

WD-DWGB-1-13

2012

Determining the Reliable Capacity of a Private Water Supply Well and Pumping System

The N.H. Water Well Board suggests that a minimum water supply capacity for domestic internal household use should be at least 600 gallons of water within a two-hour period once each day. This is equivalent to a flow rate of 5 gallons per minute (gpm) for two hours. Some homeowners may find this amount to be less than desirable depending on the size of the family or if outdoor use is a requirement. Water supply capacities less than this amount may be considered a hardship by many homeowners (see [WD-DWGB-1-8: Recommended Minimum Water Supply Capacity for Private Wells](#)).

In addition, the N.H. Water Well Association and the N.H. Water Well Board recommend a flow rate of 4 gpm for a period of four hours as an optimum water supply capacity for a private domestic supply. This volume is equivalent to 960 gallons of water within a four-hour period and should be adequate for all indoor domestic use as well as a modest amount of outdoor use.

The minimum amount of water supplied to a home does not necessarily reflect the yield of the well because the amount of water that can be reliably produced to the home is affected by several conditions.

- 1) Well yield.
- 2) Static groundwater level measured in the well.
- 3) Depth of well.
- 4) Pump depth setting, pump controls, pump efficiency and pump horsepower rating.
- 5) Storage/pressure tank size and performance.
- 6) Condition of plumbing system.
- 7) Height of home.

In order to determine whether a well and associated water system meet the water supply capacity recommendations above, a simple test can be completed, as described in the following steps.

- 1) Estimate the initial depth to the water level in the well. Homeowners do not typically own devices that can measure the depth of groundwater in a well; generally only professionals in the water industry have access to these devices. A homeowner can estimate the water level by opening the well casing and measuring the time it takes for an ice cube that is dropped in the well to land in water.

16 x (time measured in seconds) x (time measured in seconds) = Approx. Depth to Water in Feet

For example, if it takes four seconds for an ice cube to fall into the well water, the depth to water would be calculated as: $16 \times (4 \text{ seconds}) \times (4 \text{ seconds}) = 256 \text{ feet}$.

Ensure water has been used minimally or not at all for several hours before estimating the initial depth to water in the well.

- 2) Fill a one-gallon milk or juice carton with water and empty into a five-gallon bucket five times. Mark the water level inside the five-gallon bucket each time after pouring in one gallon of water.
- 3) Using an outdoor water fixture, discharge water in the following manner:
 - a) Discharge water at a rate of five gallons a minute for two hours to assess whether the water system can meet the recommendations of the N.H. Water Well Board; or
 - b) Discharge water at a rate of four gallons a minute for four hours to assess whether the water system can meet the N.H. Water Well Board and N.H. Water Well Association recommendation for an optimal water supply. Flow can be adjusted by using a hose nozzle or valve.

Utilize the five-gallon bucket with the one-gallon marks developed in step two and a timer or watch to achieve the discharge rates described in a) or b), above.

- 4) Estimate the stressed depth to water level in the well. Immediately after discharging water at a rate of five gallons a minute for two hours or four gallons a minute four hours, estimate the depth to water in the well again using the procedure described in Step 1. Verify that the pump is not actively pumping prior to dropping an ice cube into the well.
- 5) Estimate the recovery depth to water level in the well. Again, verify that the pump is not operating. Estimate the depth to water in the well again two hours (if the five gallon a minute for two hour test was conducted) or four hours (if the four gallon a minute for four hours test was conducted) after completing the discharge test in Step 3. Use the procedure in step 1 to estimate the water level.
- 6) Calculate the percent water level recovery in the well. This calculation can be completed using the formula:

$$\frac{(\text{Stressed Water Level} - \text{Recovery Water Level})}{(\text{Stressed Water Level} - \text{Initial Water Level})} \times 100\%$$

The results of the discharge test(s) enable an assessment of the capacity of the water system to meet minimum and optimal water supply recommendations provided by the N.H. Water Well Board and N.H. Water Well Association. Additionally, the results will show whether the depth of water in a well recovers after being stressed. If the depth to water exhibits no or slow recovery (recovers less than 75 percent), this may indicate that the capacity of the water system may significantly diminish after several days of use. Some wells that exhibit slow recovery rates mitigate the slow rate of recovery by being drilled deeper. This allows the well to recover more water during periods when no water is used, such as the overnight hours.

Licensed water well contractors and pump installers have the experience and equipment to more thoroughly assess the capacity of a well and/or associated water system. The procedures described above are only meant to provide a homeowner with some coarse measures with which the capacity of a well and associated water system can be assessed.

For More Information

Please contact the Drinking Water and Groundwater Bureau at (603) 271-2513 or dwgbinfo@des.nh.gov or visit <http://des.nh.gov/organization/divisions/water/dwgb/index.htm>. All of the bureau's fact sheets are available at: <http://des.nh.gov/organization/commissioner/pip/factsheets/dwgb/index.htm>.

Note: This fact sheet is accurate as of August 2012. Statutory or regulatory changes or the availability of additional information after this date may render this information inaccurate or incomplete.