



CityWater Tutorial

CityWater – Fire Flow Analysis

How to view and use the Fire Flow features for your project



Objectives

This tutorial demonstrates the Fire Flow analysis tools and options available in CityWater™.

Prerequisites

- Login and User Profile

Requirements

- CityWater Account with the Fire Flow Analysis Add-on
- Internet access

Time

- 10–20 minutes

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1 Getting Started

CityWater provides a useful way to visualize your EPANET project peak demand pressure using the Fire Flow options when importing a new project or within an existing project. You will need account access to CityWater with the Fire Flow Analysis Add-on and at least one EPANET model uploaded to complete this tutorial.

If you are not already logged in to your CityWater account, access the Aquaveo™ Portal by doing the following:

1. Open a web browser. For the best experience, use Google Chrome, Mozilla Firefox, or Safari.
2. Navigate to the Aquaveo Portal using this address:
<https://portal.aquaveo.com>
3. Log in to your CityWater account.
4. Open the CityWater app by selecting its app icon in the Apps Library.

2 Peakday Fire Flow Analysis

When creating a new project in CityWater, turning on the Peakday Fire Flow option calculates the fire flow available at each junction in your model. It then makes fire flow available as a color-coded, interactive map layer. This process can be fairly quick for smaller projects, or significantly longer for larger projects.

In order to speed up the process, only the basic steps for creating the new project will be presented, in addition to the fire flow steps. For more information on entering the basic project information, please refer to the “New Project” tutorial.

2.1 Creating a New Project

To enter the basic project information, do the following:

1. Click on **Projects** in the Navigation pane.
2. Click on the **New Project** button.
3. Enter “Test Fire Flow Idaho” as the Name of Project.
4. Enter “Fire Flow demonstration (Idaho)” as the Description.

5. Leave the Organization as the default which should be the organization you belong to.
6. Enter “Idaho East” in the Spatial Reference System field, wait for a moment for the search to complete, and select “2241 NAD83 / Idaho East (ftUS)”.
7. Click the **Browse** button and select the “Example_Model-1.inp” input file.

After entering the basic project information, do the following to enable the fire flow processing described above:

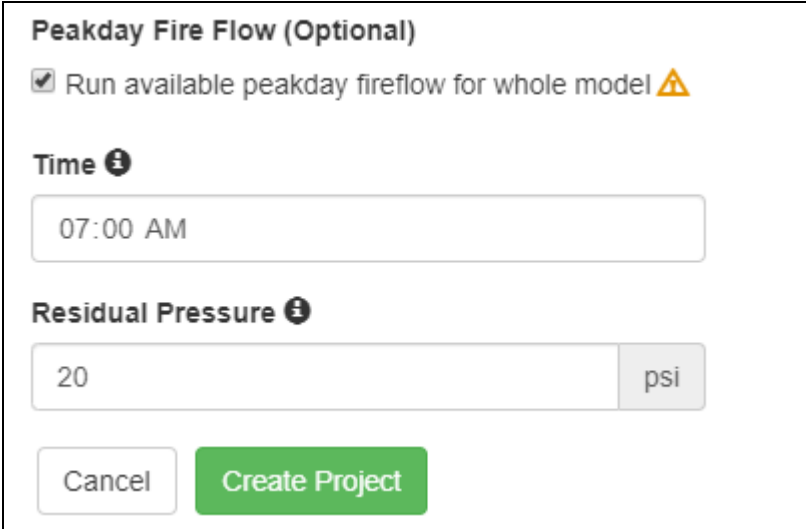
8. Check the box underneath Peakday Fire Flow on the New Project screen.
9. Enter a Peakday Time of “07:00 AM”.

This is the time of day when peak usage occurs.

10. Enter “20” as the Residual Pressure.

This is the lowest allowable pressure in the system during a Fire Flow event. If any junction drops below this value during the fire flow calculations, CityWater will advise you. This will be discussed later in the tutorial.

11. Click **Create Project** to begin the processing to create the new project.



Peakday Fire Flow (Optional)

☒ Run available peakday fireflow for whole model ⚠

Time ⓘ

07:00 AM

Residual Pressure ⓘ

20 psi

Cancel Create Project

Figure 1 Fire Flow Options

Please note that the Peakday Fire Flow option will add significantly to the upload processing time. However, once the essentials of the project have been processed, the model will be accessible via the Project Details page. Once the fire flow information is calculated, it will also be made available.

| Processing Status | | | | | |
|-------------------|--------------|-------------------------|-------------------------|----------|--------------------|
| Id | Name | Creation Time | Execute Time | Run Time | Status |
| 296 | FireFlowdemo | Feb. 7, 2018, 7:06 p.m. | Feb. 7, 2018, 7:06 p.m. | 0:00:18 | <div></div> Delete |

Figure 2 Project using the Fire Flow Option being processed

2.2 Accessing Fire Flow Information

Once the fire flow calculations have been completed, the status for the project will appear as “Complete” on the Processing Status page.

1. Click “Back to Project Details” to return to the Project Details page.
2. On the Map tab, click the **Go to Map** button.
3. Select “Peakday Fireflow Available” from the Node Layer drop-down.
4. Select “Flow” from the Link Layer drop-down.
5. Select any junction node and review the Peakday Fire Flow Available value on the Properties tab in the Navigation pane.
6. Select any other junction node to review the Peakday Fire Flow Available value.

Every junction node should have a value. This is because the Peakday Fire Flow option was turned on when the project was created.


3 Using the Map Screen Fire Flow Options

Note: This section assumes Section 2 was completed first. If you were unable to do Section 2, please use one of your existing projects or contact your administrator to have them create a new project using the steps in Section 2.

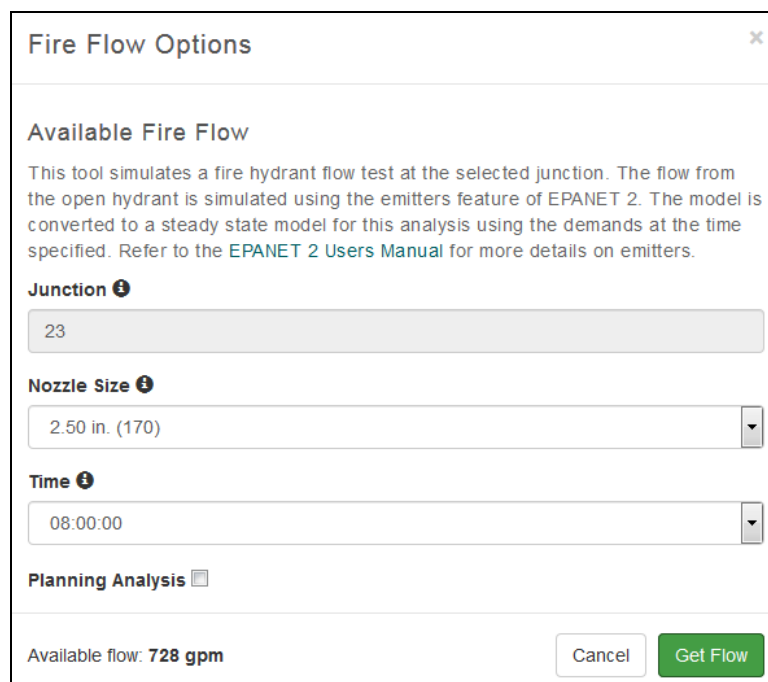
Fire Flow analysis can be performed even without the Peakday Fire Flow option being turned on when the project is created.

3.1 Available Fire Flow at a Junction

When any junction is selected, notice that the Peakday Fire Flow options button at the bottom of the Map screen becomes available.

1. Select any junction node.
2. Click the Fire Flow Options  button to bring up the Fire Flow Options dialog.
3. Leave the Junction drop-down at the default. It should already be set to the junction node selected in step 1.
4. Leave the Nozzle Size at the default (“2.50 in.”). This is the nozzle size on the hydrant.
5. Select “08:00:00” from the Time drop-down..
6. Do not check the Planning Analysis box.
7. Click **Get Flow**.

The “Available flow” at the bottom left of the dialog should show a value now.

The image shows a software dialog box titled "Fire Flow Options" with a close button (X) in the top right corner. The dialog is divided into several sections. The first section, "Available Fire Flow", contains a descriptive paragraph about simulating a fire hydrant flow test using EPANET 2. Below this is a "Junction" field with a dropdown menu showing the value "23". The next section is "Nozzle Size", featuring a dropdown menu currently set to "2.50 in. (170)". Below that is a "Time" field with a dropdown menu showing "08:00:00". A "Planning Analysis" checkbox is located below the time field and is currently unchecked. At the bottom left, the text "Available flow: 728 gpm" is displayed. At the bottom right, there are two buttons: a "Cancel" button and a green "Get Flow" button.

Fire Flow Options

Available Fire Flow

This tool simulates a fire hydrant flow test at the selected junction. The flow from the open hydrant is simulated using the emitters feature of EPANET 2. The model is converted to a steady state model for this analysis using the demands at the time specified. Refer to the [EPANET 2 Users Manual](#) for more details on emitters.

Junction ⓘ

23

Nozzle Size ⓘ

2.50 in. (170)

Time ⓘ

08:00:00

Planning Analysis ☐

Available flow: **728 gpm**

Cancel Get Flow

Figure 3 Fire Flow Options dialog

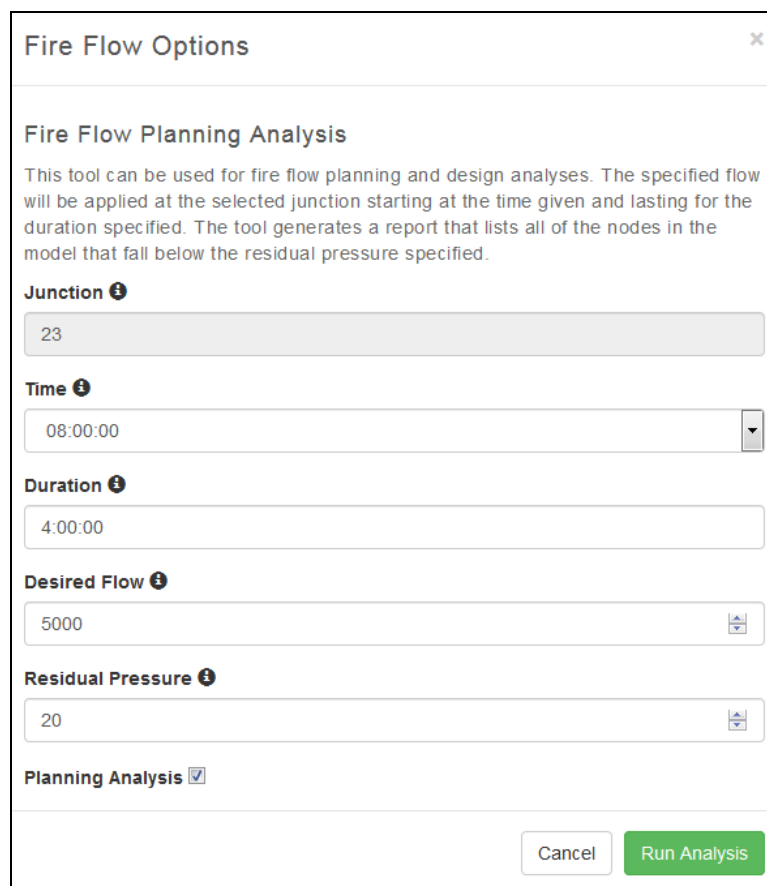
8. Select "4.50 in." from the Nozzle Size drop-down.
9. Do not check the Planning Analysis box.
10. Click **Get Flow**.

Notice that the "Available flow" has changed. This feature provides a quick way to calculate available flow for fire flow events at any junction in the project.

3.2 Planning Analysis

The Fire Flow Options dialog can also be used to run a planning analysis, which shows how a specified flow at a junction impacts the system as a whole.

1. Check the Planning Analysis box to reveal the advanced options.



Fire Flow Options

Fire Flow Planning Analysis

This tool can be used for fire flow planning and design analyses. The specified flow will be applied at the selected junction starting at the time given and lasting for the duration specified. The tool generates a report that lists all of the nodes in the model that fall below the residual pressure specified.

Junction ⓘ

23

Time ⓘ

08:00:00

Duration ⓘ

4:00:00

Desired Flow ⓘ

5000

Residual Pressure ⓘ

20

Planning Analysis ☒

Cancel Run Analysis

Figure 4 Fire Flow Options dialog with Planning Analysis checked

The advanced options allow you to set specific desired parameters for flow, residual pressure, and duration.

1. Enter “4:00:00” as the Duration.
2. Enter “2000” as the Desired Flow.
3. Enter “30” as the Residual Pressure.
4. Click Run Analysis.

When the analysis is complete, a results dialog will appear.

The results provide a variety of useful information on the selected junction as well as any issues or possible concerns with nodes throughout the project. For the selected junction, the initial settings are shown along with the minimum pressure that occurred within the duration of the analysis and when that minimum pressure occurred.

The other two sections of the results list any nodes which fell below the Residual Pressure set for the analysis and the node with the minimum pressure within the zone containing the selected junction. You can jump to any junction listed on the results dialog by clicking on its ID.

Feel free to experiment with other nodes, desired flows, residual pressures, and durations.

Fire Flow Planning Analysis Results

Junction of Interest

| | |
|-------------------------|----------|
| ID | 23 |
| Desired flow (gpm) | 2000 |
| Residual pressure (psi) | 30 |
| Start time | 08:00 AM |
| Duration | 4:00:00 |
| Minimum Pressure (psi) | -1556.0 |
| Minimum Pressure Hour | 6:00:00 |

Violating Nodes

346 violations reported at 25 nodes of 25 total zone nodes (100%).

| Junction | Pressure (psi) | Hour |
|----------|----------------|---------|
| 2 | -2.66 | 2:00:00 |
| 3 | -34.4 | 2:00:00 |
| 4 | -66.83 | 2:00:00 |
| 5 | -107.81 | 2:00:00 |
| 6 | -118.37 | 2:00:00 |

Minimum Zone Pressure

| Junction | Pressure (psi) | Hour |
|----------|----------------|---------|
| 23 | -1556.0 | 6:00:00 |

Back

Done

Figure 5 Fire Flow Planning Analysis Results dialog

4 Conclusion

This concludes the “Fire Flow” tutorial for CityWater. Items discussed in the tutorial included:

- Calculating peakday fire flow for the entire model
- Calculating available fire flow at any junction in the model
- Performing a fire flow planning analysis