



Scope of Work for Water Sampling

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Downstream Strategies herein presents three variations on our approach to conducting baseline water quality monitoring at residential drinking water wells and springs locations in Monroe County, West Virginia. Sample collection will be performed by Downstream Strategies staff in accordance with established standard operating procedures, which include a quality assurance/quality control program. Samples will be analyzed by an independent laboratory certified in West Virginia.

We present three sampling options: low cost, basic, and comprehensive. Cost savings can be accomplished if samples are collected for a group of landowners located within a close proximity of each other. For each sampling option, we provide a cost for a single landowner and a per landowner cost for a group of three landowners. Each proposed monitoring strategy shall consist of one monitoring event, to include either one residential well, one spring, or one surface water location per landowner, prior to pipeline construction to establish baseline water quality data.

We recommend that each landowner measures conductivity with a handheld meter routinely—at least once per week. Ideally, conductivity monitoring could begin as soon as possible to improve the data set over time. Additionally, qualitative observations (i.e. color, odor, clarity, sediment, and quantity) should be routinely documented.

The following sections describe the proposed baseline monitoring sampling approach, analytical suite, and cost estimates.

Morgantown Location

911 Greenbag Road
Morgantown, WV 26508
304.292.2450

Alderson Location

100 Railroad Avenue
Suite 200
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Interview. Staff will interview the landowners about the water resources and current/historical conditions on their property.

Water quality sampling. Downstream Strategies will perform field monitoring for water quality indicator parameters and collect water samples in clean bottles provided by the laboratory. These bottles will be transported to the laboratory within appropriate holding times and using approved methods. Chain of custody procedures will be utilized. Samples will be analyzed for the parameters listed in Table 1 below by a lab certified in West Virginia.

Quality assurance/quality control:

Field blank. One field blank will be collected for quality assurance/quality control during each sampling day. A field blank involves following the same protocols as collecting real samples in the field, but instead of filling bottles with well or surface water, we will fill the bottles with analyte-free water provided by the laboratory. These bottles are returned blind to the lab with the other samples and analyzed for total metals. Field blanks can help confirm the effectiveness of sample collection procedures and indicate the potential for sample contamination.

Duplicate. One duplicate sample will be collected on each day of sampling. To prepare a duplicate sample, a second sample will be prepared using well water at one site and following the same procedures as used for the original sample. The duplicate will be submitted blind to the laboratory and will provide information about the replicability of sampling procedures.

Trip blank. We will collect a single trip blank for quality assurance/quality control during each sampling event. Trip blanks are filled and provided by the laboratory and remain with the field samples and bottleware at all times. Trip blanks are used to determine whether contamination has occurred from the time the sample containers leave the laboratory until the time they are returned. Trip blanks are only analyzed for a select set of parameters known generally as volatiles. *(Basic and comprehensive options only.)*

Results. At the completion of the sampling event, results will be compiled into a concise summary report for each property owner presenting field documentation, equipment calibration, and lab results. Reports will include a summary table comparing sampling results with federal and state water quality standards, as applicable. We will also further discuss results with the client over the phone or at the Downstream Strategies office in Morgantown or Alderson, West Virginia. *(Basic and comprehensive options only.)*

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Project team. Two qualified Downstream Strategies staff will perform the water quality monitoring. Principal Marc Glass will oversee the project and participate in the discussion of results.

Timeline. After sampling is conducted, it will take approximately twenty business days to produce the final report; the exact timeline will depend on when lab results are provided to Downstream Strategies.

Sampling options with estimated budgets

Each cost estimate includes all labor, laboratory fees including QA/QC samples, travel costs, and expenses incurred by Downstream Strategies to perform the proposed monitoring event. This labor includes coordination with landowners, preparation with the lab, calibration of field equipment, travel, field sample and site data collection, delivery of bottles to the lab courier, preparation of reports, and a discussion of results with client.

Comprehensive option

Samples will be analyzed for the comprehensive list of analytes displayed in Table 1 below. Quality assurance/quality control measures will include a field blank, a duplicate, and a trip blank. Downstream Strategies staff will review results reports provided by the laboratory and compile a results report as described above. Additionally, Downstream Strategies staff will be available to discuss sampling results with the landowner.

Estimated budget for one landowner: \$2,780

Estimated budget per sample for a group of three landowners: \$1,995

Basic option

Samples will be analyzed for the basic list of analytes displayed in Table 1 below. Quality assurance/quality control measures will include a field blank, a duplicate, and a trip blank. Downstream Strategies staff will review results reports provided by the laboratory and compile a results report as described above. Additionally, Downstream Strategies staff will be available to discuss sampling results with the landowner.

Estimated budget for one landowner: \$1,325

Estimated budget per sample for a group of three landowners: \$1,106

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Minimalist indicator option

Samples will be analyzed for the minimalist indicator list of analytes displayed in Table 1 below. Quality assurance/quality control measures will include a field blank. Downstream Strategies staff will provide laboratory results directly to the client and will be available to discuss results at a rate of \$65/hour.

Estimated budget for one landowner: \$795

Estimated budget per sample for a group of three landowners: \$595

Each cost estimate assumes landowners will provide Downstream Strategies with property access agreements and contact information so we can efficiently plan for logistics in advance of each sampling event.

Due to laboratory costs incurred, we request a retainer. Should you wish to proceed, Downstream Strategies requests that we execute a standard contract for services with each landowner and receive payment for the project retainer at or prior to the first sampling event.

Should you wish to discuss or if you require further assistance, please do not hesitate to contact Marc Glass at (304) 292-2450 or Meghan Betcher at (304) 445-7200.

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Table 1: Analytical program

		Comprehensive	Basic	Minimalist indicator
Meter measurements	pH	X	X	X
	Specific conductivity	X	X	X
	Temperature	X	X	X
	Total dissolved solids	X	X	X
General chemistry	Turbidity	X	X	X
	Hardness	X		
	Total dissolved solids	X	X	X
Major ions	Chloride	X	X	X
	Sulfate	X	X	X
Nutrients and biologicals	Nitrate	X		X
	Fecal coliform	X	X	X
Metals	Aluminum	X		
	Antimony	X		
	Arsenic	X	X	X
	Barium	X		X
	Beryllium	X		
	Cadmium	X		
	Chromium	X	X	X
	Copper	X	X	
	Iron	X	X	
	Lead	X	X	X
	Manganese	X	X	
	Mercury	X	X	
	Nickel	X		
	Potassium	X	X	
	Selenium	X	X	X
Volatile organic compounds	Acrylonitrile	X		
	Benzene			
	Ethylbenzene			
	m,p-Xylene			
	Methyl tert-butyl ether			
	o-Xylene			
	tert-Butyl alcohol			
	Toluene			
	Xylenes, Total			

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		Comprehensive	Basic	Minimalist indicator
Semi-volatile organic compounds	2-Chloronaphthalene	X		
	2-Methylnaphthalene			
	Acenaphthene			
	Acenaphthylene			
	Anthracene			
	Benzo(a)anthracene			
	Benzo(a)pyrene			
	Benzo(b)fluoranthene			
	Benzo(g,h,i)perylene			
	Benzo(k)fluoranthene			
	Chrysene			
	Dibenzo(a,h)anthracene			
	Fluoranthene			
	Fluorene			
	Indeno(1,2,3-cd)pyrene			
	Naphthalene			
Phenanthrene				
Pyrene				
BTEX			X	
Pesticides		X		
Herbicides		X		
Explosives		X		

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