

# LEGGETTE, BRASHEARS & GRAHAM, INC.

## PROFESSIONAL GROUNDWATER AND ENVIRONMENTAL ENGINEERING SERVICES

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4 RESEARCH DRIVE, SUITE 204  
SHELTON, CT 06484  
(203) 929-8555  
FAX (203) 926-9140  
[www.lbgweb.com](http://www.lbgweb.com)

June 20, 2017

Mr. Edward Balicki  
Chief Operator, City of Beacon  
1 Municipal Plaza, Suite 1  
Beacon, NY 12508

### *Via Electronic Transmission*

RE: Bedrock Well Drilling on Existing Water  
Treatment Plant Property  
Beacon, New York

Dear Mr. Balicki:

The following is a summary of the bedrock well drilling work completed on the existing Water Treatment Plant property on Liberty Street. The Water Treatment Plant property was identified as a target parcel for drilling because the underlying bedrock geology appeared favorable to produce high-yielding wells. Existing geologic map information and bedrock outcrops in the area indicated that the underlying bedrock types in the region were shales and limestone and there was a bedrock contact and inactive fault mapped close to the Water Treatment Plant property, all of which are favorable geologic features for targeting high-yielding bedrock wells. The Water Treatment Plant property was also an economically favorable alternative for conducting bedrock groundwater exploration because the municipality already owns the property, which eliminated the need to obtain property access rights from a third-party owner, and the close proximity of the existing treatment facility also would result in a significantly lower cost to connect the new well to the system compared to a well drilled at a more remote location.

Site layout information was obtained from drawings provided to LBG from the City. Using these drawings and some additional survey work conducted by Lanc & Tully Engineering, a site survey was prepared for use in obtaining well site approval from the Dutchess County Department of Health (DCDH) for the proposed test well location. Based on the completed site survey, Leggette, Brashears & Graham, Inc. (LBG) was only able to site one well on the treatment plant property that met all of the minimum offset distance requirements listed in the New York State Sanitary Code Part 5, Subpart 5-1, Appendix 5D.

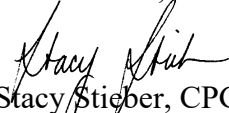
Once the DCDH issued well site approval, Turnbull Drilling, Inc. was contracted to complete the well. The well was drilled using 8-inch diameter casing. Bedrock was encountered at approximately 12 feet below grade (ft bg) and the 8-inch diameter well casing was set to a depth of 100 ft bg. The bedrock encountered below the surface was limestone from 12 ft bg

down to about 125 ft bg. At 125 ft bg the rock type changed to a granitic rock type. This granitic rock continued from 125 ft bg down to 500 ft bg. At 500 ft bg the bedrock turned into shale, and the shale bedrock continued down to the well's final depth of 625 ft bg. No significant water-bearing fractures were encountered any of the bedrock formations (limestone, granitic rock or shale) and the contacts between the rock types did not yield any significant water. The estimated yield of the well at completion was about 5 gallons per minute (gpm).

At this time, the completion of a 72-hour pumping test is not warranted because the well did not produce sufficient yield to pursue as a potable water-supply well. Based on the current options available, LBG is recommending that groundwater exploration at the Pump Road Road parcel be pursued. The June 10, 2016 work scope describing the proposed groundwater exploration on the parcel is attached.

Very truly yours,

LEGGETTE, BRASHEARS & GRAHAM, INC.

  
Stacy Stieber, CPG  
Associate/Hydrogeologist

Affirmed by:



Thomas P. Cusack, CPG  
Senior Vice President

SS:nv

Attachment

H:\City of Beacon\2017\Drilling Summary letter.doc

**ATTACHMENT**

# LEGGETTE, BRASHEARS & GRAHAM, INC.

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June 10, 2016

Mr. Edward Balicki  
Chief Operator, City of Beacon  
1 Municipal Plaza, Suite 1  
Beacon, NY 12508

### *Via Electronic Transmission*

RE: Sand and Gravel Aquifer  
Groundwater Exploration Program  
Beacon, New York

Dear Mr. Balicki:

Leggette, Brashears & Graham, Inc. (LBG) is pleased to provide you this work scope and cost estimate for the completion of a sand and gravel aquifer groundwater exploration program to develop additional groundwater sources for the City of Beacon, New York. Groundwater exploration of the sand and gravel aquifer underlying the Pump House Road parcel is proposed to assess the yield potential of the aquifer. Small diameter test borings using the drive and wash drilling method will be completed to assess the depth of the formation, the saturated thickness, and the coarseness and stratigraphy of the aquifer material. If suitable sand and gravel is encountered, small diameter test wells will be installed in the borings and short-term yield tests conducted to estimate aquifer parameters and the potential yield of a full-scale sand and gravel production well. In addition to the groundwater exploration, LBG will evaluate the existing water distribution pipe system from the existing bedrock Wells 1 and 2 to determine whether pipe size restriction (or friction loss) may be the cause of the reduction in yield which occurs when Wells 1 and 2 are pumped concurrently. This pipe size restriction evaluation can be completed at no additional cost to the City of Beacon.

LBG will begin by selecting test boring drilling locations based on New York State Department of Health (NYSDOH) well siting requirements and the presence of potential wetland and flood plain features on the site. For this proposal it is assumed that existing site maps will be sufficient to determine appropriate test well site locations and that clearing of access roads for the drill rig can be completed by the City of Beacon if needed.

The results of the sand and gravel groundwater exploration will be used to determine whether the property is suitable for sand and gravel production well development and provide the necessary information to assess the cost for construction, testing, and permitting of a full-sized sand and gravel production well. If the sand and gravel aquifer is not considered suitable, drilling additional bedrock wells is a favorable alternative. The cost for drilling and testing new bedrock wells on the Pump House Road property would be similar to those presented in LBG's June 10, 2016 proposal "Bedrock Well Drilling on Existing Water Treatment Plant Property".

### LBG Tasks

Assist in preparation of bid documents for selection of Well Drilling Contractor if needed; coordination of drilling activities with Well Drilling Contractor and City of Beacon, conduct site visit to stake test boring locations and determine access requirements.....\$1,500

Conduct oversight of drilling of 4 to 6 test borings and installation of up to 6 small-diameter test wells, oversight of short-term yield tests at two well locations (assumes 6 to 8 field days)..... \$4,000-\$5,500

Process data collected during drilling program, includes conducting sieve analyses on formation samples collected, processing water-level data from short-term yield tests, calculation of aquifer parameters and potential yield, and theoretical design of a full-sized sand and gravel production well..... \$2,000-\$2,500

LBG Total ..... \$7,500-\$9,500

### Subcontractor Tasks

Well Drilling Contractor:

Completion of 4 to 6 test borings to depth of 80 feet to 100 feet; installation of up to 6 small-diameter test wells; conduct short-term yield tests on two wells..... \$31,000-\$52,000<sup>1/</sup>

Subcontractor Total..... \$31,000-\$52,000

<sup>1/</sup> Prevailing wages have been used in generate estimate.....

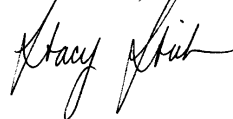
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**Total Cost Estimate..... \$38,500-\$61,500**

LBG can begin work immediately upon receipt of the signed Quick Start Contract.  
Should you have any questions, please do not hesitate to contact me directly at (475) 882-1723.

Very truly yours,

LEGGETTE, BRASHEARS & GRAHAM, INC.

A handwritten signature in black ink, appearing to read "Stacy Stieber", written over the company name.

Stacy Stieber, CPG  
Associate/Hydrogeologist

Affirmed by:

A handwritten signature in black ink, appearing to read "Thomas P. Cusack", written over the name and title.

Thomas P. Cusack, CPG  
Senior Vice President

SS:cmm

Enclosures

H:\PROPOSAL\2016\ (C) Beacon City-Sand, Gravel Aquifer.doc

## **ATTACHMENTS**

**The Stephen B. Church Company**  
**49 Great Hill Road**  
**Oxford, CT**  
*Since 1886*

May 24, 2016

E mail to Leggette, Brashears, and Graham  
Attention: Stacy Stieber  
Shelton, CT  
Phone 203-929-8555  
E-mail [SStieber@lbgct.com](mailto:SStieber@lbgct.com)

From Jim Duncan  
The Stephen B Church Co  
Oxford, CT  
Phone 203-888-2132  
E-mail [stephenbch@aol.com](mailto:stephenbch@aol.com)

Re: Test Well Drilling – Beacon, NY

Dear Stacy –

With this e mail, we wish to provide you with our proposal for test well drilling in Beacon, New York.

We understand that you would like four test wells drilled to depths estimated at 80 to 100 feet, with up to two adjacent sister wells. We also understand that you would like one or two pump tests of six hours duration after the completion of the drilling.

We propose to do this work on a time and materials basis with a drive and wash rig. We normally use a three man crew for this work. The drilling sites need to be level, clear, and accessible to truck mounted equipment. We also need a source of water within 200 feet of the drilling locations for our use during the field operation.

Unit prices and estimated quantities are as follows:

Mobilization	1	lump sum at	600.00	each
Rig and crew	6 to 10	days at	3650.00	per day
Extra heavy pipe	300 to 540	feet at	26.00	per foot
5 foot screens	4 to 12	each at	150.00	each
Drive shoes	4 to 6	each at	40.00	each



The estimated cost for the field work is \$31,000 to \$52,200. Prices quoted do not include the use of a water truck. A water truck can be provided for an additional \$250 per day.

We would ask for a site plan with the well sites marked. We would also ask the owner to secure proper underground utility clearance before starting this work.

We assume that we would be required to pay prevailing wages. Prices quoted include our standard insurance coverage.

Thank you for asking us to quote on this project. If you have any questions, please feel free to call.

Very truly yours,

*Jim Duncan*

# QUICK START CONTRACT

This agreement for the performance of services is entered into this 10<sup>th</sup> day of June, 2016, by and between Leggette, Brashears & Graham, Inc. (LBG) and City of Beacon (Client). Subject to the contract terms printed on the reverse side of this form, LBG's standard fee schedule and the annexed proposal or scope of work. In the event of a conflict between the standard contract terms or fee schedule and any attached proposal or scope of work, terms of the proposal or scope shall govern.

## CLIENT

**Name:** Mr. Edward Balicki  
**Company:** City of Beacon  
**Address:** 1 Municipal Plaza, Suite 1  
**City/State/Zip:** Beacon, NY 12508

## CLIENT CONTACTS

**Reporting:** Mr. Edward Balicki  
**Site Conditions:** Mr. Edward Balicki

## BILLING INFORMATION

**Name:** Mr. Edward Balicki  
**Company:** City of Beacon  
**Address:** 1 Municipal Plaza, Suite 1  
**City/State/Zip:** Beacon, NY 12508

**Project Location:** **Street:** \_\_\_\_\_ **City:** Beacon **State:** NY  
**Proposal/Scope Date and Reference No.:** June 10, 2016 **#Pages Attached:** 3

**Brief Statement of Services:** Sand and gravel aquifer exploration on Pump House Road parcel.

**Anticipated Start Date:** To be determined **Anticipated Completion Date:** To be determined  
**Preliminary Cost Estimate:** \$7,500-\$9,500 (LBG Costs Only)

**LBG Office Location:** Shelton, CT **Project Representative:** Stacy Stieber  
**Principal-in-Charge:** Thomas P. Cusack  
**Retainer:** Waived

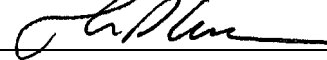

Client hereby engages LBG to perform the services described and referred to herein and agrees to pay LBG for such services, and acknowledges that the terms of this agreement are subject to LBG's standard contract terms and all attached and referenced material and documents. Unless otherwise provided in the attached proposal or scope: (1) inclusion of anticipated "start" and "completion" dates shall not be construed to impose a "time is of the essence" requirement; and (2) any preliminary cost estimate shall not be construed as a "flat-fee" or "not-to-exceed" amount. In consideration of the foregoing, LBG agrees to perform the services described and referenced herein.

**CITY OF BEACON**

**LEGGETTE, BRASHEARS & GRAHAM, INC.**

**CLIENT**

**By: (signature)** \_\_\_\_\_  
**(printed)** \_\_\_\_\_  
**Title:** \_\_\_\_\_  
**Date:** \_\_\_\_\_  
**Witness:** \_\_\_\_\_

**By: (signature)**   
**(printed)** Thomas P. Cusack  
**Title:** Senior Vice President  
**Date:** June 10, 2016  
**Witness:** 

## **GENERAL TERMS AND CONDITIONS**

### **FEE PAYMENT**

- 1) LBG will submit invoices to Client monthly following any month of significant activity, and a final invoice upon completion of services. Invoices will show charges based on current LBG Fee Schedules or other agreed-upon basis, and will include a detailed separation of charges and supporting information.
- 2) Payment is due upon receipt of invoice. On accounts past due by forty-five (45) days, Client will pay a finance charge of 1.25 percent per month dating from the invoice date.
- 3) In the event Client requires expert-witness testimony, Client will pay LBG all past due balances before LBG will proceed to prepare for or offer testimony.
- 4) Client will pay the balance stated on the invoice unless Client notifies LBG of the particular item that is alleged to be incorrect within fifteen (15) days from the invoice date. Client will remit the balance of undisputed items in a timely manner while a disputed item is being reviewed.
- 5) In the event Client fails to pay LBG within forty-five (45) days following invoice date, LBG may consider the default a breach of the consulting agreement and all duties of LBG may be suspended or terminated, and work product may be withheld, without liability of any kind to LBG.

### **OWNERSHIP OF DOCUMENTS AND CONFIDENTIALITY**

- 1) All reports, field data and notes, laboratory test data, calculations, estimates, and other documents prepared in the course of consulting service shall remain the property of LBG. Client agrees that all reports and other work LBG furnished to Client or Client's agents which are not paid for, will be returned upon demand and will not be used for any purpose whatsoever.
- 2) Documents provided to LBG by Client will be returned to Client, upon request, at the completion of work at Client's cost.
- 3) Reuse of reports or other materials by Client or others on extensions or modifications of the project or on other sites, without written permission from LBG or adaptation by LBG for the specific purpose intended, shall be at the user's sole risk, without liability on the part of LBG, and Client agrees to indemnify and hold LBG harmless from all claims, damages and expenses, including attorney's fees.
- 4) LBG shall maintain Client's project data and reports in strictest confidence, and will release such information to others only upon express written permission from Client.

### **DISPUTES**

- 1) Client will pay all reasonable collection expenses or litigation fees, including attorney fees, that LBG incurs in collecting any delinquent amount Client owes.
- 2) If the Client institutes a suit against LBG which is dismissed or for which judgement is rendered for LBG, Client will pay LBG for all costs of defense including attorney fees, expert witness fees and court costs.

### **INSURANCE AND INDEMNIFICATION**

- 1) LBG will carry Workers Compensation, General Liability, Automobile Liability, Excess Umbrella-Form Liability and Professional Liability insurance policies in amounts which LBG considers adequate. Certificates of insurance will be provided to Client upon request. Within the terms and conditions of the insurance, LBG agrees to indemnify Client against loss caused by actions of LBG, its employees or its subcontractors. LBG will not be responsible for liability beyond the limits and conditions of the insurance. At Client's request, LBG will seek additional insurance coverages or coverage limits for specific projects, and will bill Client for the additional premium cost. LBG will require that its field subcontractors are insured to the same levels required of LBG by Client.
- 2) LBG's professional liability will be limited to the value of the consulting services performed.
- 3) LBG will not be responsible for any loss or liability from negligence by Client or by other agents, contractors or consultants employed by Client or from negligence by any person for whose conduct we are not legally responsible.

### **TEST BORINGS AND OTHER EXPLORATIONS**

- 1) To drill test borings or perform other explorations, LBG may engage a contractor experienced in this work. The Contractor's invoices plus a fifteen (15) percent service charge will be added to LBG's invoice. On occasion, LBG engages the specialized services of individual consultants or other companies to participate in a project. When considered necessary, these firms or other consultants will be used with Client's approval. The cost of such services plus a fifteen (15) percent service charge will be included in our invoice. Such specialists will be wholly responsible for their work product.

- 2) Alternatively, at Client's request, LBG will recommend contractor(s) or specialist(s) for Client to enter into direct contract(s) with. In that event, invoices for these outside services will be mailed to Client for direct payment to the contractor(s). LBG review and approval of each invoice will be provided on request. Under either alternative, LBG does not guarantee and is not responsible for the performance of the contractor(s) or the accuracy of their results.

### **GEOPHYSICAL AND GEOCHEMICAL INSTRUMENTATION SERVICES**

LBG is equipped to provide specialized geophysical and geochemical instrumentation services according to project needs. Fees for these equipment services will be based on use charges at standard rates published by LBG plus fees for consulting services.

### **CUSTODY OF MATERIALS**

- 1) In the course of work, LBG may take custody of and transport soil and/or water samples from Client's site. Upon the completion of evaluation and/or testing of such samples, LBG reserves the right to return the samples to Client at Client's expense, and Client agrees to accept such samples and the responsibility for their proper and legal disposal.
- 2) At no time, under any circumstances, will LBG personnel represent LBG or themselves as generators of waste, hazardous or otherwise, which may have to be removed from or disposed of on a site, and LBG personnel will not sign hazardous waste manifests on behalf of Client.

### **RIGHT OF ENTRY**

Client will furnish right-of-entry on the site for LBG to conduct the work. LBG will take reasonable precautions to minimize damage to the land from use of equipment, but has not included in the fee the cost for restoration of damage that may result from site operations. If LBG is required to restore the land to its former condition, this will be arranged and the cost plus fifteen (15) percent will be added to our fee.

### **DAMAGE TO SUBSURFACE STRUCTURES**

Reasonable care will be exercised in locating subsurface structures in the vicinity of proposed subsurface explorations. This will include contact with the local agency coordinating subsurface utility information (i.e., "Call Before You Dig" service) and a review of plans provided by Client for the site to be investigated. LBG shall rely upon any information provided by Client or Client's agent or representative. If the locations of underground structures are not known accurately or cannot be confirmed, then there will be a degree of risk to Client associated with conducting the work. In the absence of confirmed underground structure locations, Client agrees to accept the risk of damage and possible costs associated with repair and restoration of damage resulting from the exploration work.

### **PETROLEUM PRODUCTS AND HAZARDOUS MATERIALS**

- 1) Petroleum products, hazardous materials, or asbestos may exist at a site where there is no reason to believe they should be present. If, at any time, evidence of the existence or possible existence of such substances is discovered, LBG reserves the right to renegotiate any consulting agreement, the fees for our services and our continued involvement in the project. LBG will notify Client as soon as possible should unanticipated hazardous materials or suspected hazardous materials be discovered.
- 2) The discovery of hazardous materials or suspected hazardous materials may make it necessary for LBG to take immediate measures to protect human health and safety and/or the environment. Client agrees to compensate LBG for the cost of any and all measures that, in our professional onsite judgment are justified to preserve and protect the health and safety of our personnel, Client's employees and/or the public, and/or the environment. In addition, Client waives any claims against LBG and, to the full extent permitted by law, agrees to indemnify, defend and hold LBG harmless from any and all claims, damages and liability, including but not limited to cost of defense, in any way connected with petroleum products, hazardous materials or asbestos.

### **STANDARD OF CARE**

In accepting our proposal for consulting services, Client acknowledges the inherent risks associated with any subsurface investigation. In performing professional services, LBG will use that degree of care and skill ordinarily exercised under similar circumstances by members of the profession practicing in the same or similar localities. LBG makes no express or implied warranty beyond our commitment to conform to this high standard of professional practice.

# **LEGGETTE, BRASHEARS & GRAHAM, INC.**

## **PROFESSIONAL GROUNDWATER AND ENVIRONMENTAL ENGINEERING SERVICES**

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### **2016 FEE SCHEDULE FOR CONSULTING SERVICES**

<b>Senior Vice President</b>	<b>\$235/hour</b>
<b>Vice President/Principal</b>	<b>\$235/hour</b>
<b>Associate Vice President</b>	<b>\$225/hour</b>
<b>Senior Consultant</b>	<b>\$235/hour</b>
<b>Senior Associate</b>	<b>\$185/hour</b>
<b>Associate</b>	<b>\$130 to \$162/hour</b>
<b>Senior Environmental Engineer</b>	<b>\$153/hour</b>
<b>Senior Hydrogeologist/Environmental Scientists</b>	<b>\$112/hour</b>
<b>Environmental Engineer II</b>	<b>\$93/hour</b>
<b>Hydrogeologist II/Environmental Scientist II</b>	<b>\$87/hour</b>
<b>Environmental Engineer I</b>	<b>\$80/hour</b>
<b>Hydrogeologist I/Environmental Scientist I</b>	<b>\$76/hour</b>
<b>Senior Technician</b>	<b>\$75/hour</b>
<b>Technician</b>	<b>\$70/hour</b>
<b>CAD Operator/Draftsperson</b>	<b>\$95/hour</b>
<b>Clerical</b>	<b>\$75/hour</b>

We require reimbursement for actual expenses incurred, including computer time. The use of personal cars in the field would be billed at the IRS approved rate per mile. An administrative charge of 5-percent is affixed to actual expenses and 15-percent for subcontractors. A 2-percent charge on services will be included to cover telephone, facsimile and in-house printing costs.

Invoices are payable upon receipt; accounts unpaid more than 45 days after the billing date are subject to 1.25-percent interest per month (15-percent annual rate) from the invoice date.

Fees for pretrial conferences and expert-witness testimony are as quoted above, with no premium fees.

**LEGGETTE, BRASHEARS & GRAHAM, INC.**  
**2016 FEE SCHEDULE FOR EQUIPMENT USE**

<b><u>ITEM</u></b>		<b><u>DAILY RATE*</u></b>
<b>INSTRUMENTATION</b>		
Turbidity meter .....	\$	35
Conductivity meter .....	\$	20
pH meter .....	\$	20
Conductivity/pH meter .....	\$	35
Dissolved oxygen meter .....	\$	50
Flow-Through Cell .....	\$	150
Photoionization detector .....	\$	100
Flame ionization detector .....	\$	120 Combustible gas
(LEL)/oxygen meter .....	\$	60
Gas detector tube system .....	\$	16
Oil/water interface tape .....	\$	65
Electric water-level indicator .....	\$	35
Multi-Channel Data logger .....	\$	75
Transducers .....	\$	30 each
In-Well Data logger/Tranducer .....	\$	90
Barotroll .....	\$	90
Surveying Equipment .....	\$	100
Air velocity meter .....	\$	80
Magnehelic gauges .....	\$	20
GPS Receiver (Trimble) .....	\$	150
Trimble Transducer Connection .....	\$	50
Trimble GPS/Transducer Connection .....	\$	200
Timble External Antenna .....	\$	75
Laptop Computer Transducer Connection .....	\$	50
Dust Monitor .....	\$	110
PID/LEL/02 meter .....	\$	100/day; 300/week
<b>SAMPLING EQUIPMENT</b>		
Two-inch air or electric submersible pumps .....	\$	115
Four-inch submersible pump .....	\$	75
Powered suction pump .....	\$	50
Peristaltic pump .....	\$	30
Hand-operated suction pump .....	\$	15
Teflon or stainless-steel bailers .....	\$	10 each
Manually operated soil/sediment sampling equipment (hand augers, sludge samplers) .....	\$	25
Soil vapor sampling equipment (probes, slide hammer) (consumable items additional) .....	\$	30
<b>GEOPHYSICAL EQUIPMENT</b>		
Electromagnetic terrain conductivity (EM-31) instrument and recorder .....	\$	100
Very low frequency electromagnetic receiver .....	\$	100
Signal-enhancement single channel seismograph .....	\$	50
Downhole video logger .....	\$	500
Borehole geophysical logger .....	\$	400
Magnetic cable indicator .....	\$	45
Metal detector .....	\$	20
<b>MISCELLANEOUS</b>		
Digital Camera .....	\$	15
Generator .....	\$	75
Rotary hammer drill .....	\$	60
Sediment gradation or hydrometer equipment .....	\$	10/sample
Van or truck for transport of equipment .....	\$	25/day + 0.65/mile
Jon Boat .....	\$	75/day
Laptop Computer Use In Field .....	\$	35/day

- Consumable materials (disposable bailers, filters, tubing, etc.) at cost.

Other specialty equipment by quote.

WEEKLY RATE IS THREE TIMES DAILY RATE, MONTHLY RATE IS THREE TIMES WEEKLY RATE.