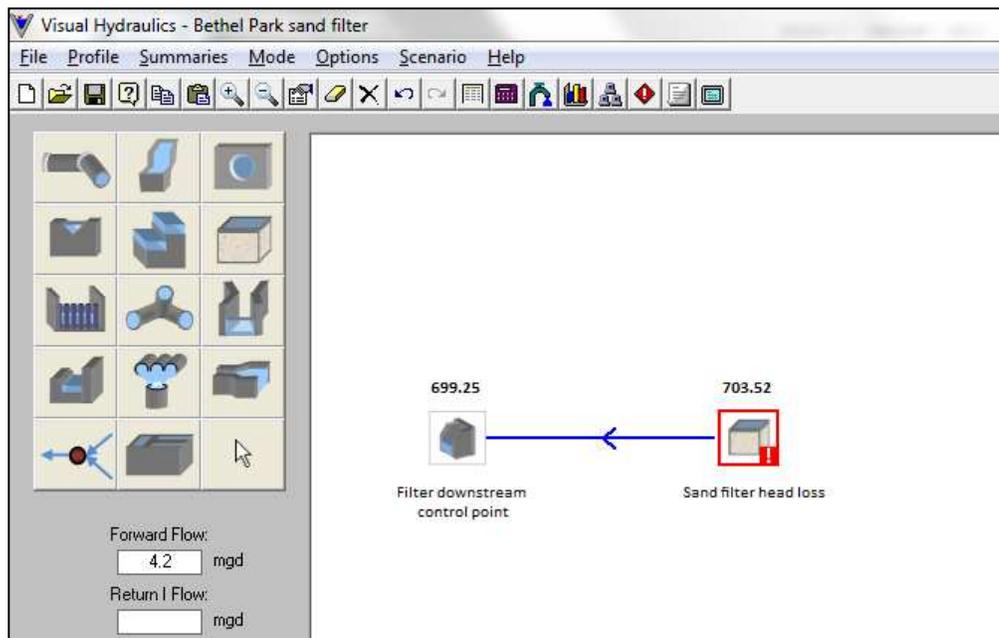


Visual Hydraulics Example III – Calculation Summaries

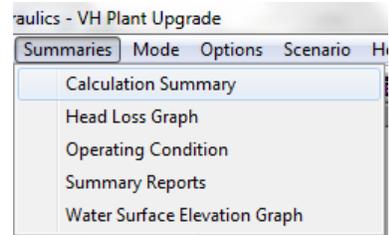
Hydraulic models can be useful in performing complex analyses of a variety of hydraulic problems and scenarios, but the user is often left with a result or answer without any summary of how the answer was determined. This in turn makes the user dependent on the result without any validation. And what happens if the data was incorrectly provided to the model?

Problem: A client has head loss calculations for a sand filter that were performed using a spreadsheet and believes that the head loss values are too high. The client has asked that the head loss through the filter be modeled and that a check be done of how the results were obtained so that the calculation can be confirmed.

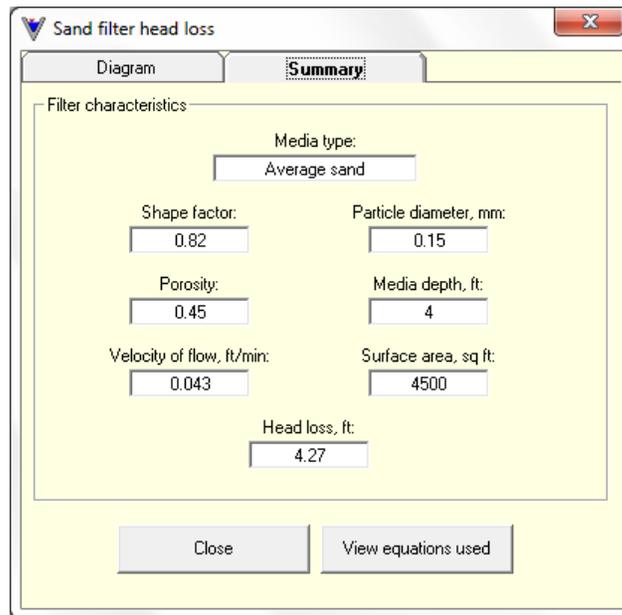
Visual Hydraulics has a variety of summary options that allow the designer to break down each section of the profile, analyze each section over any range of flows, catch unusual conditions, and summarize the data obtained by the program through the use of summary reports. Each of these options will be broken down in detail. Consider the following very simple hydraulic model developed for the sand filter in question:



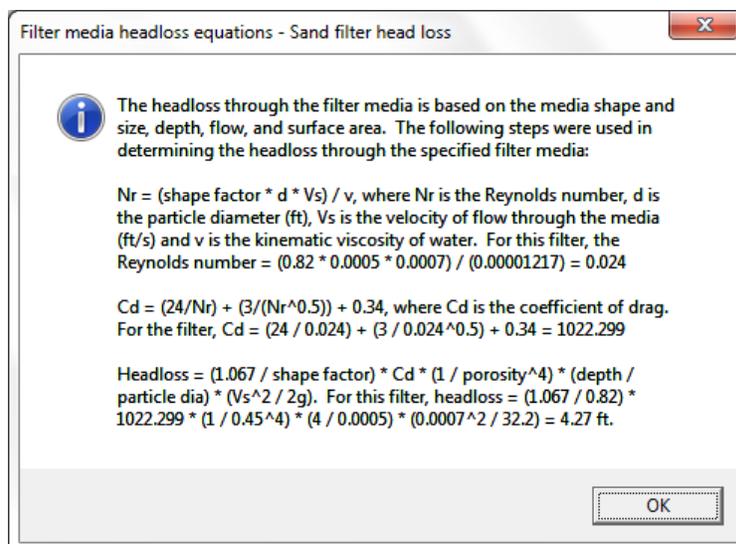
As can be seen, the head loss for the filter is indeed fairly high. But why, and what can be done to check it? How can the user be sure the calculation performed is correct, and that the results are reasonable? Visual Hydraulics calculation summaries have been built into the software for just this reason. A calculation summary can be performed by clicking on the calculation summary icon on the toolbar, or by selecting the “Calculation Summary” option from the “Summaries” main menu:



When this is done, the software will display for the user a summary form containing all of the data obtained and calculated by the software for the filter:

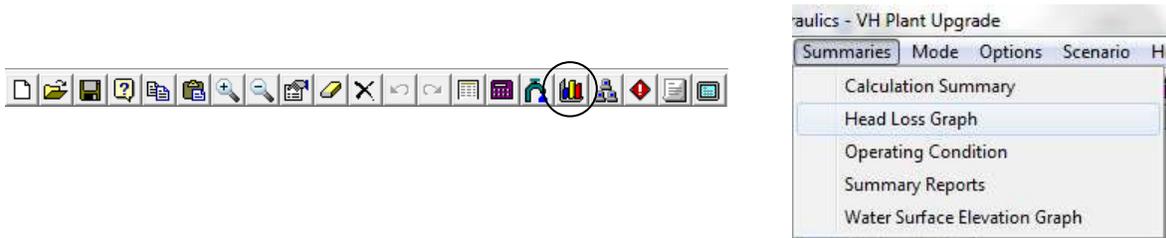


Perhaps even more valuable is the ability for the software to generate a calculation summary of the equations and theory used to determine the head loss. If the user selects the “View equations used” button at the bottom of the form, those equations and theory will be displayed for the user to check:



By viewing the calculation summary and the equations used by the software to determine the head loss, the user can see step by step how the head loss was determined and what values were used in coming up with the result. This in turn allows the user to perform a QC check on the model and make sure that the result is accurate and reasonable.

As another calculation check, the user can choose to perform a head loss graph on any element that has been included as part of the model. This allows the user to determine the hydraulic behavior of that element over any range of flows. The head loss graph can be generated from the toolbar or via the main menu:



If we check the sand filter’s head loss graph over a range of flows, the following head loss graph is generated:

