LONE STAR GCD'S HYDROGEOLOGICAL REPORT GUIDELINES

Adopted pursuant to Rules 2.6(b)(15), 2.12 and 3.4

I. INTRODUCTION

A. The purpose of the Hydrogeological Report is to provide the District with hydrogeological information addressing the impacts of the proposed well on existing wells. The Hydrogeological Report Requirement will assist with the District's mission to collect data and use the best available data and science in managing aquifers of the District.

B. The Hydrogeological Report must be included with an administratively complete application for any of the following:

1. a request to modify or increase an existing well or well system that would result in the existing well(s) 700 gallons per minute or greater;
2. a request to drill and operate a proposed new well or well system with a proposed aggregate production capacity of 700 gallons per minute or greater; and/or
3. a request for an exception to the Rule 3.3 spacing requirements.

C. Reports submitted pursuant to Rules 2.6(b)(15), 2.12, and 3.4, and these guidelines are required to be stamped by a Professional Geoscientist or Professional Engineer licensed in the State of Texas

D. Hydrogeological Reports submitted to the District should follow the chronological order of the criteria set forth in Section II.

E. Spacing requirements for new wells must meet the requirements in the Rules. If requesting an exception to spacing, please complete requirements in Section II.B.

II. REQUIREMENTS OF HYDROGEOLOGICAL REPORTS

A. Hydrogeological Report for New Annual Allocation Only (no new well(s) or changes to maximum production rate per well(s))

1. Location

(a) Provide map(s) showing location of property relative to county line and location of water system well(s) relative to property boundaries and other relevant features.

(b) If well system contains wells in multiple aquifers, provide a map for each aquifer and the well(s) screened in that aquifer.

2. Table of wells that lists the LSGCD Well ID Number, Water System Well Number, aquifer, well horsepower, maximum production rate (gpm) and anticipated annual production volume from each well.

3. Interference Analysis

(a) Provide quantitative analysis that shows the projected impacts from the existing water system well(s) NOTE: Applicant is advised to work with District Staff to settle on proposed production volume and aquifer prior to performing the analysis.

(b) The maximum pumping capacity shown on the Application for Well Registration should be used as the production rate for the existing water system well(s) 24-hour and maximum production well simulations. For water system well(s) simulations, the simulated pumping rate of each permitted and registered water system well that is listed on the Application for Well Registration for water system wells that are completed in the same Aquifer of the District should be the maximum production rate for the 24-hour and maximum production well simulations; The maximum production simulation should simulate drawdown for the number of days required for the well(s) pumping at the maximum allowed rate (gpm) to reach the anticipated annual permitted volume of the water system well(s) for that aquifer. Potential simulated groundwater production rates for special case scenarios can be discussed with District Staff as needed.

(c) Identify at a minimum, all District registered and permitted wells based on the greater distance of the following: a 1/2-mile radius of the water system well(s) or the required well spacing radius of the aquifer based on the maximum production rate of the water system well(s); Upon request, the District will provide well location and available screened interval, total depth and aquifer information for the registered and permitted wells; Available well data from the Texas Water Development Board Groundwater Database and Submitted Driller's Report Database can be used to supplement the District well data.

(d) Aquifer parameters at the well site(s), including transmissivity, hydraulic conductivity and storativity based on the Texas Water Development Board (TWDB)'s Houston Area Groundwater Model (HAGM) for the aquifer or other site-specific data if available; A table should be included specifying the transmissivity, hydraulic conductivity and storativity used at each water system well location for the simulation(s) if multiple transmissivity, hydraulic conductivity and/or storativity values are used.

(e) Simulation results showing drawdown at 24 hours and for the maximum production scenario.

(f) Discussion of the methodology used for estimating drawdown, including software that was used, the assumptions and/or solution method employed.

(g) Illustration and/or maps showing the estimated drawdown contours from all water system well(s) for each aquifer.

4. For well systems, a brief discussion of the amount or degree of interference that each of the water system wells may exert on other system wells.

5. Discussion of the estimated 24-hour and maximum production scenario impacts on existing District registered and permitted wells based on the greater distance of the following: a 1/2-mile radius of the proposed well and water system wells or the required well spacing radius of the aquifer based on the maximum production rate of the water system well(s);

   (a) Results of the impact analysis should be presented in tabular form and include District well registration number, distance from the nearest water system well, well screened interval, well depth (total), aquifer, drawdown estimate at well based on water system well(s) pumping for 24 hours and the maximum production scenario

B. Hydrogeological Report for New Well(s) or Increased Maximum Production Rate per Well (prior to Drilling)

1. Confirm that well spacing complies with the Rules or that you are requesting an exception from spacing. If requesting an exception to spacing, also provide supporting documentation of impacts at the proposed spacing.

2. Anticipated specific details of well construction must include the following:

   (a) Schematic well construction diagram including completion (i.e., screened) intervals and screen diameter, filter pack setting (if applicable), casing diameter and setting, cemented intervals or other seals;

   (b) Lithologic description of geology anticipated during well drilling; and

   (c) Location: Provide map(s) showing location of property relative to county line and location of well relative to property boundaries and other relevant features.

3. Discussion of hydrogeologic setting must include the following:

   (a) Identification of aquifer: Applicant is advised to work with District Staff to properly identify the aquifer for the proposed well;

   (b) Surface and subsurface geology, including, as applicable, occurrence of any significant groundwater recharge features such as outcrop, surface water bodies, sinkholes, faults or other geologic features;

   (c) Depth interval of proposed water bearing zone; identify target production zone; and anticipated screen interval(s);

   (d) Anticipated thickness of water bearing zone and well screen(s);

   (e) Whether the target production zone is anticipated to be confined or unconfined;

   (f) Estimates of thickness of confining layer at well site location, if applicable;

   (g) Aquifer parameters at the well site, including transmissivity, hydraulic conductivity and storativity based on the Texas Water Development Board (TWDB)'s Houston Area Groundwater Model (HAGM) for the aquifer or other site-specific data if available; A table should be included specifying the transmissivity, hydraulic conductivity and storativity used at each water system well location for the simulations if multiple transmissivity, hydraulic conductivity and/or storativity values are used;

   (h) Identify at a minimum, all District registered and permitted wells based on the greater distance of the following: a 1/2-mile radius of the proposed well or the required well spacing radius of the aquifer based on the maximum production rate of the proposed well; Upon request, the District will provide well location and available screened interval, total depth and aquifer information for the registered and permitted wells; Available well data from the Texas Water Development Board Groundwater Database and Submitted Driller's Report Database can be used to supplement the District well data; and

   (i) Include streams or springs within a 1-mile radius.

4. Water Quality

(a) Discussion of known quality in the area based on literature, well reports.

5. Interference Analysis

(a) Provide quantitative analysis that shows the projected impacts from i) the proposed production from the well or well system (if applicable) and ii) the well or well system (if applicable) running 100% of the simulation periods. NOTE: Applicant is advised to work with District Staff to settle on proposed production volume and aquifer prior to performing the analysis.

(i) The maximum pumping capacity shown on the Application for Well Registration should be used as the production rate for the 24-hour and maximum production well simulations. For water system well simulations, the simulated pumping rate of each permitted and registered water system well that is listed on the Application for Well Registration for water system wells that are completed in the same Aquifer of the District as the proposed well should be the maximum production rate for the 24-hour and maximum production well simulations. The maximum production simulation should simulate drawdown for the number of days required for the well(s) pumping at maximum allowed rate (gpm) to reach the anticipated annual permitted volume of the well or system for that aquifer. Potential simulated groundwater production rates for special case scenarios can be discussed with District Staff as needed.

(ii) Simulation results showing drawdown at 24 hours and maximum production scenario.

(iii) Discussion of the methodology used for estimating drawdown, including software that was used, the assumptions and/or solution method employed.

(iv) Illustration and/or maps showing the estimated cone of depression; if there is more than one well in the group, two maps should be included demonstrating:

i. contours for impacts from pumping the proposed well only, and
ii. contours for impacts from all wells in the system.

(b) For well systems, a discussion of the amount or degree of interference that each of the system wells may exert on other system wells.

(c) Discussion of the estimated 24-hour and maximum production scenario well and water system well impacts on existing District registered and permitted wells based on the greater distance of the following: a 1/2-mile radius of the proposed well or the required well

spacing radius of the aquifer based on the maximum production rate of the proposed well and water system wells;

i. Results of the impact analysis should be presented in tabular form and include District well registration number, distance from the proposed well, well screened interval, well depth (total), aquifer, drawdown estimate at well based on proposed well pumping for 24 hours and the maximum production scenario and drawdown estimate at well based on proposed water system well(s) pumping for 24 hours and the maximum production scenario.

III. POST-DRILLING REQUIREMENTS FOR NEW WELLS

If available, the well owner shall provide the following information:

1. Geophysical logs required to be submitted upon completion of the well.
   (a) Geophysical logs to consist of a resistivity or induction curve and a spontaneous potential or gamma ray curve at a minimum.
   (b) Geophysical logs performed in the initial open-borehole are required and will consist of resistivity (self potential and gamma ray at a minimum).
   (c) Wells cased with PVC require induction and gamma ray logs.
   (d) All digital log files to be submitted in LAS format as well as printed.
2. All public water supply sampling completed in accordance with TCEQ/EPA requirements must be submitted to the District.
3. Digital or tabulated data of water levels measured during drawdown, specific capacity, or aquifer test; and an estimate of specific capacity and transmissivity from tests that were performed.
4. Table summarizing aquifer conditions and well and pump parameters, including: static water level (prior to pumping test), static water level measurement date, diameter of the screen and blank liner, depth to the top of the screen and blank liner, depth of the top of first well screen, total depth of the well, diameter of permanent pump and permanent pump setting;
5. Field parameters of specific conductivity, temperature and pH of measurements made during the drawdown or pumping test, or well sampling; and/or
6. Any laboratory analysis completed on samples collected from the well after construction and development.