

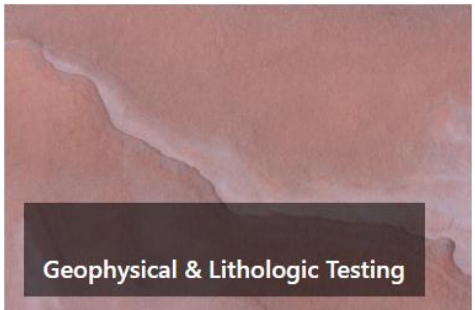
Certification & Submission



Projected Water Demand Estimate



Groundwater/Site Specific Resource Information



Geophysical & Lithologic Testing

The certifications required by the state of Texas need to be prepared by either a licensed geoscientist or a licensed engineer. Below are links to the database of P.G.s and P.E.s in the State of Texas.

[Texas Board of Professional Engineers & Land Surveyors](#)

[Texas Board of Professional Geoscientists](#)

Part of the study is estimating the projected water demand from a proposed subdivision or development, based on a variety of variables. Residential demand estimates shall at a minimum, be based on the current demand of any existing residential well, and (all of these at full build out):

- number of proposed housing units
- average number of persons per housing unit
- gallons of water required per person per day
- water demand per housing unit per year (in acre-feet per year)
- total expected residential demand per year for the entire subdivision (also in acre-feet per year).
- total annual water demand estimate (this includes residential and non residential estimates at full build out combined together).

All data & calculations according to the TCEQ, shall be made available to a county authority or municipality if requested, and plat applicants shall provide any additional information required by any of our four counties as apart of their plat application.

The next two chapters of TCEQ's certification involve information on the aquifer system that is the intended source of the subdivision or development. The information below "shall be considered in planning and designing an aquifer test", and includes the following on the intended aquifer system: stratigraphy of the formations underlying the subdivision, lithology of the geologic strata geologic, structure aquifer characteristics, recharge & discharge rates from the aquifer(s), and ambient water quality in the aquifer formation.

When an aquifer test is being designed for a subdivision that will house individual lots and individual water wells, the following protocols details requirements about the study.

Test wells and observation wells: at least one of each is required within the proposed subdivision, and must both be completed into the same formation of interest.

Location of observation & test wells - below are the minimum and maximum distances required for an observation well with regards to a test well within the

Observation Well Location	Minimum Distance	Maximum Distance
Confined Aquifer	≥ 2b <i>b = aquifer thickness</i>	≤ 700 feet
Unconfined Aquifer	≥ 2b <i>b = aquifer thickness</i>	≤ 300 feet

A lithologic log is a long collection of data from the aquifer formation, showing the thickness and lithology of the unit, which includes size of particles, range of size of particles (also known as sorting), shape and smoothness of particles (also known as grading), the occurrence of water bearing strata or rock units, and special notes relevant to the drilling process.

A geophysical log on the other hand, uses characteristics of the rock formations to generate an image of the subsurface beneath the subdivision, essentially mapping the aquifer.

TCEQ requires at a minimum Ch. 230.8 "Obtaining Site-Specific Groundwater Data" defines a geophysical log as "an electrical log with shallow and deep investigative curves (e.g., 16 inch short normal/64-inch long-normal resistivity curves or induction log) with a spontaneous potential curve."

UTGCD owns and maintains a geophysical logging truck, and through interlocal agreements can lend our staff and equipment to assist in the geophysical logging of wells within the proposed subdivision. Call 817-523-5200 or visit uppertrinitygcd.com to schedule or request more information.

Dual Induction Tool - must be performed before well is cased OR if casing is constructed of PVC pipe.

Gamma Ray Tool - can be performed before or after well development.

Equipment sizing: 4 in. diameter or larger is necessary for downhole capability.



Upper Trinity Groundwater Conservation District

G.A.C. One-Page Guide

**1859 W. Hwy 199
Springtown, TX 76082**

Uppertrinitygcd.com



Geophysical & Lithologic Testing

When a well is developed, the test well shall be pumped for several hours to determine the 1) specific capacity of the well, 2) the maximum anticipated drawdown of the water level in the well, 3) the volume of water produced at certain pump speeds. This all assists in determining if the test well is in a decent location to perform aquifer tests.

Prior to Testing: delay aquifer testing until water levels after a well's development phase have completely recovered from pre-pumping levels, or to at least 90% recovery.

Testing: the duration of aquifer tests depend heavily on local geology and lithology, however the goal is to produce a "straight-line trend" on a water level versus logarithmic time scale. See below for an example of what that looks like:

Testing: at a minimum, 24 hours is required for a uniform rate aquifer test. The time can be extended until either the straight-line or a consistent pumping level trend is observed.

After the pump portion of the test has occurred, this is when recovery measurements are recorded, and these recovery tests will continue until water levels are at 90% or at pre-pumping levels.

Existing Wells: existing wells on the property can be useful depending on their age and condition. TCEQ states an existing well may be used as an observation well if "sufficient information is available for that well to demonstrate that it meets the requirements of the section." These tests will produce the data necessary to determine aquifer conditions such as hydraulic conductivity, transmissivity, and storativity.



Groundwater Quality

Groundwater quality within the proposed subdivision also plays a role in groundwater certification and review.

The list below is all the substances/parameters that should be sampled for near the end of the aquifer test for those with proposed individual wells on individual lots:

- chloride
- conductivity
- flouride
- iron
- nitrate (as nitrogen)
- manganese
- pH
- sulfate
- total hardness
- TDS (total dissolved solids)
- presence/absence of total coliform bacteria

Conductivity and pH may be measured in the field with hand-held equipment, but the other substances "shall" be tested in a TCEQ accredited laboratory. Below is a database of certified labs via UTGCD and TCEQ. *The tested values should be compared to primary and secondary public drinking water standards and the results documented.*

[UTGCD Water Lab Database TCEQ - List of Labs \(at bottom of webpage\)](#)



Groundwater Availability Projections

Groundwater Availability shall be determined for:

- 10 years
- 30 years
- Any other timeframe required by municipal or county authority

Time Drawdown Requirements

- Amount of drawdown at the pumped wells at 10 years
- Amount of drawdown at the pumped well locations at 30 years
- The amount of drawdown at the proposed subdivision boundaries at 10 years
- The amount of drawdown at the proposed subdivision boundaries at 30 years

Distance Drawdown Requirements

- Distance from the pumped well to the outer edges of the cone of depression for 10 years
- Distance from the pumped well to the outer edges of the cone of depression for 30 years

For multiple wells within a subdivision;

- How pumpage from multiple wells will affect drawdown in individual wells over 10 years
- How pumpage from multiple wells will affect drawdown in individual wells over 30 years



"Is there water there?"

While over 75% of Texas is underlain by a major or minor groundwater system, these study parameters are designed to project future water demands for subdivisions and areas of high growth within the Lone Star State. UTGCD and its review process aim to project three water futures within each review application including;

- Scenario 1, where outdoor watering occurs sparingly and alternative water technologies such as rainwater harvesting and xeriscape are used
- Scenario 2, where high water use is anticipated by extreme outdoor watering conditions, and then
- the plat applicant's projected demands somewhere in the middle.

This will provide both landowners and community leaders with additional tools to assess where in their counties may require more involved water policy and management. Contact UTGCD with any questions regarding our review process.