



December 12, 2017

Mr. Matt Breen  
Spokane International Airport  
9000 West Airport Drive  
Spokane, Washington 99219

Re: Monitoring Well Installation and Groundwater Monitoring for Perfluorinated Chemicals  
Spokane International Airport  
Spokane, Washington  
SIA Contract #17-43-9999-020-001-00  
AECOM Job No.:60557313

Dear Mr. Breen:

Attached are the results and supporting documentation for the recent, limited groundwater monitoring event for the perfluorinated chemicals, Perfluorooctanoic Acid (PFOA) and Perfluorooctane Sulfonic Acid (PFOS). This monitoring event was conducted per your request so that Spokane International Airport's (SIA) could ascertain if detectable levels of perfluorinated chemicals are present in shallow groundwater beneath the airport. Samples were collected from newly installed monitoring wells MW-13 and MW-14, and from existing well MW-5. MW-5 was added to the sampling program so as to provide a reference point when discussing analytical results.

Our scope of work for this project included the following tasks:

- Contracted and provided oversight for the installation of two additional monitoring wells with locations near the east property line of the Airport. Boring locations were screened for utilities by both public and private utility locate contractors. Monitoring wells were installed on November 2, 2017 by Geologic Drill, LLC, a Washington-licensed driller in accordance with applicable state regulations.
- Performed one limited groundwater monitoring and sampling event on November 8, 2017. Groundwater samples were collected from the two new downgradient monitoring wells MW-13 and MW-14 and from MW-5 (Figure 1).
- Groundwater samples were shipped to ALS Global Laboratories' (ALS) laboratory in Kelso, Washington for analysis. ALS is accredited by the Washington State Department of Ecology with the certification number C544. The samples were analyzed for PFOA and PFOS by USEPA Method 537M. Samples were submitted on a standard turnaround time of 15-business days. An AECOM project chemist reviewed the analytical data and no data usability issues were identified.
- Prepared this letter report presenting the results of the sampling event, compared the analytical results to national standards, and provided our conclusions and recommendations.

wells 1,3,5,8 sampled 5/23/17  
wells 5,13,14 sampled 11/8/17

Figure 1, dated 6/20/17  
Also includes well locations for 1,2,3,4,5,6,7,8,13,14  
w/ data collected out on 1,3,5,8,13,14  
No data for 2,4,6,7

Post-It® Fax Note 7671  
To: Matt Breen #13, 14

### Monitoring Well Installation

Two groundwater monitoring wells were installed on November 2, 2017. The locations of the wells were approved prior to installation by SIA personnel. Utility clearance was conducted through the public One Call system, with specific boring locations cleared by Advance Underground Utility Locating (AUUL) prior to bringing the driller on site. Monitoring wells were installed using 2-inch diameter poly-vinyl chloride screen and casing and were finished with aboveground steel monuments and protective bollards. Monitoring well locations are shown on Figure 1. Boring logs and construction information are included in Attachment A - Boring Logs.

2 new wells  
2017

### Groundwater Sampling

Depth to water in each well was measured to the nearest 1/100<sup>th</sup> of a foot prior to sampling. Groundwater samples were collected from each well using a peristaltic pump. The new wells were purged for approximately one hour prior to measuring field parameters. Purging and sampling using low-flow sampling techniques where flow rates were generally about 0.3 to 0.5 liters per minute (l/min). The purge rate was adjusted to minimize the drawdown of groundwater in the wells during purging.

Field parameters were measured with a Horiba-U52 water quality meter. Parameters include pH, conductivity, turbidity, dissolved oxygen (DO), temperature, and oxidation reduction potential (ORP). Once field parameters stabilized within 10% from reading to reading for each parameter, laboratory-prepared sample containers were filled with water from the wells, sealed and placed on ice pending next-day transport to the laboratory.

### Results

Groundwater levels measured in the monitoring wells on November 8, 2017 were noted at depths ranging from 6.90 to 10.00 feet bgs. Groundwater samples were collected from monitoring wells MW-5, MW-13 and MW-14. Monitoring well locations, depth to water and analytical results are shown on Figure 1.

MW-5 is an existing well and is located east, and down-gradient of the main infiltration area. MW-13 is located in an inferred down-gradient direction of MW-5. MW-13 is located in an area where drainages from 3-21 and Alpha Outfall's merge with a drainage located south of 3-21. This drainage captures flow from the southern-portion of the Airport which is serviced by Taxiway G and the associated Outfall.

MW-14 is located in what is inferred to be a system which is predominantly fed by flow from the Alpha Outfall. However, the hydrology is not well understood at this location and it is possible that some mixing with subsurface flow from 3-12 Outfall could be occurring.

Groundwater flow direction was not calculated for this event. Various studies have been conducted in support of the pending Stormwater Discharge Permit and each has concluded that the direction of flow for shallow groundwater across the site is generally northeasterly.

Each sample collected from the three monitoring wells had detections of PFOA/PFOS at levels

exceeding the screening level of 70 ng/L. The greatest concentrations are observed in samples collected from MW-14. The concentration of PFOA/PFOS observed in the sample collected from MW-13 was observed to be lower than the concentration observed in the sample collected from MW-5. This suggests that some mixing and/or dilution could be occurring as a result of inflow from the Taxiway G Outfall.

Each of these sample locations are subjected to stormwater collection and discharge from active portions of the Airport. As a result each sample contained concentrations of PFOA/PFOS at concentrations exceeding regulatory guidelines. Analytical results are shown on **Table 1** and the laboratory analytical report is included in **Attachment B – Analytical Results**.

#### **Summary**

The highest concentration of perfluorinated compounds was detected in the groundwater sample collected from MW-14. This well is predominantly downgradient of the 3-21 Outfall. Current and historic aviation practices within the capture zone of this outfall appear to have an impact on shallow groundwater quality downgradient of the Airport.

#### **Limitations**

The findings and conclusions documented in this report have been prepared for specific application to this project and have been developed in a manner consistent with the level of care and skill normally exercised by members of the environmental science profession currently practicing under similar conditions in the area and in general accordance with the terms and conditions set forth in our Agreement, and with the AECOM proposal dated October 6, 2017. No other warranty, express or implied, is made.

The findings presented in this report are based on conditions observed at specific site locations and sampling intervals at the time of the assessment. Because conditions between the wells and sampling intervals may vary over distance and time, the potential always remains for the presence of unknown, unidentified, unforeseen, or changed surface and subsurface contamination.

This report is for the exclusive use of Spokane International Airport and its representatives. No third party shall have the right to rely on AECOM's opinions rendered in connection with the services or in this document without our written consent and the third party's agreement to be bound to the same conditions and limitations as Spokane International Airport.

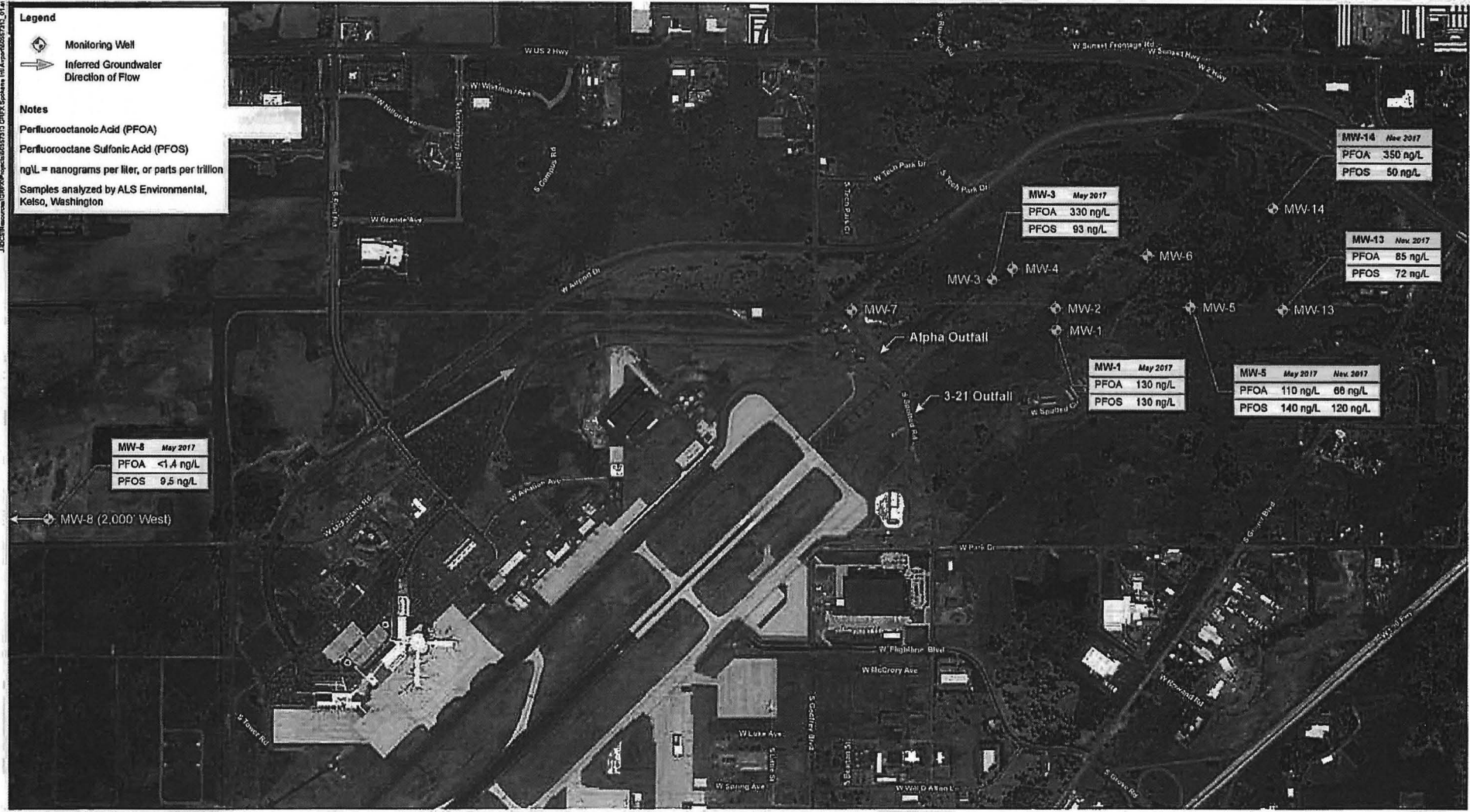
AECOM appreciates the opportunity to provide these services. Please contact the undersigned regarding any questions related to the information provided in this letter report.

Sincerely,  
AECOM



Gary D. Panther, LG, LEG

NORTH?  
↑



Source: Google Earth Pro, Imagery dated 6/20/17

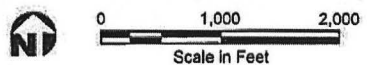


Figure 1  
Spokane International Airport  
PFOA/PFOS Study Area

Job No. 60557313

AECOM

Spokane International Airport  
PFOA/PFOS Study Area  
Spokane, Washington

**Table 1**  
**Summary of Groundwater Analytical Results**  
**Perfluorooctanoic Acid (PFOA) and Perfluorooctane Sulfonic Acid (PFOS)**  
**Spokane International Airport**

Well ID	Sample Date	Depth to Water	PFOA (ng/L)	PFOS (ng/L)
Groundwater Screening Level (ng/L) <sup>1</sup>			70	70
MW-5	11/8/2017	6.90	66	120
MW-13	11/8/2017	9.90	<b>85</b>	<b>72</b>
MW-14	11/8/2017	10.00	<b>350</b>	50

**Notes:**

<sup>1</sup> Groundwater screening levels were obtained from EPA's "Fact Sheet, PFOA & PFOS Drinking Water Health Advisories," dated November 2016.

Values in **bold font** indicate that the result reported meets or exceeds the groundwater screening level.

Depth to water measured from top of casing.

ng/L - nanogram per liter

PFOA - perfluorooctanoic acid

PFOS - perfluorooctane sulfonic acid

Samples analyzed by ALS Global Laboratories, Kelso, Washington.





AECOM Project Number: 60557313	Spokane International Airports, New Wells PFOA-PFOS Assessment	Boring Number: MW-13 Well Tag: BKP-258
Equipment Type/ model #: Mobile G-2400		Location NAD 83 47.6355 N, 117.4977 W
Auger type/diameter: 8-inch Hollow Stem		Sheet 1 of 1
Contractor: Geologic Drill, LLC		
Sampling method: 2-Inch SPT		Above-Grade Monument
Hammer Weight: 140 Lbs		
Free Fall: 30"		Time 830
Location of Boring: Approx. 185 feet W of east property line.		
Surface conditions/ Topsoil Depth: Grass-covered hillside.		Date 11/2/17
Material Description		

Blow Counts	Recovery %	Depth In Feet	Graphic Log	Soil Graph/ USCS	Material Description	
2-2-6	100%	0	[Shaded bar]	SM	Brown silty SAND with occasional gravel. Loose, Moist. With organics.	
		1				
		2				
		3				
		4				
5-6-6	100%	5		SM	Brown silty SAND, Medium-dense, Moist.	
		6		GM	Brown, silty GRAVEL with sand, Medium-dense, Wet.	
		7				
		8				
		9		SP	Grey- brown SAND with trace silt, Medium-dense, Wet.	
10-13-37	76%	10				
		11		RX	Basalt. Refusal at 11.5 feet bgs.	
		12				
		13			Well constructed with 6-feet of 20-slot screen.	
		14				
		15				
		16				
		17				
		18				
		19				
		20				
		21				

Boring Completed at 11.5 feet BGS. Groundwater encountered at 6.8 feet bgs.

STA NEW WELL  
 MW-14 11-2-17  
 10-11 1/2  
 2-2-3

AECOM Project Number: 60557313	Spokane International Airports, New Wells PFOA-PFOS Assessment	Boring Number: MW-14 Well Tag: BKP-259
Equipment Type/ model #: Mobile G-2400		Location NAD 83 47.6385 N, 117.4981 W
Auger type/diameter: 8-inch Hollow Stem		
Contractor: Geologic Drill, LLC		Sheet 1 of 1
Sampling method: 2-inch SPT		
Hammer Weight: 140 Lbs		Above-Grade Monument
Free Fall: 30"		
Location of Boring: Approx. 300 feet W of east property line.		Time 1330
Surface conditions/ Topsoil Depth: Grass-covered.		Date 11/2/17
Material Description		

Blow Counts	Recovery %	Depth In Feet	Graphic Log	Soil Graph/ USCS	Material Description
2-2-4		0		SM	Brown silty SAND with occasional gravel. Loose, Moist. With organics.
		1			
		2			
		3			
		4			
3-4-5		5		SP	Grey- brown SAND with trace silt, Loose, Moist.
		6			
		7			
		8			
		9			
2-2-3		10		SP	Grey- brown SAND, Loose, Wet.
		11			
		12			
		13			
		14			
2-2-5		15		SP	Grey- brown SAND, Loose, Wet.
		16			Heaving sands-lost approximately 2-feet of boring. Boring terminated, well set.
		17			
		18			
		19			
		20			Completed well depth is 14.5- feet bgs. Well constructed with 10-feet of 20-slot screen.
		21		Boring Completed at 16.5-feet BGS. Groundwater encountered at 7.0 feet bgs.	

Mr. Matt Breen

Spokane International Airport  
December 12, 2017

**Attachment B: Analytical Results**