

Grand Forks Fire Department

Standard Operating Procedures

SOP# 603.05	Section Emergency Operations	Title Water Supplies
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I. Scope

This standard establishes the requirement that an adequate and reliable water supply be established at each incident.

II. General

A. For firefighting efforts to be effective, an adequate and reliable supply of water must be available. The adequacy and reliability of potential sources of water may change due to weather, system demands, and many other factors beyond the department's control.

B. Each member shall be aware of the potential fire flow demands within his district and shall identify available options for developing a sufficient volume of water to adequately combat any fire that might occur.

III. Responsibilities

A. The Deputy Chief or his/her designee shall serve as the water supply officer for the department.

B. The water supply officer shall:

1. Serve as a liaison with the water department.
2. Furnish an accurate and up-to-date hydrant map to each station and company.
3. Maintain a complete and up-to-date water supply map at the headquarters station.

4. Identify areas where additional hydrants are needed and work with the water department to have them installed.
 5. Provide each station and company with a map identifying static water sources. The map shall provide information concerning accessibility and capacity for firefighting.
 6. Supervise fire flow testing and have the results recorded.
 7. Yearly testing/flushing of hydrants as per schedule prepared by the water supply officer.
 8. An up-to-date list of out-of-service hydrants will be maintained and distributed by watchroom personnel.
- C. The Deputy Chief shall have overall responsibility for developing quick access preplans for all schools, institutional occupancies, high-rises, and target hazards. A copy of all quick access preplans shall be carried on all command vehicles. Fire flow demand and water supply information shall be included on the quick access preplans.
- D. The Battalion Chiefs shall conduct monthly territory drills with the members of their shifts to acquaint members with the location and capacity of the fire hydrants and static water supplies within our jurisdiction.
- E. Company officers shall be responsible for:
1. Having a working knowledge of the hydrants, water distribution system and static water sources in their first-due area.
 2. Reporting high grass, weeds, and other hydrant obstructions to the Deputy Chief for correction. If the problem can be easily remedied by the company officer with his/her crew, every attempt should be made to correct the problem, i.e. snow – shovel it.
 3. Maintaining an up-to-date list of hydrants that are out of service within their first-due district.
- F. FAS/SO s and FF IIIs shall be responsible for having a working knowledge of the hydrants, water distribution system and static water sources in their first-due area. They shall also be responsible for ensuring that a street and hydrant map is maintained in their assigned apparatus and that the map is current and up to date.

IV. Hydrant Color Codes

- A. Hydrants are color-coded based on NFPA 291, Recommended Practice for Fire Flow Testing and Marking of Hydrants as follows:

<u>Color</u>	<u>Flow</u>
Red	1-500 gpm
Orange	500-1,000 gpm
Green	1,000-1,500 gpm
Blue	= to or greater than 1,500 gpm

*** At this time the department does not utilize the blue coding, we will be starting during 2002-2003 timeframe. There are blue coded private hydrants in the community. DC Flermoen***

- B. Whenever a hydrant is discovered that has not been color-coded, it shall be properly color-coded by the company that made the discovery. Color-coding may be accomplished by placing appropriate colored stickers onto the hydrant.

V. Operational Procedures

- A. Each engine company shall be responsible for providing its own uninterrupted water supply on the fireground. The ability to do so will be predicated on:

1. The required fire flow.
2. The available water supply.
3. The number of personnel available.
4. The numbers and types of available apparatus.

- B. Calculations of required fire flow:

1. The following factors influence the required fire flow:
 - a. Construction type.
 - b. Contents.
 - c. Occupancy.
 - d. Exposures.
 - e. The presence or absence of extinguishing systems.

2. One way to calculate fire flow is the following Insurance Services Office (ISO) formula:

$$Q = 18 C (A)^{0.5}$$

Q = Needed fire flow in gallons per minute (gpm)

A = Total building area in square feet (ft²).

C = A factor based on construction as follows:

C = 1.5 for wood frame.

C = 1.0 for wood foisted masonry

C = 0.8 for unprotected noncombustible.

C = 0.6 for fire resistive.

3. For a quick reference during a fireground operation, and what we use on our departmental QAPs, use the Nelson-Royer Formula for the required fire flow:

$$\text{Required fire flow (Gpm)} = \frac{H \times W \times L}{100}$$

H = Building height.

W = Building width.

L = Building length.

Example: For a building that is 60 feet long and 40 feet wide with a 10-foot ceiling, the fire flow would be:

$$\text{Gpm} = \frac{10 \times 40 \times 60}{100} = \frac{24,000}{100} = 240$$

To achieve a flow of 240 gpm would require:

One 2 ½ -inch handline flowing 240 gpm or two 1 ¾ -inch handlines at 120 gpm each.

4. As a general rule of thumb, the following minimum flows are required:

Residential	500 gpm
Light commercial	1,000 gpm
Heavy commercial	1,500 gpm
Industrial	= to or greater than 2,000 gpm

5. The required fire flow may be reduced by 50 percent if an automatic fire sprinkler system is present.

C. Water supplies may be established by:

1. Booster tank operations: For demands of less than 500 gallons or brief duration.
2. Supply hose: A 5-inch line or multiple 3-inch lines from a hydrant or static source via drafting. This is the most dependable source and should be used whenever possible.

When in doubt, lay a line.