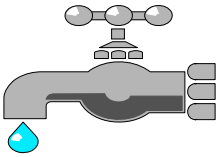
Factsheet: Documenting Low Pressure



The criteria established by the State Water Infrastructure Authority provide Public Health priority points for projects that address documented low water pressures. The Division of Water Infrastructure prepared this factsheet to describe how to document a pressure problem.

The Rules Governing Public Water Systems at T15A 18C NCAC .0901 read as follows:

> *Water distribution mains shall be sized to provide a minimum pressure at all points within the distribution system of not less than 20 pounds per square inch (gauge) during periods of peak demand (fire flow), but in any case water mains shall not be less than two-inch standard nominal diameter. Fire hydrants shall not be installed on water mains of less than six inches diameter or on water mains or water systems not designed to carry fire protection flows. Systems not designed for fire flows shall have the capacity to maintain a pressure of at least 30 pounds per square inch (gauge) throughout the system during periods of peak flow.*

In summary, this regulation requires that a system maintain 20 pounds per square inch (psi) at all times (even when under fire flow), and 30 psi except when under fire flow. In the absence of a documented legal requirement for a higher fire flowrate, fire flow is presumed to be 250 gallons per minute.

Measurement Method

To determine if this standard is met, applicants typically open one fire hydrant to a flowrate of 250 gallons per minute while reading the pressure on a nearby hydrant. If the Applicant documents that a higher fireflow is required by law, then the open hydrant can be flowed at that required fire flowrate.

Alternatively, the Applicant may place a continuous pressure recorder on various fixtures (e.g., fire hydrants) to determine the pressures encountered during routine operation.

Documentation

The report documenting the pressure problems must explain in detail how each low pressure reading was obtained. An example report appears on the back of this factsheet.

The report text must briefly describe what was done to generate each low pressure reading, particularly the flowrate in the open hydrant. The report text must describe any legal requirement for a fire flowrate over 250 gallons per minute and include copies of all the cited relevant legal requirements. Note the following:

- Insurance ratings are not legal requirements.
- The **Fire Flow Requirements for Buildings** in Appendix B of the North Carolina building code are not mandatory unless specifically adopted by a local ordinance, in which case the Applicant must provide a copy of both the ordinance that specifically references the code and a copy of the ordinance.

Attach a map that shows the sampling location of each low pressure reading (or outage), including the following information:

- the existing line,
- the proposed line,
- the location and flowrate of the open hydrant, and
- where the pressure was measured (typically, the closed hydrant).

Attach <u>all</u> field data sheets.

In summary, the report must demonstrate that the problem exists, document how the Applicant determined the problem exists, and include all raw data.

Note that the follow-up Engineering Report (ER) must demonstrate that the proposed project is the most cost-effective solution to the problem you document.

Project Design

Ensure that you have enough pressure readings or outages to justify the entire project. That is, the readings should be well spread out throughout the project area. There must be at least one reading on every distinct stretch of line.

If some physically separate line does not have low pressure or outages but needs to be replaced to fix a problem elsewhere (i.e., is hydraulically linked to a low pressure zone), then explain this linkage.

The number of pressure readings should be proportionate to the length of line. More readings are appropriate in highly built up areas. Provide at least one reading for the following:

- each physically separate section of line, and
- each mile of line.

An example of the recommended presentation follows:

Measurements were made of the static pressure (no flow pressure) of hydrants in the Minor Street Area by connecting a calibrated pressure gauge to the hydrants. Simulated fire-flow pressure (residual pressure) was made by having the local fire department flow a nearby hydrant at 250 gallons per minute and reading the residual pressure.

Two of the hydrants failed to meet requirements to maintain residual pressure of 20 psi under simulated fire flow conditions. The hydrant Near 1300 Post Street just met the requirement. These results clearly justify upsizing the lines on Elm and Post streets to 6-inch. Note that all three hydrants are installed on 4-inch line in violation of 15A NCAC 18C .0901 (which requires 6-inch line).

There have been six line breaks on the 1300 block of Post Street since January 2006 (dates are documented in the attached repair work orders). We will replace the line on Post Street to create a 6-inch lop connected on both ends to the 12-inch supply main on Main Street, and to prevent future outages.

Field data sheets are attached to the back of this report.

Table 1. Pressure testing results - Main Street Area

Location of Low P reading	Location of Open hydrant	Open Hydrant Flow Rate [gallons / minute]	Static (no flow) Pressur e [psi]	Fire Flow (Residual) Pressure [psi]	Comments
6527 Minor Street	Corner Minor & Elm	250	60	11	fails to meet requirements
Corner Minor & Elm	6527 Minor Street	250	58	13	fails to meet requirements
1300 Post Street	6527 Elm Street	250	45	20	marginally meets requirements, but multiple outages;