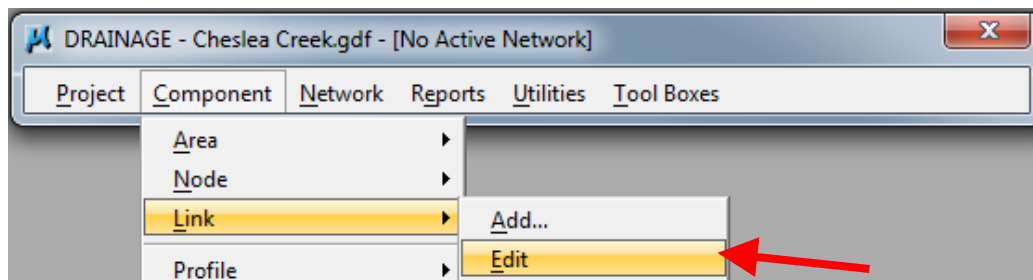Under *Options➔Computation,* the following window will appear:
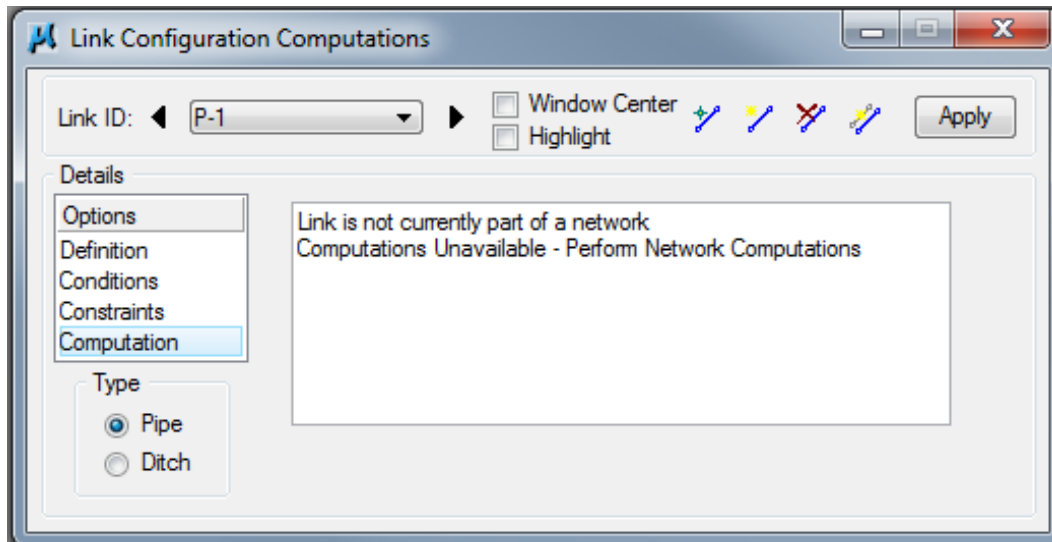
This window will fill in when the network program is run, see Section . It will look similar to the window below:
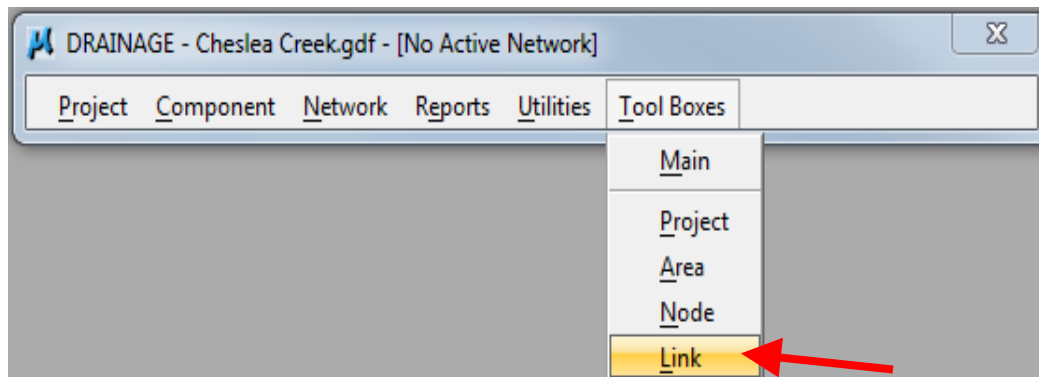
Editing Links

Links can be edited at any time. Designers have several options to open a link for editing:
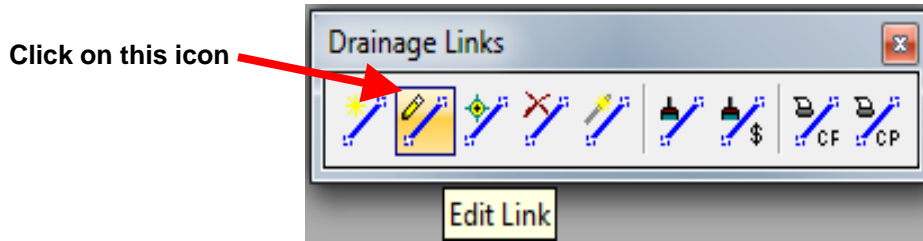
- Using the Component menu in the DRAINAGE dialog box:

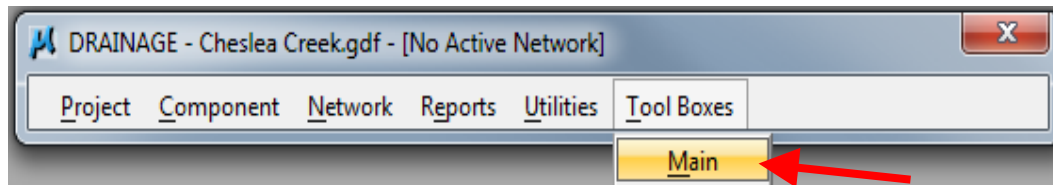- Using the Drainage Links toolbox accessed through the DRAINAGE dialog box:
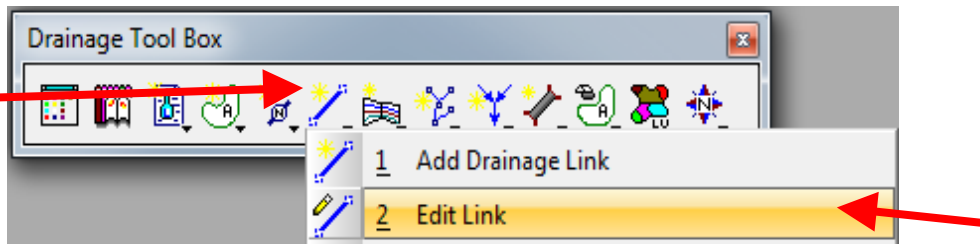
The following tool box will appear:

Click on this icon

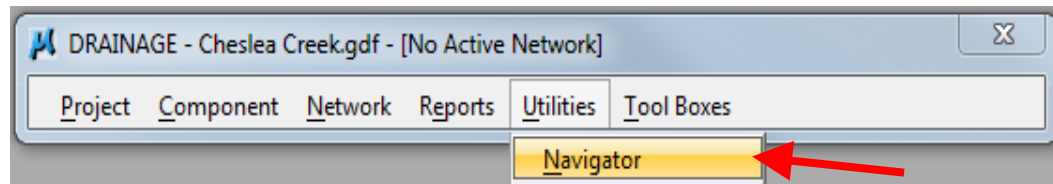Using the Drainage Tool Box accessed through the DRAINAGE dialog box:

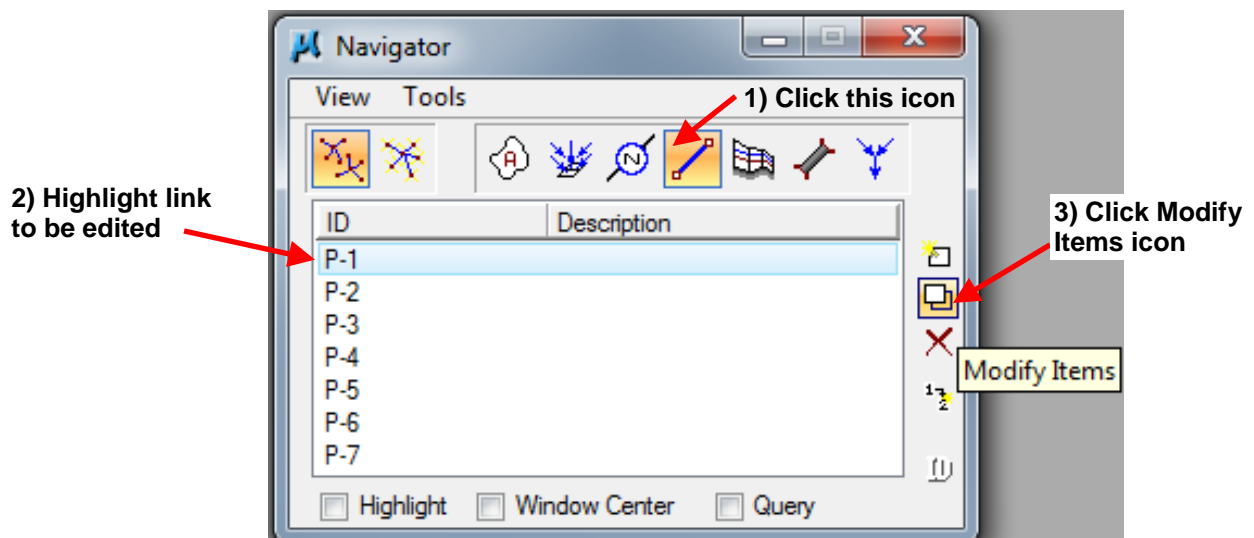The following tool box will appear:

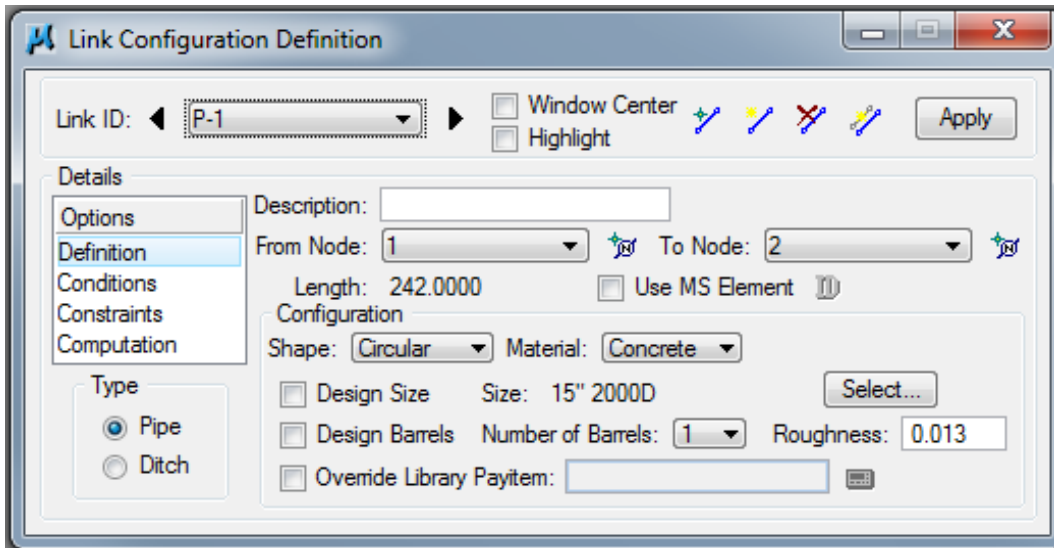**Click on this icon and hold mouse button down until drop down menu appears**

Using the Navigator accessed through the DRAINAGE menu:

The following dialog box will appear:

2) Highlight link to be edited

1) Click this icon

3) Click Modify Items icon

Regardless of the method designers use edit a node, the Link Configuration Definition dialog box will appear:

Changes are made in this dialog box.

Note: In order to have changes take place, the *Apply* button must be clicked.

Chronology of Changes to Design Manual Section:

004A-055   Geopak Drainage – Pipes

11/30/2011   Revised
                Correct graphics under Definition

7/29/2011   NEW
                New