

## LAND USE

### *230 Attachment 15*

#### **Township of Delaware**

#### **Appendix VI Aquifer Test Procedures**

1. The first test phase will involve the collection of background water levels prior to the start of the test. The second test phase will involve the pumping of water from the well and the monitoring of water-level drawdown in the observation and pumping wells. The third test phase will involve the measurement of water-level recovery in the observation and pumping wells after the pump has been shut down. This third phase of the test must, at a minimum, be the same length as the pumping phase.
2. The aquifer test (all three phases) shall not be conducted during a precipitation event or events in which total precipitation equals or exceeds 0.5 inch. Precipitation must be recorded with a National Weather Service acceptable rain gauge on site during all phases of testing and measurements for each day must be included in the hydrogeologic report. If precipitation occurs during the test, the applicant shall provide precipitation amounts and sufficient data to show that the precipitation did not recharge the aquifer during the test and impair the test results. If precipitation amounts exceeding 0.5 inch are recorded, the test may have to be repeated unless adequate data can be provided to assure the municipality's consulting hydrogeologist and the Board that the precipitation did not affect the water-level data collected during the aquifer test. The requirement to repeat the test will be at the Board's discretion.
3. The pumping equipment must be installed in the pumping well at least 24 hours prior to the start of the background phase.
4. Prior to starting the background phase, water levels in the test well and observation wells must be permitted to stabilize for a minimum of three days after all drilling activities are completed.
5. During the background phase, water levels should be collected at a minimum of one measurement per hour for the twenty-four-hour period prior to the start of the pumping test. It is the applicant's responsibility to collect sufficient data to determine background conditions and to ensure that antecedent influences can be fully characterized. Barometric measurements and additional water-level measurements can be made by the applicant to evaluate the change in water levels resulting from barometric pressure changes and/or influences from off-site pumping.
6. On the day of the pumping phase, water levels shall be collected from the pumping and observation wells to determine static water level conditions prior to the start of pumping. Water levels in wells on neighboring properties should be allowed to stabilize to at or near static prior to the start of pumping. For any observation well which has been pumped within the 24 hours preceding the test, two depth-to-water measurements, at least one hour apart, shall be collected to assess if the well has fully recovered prior to the start of pumping.

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7. When the aquifer test is started, the pumping flow rate shall be adjusted, within the first several minutes of pumping, to a uniform (constant) pumping rate as required for a constant-rate test and in accordance with the approved aquifer test plan. The flow rate shall not vary by more than 10% throughout the test. If the flow rate fluctuates more than 10%, the test may be deemed invalid and the applicant will be required to repeat the notification and testing process.
8. Water-level measurements during the pumping phase of the test shall be collected in accordance with **Table V-1**. This same schedule shall be followed for the recovery phase of testing upon shut down of the pump in the test well.

**Table V-1: Minimum Frequency of Water-Level Measurements in Wells During Pumping and Recovery Phases of Aquifer Test**

<b>Time Since Pumping Began or Stopped</b>	<b>Test Well</b>	<b>Observation Wells</b>
0 to 5 minutes	0.5 minutes	0.5 minutes
5 to 10 minutes	1 minute	1 minute
10 to 30 minutes	2 minutes	2 minutes
30 to 60 minutes	5 minutes	5 minutes
60 to 120 minutes	10 minutes	10 minutes
2 to 24 hours	30 minutes	30 minutes

**Aquifer Pumping Test Rate and Duration:**

The rate and duration of the aquifer test will depend upon the size of the proposed development and/or the expected average and peak daily demands for water.

1. The average daily and average yearly water demand for human consumption within the lot in question must be determined according to the guidelines in N.J.A.C. 7:10-12.6. Demand calculations must further include irrigation systems, if proposed, and water usage for filling of swimming pools and all other demands. The peak-day demand is twice the average daily demand. For nonresidential developments, peak-day demand must include seasonal factors.
2. The pumping phase must simulate peak-day demand and therefore, the pumping phase duration is not to extend more than 24 hours. The minimum pumping rate is calculated by dividing the peak-day demand by 1,440 minutes per twenty-four-hour period. If the well yield is sufficient, shorter pumping periods can be used, but should be not less than eight hours in duration.
3. If the demand exceeds 100,000 gallons per day, a New Jersey Water Allocation Permit or Agricultural Water Use Certification, as applicable, must be obtained from the New Jersey Department of Environmental Protection.

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4. For mixed-use developments containing two or more of the following components: residential, nonresidential and agricultural, each component shall be tested separately. Wells installed for the residential portion must be used as observation wells for the nonresidential and/or agricultural well testing and wells installed for nonresidential use must be used as observation wells for the residential and/or agricultural well testing.
5. The pumping rate will be determined by equipping the discharge pipe with a calibrated flow meter to measure flow rate and determine total volume pumped from the well. The calibration certification for the meter must be submitted to the Board. If the meter has not been calibrated within one year of the testing date, the test must be repeated.
6. The discharge shall be directed so that it leaves the lot in question without infiltrating to the aquifer. The pumped water discharge location must be at least 200 feet from the pumping well. Any and all permits required by the NJDEP and/or local authorities for the discharge of pumped water must be obtained prior to starting the test.