

**PROFESSIONAL SERVICES
SUPPLEMENTAL AGREEMENT # 2
FOR
HYDROGEOLOGIC SERVICES AND TESTING**

STATE OF TEXAS §
 §
COUNTY OF TRAVIS §

FIRM: Thornhill Group, Inc. ("Consultant")

ADDRESS: 1104 S. Mays Street, Suite 208, Round Rock, Texas 78664

This Supplemental Agreement No. 2 to a contract for Professional Services is made by and between the City of Pflugerville, Texas, hereinafter called the "City" and Thornhill Group, Inc, hereinafter called the "Consultant".

WHEREAS, the City and Consultant executed an Agreement for Professional Services, hereinafter called the "Agreement", on the 23rd day of August, 2013 for the Hydrogeological Services and Testing project in the amount of \$132,700; and

WHEREAS, the City and Consultant executed a Supplemental Agreement #1 for Professional Services, on the 12th day of November, 2013 for the Hydrogeological Services and Testing project reducing the authorized project funding to \$73,500; and

WHEREAS, it has become necessary to amend the Agreement to modify the provisions for the Term of the Agreement, Scope of Services, and Work Schedule; and

NOW THEREFORE, premises considered, the City and the Consultant agree that said Agreement is amended as follows:

I.

Article II. Term shall be amended by changing the term of the Agreement to terminate on December 31, 2015.

Article III. Scope of Services, shall be amended as set forth in the attached addendum to the Scope of Services dated March 18, 2015.

Article III. Work Schedule shall be amended as set forth in the attached addendum to the Scope of Services dated March 18, 2015.

EXECUTED and **AGREED** to as of the dates indicated below.

**CITY OF
PFLUGERVILLE**

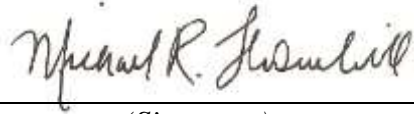
THORNHILL GROUP, INC.

(Signature)

Printed Name: Brandon E. Wade

Title: City Manager

Date: _____



(Signature)

Printed Name: **Michael R. Thornhill**

Title: **President**

Date: **March 31, 2015**

APPROVED AS TO FORM:

George Hyde
City Attorney
Denton Navarro Rocha Bernal Hyde & Zech, P.C.



THORNHILL GROUP, INC.

Professional Hydrogeologists • Water Resources Specialists

March 18, 2015

Mr. Thomas E. Word, Jr., P.E.
Assistant City Manager
City of Pflugerville
100 East Main Street
Pflugerville, TX 78691

Re: Proposal for Hydrogeologic Services for Well Testing and Evaluations —
City of Pflugerville, Travis County, Texas

Dear Mr. Word:

Per our recent discussions with you, Thornhill Group, Inc. (TGI) provides herein a proposed Scope of Services and associated Cost Estimate to provide professional services to assess the current conditions of the City of Pflugerville's (City) public supply water wells, Well No. 6 and Well No. 7. TGI understands the City needs a production of at least 3 million gallons per day (MGD), or approximately 1.5 MGD from each well. The work proposed herein includes tasks to determine if the City can obtain 3 MGD from the two existing wells in their current conditions, or if rehabilitation may be required to increase ground-water supply capacity. Specifically, the objectives of the proposed Work include:

- Removal of debris from well No 7, and conducting downhole videos of Well No. 6 and Well No. 7 to assess the producing intervals and rock openings in each well;
- Conducting production tests on Well No. 6 and Well No. 7 and utilizing nearby wells, if accessible (i.e., Well No. 5 and TWDB #58-35-626), as observation wells to effectively evaluate the wells for potential short-term and long-term pumping rates and potential increases in rates; and
- Preparing and submitting of a letter to the City regarding the current production conditions, the potential productivity, recommending options for rehabilitating the existing wells, deepening the open-hole portion of the existing wells, and/or options for drilling new wells, if needed.

SCOPE OF SERVICES

The following Scope of Services consists of six (6) tasks, some of which may be conducted concurrently to expedite completion.

Task 1 – Initial Site Visit

This task was conducted on March 11, 2015 and included a site visit to Well No. 6 and Well No. 7 to verify the type of pumping equipment, and evaluate the conditions and set up at each well head. Results from this task assisted in preparation of and obtaining cost estimates for subsequent tasks.

TGI Task 1 Cost Estimate – \$300

Task 2 – Down-Hole Video Inspection of Well No. 7

Task 2 involves contracting with a licensed water well driller and pump installer to pull the existing pump and motor, conduct a down-hole video survey, and properly reinstall the pumping equipment along with a 1½-inch PVC measuring tube. Specifically, work for this task will include:

- Coordinating with the City and the selected water well contractor an opportune time to take Well No. 7 offline for a period of at least 24 hours;
- Observing the down-hole video surveying of the well and obtaining copies of the video for in-house review; and,
- Ensuring the pump and motor equipment are reinstalled as needed (e.g. flow meter, valve, and portal to measure water levels) to subsequently conduct pumping tests.

The information derived from Task 2 will be utilized in subsequent tasks for developing accurate and reliable determinations and recommendations.

TGI Task 2 Cost Estimate – \$800

Drilling Contractor Task 2 Cost Estimate – \$12,000

Task 3 – Removal of Debris from Well No. 6

Removal of the debris from Well No. 6 involves “fishing” for the debris, then running a camera survey to check progress and continue “fishing” as needed. It is important to note that this could take several days and the timeframe is unknown; however, TGI will work with the City to minimize cost and conduct the work as economically and expeditiously as possible. The Contractor fishing the debris out of the well will only proceed as directed by the City or an authorized representative of the City. For cost estimate purposes, TGI assumes two days of labor by the Drilling Contractor.

TGI Task 3 Cost Estimate – \$800

Drilling Contractor Task 3 Cost Estimate – \$25,000

Task 4 – Well No. 6 and Well No. 7 Pumping Tests

This task includes conducting pumping tests on Well No. 6 and Well No. 7 and utilizing nearby wells, if accessible (i.e., Well No. 5 and TWDB #58-35-626), as observation wells. Specifically, this task will include the following work:

- Coordinating with the City regarding scheduling pumping tests for Well No. 6 and Well No. 7 on separate days. The testing will include the following:
 - Turning the pump off for a period of at least 12-hours prior to conducting the test to allow for aquifer water levels to return to static levels, and to measure water-level trends;
 - Conducting a constant-rate pumping test for a continuous period (e.g., 6 to 8 hours); and,
 - Measuring recovery after pumps are turned off (e.g., 2 to 4 hours) where water levels will be allowed to return to approximately pre-pumping water level.
- During testing, monitoring water levels at selected intervals utilizing manual e-line and an automatic data logger (i.e., pressure transducer).
- If accessible, monitoring water levels at nearby observation (non-pumping) wells during the pumping and recovery periods of the test utilizing manual and automatic data logging equipment;
- Monitoring field water-quality parameters (e.g., specific conductance, pH, temperature, turbidity, and suspended solids) throughout each test; and,
- Collecting and delivering water samples to a qualified laboratory for analysis of water quality, particularly analyzing for parameters relating to potable or public drinking water supplies.

Results from short-term testing will provide TGI with important well parameters to effectively determine the potential short-term and long-term pumping rates and potential increases in rates for each well.

TGI Task 4 Cost Estimate — \$2,400

Lab Task 4 Cost Estimate – \$1,000

Task 5 – Well Production Evaluation and Potential Capacities

Task 5 includes analyzing the data collected from previous tasks to assess the current conditions and potential capacities of the City's Well No. 6 and Well No. 7. Specifically, this task will include the following:

- Evaluating the down-hole video survey of Well No. 7 to verify and assess the well completion, the geology down hole, and the depths of producing intervals;

- Re-evaluating the down-hole video survey of Well No. 6 to verify the debris was successfully removed and verify the total depth of the well and current down hole conditions;
- Analyzing production characteristics of each well including specific capacity, well efficiency, and suspended solids;
- Assessing production intervals, well completion, well performance and long-term water-level fluctuations to estimate optimal and maximum short-term and long-term pump rates for each well.
- Analyzing apparent water quality changes, if any, during the production tests and identifying potential changes that may occur because of future pumping demands from the Edwards aquifer.

Results from this task will be utilized in Task 6 reporting and providing recommendations on the viability of obtaining 3 MGD from Well No. 6 and Well No. 7.

TGI Task 5 Cost Estimate – \$7,500

Task 6 – Reports and Meetings

TGI will compile the information collected from previous tasks into letter report summarizing the results of the City's existing wells and verify if the wells can produce a total of 3 MGD and, if warranted, recommend options to the City for rehabilitating the existing wells, deepening the open-hole portion of the existing wells, installing production liners, and/or options for drilling new wells, if needed. For cost estimate purposes, this task assumes one (1) meeting with the City to discuss the results.

TGI Task 6 Cost Estimate – \$5,000

COST ESTIMATE

TGI's estimated total cost for the work as described above is \$17,300. TGI fees and costs will be determined by actual working hours and direct expenses associated with completing the work tasks outlined above and are based on the attached Standard Fee Schedule (Attachment A) and Equipment Fee Schedule (Attachment B). Invoices are payable upon receipt.

TGI obtained preliminary cost estimates from licensed water well contractors for pulling the pump, video surveying, and reinstalling the pump at each well. TGI also obtained cost estimates for removal of debris from Well No. 6. The additional cost of a Drilling Contractor for these services could range from \$30,000 to \$40,000. In the event that TGI should identify additional work items necessary to effectively and successfully complete the project, TGI will provide written recommendations and associated costs. Such additional work will only be conducted with specific verbal or written approval from the City.

SCHEDULE

Once authorized, we anticipate being able to begin work immediately. Conducting downhole videos of the wells can begin at the City's discretion. TGI will work with the City to coordinate pulling of the pump and video logging and conducting testing at Well No. 6 and Well No. 7. The primary factors dictating the scheduling and completion of the work will be the availability of the licensed water well contractor. We anticipate that the Work described in this Proposal could be completed in 60 to 90 days, depending on access to wells and contractor availability.

AUTHORIZATION

If the included Cost Estimate and Schedule are acceptable, please authorize work in the space provided below and return a copy to us via facsimile to (512) 244-1461 or by mail. Upon receipt of an executed copy, we will proceed with the work as described.

We very much appreciate the opportunity to provide you this Cost Estimate and look forward to assisting you with this project.

If you have any questions, please call.

Sincerely,
THORNHILL GROUP, INC.



Michael R. Thornhill, P.G.
President

Attachments

APPROVED:

(Client Signature)

(Title)

(Printed Name)

(Date)

**STANDARD FEES FOR PROFESSIONAL SERVICES
BY THORNHILL GROUP, INC.**

Fees for professional services provided by Thornhill Group, Inc. are based on the actual and direct time of personnel on the project at the following hourly rates:

Principal	\$ 240
Project Manager	\$ 185
Technical Staff 3	\$ 145
Technical Staff 2	\$ 125
Technical Staff 1	\$ 110
GIS Staff	\$ 90
Graphics Staff	\$ 80
Field Technician	\$ 70
Clerical Staff	\$ 50

Reimbursement for actual expenses incurred that are directly related to work and performance on the project are billed per the following:

- a. for reproductions by graphics department, charges equivalent to commercial rates for similar commercial services.
- b. for transportation in company or personal vehicles, mileage will be billed at the current IRS approved rate per mile.
- c. for use of company field equipment, including but not limited to steel tapes, electric lines, conductivity, pH and turbidity meters, computers, data recorders, transducers and air monitoring equipment, charges are equivalent to commercial rates for similar equipment rentals.
- d. for all other expenses, including but not limited to reproduction, transportation, meals, lodging, parking, taxi fares, vehicle rentals, airfare, long distance telephone calls, printing, maps, photographs, field supplies, equipment rental, shipping, drilling contracting, laboratory costs, charges will be based on the actual invoice costs.

Invoices are payable upon receipt, and accounts unpaid more than 30 days after the billing date are subject to interest.

**STANDARD FEES FOR FIELD EQUIPMENT PROVIDED
BY THORNHILL GROUP, INC.**

Fees for use of company field equipment provided by Thornhill Group, Inc. are based on actual daily usage in the field, at the following rates:

<u>EQUIPMENT</u>	<u>Daily</u>	<u>Weekly</u>	<u>Monthly</u>
Field Vehicle	\$50.00	\$150.00	\$450.00
Data Recorders	\$25.00	\$75.00	\$225.00
E-Line	\$20.00	\$60.00	\$180.00
Conductance Meter	\$15.00	\$45.00	\$135.00
pH Meter	\$15.00	\$45.00	\$135.00
ORP Meter	\$15.00	\$45.00	\$135.00
DO Meter	\$25.00	\$90.00	\$300.00