

June 25, 2015

City of Camas
616 NE Fourth Avenue
Camas, WA 98607

Attn: Mr. Steve Wall

Re: Hydrogeologic Support Services

Dear Steve:

This letter provide a scope of work and cost estimate to provide the City with on-going technical assistance for managing your water supply sources as well as planning for new source development to meet continuing growth targets.

SCOPE OF WORK

Task 1 - Maintenance of Surface Water and Groundwater Monitoring Stations

Activities to include:

- Servicing data loggers that are used to capture groundwater level information in the Washougal River wellfield area and surface water data from the Washougal River stage gage
- Relocation of the Washougal River gage from the north side of the footbridge to the south side which is more stable location for data capture and better suited to monitor low flow conditions (see Attachment 1 – River Measurements)
- Periodic reduction and analysis of monitoring data

Task 2 - Hydrogeologic Support Service

Hydrogeologic support services may include:

- Assessment of wellfield performance and providing input when needed to asses question on drought conditions and other factors that might arise.
- Assistance with regulatory questions
- Responding to water right purchase opportunities
- Addressing question related to potential environmental threats to the supply sources
- Assistance with Water System Plan development
- Assistance with new source development

Task 3 - Management and Meetings

PGG's Project Manager will prepare and document invoices, manage staff resources and the project schedule, and communicate with City representatives regarding project logistics, schedule, and technical issues as the project unfolds. We will also attend meeting when needed to assist the City with strategic planning, permitting questions, negotiation of water right purchases, and technical issues.

PROJECT COST ESTIMATE

PGG estimates that the costs associated with the proposed scope of work will be **\$20,000**, including expenses. Cost estimate details are provided in Table 1, attached. Since specific details on the nature of our services cannot be explicitly defined at this time, the authorization should be considered as preliminary and subject to change depending on specific City requests for assistance.

Our costs will be invoiced monthly on a time-and-materials basis. In the event that unexpected information is encountered that appears to require additional work, PGG will bring them to your attention and seek your approval for any added expenditures. Our professional services will be performed, our findings obtained, and our reports prepared in accordance with generally accepted hydrogeologic practices. This warranty is in lieu of all other warranties, either express or implied.

Please call if you should have any questions concerning the enclosed information.

Sincerely,

Pacific Groundwater Group



Dan Matlock

Principal Hydrogeologist

**Table 1 - Hydrogeologic Support Services - City of Camas
Pacific Groundwater Group**

JM9702.17

Task	Description	ESTIMATED HOURS					OTHER COSTS ¹			TOTAL TASK COST
		Support \$60	Permit Specialist \$125	GIS \$110	Principal \$150	Labor Cost	Direct Costs	Mileage	Sub- RM	
1	Maintenance of Surface Water and Groundwater Monitoring Stations				16	\$ 2,400.00		300.00	10,740.00	\$ 13,440.00
2	Hydrogeologic Support Services		8		24	\$ 4,600.00				\$ 4,600.00
5	Project Management and Meetings	4	4		8	\$ 1,940.00	20.00			\$ 1,960.00
	Subtotal	4	12	0	48	\$8,940.00	\$20.00		\$10,740.00	\$20,000.00

Notes:

1) Includes 10% markup

Attachment A

**Proposal from River Measurements for Relocation and Maintenance of Washougal
River Gage**



Proposal
Lower Washougal River Stream Gage at Greenway Trail, at Camas, WA
Relocate Equipment to Improve Data Quality and
Operation and Maintenance for One Year

6/23/15

This cost estimate was prepared by River Measurement, a Division of WEST Consultants, Inc. for Pacific Groundwater Group. A description of work and associated costs are given for relocation of the gaging station and for operation and maintenance of the site.

Background

In 2008 WEST Consultants, Inc. installed a bubbler type stream gaging station at the Washougal River Greenway Trail footbridge crossing the Washougal River. The bubbler sensor continuously measures the water level (stage) of the river. Stage is measured at the streamward end of a 1-1/2" steel pipe that extends about 40 feet outward (south) into the river from the north bridge pier. Sediment deposits accumulate on the north side of the river and this has a negative impact on collection of stage data. The end of the pipe often becomes buried and the result is unreliable and at times unusable stage data. The lowest summer flows cannot be measured because water levels drop below the end of the pipe. Attempts to extend the bubbler pipe further out into the river from the north bank have had limited success and increasingly expose the pipe to damage from debris in the river at high flow.

At this time instrumentation for the stream gage is accessed by a catwalk under the bridge. There are locked gates at both ends. Protective conduit for the bubbler tubing is fastened to the north concrete bridge pier and extends out about 40 feet towards the low-water channel. There is a locked 30" x 36" steel electrical enclosure fastened to bridge supports. Bubbler tubing, protected by conduit runs from the enclosure, down through the open concrete pier, and out the bottom of the pier into the river.

A USGS type wire-weight gage is installed on the bridge catwalk directly above the end of the orifice pipe. It is used as a reference gage to validate water levels measured by the instrumentation. The wire-weight gage is used instead of staff gages.

Once the station is relocated it will require the same operation and maintenance procedures as before.

Recommendations

Task 1: Relocate stream gage from north side of river to south side of river.

WEST recommends moving the bubbler and wire-weight equipment to the south side of the river where the depths are the greatest and the channel remains free of gravel and sand bars. The electrical enclosure will be bolted to the concrete bridge abutment at the south end of the catwalk. Conduit for the bubbler tubing will be installed from the enclosure, down the abutment, and into the river. The steel conduit will be fastened to large boulders in the channel with the end of the conduit at an elevation low enough to measure all flows. The wire-weight gage will be moved to a location directly above the river end of the orifice conduit.

The same instrumentation, enclosure, and wire-weight gage will be used. Materials such as conduit, pipe fittings, and hardware will be reused when possible however some additional items will need to be purchased.

Cost for relocating equipment:

Materials	\$700
Services	<u>\$6,180</u>
Total for Task 1	\$6,780

Task 2: Routine operation and maintenance (1 year)

Regular visits to the tide gage will be made to ensure proper operation. Data will be downloaded, backed up at the office, and sent to the client upon request. Batteries will be changed to allow continued operation until the next visit. The elevation of the water surface will be read from the wire-weight gage and compared to data recorded by the data logger. Field notes will be taken to document site visit information.

The site will be visited at least 6 times to change batteries, download data, and check for problems. Stage data will be provided to the client upon request.

Cost for routine operation and maintenance (1 year)

Services	<u>\$2,884</u>
Total for Task 2	\$2,884

Washougal River Stream Gage at Greenway Trail Footbridge					
Task 1: Relocate stream gage from north side of river to south side of river					
No.	Item	Description	Unit Price	Qty.	Total Price
Materials					
1	Materials	Misc. hardware, plumbing, and electrical supplies	\$700.00	1	\$700
2	Services	Relocation of stream gaging station (\$103/hr)	\$103.00	60	\$6,180
		Task 1 Total for materials and services			\$6,880
Task 2: Operate and Maintain Stream Gaging Station for 12 months					
No.	Item	Description	Unit Price	Qty.	Total Price
1	Services	Operate and maintain stream gaging station, data management, 6 site visits, streamflow records (\$103/hr)	\$103.00	28	\$2,884
		Task 2 Total for services			\$2,884
TOTAL FOR TASK 1 AND TASK 2:					\$9,764

The total cost for this project including relocation and one year of operation and maintenance is not to exceed \$9,764.