



DEPARTMENT OF THE NAVY
BASE REALIGNMENT AND CLOSURE
PROGRAM MANAGEMENT OFFICE EAST
4911 SOUTH BROAD STREET
PHILADELPHIA, PA 19112-1303

5090
Ser BPMOE/17-132
March 20, 2017

Ms. Kerry Topovski
Director, Environmental Health
Department of Health
Anne Arundel County
1 Harry S. Truman Parkway
Annapolis, MD 21401

Dear Ms. Topovski:

As you are aware, the Department of the Navy (Navy) is conducting an environmental investigation at Bay Head Park (the former Bay Head Road Annex). The investigation was initiated in response to Navy's historic use of aqueous film forming foam (AFFF) at a burn pad that existed at the former base.

Phase I consisted of sampling two shallow, down gradient, private drinking water wells for the perfluorinated alkylated substances (PFAS) perfluorooctane sulfonate (PFOS), perfluorooctanoic acid (PFOA), and perfluorobutanesulfonic acid (PFBS). These emerging contaminants were contained in the AFFF used at the former base.

The well at the house nearest to the park, 1621 Bay Head Road, was sampled on 16 December 2016. The house farther from the former base was sampled on 18 November 2016. Results from both samples were received on 22 November 2016. The Navy is pleased to report that neither sample contained PFAS at or above laboratory detection limits (Attachments 1 and 2).

Phase II, which is ongoing, consists of sampling of environmental media to gain an understanding of PFAS impacts at the park. The initial round of sampling began 31 October and was completed on 12 January 2017. The effort consisted of the collection of 68 groundwater grab samples from two depths, 28 soil samples, 4 sediment samples, and 1 surface water sample. This memo presents the results to date.

Groundwater and Surface Water

Concentrations of PFAS were detected at all locations in the area and surrounding and down gradient of the former burn pad, at both depths (Attachments 1 and 2; Figure 1). Concentrations ranged from 0.16 micrograms per liter ($\mu\text{g/l}$) total PFAS in the northwest corner of the former base to 27 $\mu\text{g/l}$ total PFAS immediately down gradient (north) of the former burn pad. Very low-concentrations were observed at one upgradient location (near the southern boundary of the park); however, there is evidence that indicates this is the result of sampling-related cross-contamination.

The presence of PFAS in groundwater does not present a risk to park users. The park is supplied by Anne Arundel County Water and there is no direct access to groundwater by users of the park.

Soil and Sediment

Concentrations of PFAS were detected at all locations in the surrounding area and down gradient of the former burn pad (Attachments 1 and 2; Figure 2). Concentrations ranged from 0.5 micrograms per kilogram ($\mu\text{g}/\text{kg}$) total PFAS in a sediment sample collected in the northeast corner of the former base to 170 $\mu\text{g}/\text{kg}$ total PFAS, in a shallow soil sample collected approximately 50 feet to the east of the former burn pad. Like groundwater, these results present no risk to park users.

For PFOS, the contaminant present at the highest concentrations, a residential screening value of 1.3 mg/kg was estimated, an order of magnitude higher than the highest detection. This value was derived using the May 2016 United States Environmental Protection Agency (USEPA) Regional Screening Level (RSL) Calculator (https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search); a target hazard quotient of 1; default residential exposure assumptions provided by USEPA in the RSL calculator; and the chronic reference dose (RfD) of 2×10^{-5} mg/kg-day (as published in *Drinking Water Health Advisory for Perfluorooctane Sulfonate (PFOS)*, EPA 822-R-16-004; May 2016). Further, it should be noted that the residential screening calculation utilizes very conservative exposure parameters, relative to the actual exposure scenario of any park user.

Path Forward

The Navy is working closely with its state regulatory partner, the Maryland Department of the Environment, to complete the investigation at the former base, which will ultimately generate an entire picture of the nature and extent of PFAS impacts at the park. As the investigation proceeds, the Navy will provide future updates and share data on a regular basis.

If you need additional information, please feel free to contact Mr. Paul F. Burgio, BRAC Environmental Coordinator at (215) 897-4903, or email paul.burgio@navy.mil.

Sincerely,


GREGORY C. PRESTON
Director

Attachments:

1. Data Tables
2. Data Validation Reports

Figures:

1. Groundwater and Surface Water Sampling Results
2. Soil and Sediment Sampling Results

Copy to:

L. Gustafson, Federal Facilities Division, Maryland Department of the Environment

Drinking Water Sampling Results Polyfluoroalkyl Substances (PFAS) Former Bay Head Road Annex Anne Arundel County, Maryland					
Location ID	Collection Date	Sample ID	PFBS (µg/L)	PFOS (µg/L)	PFOA (µg/L)
DW-16-01	11/16/2016	DW-16-01-111616	< 0.0060 U	< 0.0032 U	< 0.0032 U
DW-16-02	11/18/2016	DW-16-02-111816	< 0.0060 U	< 0.0032 U	< 0.0032 U

Notes:

µg/L = micrograms per liter

PFBS = Perfluorobutanesulfonic Acid

PFOS = Perfluorooctane Sulfonate

PFOA = Perfluorooctanoic Acid

Data Validation Qualifiers:

J = Analyte positively detected but value is an approximate concentration.

J+ = Analyte positively detected but value is an approximate concentration, potentially biased high.

J- = Analyte positively detected but value is approximate concentration, potentially based low.

U = Analyte was not detected above the reported quantitation limit.

J+ = Analyte positively detected but value is an approximate concentration, potentially biased high.

J- = Analyte positively detected but value is approximate concentration, potentially based low.

U = Analyte was not detected above the reported quantitation limit.

**Groundwater Sampling Results
Polyfluoroalkyl Substances (PFAS)
Former Bay Head Road Annex
Anne Arundel County, Maryland**

Location ID	Collection Date	Interval (ft bgs)	Sample ID	PFBS (µg/L)	PFOS (µg/L)	PFOA (µg/L)
DPT-16-01	11/14/2016	17 - 21 ft	DPT-16-01-GW-17-21	0.011 J-	0.98 J-	0.062 J-
DPT-16-02	11/11/2016	6 - 10 ft	DPT-16-02-GW-06-10	0.0061 J-	0.12 J-	0.033 J-
DPT-16-02	11/11/2016	17 - 21 ft	DPT-16-02-GW-17-21	0.0099 J-	0.21 J-	0.036 J-
DPT-16-03	11/30/2016	18 - 22 ft	DPT-16-03-GW-18-22	< 0.0019 UJ	0.0071 J-	0.00092 J-
DPT-16-03	11/30/2016	31 - 35 ft	DPT-16-03-GW-31-35	< 0.0020 UJ	0.13 J-	0.019 J-
DPT-16-04	11/30/2016	18 - 22 ft	DPT-16-04-GW-18-22	< 0.0020 UJ	0.027 J-	0.0027 J-
DPT-16-04	11/30/2016	31 - 35 ft	DPT-16-04-GW-31-35	< 0.0020 UJ	0.0016 J-	< 0.0020 UJ
DPT-16-05	11/14/2016	17 - 21 ft	DPT-16-05-GW-17-21	0.050 J	2.8 J-	0.19 J-
DPT-16-06	12/1/2016	18 - 22 ft	DPT-16-06-GW-18-22	0.20 J-	2.8 J-	1.9 J-
DPT-16-06	12/1/2016	31 - 35 ft	DPT-16-06-GW-31-35	0.28 J-	2.7 J-	1.6 J-
DPT-16-07	12/1/2016	18 - 22 ft	DPT-16-07-GW-18-22	0.17 J-	1.9 J-	0.37 J-
DPT-16-07	12/1/2016	31 - 35 ft	DPT-16-07-GW-31-35	0.18 J-	3.1 J-	1.2 J-
DPT-16-08	12/1/2016	18 - 22 ft	DPT-16-08-GW-18-22	0.0030 J-	0.038 J-	0.0075 J-
DPT-16-08	12/1/2016	31 - 35 ft	DPT-16-08-GW-31-35	0.0056 J-	0.022 J-	0.0045 J-
DPT-16-09	11/30/2016	18 - 22 ft	DPT-16-09-GW-18-22	0.0043 J-	0.019 J-	0.0045 J-
DPT-16-09	11/30/2016	31 - 35 ft	DPT-16-09-GW-31-35	0.0027 J-	0.017 J-	0.0021 J-
DPT-16-10	11/30/2016	18 - 22 ft	DPT-16-10-GW-18-22	0.010 J-	0.030 J-	0.0062 J-
DPT-16-10	11/30/2016	31 - 35 ft	DPT-16-10-GW-31-35	< 0.0020 UJ	0.11 J-	0.014 J-
DPT-16-11	12/1/2016	18 - 22 ft	DPT-16-11-GW-18-22	0.18 J-	6.0 J-	2.0 J-
DPT-16-11	12/1/2016	31 - 35 ft	DPT-16-11-GW-31-35	0.080 J-	0.86 J-	0.33 J-
DPT-16-12	12/5/2016	19 - 23 ft	DPT-16-12-GW-19-23	0.22	4.6	1.7
DPT-16-12	12/5/2016	31 - 35 ft	DPT-16-12-GW-31-35	0.060	0.69	0.24
DPT-16-13	11/29/2016	18 - 22 ft	DPT-16-13-GW-18-22	0.91 J	14 J	7.0 J
DPT-16-13	11/29/2016	31 - 35 ft	DPT-16-13-GW-31-35	0.060 J	0.62 J	0.31 J
DPT-16-14	12/5/2016	19 - 23 ft	DPT-16-14-GW-19-23	0.15	6.4	1.0
DPT-16-14	12/5/2016	31 - 35 ft	DPT-16-14-GW-31-35	0.20	5.4	0.67
DPT-16-15	11/21/2016	18 - 22 ft	DPT-16-15-GW-18-22	0.54 J-	12 J-	15 J-
DPT-16-15	11/21/2016	31 - 35 ft	DPT-16-15-GW-31-35	0.048 J-	0.45 J-	0.27 J
DPT-16-16	12/5/2016	19 - 23 ft	DPT-16-16-GW-19-23	0.060	0.88	0.22

**Groundwater Sampling Results
Polyfluoroalkyl Substances (PFAS)
Former Bay Head Road Annex
Anne Arundel County, Maryland**

Location ID	Collection Date	Interval (ft bgs)	Sample ID	PFBS (µg/L)	PFOS (µg/L)	PFOA (µg/L)
DPT-16-16	12/5/2016	31 - 35 ft	DPT-16-16-GW-31-35	0.28	1.9	2.3
DPT-16-17	11/17/2016	16 - 20 ft	DPT-16-17-GW-16-20	0.11	0.23	0.49
DPT-16-17	11/17/2016	31 - 35 ft	DPT-16-17-GW-31-35	0.063	0.26	0.45
DPT-16-18	11/23/2016	21 - 25 ft	DPT-16-18-GW-21-25	0.15	2.0	0.84
DPT-16-18	11/23/2016	31 - 35 ft	DPT-16-18-GW-31-35	0.057	0.37	0.24
DPT-16-19	11/23/2016	21 - 25 ft	DPT-16-19-GW-21-25	0.17	2.6	0.34
DPT-16-19	11/23/2016	31 - 35 ft	DPT-16-19-GW-31-35	0.33	0.68	0.93
DPT-16-20	11/15/2016	16 - 20 ft	DPT-16-20-GW-16-20	0.017 J-	0.66 J-	0.15 J-
DPT-16-20	11/15/2016	26 - 30 ft	DPT-16-20-GW-26-30	< 0.20 UJ	6.8 J-	1.0 J-
DPT-16-21	11/28/2016	19 - 23 ft	DPT-16-21-GW-19-23	1.1 J	12 J	15 J
DPT-16-21	11/28/2016	31 - 35 ft	DPT-16-21-GW-31-35	0.16 J	3.2 J	0.74 J
DPT-16-22	12/5/2016	19 - 23 ft	DPT-16-22-GW-19-23	0.070	0.82	0.17
DPT-16-22	12/5/2016	31 - 35 ft	DPT-16-22-GW-31-35	0.29	0.61	0.18
DPT-16-23	11/23/2016	21 - 25 ft	DPT-16-23-GW-21-25	0.32	0.96	0.84
DPT-16-23	11/23/2016	31 - 35 ft	DPT-16-23-GW-31-35	0.11	0.27	0.34
DPT-16-24	12/6/2016	21 - 25 ft	DPT-16-24-GW-21-25	0.029	0.41	0.044
DPT-16-24	12/6/2016	31 - 35 ft	DPT-16-24-GW-31-35	0.043	0.47	0.15
DPT-16-25	12/6/2016	19 - 23 ft	DPT-16-25-GW-19-23	0.31	1.1	0.57
DPT-16-25	12/6/2016	31 - 35 ft	DPT-16-25-GW-31-35	0.060	0.39	0.17
DPT-16-28	12/6/2016	19 - 23 ft	DPT-16-28-GW-19-23	0.16	4.9	0.66
DPT-16-28	12/6/2016	31 - 35 ft	DPT-16-28-GW-31-35	0.21	0.43	0.61
DPT-16-29	11/18/2016	16 - 20 ft	DPT-16-29-GW-16-20	0.11	2.1	0.27
DPT-16-29	11/18/2016	31 - 35 ft	DPT-16-29-GW-31-35	0.034	0.14	0.15
DPT-16-30	11/29/2016	18 - 22 ft	DPT-16-30-GW-18-22	0.21 J	6.6 J	1.4 J
DPT-16-30	11/29/2016	31 - 35 ft	DPT-16-30-GW-31-35	0.31 J	11 J	1.4 J
DPT-16-31	11/28/2016	19 - 23 ft	DPT-16-31-GW-19-23	1.1 J	42 J	28 J
DPT-16-31	11/28/2016	31 - 35 ft	DPT-16-31-GW-31-35	0.086 J	2.0 J	0.34 J
DPT-16-32	11/28/2016	19 - 23 ft	DPT-16-32-GW-19-23	0.14 J	9.2 J	0.68 J
DPT-16-32	11/28/2016	31 - 35 ft	DPT-16-32-GW-31-35	0.12 J	2.1 J	0.65 J

**Groundwater Sampling Results
Polyfluoroalkyl Substances (PFAS)
Former Bay Head Road Annex
Anne Arundel County, Maryland**

Location ID	Collection Date	Interval (ft bgs)	Sample ID	PFBS (µg/L)	PFOS (µg/L)	PFOA (µg/L)
DPT-16-33	12/5/2016	19 - 23 ft	DPT-16-33-GW-19-23	0.23 J	8.3	2.8
DPT-16-33	12/5/2016	31 - 35 ft	DPT-16-33-GW-31-35	0.15	1.3	0.96
DPT-16-34	11/15/2016	16 - 20 ft	DPT-16-34-GW-16-20	0.028 J-	1.6 J-	0.40 J-
DPT-16-34	11/14/2016	31 - 35 ft	DPT-16-34-GW-31-35	0.12 J-	1.4 J-	1.0 J-
DPT-16-35	11/22/2016	21 - 25 ft	DPT-16-35-GW-21-25	0.28 J-	2.4 J-	0.76 J-
DPT-16-35	11/22/2016	31 - 35 ft	DPT-16-35-GW-31-35	0.38 J-	0.80 J-	1.4 J-
DPT-17-26	1/11/2017	18 - 22 ft	DPT-17-26-GW-18-22	0.0011 J	< 0.0083 U	0.0059
DPT-17-26	1/11/2017	29 - 33 ft	DPT-17-26-GW-29-33	< 0.0019 U	0.0083	< 0.0024 U
DPT-17-27	1/11/2017	18 - 22 ft	DPT-17-27-GW-18-22	< 0.0020 U	< 0.0030 U	< 0.0020 U
DPT-17-27	1/11/2017	29 - 33 ft	DPT-17-27-GW-29-33	< 0.0020 U	< 0.0040 U	< 0.0020 U

Notes:

µg/L = micrograms per liter

PFBS = Perfluorobutanesulfonic Acid

PFOS = Perfluorooctane Sulfonate

PFOA = Perfluorooctanoic Acid

Data Validation Qualifiers:

J = Analyte positively detected but value is an approximate concentration.

J+ = Analyte positively detected but value is an approximate concentration, potentially biased high.

J- = Analyte positively detected but value is approximate concentration, potentially based low.

U = Analyte was not detected above the reported quantitation limit.

**Surface Water Sampling Results
Polyfluoroalkyl Substances (PFAS)
Former Bay Head Road Annex
Anne Arundel County, Maryland**

Location ID	Collection Date	Sample ID	PFBS (µg/L)	PFOS (µg/L)	PFOA (µg/L)
SW-16-01	12/5/2016	SW-16-01-SW	0.020	0.27	0.023
SW-16-02	12/5/2016	SW-16-02-SW	0.0084	0.12	0.042

Notes:

µg/L = micrograms per liter

PFBS = Perfluorobutanesulfonic Acid

PFOS = Perfluorooctane Sulfonate

PFOA = Perfluorooctanoic Acid

Data Validation Qualifiers:

J = Analyte positively detected but value is an approximate concentration.

J+ = Analyte positively detected but value is an approximate concentration, potentially biased high.

J- = Analyte positively detected but value is approximate concentration, potentially based low.

U = Analyte was not detected above the reported quantitation limit.

Soil Sampling Results
Polyfluoroalkyl Substances (PFAS)
Former Bay Head Road Annex
Anne Arundel County, Maryland

Location ID	Collection Date	Interval (ft bgs)	Sample ID	PFBS (µg/kg)	PFOS (µg/kg)	PFOA (µg/kg)
DPT-16-15	11/2/2016	0 - 1 ft	DPT-16-15-SO-00-01	0.14 J	27	0.98
DPT-16-15	11/21/2016	14 - 15 ft	DPT-16-15-SO-14-15	< 0.37 U	11	0.51 J
DPT-16-19	11/22/2016	0 - 1 ft	DPT-16-19-SO-00-01	0.18 J	170	3.8
DPT-16-19	11/22/2016	17 - 17 ft	DPT-16-19-SO-17-18	< 0.37 U	6.5	0.37 J
DPT-16-20	11/2/2016	0 - 1 ft	DPT-16-20-SO-00-01	< 0.33 U	12	0.70
DPT-16-20	11/15/2016	16 - 17 ft	DPT-16-20-SO-16-17	< 0.37 U	10 J	0.46 J
DPT-16-28	11/2/2016	0 - 1 ft	DPT-16-28-SO-00-01	< 0.36 U	8.9	0.27 J
DPT-16-28	11/21/2016	14 - 15 ft	DPT-16-28-SO-14-15	< 0.35 U	10	0.45 J
DPT-16-29	11/2/2016	0 - 1 ft	DPT-16-29-SO-00-01	0.19 J	38	1.8
DPT-16-29	11/18/2016	14 - 15 ft	DPT-16-29-SO-14-15	< 0.37 U	1.5	0.49 J
DPT-16-30	11/2/2016	0 - 1 ft	DPT-16-30-SO-00-01	0.12 J	20	1.0
DPT-16-30	11/21/2016	14 - 15 ft	DPT-16-30-SO-14-15	< 0.36 U	57	5.5
DPT-16-31	11/2/2016	0 - 1 ft	DPT-16-31-SO-00-01	< 0.33 U	5.9	0.26 J
DPT-16-31	11/21/2016	14 - 15 ft	DPT-16-31-SO-14-15	< 0.36 U	11	0.27 J
DPT-16-32	11/2/2016	0 - 1 ft	DPT-16-32-SO-00-01	< 0.35 U	10	0.24 J
DPT-16-32	11/21/2016	14 - 15 ft	DPT-16-32-SO-14-15	< 0.36 U	46	1.1
DPT-16-34	11/2/2016	0 - 1 ft	DPT-16-34-SO-00-01	< 0.33 U	80	8.9
DPT-16-34	11/14/2016	14 - 15 ft	DPT-16-34-SO-14-15	< 0.37 U	35	3.2 J+
DPT-16-35	11/22/2016	0 - 1 ft	DPT-16-35-SO-00-01	0.21 J	28	12
DPT-16-35	11/22/2016	19 - 20 ft	DPT-16-35-SO-19-20	< 0.36 U	4.0	0.56 J
DPT-17-26	1/12/2017	0 - 1 ft	DPT-17-26-SO-00-01	< 0.36 U	0.25 J	0.22 J
DPT-17-26	1/12/2017	12 - 13 ft	DPT-17-26-SO-12-13	< 0.36 U	< 0.36 U	< 0.36 U
DPT-17-27	1/12/2017	0 - 1 ft	DPT-17-27-SO-00-01	< 0.36 U	< 0.60 U	0.25 J
DPT-17-27	1/12/2017	13 - 14 ft	DPT-17-27-SO-13-14	< 0.36 U	< 0.36 U	< 0.36 U

Notes:

µg/L = micrograms per liter
PFBS = Perfluorobutanesulfonic Acid
PFOS = Perfluorooctane Sulfonate
PFOA = Perfluorooctanoic Acid

Data Validation Qualifiers:

J = Analyte positively detected but value is an approximate concentration.
J+ = Analyte positively detected but value is an approximate concentration, potentially biased high.
J- = Analyte positively detected but value is approximate concentration, potentially based low.
U = Analyte was not detected above the reported quantitation limit.

Sediment Sampling Results Polyfluoroalkyl Substances (PFAS) Former Bay Head Road Annex Anne Arundel County, Maryland					
Location ID	Collection Date	Sample ID	PFBS (µg/kg)	PFOS (µg/kg)	PFOA (µg/kg)
SD-16-01	11/2/2016	SWSD-16-01-SD	< 0.37 U	1.7	0.23 J
SD-16-02	11/2/2016	SWSD-16-02-SD	< 0.69 U	5.1	< 0.69 U
SD-16-03	11/2/2016	SWSD-16-03-SD	< 0.63 U	6.6	0.28 J
SD-16-04	11/2/2016	SWSD-16-04-SD	< 0.38 U	0.42 J	0.18 J

Notes:

µg/L = micrograms per liter
 PFBS = Perfluorobutanesulfonic Acid
 PFOS = Perfluorooctane Sulfonate
 PFOA = Perfluorooctanoic Acid

Data Validation Qualifiers:

J = Analyte positively detected but value is an approximate concentration.
 J+ = Analyte positively detected but value is an approximate concentration, potentially biased high.
 J- = Analyte positively detected but value is approximate concentration, potentially based low.
 U = Analyte was not detected above the reported quantitation limit.



Resolution Consultants
250 Apollo Drive
Chelmsford, MA 01824

978.905.2100 tel
978.905.2101 fax

Drinking Water Data Validation Report

Project:	Former Bay Head Road Annex- Annapolis, MD	
Laboratory:	Accutest Laboratories – Orlando, FL	
Job Number:	FA38820 and FA38917	
Analyses/Method:	Perfluorinated Compounds (PFCs) by Liquid Chromatography/Mass Spectrometry/Mass Spectrometry (LC/MS/MS)/ EPA Method 537	
Validation Level:	Limited	
Resolution Consultants 60444465-DM.DE		
Project Number:		
Prepared by:	Paula DiMattei/Resolution Consultants	Completed on: 2/16/2017
Reviewed by:	Robert Kennedy/Resolution Consultants	Completed on: 2/16/2017

SUMMARY

The samples listed below were collected by Resolution Consultants from the Former Bay Head Road Annex site in Annapolis, MD on November 16 and 18, 2016.

Laboratory Job No.	Sample ID	Matrix/Sample Type
FA38820	DW-16-01-111616	Drinking water
	DW-16-01-111616-DUP	Field duplicate of DW-16-01-111616
	DW-16-01-111616-FRB	Field reagent blank
FA38917	DW-16-02-111816	Drinking water
	DW-16-02-111816-FRB	Field reagent blank

Data validation activities were conducted with reference to:

- Accutest Laboratories SOP: Standard Operating Procedure for the Extraction of Perfluorinated Alkyl Acids from Potable and Finished Drinking Water Samples for LC/MS/MS Analysis); OP 064.2, Rev. Date: 09/16
- USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (September 2016);
- Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (DoD, July 2013); and
- The project-specific Sampling and Analysis Plan.

In the absence of method-specific information, laboratory quality control (QC) limits, project-specific requirements and/or professional judgment were used as appropriate.

REVIEW ELEMENTS

The data were evaluated based on the following review elements (where applicable to the method):

- ✓ Data completeness (chain-of-custody (COC)/sample integrity)
- ✓ Holding times/sample preservation
- ✓ Initial calibration/initial and continuing calibration verification
- ✓ Laboratory method blanks/field reagent blanks
- ✓ Surrogate recoveries
- ✓ Matrix spike (MS) and/or matrix spike duplicate (MSD) results
- ✓ Laboratory control sample (LCS) results
- ✓ Field duplicate results
- ✓ Internal standard results
- ✓ Sample results/reporting issues

The symbol (✓) indicates that no validation qualifiers were applied based on this parameter. An "NA" indicates that the parameter was not included as part of this data set or was not applicable to this validation and therefore not reviewed. The symbol (✗) indicates that a QC nonconformance resulted in the qualification of data. Any QC nonconformance that resulted in the qualification of data is discussed below. In addition, nonconformances or other issues that were noted during validation, but did not result in qualification of data, may be discussed for informational purposes only.

The data appear valid as reported and may be used for decision making purposes. Qualification of the data was not required on the basis of this data review.

RESULTS

Data Completeness (chain-of-custody (COC)/Sample Integrity)

The data package was reviewed and found to meet acceptance criteria for completeness:

- The COCs were reviewed for completeness of information relevant to the samples and requested analyses, and for signatures indicating transfer of sample custody.
- The laboratory sample login sheet(s) were reviewed for issues potentially affecting sample integrity, including the condition of sample containers upon receipt at the laboratory.
- Completeness of analyses was verified by comparing the reported results to the COC requests.

Laboratory Job No: FA38820 and FA38917

No discrepancies were noted.

Holding Times/Sample Preservation

Sample preservation and preparation/analysis holding times were reviewed for conformance with the QC acceptance criteria.

Laboratory Job No: FA38820 and FA38917

All QC acceptance criteria were met.

Initial Calibration/Initial and Continuing Calibration Verification

Calibration data were reviewed for conformance with the QC acceptance criteria to ensure that:

- the initial calibration (ICAL) percent relative standard deviation (%RSD) or correlation coefficient (r) or coefficient of determination (r^2) method acceptance criteria were met;
- the initial calibration verification standard (ICV) percent recovery acceptance criteria were met; and
- the continuing calibration verification standard (CCV) frequency and method percent difference or percent drift (%D) criteria were met.

Laboratory Job No: FA38820 and FA38917

All QC acceptance criteria were met.

Laboratory Method Blanks/Field Reagent Blanks

Laboratory method blanks and field reagent blanks are evaluated as to whether there are contaminants detected above the detection limit (DL).

Laboratory Job No: FA38820 and FA38917

Target compounds were not detected in the laboratory method blank or the field reagent blank associated with the samples in this data set.

Surrogate Recoveries

The surrogate recoveries (%Rs) were reviewed for conformance with the QC acceptance criteria.

Laboratory Job No: FA38820 and FA38917

All QC acceptance criteria were met.

MS/MSD Results

The MS/MSD %Rs and relative percent differences (RPDs) were reviewed for conformance with the QC acceptance criteria.

Laboratory Job No: FA38820

All QC acceptance criteria were met.

Laboratory Job No: FA38917

MS/MSD analyses were not performed on a sample in this data set. Qualification of the data was not required.

LCS Results

The LCS %Rs were reviewed for conformance with the QC acceptance criteria.

Laboratory Job No: FA38820 and FA38917

All QC acceptance criteria were met.

Field Duplicate Results

Field duplicate RPDs are reviewed for conformance with the RESCON QC acceptance limit of $\leq 30\%$ [if both results are greater than five times the LOQ] for aqueous matrices.

Laboratory Job No: FA38820

Target compounds were not detected in either sample of the field duplicate pair. Precision is deemed acceptable.

Laboratory Job No: FA38917

Field duplicate samples were not submitted with this data set. Qualification of the data was not required.

Internal Standard Results

The internal standard results were reviewed for conformance with the QC acceptance criteria.

Laboratory Job No: FA38820 and FA38917

All QC acceptance criteria were met.

Sample Results/Reporting Issues

Laboratory Job No: FA38820 and FA38917

If applicable, compounds detected at concentrations less than the limit of quantitation (LOQ) but greater than the detection limit (DL) are qualified by the laboratory as estimated (J). This "J" qualifier is retained during data validation.

QUALIFICATION ACTIONS

Qualification of the data was not required on this basis of this data review.



Groundwater and Surface Water Data Validation Report

Project:	Former Bay Head Road Annex- Annapolis, MD	
Laboratory:	TestAmerica-West Sacramento, CA	
Job Number:	320-23501-1, 320-23542-1, 320-23651-1, 320-23718-1, 320-23783-1, 320-23830-1, 320-23890-1, 320-23998-1, 320-24060-1, and 320-24961-1	
Analyses/Method:	Perfluorinated Compounds (PFCs) in Water, Soils, Sediments and Tissues by Liquid Chromatography/Mass Spectrometry/Mass Spectrometry (LC/MS/MS)/ Revision 1.4 (August 2015)	
Validation Level:	Limited	
Resolution Consultants	60444465-DM.DE	
Project Number:		
Prepared by:	Paula DiMattei/Resolution Consultants	Completed on: 2/7/2017
Reviewed by:	Robert Kennedy/Resolution Consultants	Completed on: 2/7/2017

SUMMARY

The samples listed below were collected by Resolution Consultants from the Former Bay Head Road Annex site in Annapolis, MD on November 11, 14-18, 21-23, 28-30, and December 1, 5-6, 2016, and January 11, 2017..

Laboratory Job No.	Sample ID	Matrix/Sample Type
320-23501-1	DPT-16-02-GW-06-10	Groundwater
	DPT-16-02-GW-06-10-DUP	Field duplicate of DPT-16-02-GW-06-10
	DPT-16-02-GW-17-21	Groundwater
320-23542-1	DPT-16-01-GW-17-21	Groundwater
	DPT-16-05-GW-17-21	Groundwater
	DPT-16-34-GW-31-35	Groundwater
320-23651-1	DPT-16-20-GW-16-20	Groundwater
	DPT-16-20-GW-26-30	Groundwater
	DPT-16-26-GW-18-22	Groundwater
	DPT-16-26-GW-29-33	Groundwater
	DPT-16-26-GW-29-33-DUP	Field duplicate of DPT-16-26-GW-29-33
	DPT-16-27-GW-18-22	Groundwater
	DPT-16-27-GW-29-33	Groundwater
DPT-16-34-GW-16-20	Groundwater	
320-23718-1	DPT-16-17-GW-16-20	Groundwater
	DPT-16-17-GW-31-35	Groundwater

Laboratory Job No.	Sample ID	Matrix/Sample Type
320-23783-1	DPT-16-29-GW-16-20	Groundwater
	DPT-16-29-GW-31-35	Groundwater
	DPT-16-15-GW-18-22	Groundwater
	DPT-16-15-GW-31-35	Groundwater
	DPT-16-35-GW-21-25	Groundwater
	DPT-16-35-GW-31-35	Groundwater
320-23830-1	DPT-16-18-GW-21-25	Groundwater
	DPT-16-18-GW-31-35	Groundwater
	DPT-16-18-GW-31-35-DUP	Field duplicate of DPT-16-18-GW-31-35
	DPT-16-19-GW-21-25	Groundwater
	DPT-16-19-GW-31-35	Groundwater
	DPT-16-23-GW-21-25	Groundwater
	DPT-16-23-GW-31-35	Groundwater
	DPT-GW-EB-112316	Equipment blank
320-23890-1	DPT-16-13-GW-18-22	Groundwater
	DPT-16-13-GW-31-35	Groundwater
	DPT-16-21-GW-19-23	Groundwater
	DPT-16-21-GW-31-35	Groundwater
	DPT-16-30-GW-18-22	Groundwater
	DPT-16-30-GW-31-35	Groundwater
	DPT-16-31-GW-19-23	Groundwater
	DPT-16-31-GW-31-35	Groundwater
	DPT-16-32-GW-19-23	Groundwater
	DPT-16-32-GW-31-35	Groundwater
320-23998-1	DPT-16-03-GW-18-22	Groundwater
	DPT-16-03-GW-31-35	Groundwater
	DPT-16-04-GW-18-22	Groundwater
	DPT-16-04-GW-31-35	Groundwater
	DPT-16-06-GW-18-22	Groundwater
	DPT-16-06-GW-31-35	Groundwater
	DPT-16-07-GW-18-22	Groundwater
	DPT-16-07-GW-31-35	Groundwater
	DPT-16-08-GW-18-22	Groundwater
	DPT-16-08-GW-31-35	Groundwater
	DPT-16-09-GW-18-22	Groundwater
	DPT-16-09-GW-31-35	Groundwater
	DPT-16-10-GW-18-22	Groundwater
	DPT-16-10-GW-31-35	Groundwater
	DPT-16-11-GW-18-22	Groundwater
	DPT-16-11-GW-31-35	Groundwater

Laboratory Job No.	Sample ID	Matrix/Sample Type
	DPT-16-11-GW-31-35-DUP	Field Duplicate of DPT-16-11-GW-31-35
320-24060-1	DPT-16-12-GW-19-23	Groundwater
	DPT-16-12-GW-31-35	Groundwater
	DPT-16-14-GW-19-23	Groundwater
	DPT-16-14-GW-31-35	Groundwater
	DPT-16-16-GW-19-23	Groundwater
	DPT-16-16-GW-31-35	Groundwater
	DPT-16-22-GW-19-23	Groundwater
	DPT-16-22-GW-31-35	Groundwater
	DPT-16-22-GW-31-35-DUP	Field duplicate of DPT-16-22-GW-31-35
	DPT-16-24-GW-21-25	Groundwater
	DPT-16-24-GW-31-35	Groundwater
	DPT-16-25-GW-19-23	Groundwater
	DPT-16-25-GW-31-35	Groundwater
	DPT-16-28-GW-19-23	Groundwater
	DPT-16-28-GW-31-35	Groundwater
	DPT-16-33-GW-19-23	Groundwater
	DPT-16-33-GW-31-35	Groundwater
	SW-16-01-SW	Surface Water
	SW-16-02-SW	Surface Water
	SW-16-02-SW-DUP	Field Duplicate of SW-16-02-SW
320-24961-1	DPT-17-26-GW-18-22	Groundwater
	DPT-17-26-GW-29-33	Groundwater
	DPT-17-27-GW-18-22	Groundwater
	DPT-17-27-GW-29-33	Groundwater
	DPT-GW-EB-26-22	Equipment blank
	DPT-GW-EB-26-33	Equipment blank
	DPT-GW-EB-27-22	Equipment blank
	DPT-GW-EB-27-33	Equipment blank
	DPT-TB-011117	Trip blank

Data validation activities were conducted with reference to:

- TestAmerica-West Sacramento SOP: Perfluorinated Compounds (PFCs) in Water, Soils, Sediments and Tissues by Liquid Chromatography/Mass Spectrometry/Mass Spectrometry (LC/MS/MS)/Revision 1.4 (August 2015);
- USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (September 2016);
- USEPA Contract Laboratory Program National Functional Guidelines for High Resolution Superfund Methods Data Review (April 2016)
- Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (DoD, July 2013); and
- the project-specific Sampling and Analysis Plan.

In the absence of method-specific information, laboratory quality control (QC) limits, project-specific requirements and/or professional judgment were used as appropriate.

REVIEW ELEMENTS

The data were evaluated based on the following review elements (where applicable to the method):

- X Data completeness (chain-of-custody (COC)/sample integrity
- ✓ Holding times/sample preservation
- ✓ Initial calibration/initial and continuing calibration verification
- X Laboratory method blanks/equipment blanks
- X Matrix spike (MS) and/or matrix spike duplicate (MSD) results
- ✓ Laboratory control sample (LCS)/laboratory control sample duplicate (LCSD) results
- X Field duplicate results
- X Labeled compound results
- ✓ Sample results/reporting issues

The symbol (✓) indicates that no validation qualifiers were applied based on this parameter. An "NA" indicates that the parameter was not included as part of this data set or was not applicable to this validation and therefore not reviewed. The symbol (X) indicates that a QC nonconformance resulted in the qualification of data. Any QC nonconformance that resulted in the qualification of data is discussed below. In addition, nonconformances or other issues that were noted during validation, but did not result in qualification of data, may be discussed for informational purposes only.

The data appear valid as reported and may be used for decision making purposes. Select data points were qualified as estimated due to nonconformances of certain QC criteria (see discussion below). Qualified sample results are presented in Table 1.

RESULTS

Data Completeness (chain-of-custody (COC)/Sample Integrity

The data package was reviewed and found to meet acceptance criteria for completeness:

- The COCs were reviewed for completeness of information relevant to the samples and requested analyses, and for signatures indicating transfer of sample custody.
- The laboratory sample login sheet(s) were reviewed for issues potentially affecting sample integrity, including the condition of sample containers upon receipt at the laboratory.
- Completeness of analyses was verified by comparing the reported results to the COC requests.

Laboratory Job No: 320-23718-1, 320-23830-1, 320-24060-1 and 320-24961-1

No discrepancies were noted.

Laboratory Job No: 320-23501-1, 320-23542-1, 320-23651-1, 320-23783-1, 320-23890-1 and 320-23998-1

The data for the following samples are regarded as not reportable at the client's request due to the suspected field cross contamination from the equipment used during sample collection: DPT-16-26-GW-18-22, DPT-16-

26-GW-29-33, DPT-16-26-GW-29-33 DUP, DPT-16-27-GW-18-22 and DPT-16-27-GW-29-33 (reported in laboratory report number 320-23651-1). This report has been revised to address this request.

The laboratory noted in the case narrative that all groundwater samples were decanted to new bottles prior to spiking and extraction because of the presence of excessive amounts of sediment present in the sample bottles. In these cases, the sample bottles are not rinsed as required by the method. It was also noted that during sample preparation, some samples turned cloudy white after concentrating the extracts and then adding 400 µl of methanol. Consequently, professional judgment was applied to qualify the positive and nondetect results for all target compounds in these samples as estimated (J-/UJ) indicating a potential loss of target compounds that may have remained in the original sample bottle or might have been impacted during the extract concentration steps. Qualified sample results are presented in Table 1.

Holding Times/Sample Preservation

Sample preservation and preparation/analysis holding times were reviewed for conformance with the QC acceptance criteria.

Laboratory Job No: 320-23501-1, 320-23542-1, 320-23651-1, 320-23718-1, 320-23783-1, 320-23830-1, 320-23890-1, 320-23998-1, and 320-24961-1

All QC acceptance criteria were met.

Laboratory Job No: 320-24060-1

Sample preservation and preparation/analysis holding times were reviewed for conformance with the QC acceptance criteria. All samples were extracted 4-5 days beyond the 7-day extraction holding time that is stipulated in the SAP. Professional judgment was used to take no actions due to the stability of the target compounds in aqueous samples and since the samples were extracted within the laboratory's current holding time and EPA Method 537 criterion of 14-days from sample collection. The data are not adversely impacted.

Initial Calibration/Initial and Continuing Calibration Verification

Calibration data were reviewed for conformance with the QC acceptance criteria to ensure that:

- the initial calibration (ICAL) percent relative standard deviation (%RSD) or correlation coefficient (r) or coefficient of determination (r^2) method acceptance criteria were met;
- the initial calibration verification standard (ICV) percent recovery acceptance criteria were met; and
- the continuing calibration verification standard (CCV) frequency and method percent difference or percent drift (%D) criteria were met.

Laboratory Job No: 320-23501-1, 320-23542-1, 320-23651-1, 320-23718-1, 320-23783-1, 320-23830-1, 320-23890-1, 320-23998-1, 320-24060-1 and 320-24961-1

All QC acceptance criteria were met or qualification of the data was not required.

Laboratory Method Blanks/Equipment Blanks

Laboratory method blanks and equipment blanks are evaluated as to whether there are contaminants detected above the detection limit (DL).

Laboratory Job No: 320-23501-1, 320-23542-1, 320-23651-1, 320-23718-1, 320-23783-1, 320-23830-1, 320-23890-1, 320-23998-1 and 320-24060-1

Target compounds were not detected in the laboratory method blanks or equipment blanks associated with the samples in this data set.

Laboratory Job No: 320-24961-1

Data validation qualifications for individual samples are based on the maximum contaminant concentration detected in all associated blanks. Blank contamination is not discussed if qualification of the data was not required. The following table summarizes the contamination detected and the associated samples.

Blank ID	Compound	Concentration (µg/L)	Associated Samples
DPT-GW-EB-26-22	PFOS	0.020	DPT-17-26-GW-18-22
DPT-GW-EB-26-33	PFOA	0.00090 J	DPT-17-26-GW-29-33
DPT-GW-EB-27-33	PFOS	0.0074	DPT-17-27-GW-29-33

Samples were qualified as follows:

Actions: Based on NFG 2016

Blank Result	Sample Result	Actions
<LOQ	Not detected	No qualification
	< LOQ	Qualify sample result as U at the LOQ
	≥ LOQ	Use professional judgment
≥LOQ	< LOQ	Qualify sample result as U at the LOQ
	≥ LOQ but <blank result	Qualify sample result as U at the result concentration.
	≥ LOQ but ≥blank result	Use professional judgment

Qualified sample results are presented in Table 1.

MS/MSD Results

The MS/MSD percent recoveries (%Rs) and relative percent differences (RPDs) were reviewed for conformance with the QC acceptance criteria.

Laboratory Job No: 320-23718-1, 320-23830-1 and 320-23998-1

All QC acceptance criteria were met.

Laboratory Job No: 320-23542-1

All QC acceptance criteria were met except for the nonconformances summarized below. Nonconformances are not noted below if qualification of the data was not required.

Sample ID	Compound	MS/MSD % R	QC Limits
DPT-16-05-GW-17-21	PFBS	161/ok	50-150

The parent sample was qualified as follows: (based on NFG 2016)

Criteria	Actions ¹	
	Detected	Not detected
RPD >Upper Acceptance Limit	J	No qualification
%R >Upper Acceptance Limit	J+	No qualification
%R >10% but < Lower Acceptance Limit	J-	UJ
<10%	J-	R
¹ Professional judgment was used to include bias codes as applicable		

Qualified sample results are presented in Table 1.

Laboratory Job No: 320-23501-1, 320-23651-1, 320-23783-1, 320-23890-1, 320-24060-1 and 320-24961-1

MS/MSD analyses were not performed on a sample from this data set. The data were not qualified on this basis.

LCS/LCSD Results

The LCS percent recoveries (%Rs) and relative percent differences (RPDs) were reviewed for conformance with the QC acceptance criteria.

Laboratory Job No: 320-23501-1, 320-23542-1, 320-23651-1, 320-23718-1, 320-23783-1, 320-23830-1, 320-23890-1, 320-23998-1, 320-24060-1 and 320-24961-1

All QC acceptance criteria were met.

Field Duplicate Results

Field duplicate RPDs are reviewed for conformance with the RESCON QC acceptance limit of $\leq 30\%$ [if results are greater than five times the limit of quantitation (LOQ)] and $\leq 2x$ the LOQ [if results are less than five times the LOQ] for aqueous matrices.

Laboratory Job No: 320-23501-1, 320-23830-1, 320-23998-1 and 320-24060-1

All field duplicate precision criteria were met.

Laboratory Job No: 320-23542-1, 320-23718-1, 320-23783-1, 320-23890-1 and 320-24961-1

Field duplicate samples were not submitted with this data set. Qualification of the data was not required on this basis.

Laboratory Job No: 320-23651-1

All field duplicate precision criteria were met with the following exceptions.

Compound	LOQ	DPT-16-26-GW-29-33 (µg/L)	DPT-16-26-GW-29-33-DUP (µg/L)	RPD
PFOS	0.0040	0.080	0.053	41

Data qualification was as follows:

Actions: (Resolution Consultants professional judgment was used)

Criteria		Action	
		Detected	Nondetected
Sample and duplicate are nondetect results	RPD Not calculable (NC)	No	No qualification
Sample and duplicate results $\geq 5 \times \text{LOQ}$	RPD > 30 (aqueous and solids)	J	Not Applicable
Sample and duplicate results $< 5 \times \text{LOQ}$	Absolute difference $\leq 2 \times \text{LOQ}$ (aqueous and solids)	J	Not Applicable
If sample or duplicate result is $> 5 \times \text{LOQ}$ and the other is not detected	NC	J	UJ

Qualified sample results are shown in Table 1.

Labeled Compound Results

The labeled compound results were reviewed for conformance with the QC acceptance criteria.

Laboratory Job No: 320-23501-1, 320-23542-1, 320-23651-1, 320-23718-1, 320-23830-1, 320-23998-1, 320-24060-1 and 320-24961-1

All QC acceptance criteria were met.

Laboratory Job No: 320-23783-1 and 320-23890-1

All QC acceptance criteria were met except for the labeled compound results summarized below.

Laboratory Job No: 320-23783-1			
Sample ID	Labeled Compound	% Recovery	QC Limits
DPT-16-15-GW-31-35	13C ₄ -PFOA	22	25-150

Laboratory Job No: 320-23890-1			
Sample ID	Labeled Compound	% Recovery	QC Limits
DPT-16-30-GW-31-35 DL	13C ₄ -PFOA	163	25-150
DPT-16-31-GW-19-23 DL	18O ₂ -PFHxS	154	25-150

Samples were qualified as follows:

Actions: (Based on NFG 2011)

Criteria	Actions	
	Detected	Not detected
%R > Upper Acceptance Limit	J	UJ
%R >10% but < Lower Acceptance Limit	J	UJ
%R <10%	See below	
<10% and S/N >10:1	J	R
<10% and S/N <10:1	R	R

Qualified sample results are presented in Table 1.

Sample Results/Reporting Issues

Laboratory Job No: 320-23501-1, 320-23542-1, 320-23651-1, 320-23718-1, 320-23783-1, 320-23830-1, 320-23890-1, 320-23998-1, 320-24060-1 and 320-24961-1

If applicable, compounds detected at concentrations less than the LOQ but greater than the DL are qualified by the laboratory as estimated (J). This "J" qualifier is retained during data validation.

It should be noted that the overall bias for a sample result is considered to be indeterminate in cases where the cumulative nonconformances do not show a consistent bias or in cases of the presence of a conflicting high and low bias.

Sample DPT-16-31-GW-19-23 (in Laboratory Job No: 320-23890-1) was analyzed at a 100x dilution; however, PFOS still exceeded the calibration range. The PFOS in this sample did not saturate the instrument detector, therefore, the result was reported from the 100x dilution and was qualified as estimated (J) since the calibration range was exceeded. Qualified sample results are presented in Table 1.

QUALIFICATION ACTIONS

Sample results qualified as a result of validation actions are summarized in Table 1. All actions are described above.

ATTACHMENTS

Attachment A: Qualifier Codes and Explanations

Attachment B: Reason Codes and Explanations

Table 1 - Data Validation Summary of Qualified Data

Laboratory Job No: 320-23501-1								
Sample ID	Matrix	Compound	Result	LOD	LOQ	Units	Validation Qualifiers	Validation Reason
DPT-16-02-GW-06-10	WG	Perfluorooctanesulfonic Acid (PFOS)	0.12	0.0029	0.0039	µg/L	J-	si
DPT-16-02-GW-06-10	WG	Perfluorooctanoic Acid (PFOA)	0.033	0.0019	0.0024	µg/L	J-	si
DPT-16-02-GW-06-10	WG	Perfluorobutanesulfonic Acid (PFBS)	0.0061	0.0019	0.0024	µg/L	J-	si
DPT-16-02-GW-06-10-DUP	WG	Perfluorooctanesulfonic Acid (PFOS)	0.12	0.0029	0.0039	µg/L	J-	si
DPT-16-02-GW-06-10-DUP	WG	Perfluorooctanoic Acid (PFOA)	0.028	0.0019	0.0024	µg/L	J-	si
DPT-16-02-GW-06-10-DUP	WG	Perfluorobutanesulfonic Acid (PFBS)	0.0059	0.0019	0.0024	µg/L	J-	si
DPT-16-02-GW-17-21	WG	Perfluorooctanesulfonic Acid (PFOS)	0.21	0.0030	0.0039	µg/L	J-	si
DPT-16-02-GW-17-21	WG	Perfluorooctanoic Acid (PFOA)	0.036	0.0020	0.0025	µg/L	J-	si
DPT-16-02-GW-17-21	WG	Perfluorobutanesulfonic Acid (PFBS)	0.0099	0.0020	0.0025	µg/L	J-	si

Laboratory Job No: 320-23542-1								
Sample ID	Matrix	Compound	Result	LOD	LOQ	Units	Validation Qualifiers	Validation Reason
DPT-16-01-GW-17-21	WG	Perfluorooctanoic Acid (PFOA)	0.062	0.0021	0.0026	µg/L	J-	si
DPT-16-01-GW-17-21	WG	Perfluorobutanesulfonic Acid (PFBS)	0.011	0.0021	0.0026	µg/L	J-	si
DPT-16-01-GW-17-21	WG	Perfluorooctanesulfonic Acid (PFOS)	0.98	0.031	0.042	µg/L	J-	si
DPT-16-05-GW-17-21	WG	Perfluorooctanoic Acid (PFOA)	0.19	0.0019	0.0024	µg/L	J-	si
DPT-16-05-GW-17-21	WG	Perfluorobutanesulfonic Acid (PFBS)	0.050	0.0019	0.0024	µg/L	J	m,si
DPT-16-05-GW-17-21	WG	Perfluorooctanesulfonic Acid (PFOS)	2.8	0.29	0.39	µg/L	J-	si
DPT-16-34-GW-31-35	WG	Perfluorobutanesulfonic Acid (PFBS)	0.12	0.0020	0.0025	µg/L	J-	si
DPT-16-34-GW-31-35	WG	Perfluorooctanesulfonic Acid (PFOS)	1.4	0.030	0.039	µg/L	J-	si
DPT-16-34-GW-31-35	WG	Perfluorooctanoic Acid (PFOA)	1.0	0.020	0.025	µg/L	J-	si

Laboratory Job No: 320-23651-1								
Sample ID	Matrix	Compound	Result	LOD	LOQ	Units	Validation Qualifiers	Validation Reason
DPT-16-20-GW-16-20	WG	Perfluorooctanesulfonic Acid (PFOS)	0.66	0.030	0.040	µg/L	J-	si
DPT-16-20-GW-16-20	WG	Perfluorooctanoic Acid (PFOA)	0.15	0.020	0.025	µg/L	J-	si
DPT-16-20-GW-16-20	WG	Perfluorobutanesulfonic Acid (PFBS)	0.017	0.020	0.025	µg/L	J-	si
DPT-16-20-GW-26-30	WG	Perfluorooctanesulfonic Acid (PFOS)	6.8	0.30	0.40	µg/L	J-	si
DPT-16-20-GW-26-30	WG	Perfluorooctanoic Acid (PFOA)	1.0	0.20	0.25	µg/L	J-	si
DPT-16-20-GW-26-30	WG	Perfluorobutanesulfonic Acid (PFBS)		0.20	0.25	µg/L	UJ	si
DPT-16-26-GW-18-22	WG	Perfluorooctanesulfonic Acid (PFOS)	0.038	0.0029	0.0039	µg/L	J-	si
DPT-16-26-GW-18-22	WG	Perfluorooctanoic Acid (PFOA)	0.0073	0.0020	0.0025	µg/L	J-	si
DPT-16-26-GW-18-22	WG	Perfluorobutanesulfonic Acid (PFBS)	0.0010	0.0020	0.0025	µg/L	J-	si
DPT-16-26-GW-29-33	WG	Perfluorooctanesulfonic Acid (PFOS)	0.080	0.0030	0.0040	µg/L	J	fd,si
DPT-16-26-GW-29-33	WG	Perfluorooctanoic Acid (PFOA)	0.0050	0.0020	0.0025	µg/L	J-	si
DPT-16-26-GW-29-33	WG	Perfluorobutanesulfonic Acid (PFBS)	0.0010	0.0020	0.0025	µg/L	J-	si
DPT-16-26-GW-29-33-DUP	WG	Perfluorooctanesulfonic Acid (PFOS)	0.053	0.0030	0.0040	µg/L	J	fd,si
DPT-16-26-GW-29-33-DUP	WG	Perfluorooctanoic Acid (PFOA)	0.0031	0.0020	0.0025	µg/L	J-	si
DPT-16-26-GW-29-33-DUP	WG	Perfluorobutanesulfonic Acid (PFBS)		0.0020	0.0025	µg/L	UJ	si
DPT-16-27-GW-18-22	WG	Perfluorooctanesulfonic Acid (PFOS)	0.026	0.0030	0.0040	µg/L	J-	si
DPT-16-27-GW-18-22	WG	Perfluorooctanoic Acid (PFOA)	0.0017	0.0020	0.0025	µg/L	J-	si
DPT-16-27-GW-18-22	WG	Perfluorobutanesulfonic Acid (PFBS)		0.0020	0.0025	µg/L	UJ	si
DPT-16-27-GW-29-33	WG	Perfluorooctanesulfonic Acid (PFOS)	0.015	0.0030	0.0040	µg/L	J-	si
DPT-16-27-GW-29-33	WG	Perfluorooctanoic Acid (PFOA)	0.0022	0.0020	0.0025	µg/L	J-	si
DPT-16-27-GW-29-33	WG	Perfluorobutanesulfonic Acid (PFBS)		0.0020	0.0025	µg/L	UJ	si

Laboratory Job No: 320-23651-1

Sample ID	Matrix	Compound	Result	LOD	LOQ	Units	Validation Qualifiers	Validation Reason
DPT-16-34-GW-16-20	WG	Perfluorooctanesulfonic Acid (PFOS)	1.6	0.030	0.039	µg/L	J-	si
DPT-16-34-GW-16-20	WG	Perfluorooctanoic Acid (PFOA)	0.40	0.020	0.025	µg/L	J-	si
DPT-16-34-GW-16-20	WG	Perfluorobutanesulfonic Acid (PFBS)	0.028	0.020	0.025	µg/L	J-	si

Laboratory Job No: 320-23783-1

Sample ID	Matrix	Compound	Result	LOD	LOQ	Units	Validation Qualifiers	Validation Reason
DPT-16-15-GW-18-22	WG	Perfluorooctanesulfonic Acid (PFOS)	12	0.30	0.40	µg/L	J-	si
DPT-16-15-GW-18-22	WG	Perfluorooctanoic Acid (PFOA)	15	0.20	0.25	µg/L	J-	si
DPT-16-15-GW-18-22	WG	Perfluorobutanesulfonic Acid (PFBS)	0.54	0.20	0.25	µg/L	J-	si
DPT-16-15-GW-31-35	WG	Perfluorooctanoic Acid (PFOA)	0.27	0.0020	0.0025	µg/L	J	lc,si
DPT-16-15-GW-31-35	WG	Perfluorobutanesulfonic Acid (PFBS)	0.048	0.0020	0.0025	µg/L	J-	si
DPT-16-15-GW-31-35	WG	Perfluorooctanesulfonic Acid (PFOS)	0.45	0.031	0.041	µg/L	J-	si
DPT-16-35-GW-21-25	WG	Perfluorobutanesulfonic Acid (PFBS)	0.28	0.0020	0.0025	µg/L	J-	si
DPT-16-35-GW-21-25	WG	Perfluorooctanesulfonic Acid (PFOS)	2.4	0.030	0.040	µg/L	J-	si
DPT-16-35-GW-21-25	WG	Perfluorooctanoic Acid (PFOA)	0.76	0.020	0.025	µg/L	J-	si
DPT-16-35-GW-31-35	WG	Perfluorooctanesulfonic Acid (PFOS)	0.80	0.030	0.040	µg/L	J-	si
DPT-16-35-GW-31-35	WG	Perfluorooctanoic Acid (PFOA)	1.4	0.020	0.025	µg/L	J-	si
DPT-16-35-GW-31-35	WG	Perfluorobutanesulfonic Acid (PFBS)	0.38	0.020	0.025	µg/L	J-	si

Laboratory Job No: 320-23890-1

Sample ID	Matrix	Compound	Result	LOD	LOQ	Units	Validation Qualifiers	Validation Reason
DPT-16-13-GW-18-22	WG	Perfluorooctanesulfonic Acid (PFOS)	14	0.15	0.20	µg/L	J-	si
DPT-16-13-GW-18-22	WG	Perfluorooctanoic Acid (PFOA)	7.0	0.099	0.12	µg/L	J-	si
DPT-16-13-GW-18-22	WG	Perfluorobutanesulfonic Acid (PFBS)	0.91	0.099	0.12	µg/L	J-	si
DPT-16-13-GW-31-35	WG	Perfluorooctanoic Acid (PFOA)	0.31	0.0020	0.0025	µg/L	J-	si
DPT-16-13-GW-31-35	WG	Perfluorobutanesulfonic Acid (PFBS)	0.060	0.0020	0.0025	µg/L	J-	si
DPT-16-13-GW-31-35	WG	Perfluorooctanesulfonic Acid (PFOS)	0.62	0.031	0.041	µg/L	J-	si
DPT-16-21-GW-19-23	WG	Perfluorooctanesulfonic Acid (PFOS)	12	0.15	0.20	µg/L	J-	si
DPT-16-21-GW-19-23	WG	Perfluorooctanoic Acid (PFOA)	15	0.10	0.13	µg/L	J-	si
DPT-16-21-GW-19-23	WG	Perfluorobutanesulfonic Acid (PFBS)	1.1	0.10	0.13	µg/L	J-	si
DPT-16-21-GW-31-35	WG	Perfluorobutanesulfonic Acid (PFBS)	0.16	0.0020	0.0025	µg/L	J-	si
DPT-16-21-GW-31-35	WG	Perfluorooctanesulfonic Acid (PFOS)	3.2	0.031	0.041	µg/L	J-	si
DPT-16-21-GW-31-35	WG	Perfluorooctanoic Acid (PFOA)	0.74	0.020	0.025	µg/L	J-	si
DPT-16-30-GW-18-22	WG	Perfluorobutanesulfonic Acid (PFBS)	0.21	0.0021	0.0026	µg/L	J-	si
DPT-16-30-GW-18-22	WG	Perfluorooctanesulfonic Acid (PFOS)	6.6	0.078	0.10	µg/L	J-	si
DPT-16-30-GW-18-22	WG	Perfluorooctanoic Acid (PFOA)	1.4	0.052	0.065	µg/L	J-	si
DPT-16-30-GW-31-35	WG	Perfluorobutanesulfonic Acid (PFBS)	0.31	0.0020	0.0025	µg/L	J-	si
DPT-16-30-GW-31-35	WG	Perfluorooctanesulfonic Acid (PFOS)	11	0.15	0.20	µg/L	J-	si
DPT-16-30-GW-31-35	WG	Perfluorooctanoic Acid (PFOA)	1.4	0.10	0.13	µg/L	J	lc,si
DPT-16-31-GW-19-23	WG	Perfluorooctanesulfonic Acid (PFOS)	42	0.30	0.40	µg/L	J	si,q
DPT-16-31-GW-19-23	WG	Perfluorooctanoic Acid (PFOA)	28	0.20	0.25	µg/L	J-	si
DPT-16-31-GW-19-23	WG	Perfluorobutanesulfonic Acid (PFBS)	1.1	0.20	0.25	µg/L	J	lc,si
DPT-16-31-GW-31-35	WG	Perfluorooctanoic Acid (PFOA)	0.34	0.0021	0.0026	µg/L	J-	si
DPT-16-31-GW-31-35	WG	Perfluorobutanesulfonic Acid (PFBS)	0.086	0.0021	0.0026	µg/L	J-	si
DPT-16-31-GW-31-35	WG	Perfluorooctanesulfonic Acid (PFOS)	2.0	0.031	0.041	µg/L	J-	si
DPT-16-32-GW-19-23	WG	Perfluorobutanesulfonic Acid (PFBS)	0.14	0.0020	0.0025	µg/L	J-	si
DPT-16-32-GW-19-23	WG	Perfluorooctanesulfonic Acid (PFOS)	9.2	0.076	0.10	µg/L	J-	si
DPT-16-32-GW-19-23	WG	Perfluorooctanoic Acid (PFOA)	0.68	0.051	0.063	µg/L	J-	si
DPT-16-32-GW-31-35	WG	Perfluorobutanesulfonic Acid (PFBS)	0.12	0.0020	0.0026	µg/L	J-	si
DPT-16-32-GW-31-35	WG	Perfluorooctanesulfonic Acid (PFOS)	2.1	0.031	0.041	µg/L	J-	si
DPT-16-32-GW-31-35	WG	Perfluorooctanoic Acid (PFOA)	0.65	0.020	0.026	µg/L	J-	si

Laboratory Job No: 320-23998-1

Sample ID	Matrix	Compound	Result	LOD	LOQ	Units	Validation Qualifiers	Validation Reason
DPT-16-03-GW-18-22	WG	Perfluorooctanesulfonic Acid (PFOS)	0.0071	0.0029	0.0039	µg/L	J-	si
DPT-16-03-GW-18-22	WG	Perfluorooctanoic Acid (PFOA)	0.00092	0.0019	0.0024	µg/L	J-	si
DPT-16-03-GW-18-22	WG	Perfluorobutanesulfonic Acid (PFBS)		0.0019	0.0024	µg/L	UJ	si
DPT-16-03-GW-31-35	WG	Perfluorooctanesulfonic Acid (PFOS)	0.13	0.0030	0.0039	µg/L	J-	si
DPT-16-03-GW-31-35	WG	Perfluorooctanoic Acid (PFOA)	0.019	0.0020	0.0025	µg/L	J-	si
DPT-16-03-GW-31-35	WG	Perfluorobutanesulfonic Acid (PFBS)		0.0020	0.0025	µg/L	UJ	si
DPT-16-04-GW-18-22	WG	Perfluorooctanesulfonic Acid (PFOS)	0.027	0.0029	0.0039	µg/L	J-	si
DPT-16-04-GW-18-22	WG	Perfluorooctanoic Acid (PFOA)	0.0027	0.0020	0.0025	µg/L	J-	si
DPT-16-04-GW-18-22	WG	Perfluorobutanesulfonic Acid (PFBS)		0.0020	0.0025	µg/L	UJ	si
DPT-16-04-GW-31-35	WG	Perfluorooctanesulfonic Acid (PFOS)	0.0016	0.0030	0.0040	µg/L	J-	si
DPT-16-04-GW-31-35	WG	Perfluorooctanoic Acid (PFOA)		0.0020	0.0025	µg/L	UJ	si
DPT-16-04-GW-31-35	WG	Perfluorobutanesulfonic Acid (PFBS)		0.0020	0.0025	µg/L	UJ	si
DPT-16-06-GW-18-22	WG	Perfluorobutanesulfonic Acid (PFBS)	0.20	0.0019	0.0024	µg/L	J-	si
DPT-16-06-GW-18-22	WG	Perfluorooctanesulfonic Acid (PFOS)	2.8	0.029	0.039	µg/L	J-	si
DPT-16-06-GW-18-22	WG	Perfluorooctanoic Acid (PFOA)	1.9	0.019	0.024	µg/L	J-	si
DPT-16-06-GW-31-35	WG	Perfluorooctanesulfonic Acid (PFOS)	2.7	0.031	0.041	µg/L	J-	si
DPT-16-06-GW-31-35	WG	Perfluorooctanoic Acid (PFOA)	1.6	0.021	0.026	µg/L	J-	si
DPT-16-06-GW-31-35	WG	Perfluorobutanesulfonic Acid (PFBS)	0.28	0.021	0.026	µg/L	J-	si
DPT-16-07-GW-18-22	WG	Perfluorooctanoic Acid (PFOA)	0.37	0.0020	0.0025	µg/L	J-	si
DPT-16-07-GW-18-22	WG	Perfluorobutanesulfonic Acid (PFBS)	0.17	0.0020	0.0025	µg/L	J-	si
DPT-16-07-GW-18-22	WG	Perfluorooctanesulfonic Acid (PFOS)	1.9	0.030	0.040	µg/L	J-	si
DPT-16-07-GW-31-35	WG	Perfluorobutanesulfonic Acid (PFBS)	0.18	0.0020	0.0025	µg/L	J-	si
DPT-16-07-GW-31-35	WG	Perfluorooctanesulfonic Acid (PFOS)	3.1	0.030	0.040	µg/L	J-	si
DPT-16-07-GW-31-35	WG	Perfluorooctanoic Acid (PFOA)	1.2	0.020	0.025	µg/L	J-	si
DPT-16-08-GW-18-22	WG	Perfluorooctanesulfonic Acid (PFOS)	0.038	0.0030	0.0040	µg/L	J-	si
DPT-16-08-GW-18-22	WG	Perfluorooctanoic Acid (PFOA)	0.0075	0.0020	0.0025	µg/L	J-	si
DPT-16-08-GW-18-22	WG	Perfluorobutanesulfonic Acid (PFBS)	0.0030	0.0020	0.0025	µg/L	J-	si
DPT-16-08-GW-31-35	WG	Perfluorooctanesulfonic Acid (PFOS)	0.022	0.0029	0.0039	µg/L	J-	si
DPT-16-08-GW-31-35	WG	Perfluorooctanoic Acid (PFOA)	0.0045	0.0019	0.0024	µg/L	J-	si
DPT-16-08-GW-31-35	WG	Perfluorobutanesulfonic Acid (PFBS)	0.0056	0.0019	0.0024	µg/L	J-	si
DPT-16-09-GW-18-22	WG	Perfluorooctanesulfonic Acid (PFOS)	0.019	0.0029	0.0039	µg/L	J-	si
DPT-16-09-GW-18-22	WG	Perfluorooctanoic Acid (PFOA)	0.0045	0.0019	0.0024	µg/L	J-	si
DPT-16-09-GW-18-22	WG	Perfluorobutanesulfonic Acid (PFBS)	0.0043	0.0019	0.0024	µg/L	J-	si
DPT-16-09-GW-31-35	WG	Perfluorooctanesulfonic Acid (PFOS)	0.017	0.0029	0.0038	µg/L	J-	si
DPT-16-09-GW-31-35	WG	Perfluorooctanoic Acid (PFOA)	0.0021	0.0019	0.0024	µg/L	J-	si
DPT-16-09-GW-31-35	WG	Perfluorobutanesulfonic Acid (PFBS)	0.0027	0.0019	0.0024	µg/L	J-	si
DPT-16-10-GW-18-22	WG	Perfluorooctanesulfonic Acid (PFOS)	0.030	0.0029	0.0038	µg/L	J-	si
DPT-16-10-GW-18-22	WG	Perfluorooctanoic Acid (PFOA)	0.0062	0.0019	0.0024	µg/L	J-	si
DPT-16-10-GW-18-22	WG	Perfluorobutanesulfonic Acid (PFBS)	0.010	0.0019	0.0024	µg/L	J-	si
DPT-16-10-GW-31-35	WG	Perfluorooctanesulfonic Acid (PFOS)	0.11	0.0030	0.0040	µg/L	J-	si
DPT-16-10-GW-31-35	WG	Perfluorooctanoic Acid (PFOA)	0.014	0.0020	0.0025	µg/L	J-	si
DPT-16-10-GW-31-35	WG	Perfluorobutanesulfonic Acid (PFBS)		0.0020	0.0025	µg/L	UJ	si
DPT-16-11-GW-18-22	WG	Perfluorobutanesulfonic Acid (PFBS)	0.18	0.0019	0.0024	µg/L	J-	si
DPT-16-11-GW-18-22	WG	Perfluorooctanesulfonic Acid (PFOS)	6.0	0.29	0.38	µg/L	J-	si
DPT-16-11-GW-18-22	WG	Perfluorooctanoic Acid (PFOA)	2.0	0.19	0.24	µg/L	J-	si
DPT-16-11-GW-31-35	WG	Perfluorooctanoic Acid (PFOA)	0.33	0.0020	0.0025	µg/L	J-	si
DPT-16-11-GW-31-35	WG	Perfluorobutanesulfonic Acid (PFBS)	0.080	0.0020	0.0025	µg/L	J-	si
DPT-16-11-GW-31-35	WG	Perfluorooctanesulfonic Acid (PFOS)	0.86	0.030	0.040	µg/L	J-	si
DPT-16-11-GW-31-35-DUP	WG	Perfluorooctanoic Acid (PFOA)	0.33	0.0020	0.0025	µg/L	J-	si
DPT-16-11-GW-31-35-DUP	WG	Perfluorobutanesulfonic Acid (PFBS)	0.076	0.0020	0.0025	µg/L	J-	si
DPT-16-11-GW-31-35-DUP	WG	Perfluorooctanesulfonic Acid (PFOS)	0.88	0.029	0.039	µg/L	J-	si

Laboratory Job No: 320-24961-1

Sample ID	Matrix	Compound	Result	LOD	LOQ	Units	Validation Qualifiers	Validation Reason
DPT-17-26-GW-18-22	WG	Perfluorooctanesulfonic Acid (PFOS)		0.0083	0.0083	µg/L	U	be
DPT-17-26-GW-29-33	WG	Perfluorooctanoic Acid (PFOA)		0.0024	0.0024	µg/L	U	be
DPT-17-27-GW-29-33	WG	Perfluorooctanesulfonic Acid (PFOS)		0.0040	0.0040	µg/L	U	be

Attachment A

Qualifier Codes and Explanations

Qualifier	Explanation
J	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
J+	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample and is potentially biased high.
J-	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample and is potentially biased low.
JN	The analyte was tentatively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
UJ	The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
U	The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
R	The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

Attachment B

Reason Codes and Explanations

Reason Code	Explanation
be	Equipment blank contamination
bf	Field blank contamination
bl	Laboratory blank contamination
c	Calibration issue
d	Reporting limit raised due to chromatographic interference
fd	Field duplicate RPDs
h	Holding times
i	Internal standard areas
k	Estimated Maximum Possible Concentration (EMPC)
l	LCS or OPR recoveries
lc	Labeled compound recovery
ld	Laboratory duplicate RPDs
lp	Laboratory control sample/laboratory control sample duplicate RPDs
m	Matrix spike recovery
md	Matrix spike/matrix spike duplicate RPDs
nb	Negative laboratory blank contamination
p	Chemical preservation issue
r	Dual column RPD
q	Quantitation issue
s	Surrogate recovery
si	Sample integrity issue
su	Ion suppression
t	Temperature preservation issue
x	Percent solids
y	Serial dilution results
z	ICS results



Soil and Sediment Data Validation Report

Project:	Former Bay Head Road Annex- Annapolis, MD	
Laboratory:	TestAmerica-West Sacramento, CA	
Job Number:	320-23256-1, 320-23542-1, 320-23651-1, 320-23718-1, 320-23783-1 and 320-24995-1	
Analyses/Method:	Perfluorinated Compounds (PFCs) in Water, Soils, Sediments and Tissues by Liquid Chromatography/Mass Spectrometry/Mass Spectrometry (LC/MS/MS)/ Revision 1.4 (August 2015)	
Validation Level:	Limited	
Resolution Consultants	60444465-DM.DE	
Project Number:		
Prepared by:	Paula DiMattei/Resolution Consultants	Completed on: 2/7/2017
Reviewed by:	Robert Kennedy/Resolution Consultants	Completed on: 2/7/2017

SUMMARY

The samples listed below were collected by Resolution Consultants from the Former Bay Head Road Annex site in Annapolis, MD on November 2, 14-18, 21-22, 2016 and January 12, 2017.

Laboratory Job No.	Sample ID	Matrix/Sample Type
320-23256-1	DPT-16-15-SO-00-01	Soil
	DPT-16-15-SO-00-01-DUP	Field duplicate of DPT-16-15-SO-00-01
	DPT-16-20-S0-00-01	Soil
	DPT-16-28-S0-00-01	Soil
	DPT-16-29-S0-00-01	Soil
	DPT-16-30-S0-00-01	Soil
	DPT-16-31-S0-00-01	Soil
	DPT-16-32-S0-00-01	Soil
	DPT-16-34-S0-00-01	Soil
	SWSD-16-03SD	Sediment
	SWSD-16-04-SD	Sediment
	SWSD-16-01-SD	Sediment
	SWSD-16-02-SD	Sediment
	SWSD-16-02-SD-DUP	Field duplicate of SWSD-16-02-SD
	DPT-SO-EB-110216	Equipment blank
	SD-EB-110216	Equipment blank
	320-23542-1	DPT-16-34-SO-14-15

Laboratory Job No.	Sample ID	Matrix/Sample Type
320-23651-1	DPT-16-20-SO-16-17	Soil
	DPT-16-20-SO-16-17-DUP	Field duplicate of DPT-16-20-SO-16-17
	DPT-SO-EB-111516	Equipment blank
320-23718-1	DPT-16-29-SO-14-15	Soil
320-23783-1	DPT-16-15-SO-14-15	Soil
	DPT-16-19-SO-00-01	Soil
	DPT-16-19-SO-17-18	Soil
	DPT-16-28-SO-14-15	Soil
	DPT-16-30-SO-14-15	Soil
	DPT-16-31-SO-14-15	Soil
	DPT-16-32-SO-14-15	Soil
	DPT-16-35-SO-00-01	Soil
DPT-16-35-SO-19-20	Soil	
320-24995-1	DPT-SO-EB-26	Equipment blank
	DPT-SO-EB-27	Equipment blank
	DPT-17-27-SO-00-01	Soil
	DPT-17-27-SO-13-14	Soil
	DPT-17-26-SO-00-01	Soil
	DPT-17-26-SO-12-13	Soil

Data validation activities were conducted with reference to:

- TestAmerica-West Sacramento SOP: Perfluorinated Compounds (PFCs) in Water, Soils, Sediments and Tissues by Liquid Chromatography/Mass Spectrometry/Mass Spectrometry (LC/MS/MS)/Revision 1.4 (August 2015);
- USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (September 2016);
- USEPA Contract Laboratory Program National Functional Guidelines for High Resolution Superfund Methods Data Review (April 2016)
- Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (DoD, July 2013); and
- the project-specific Sampling and Analysis Plan.

In the absence of method-specific information, laboratory quality control (QC) limits, project-specific requirements and/or professional judgment were used as appropriate.

REVIEW ELEMENTS

The data were evaluated based on the following review elements (where applicable to the method):

- ✓ Data completeness (chain-of-custody (COC)/sample integrity)
- ✓ Holding times/sample preservation
- ✓ Initial calibration/initial and continuing calibration verification
- ✗ Laboratory method blanks/equipment blanks
- ✗ Matrix spike (MS) and/or matrix spike duplicate (MSD) results

- ✓ Laboratory control sample (LCS)/laboratory control sample duplicate (LCSD) results
- ✗ Field duplicate results
- ✓ Labeled compound results
- ✓ Sample results/reporting issues

The symbol (✓) indicates that no validation qualifiers were applied based on this parameter. An "NA" indicates that the parameter was not included as part of this data set or was not applicable to this validation and therefore not reviewed. The symbol (✗) indicates that a QC nonconformance resulted in the qualification of data. Any QC nonconformance that resulted in the qualification of data is discussed below. In addition, nonconformances or other issues that were noted during validation, but did not result in qualification of data, may be discussed for informational purposes only.

The data appear valid as reported and may be used for decision making purposes. Qualification of the data was not required on the basis of this data review.

RESULTS

Data Completeness (chain-of-custody (COC)/Sample Integrity)

The data package was reviewed and found to meet acceptance criteria for completeness:

- The COCs were reviewed for completeness of information relevant to the samples and requested analyses, and for signatures indicating transfer of sample custody.
- The laboratory sample login sheet(s) were reviewed for issues potentially affecting sample integrity, including the condition of sample containers upon receipt at the laboratory.
- Completeness of analyses was verified by comparing the reported results to the COC requests.

Laboratory Job No: 320-23256-1, 320-23542-1, 320-23651-1, 320-23718-1 and 320-24995-1

No discrepancies were noted.

Laboratory Job No: 320-23783-1

The laboratory noted that the sample container label for sample 320-23783-10 identified the sample as DPT-16-22-SO-14-15 while the COC identified this sample as DPT-16-28-SO-14-15. The sample ID listed on the COC was used to identify this sample.

Holding Times/Sample Preservation

Sample preservation and preparation/analysis holding times were reviewed for conformance with the QC acceptance criteria.

Laboratory Job No: 320-23256-1, 320-23542-1, 320-23651-1, 320-23718-1, 320-23783-1 and 320-24995-1

All QC acceptance criteria were met.

Initial Calibration/Initial and Continuing Calibration Verification

Calibration data were reviewed for conformance with the QC acceptance criteria to ensure that:

- the initial calibration (ICAL) percent relative standard deviation (%RSD) or correlation coefficient (r) or coefficient of determination (r^2) method acceptance criteria were met;
- the initial calibration verification standard (ICV) percent recovery acceptance criteria were met; and
- the continuing calibration verification standard (CCV) frequency and method percent difference or percent drift (%D) criteria were met.

Laboratory Job No: 320-23256-1, 320-23542-1, 320-23651-1, 320-23718-1, 320-23783-1 and 320-24995-1

All QC acceptance criteria were met.

Laboratory Method Blanks/Equipment Blanks

Laboratory method blanks and equipment blanks are evaluated as to whether there are contaminants detected above the detection limit (DL).

Laboratory Job No: 320-23256-1, 320-23542-1, 320-23651-1, 320-23718-1 and 320-23783-1

Target compounds were not detected in the laboratory method blank or the equipment blanks associated with the samples in this data set.

Laboratory Job No: 320-24995-1

Data validation qualifications for individual samples are based on the maximum contaminant concentration detected in all associated blanks. Blank contamination is not discussed if qualification of the data was not required. The following table summarizes the contamination detected and the associated samples.

Blank ID	Compound	Concentration (µg/L)	Associated Samples
DPT-SO-EB-27	PFOS	0.0011 J	DPT-17-27-SO-00-01 DPT-17-27-SO-13-14

Samples were qualified as follows:

Actions: Based on NFG 2016

Blank Result	Sample Result	Actions
<LOQ	Not detected	No qualification
	< LOQ	Qualify sample result as U at the LOQ
	≥ LOQ	Use professional judgment
≥LOQ	< LOQ	Qualify sample result as U at the LOQ
	≥ LOQ but <blank result	Qualify sample result as U at the result concentration.
	≥ LOQ but ≥blank result	Use professional judgment

Qualified sample results are presented in Table 1.

MS/MSD Results

The MS/MSD percent recoveries (%Rs) and relative percent differences (RPDs) were reviewed for conformance with the QC acceptance criteria.

Laboratory Job No: 320-23256-1, 320-23718-1 and 320-24995-1

All QC acceptance criteria were met.

Laboratory Job No: 320-23542-1

All QC acceptance criteria were met except for the nonconformances summarized below. Nonconformances are not noted below if qualification of the data was not required.

Sample ID	Compound	MS/MSD % R	QC Limits
DPT-16-34-SO-14-15	PFOA	179/198	60-140

The parent sample was qualified as follows: (based on NFG 2016)

Criteria	Actions ¹	
	Detected	Not detected
RPD >Upper Acceptance Limit	J	No qualification
%R >Upper Acceptance Limit	J+	No qualification
%R >10% but < Lower Acceptance Limit	J-	UJ
<10%	J-	R
¹ Professional judgment was used to include bias codes as applicable		

Qualified sample results are presented in Table 1.

Laboratory Job No: 320-23651-1 and 320-23783-1

MS/MSD analyses were not performed on a sample from this data set. The data were not qualified on this basis.

LCS/LCSD Results

The LCS %Rs and RPDs were reviewed for conformance with the QC acceptance criteria.

Laboratory Job No: 320-23256-1, 320-23542-1, 320-23651-1, 320-23718-1, 320-23783-1 and 320-24995-1

All QC acceptance criteria were met.

Field Duplicate Results

Field duplicate RPDs are reviewed for conformance with the RESCON QC acceptance limit of $\leq 30\%$ [if results are greater than five times the limit of quantitation (LOQ)] and $\leq 2x$ the LOQ [if results are less than five times the LOQ] for aqueous and solid matrices.

Laboratory Job No: 320-23256-1

All field duplicate precision criteria were met.

Laboratory Job No: 320-23542-1, 320-23718-1, 320-23783-1 and 320-24995-1

Field duplicate samples were not submitted with this data set. Qualification of the data was not required on this basis.

Laboratory Job No: 320-23651-1

All field duplicate precision criteria were met with the following exceptions.

Compound	LOQ	DPT-16-20-SO-16-17 (µg/Kg)	DPT-16-20-SO-16-17-DUP (µg/Kg)	RPD
PFOS	0.61	10	20	67

Data qualification was as follows:

Actions: (Resolution Consultants professional judgment was used)

Criteria		Action	
		Detected	Nondetected
Sample and duplicate are nondetect results	RPD Not calculable (NC)	No	No qualification
Sample and duplicate results $\geq 5xLOQ$	RPD >30 (aqueous and solids)	J	Not Applicable
Sample and duplicate results $<5xLOQ$	Absolute difference $\leq 2x LOQ$ (aqueous and solids)	J	Not Applicable
If sample or duplicate result is $>5x LOQ$ and the other is not detected	NC	J	UJ

Qualified sample results are shown in Table 1.

Labeled Compound Results

The labeled compound results were reviewed for conformance with the QC acceptance criteria.

Laboratory Job No: 320-23256-1, 320-23542-1, 320-23651-1, 320-23718-1, 320-23783-1 and 320-24995-1

All QC acceptance criteria were met.

Sample Results/Reporting Issues

Laboratory Job No: 320-23256-1, 320-23542-1, 320-23651-1, 320-23718-1, 320-23783-1 and 320-24995-1

If applicable, compounds detected at concentrations less than the LOQ but greater than the DL are qualified by the laboratory as estimated (J). This "J" qualifier is retained during data validation.

It should be noted that the overall bias for a sample result is considered to be indeterminate in cases where the cumulative nonconformances do not show a consistent bias or in cases of the presence of a conflicting high and low bias.

QUALIFICATION ACTIONS

Sample results qualified as a result of validation actions are summarized in Table 1. All actions are described above.

ATTACHMENTS

Attachment A: Qualifier Codes and Explanations

Attachment B: Reason Codes and Explanations

Table 1 - Data Validation Summary of Qualified Data

Laboratory Job No: 320-23542-1								
Sample ID	Matrix	Compound	Result	LOD	LOQ	Units	Validation Qualifiers	Validation Reason
DPT-16-34-SO-14-15	SO	Perfluorooctanoic Acid (PFOA)	3.2	0.37	0.62	µg/Kg	J+	m

Laboratory Job No: 320-23651-1								
Sample ID	Matrix	Compound	Result	LOD	LOQ	Units	Validation Qualifiers	Validation Reason
DPT-16-20-SO-16-17	SO	Perfluorooctanesulfonic Acid (PFOS)	10	0.37	0.61	µg/Kg	J	fd
DPT-16-20-SO-16-17-DUP	SO	Perfluorooctanesulfonic Acid (PFOS)	20	0.36	0.59	µg/Kg	J	fd

Laboratory Job No: 320-24995-1								
Sample ID	Matrix	Compound	Result	LOD	LOQ	Units	Validation Qualifiers	Validation Reason
DPT-17-27-SO-00-01	SO	Perfluorooctanesulfonic Acid (PFOS)		0.60	0.60	µg/Kg	U	be

Attachment A

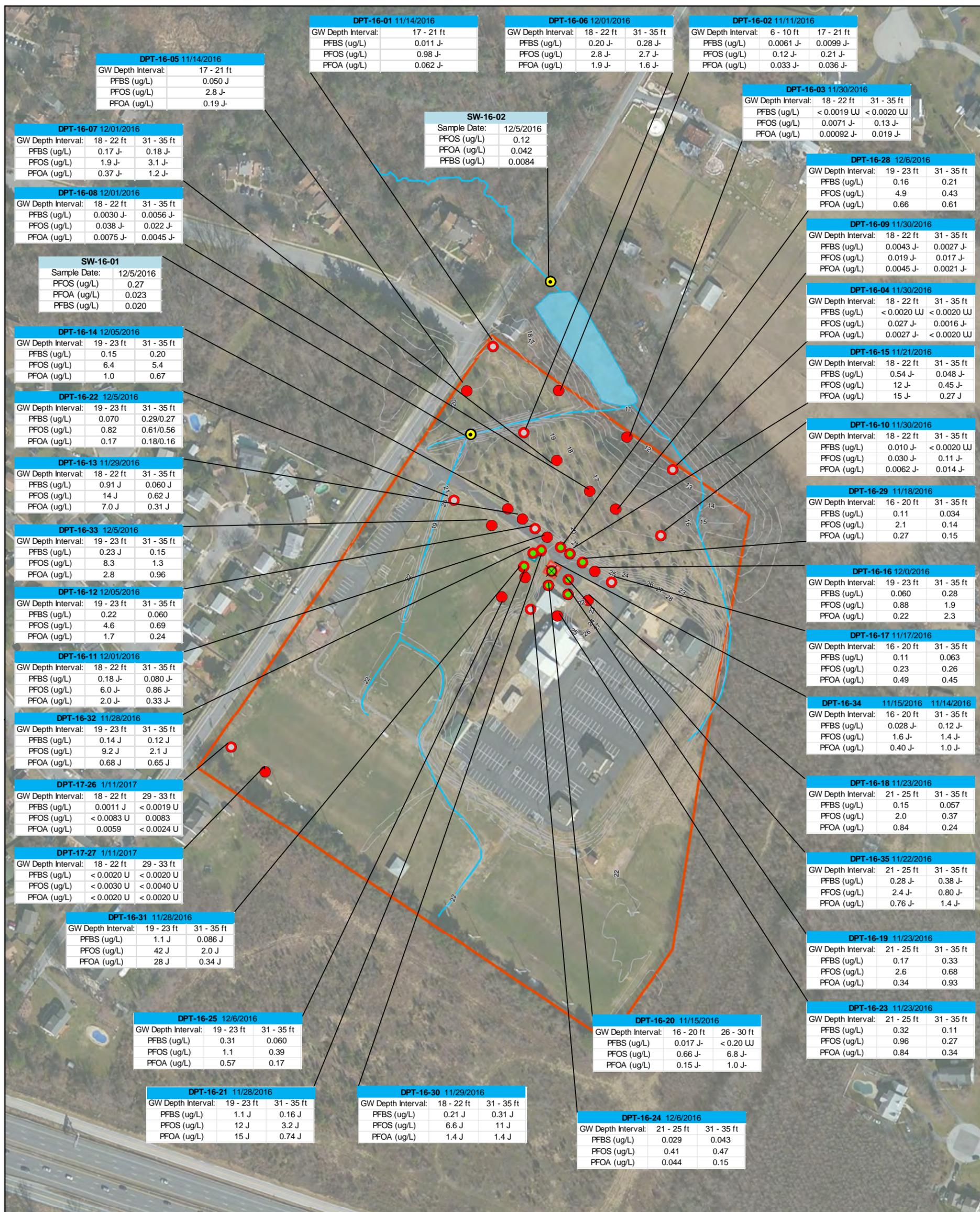
Qualifier Codes and Explanations

Qualifier	Explanation
J	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
J+	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample and is potentially biased high.
J-	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample and is potentially biased low.
JN	The analyte was tentatively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
UJ	The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
U	The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
R	The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

Attachment B

Reason Codes and Explanations

Reason Code	Explanation
be	Equipment blank contamination
bf	Field blank contamination
bl	Laboratory blank contamination
c	Calibration issue
d	Reporting limit raised due to chromatographic interference
fd	Field duplicate RPDs
h	Holding times
i	Internal standard areas
k	Estimated Maximum Possible Concentration (EMPC)
l	LCS or OPR recoveries
lc	Labeled compound recovery
ld	Laboratory duplicate RPDs
lp	Laboratory control sample/laboratory control sample duplicate RPDs
m	Matrix spike recovery
md	Matrix spike/matrix spike duplicate RPDs
nb	Negative laboratory blank contamination
p	Chemical preservation issue
r	Dual column RPD
q	Quantitation issue
s	Surrogate recovery
si	Sample integrity issue
su	Ion suppression
t	Temperature preservation issue
x	Percent solids
y	Serial dilution results
z	ICS results



Legend

- Surface Water and Sediment Sample
- Soil / GW Sample adjacent to Historic RI
- GW Sample and HPT Survey
- Soil and GW Sample
- Groundwater Sample
- Soil Sample, GW Sample, and HPT Survey
- Former Bay Head Road Annex Facility
- Former Burn Pad
- Former Evaporation Pond
- 1-ft Contour
- Surface Water
- Groundwater Flow Direction

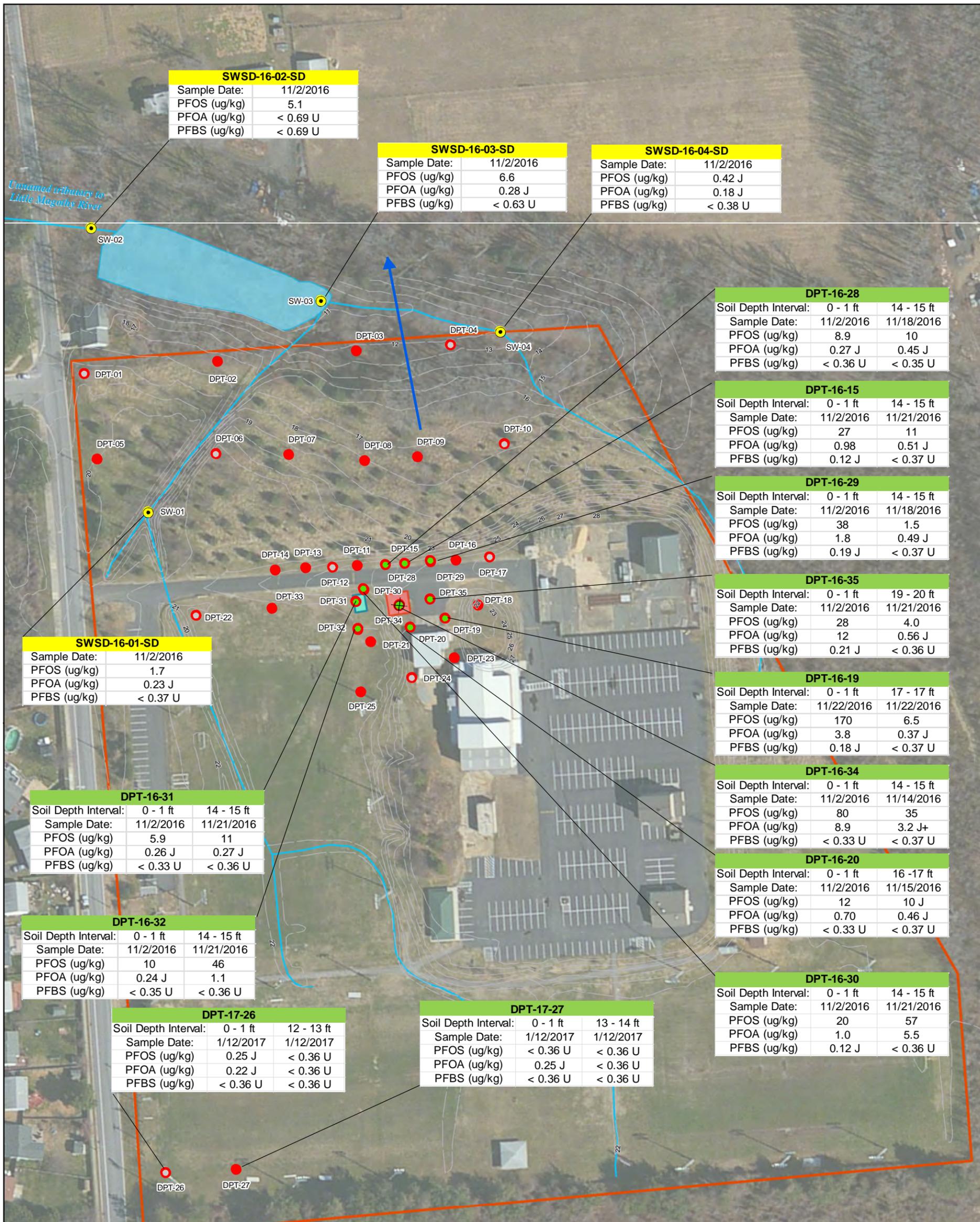
SURFACE WATER ANALYTICAL RESULTS

GROUNDWATER ANALYTICAL RESULTS

Notes:
 U indicates value below reporting detection limit
 J indicates estimated value
 J+ indicates estimated value on the high side
 J- indicates estimated value on the low side
 0.12 / 0.12 indicates Parent Sample / Duplicate Sample
 PFBS = Perfluorobutanesulfonic Acid
 PFOS = Perfluorooctane Sulfonate
 PFOA = Perfluorooctanoic Acid

0 37.5 75 150 225 300 Feet

CONTRACT NO 60444465		Former Bay Head Road Annex Facility	
CARTOGRAPHY BY A. Carr		<p align="center">Figure 1 Groundwater and Surface Water Sampling Results Former Bay Head Road Annex Facility Annapolis, MD</p>	
CHECKED BY C. Mitchell	DATE February 2017		
SCALE 1" = 61'	SHEET 1 of 1		
20170206_Fig_2_Groundwater			



SWSD-16-02-SD	
Sample Date:	11/2/2016
PFOS (ug/kg)	5.1
PFOA (ug/kg)	< 0.69 U
PFBS (ug/kg)	< 0.69 U

SWSD-16-03-SD	
Sample Date:	11/2/2016
PFOS (ug/kg)	6.6
PFOA (ug/kg)	0.28 J
PFBS (ug/kg)	< 0.63 U

SWSD-16-04-SD	
Sample Date:	11/2/2016
PFOS (ug/kg)	0.42 J
PFOA (ug/kg)	0.18 J
PFBS (ug/kg)	< 0.38 U

DPT-16-28		
Soil Depth Interval:	0 - 1 ft	14 - 15 ft
Sample Date:	11/2/2016	11/18/2016
PFOS (ug/kg)	8.9	10
PFOA (ug/kg)	0.27 J	0.45 J
PFBS (ug/kg)	< 0.36 U	< 0.35 U

DPT-16-15		
Soil Depth Interval:	0 - 1 ft	14 - 15 ft
Sample Date:	11/2/2016	11/21/2016
PFOS (ug/kg)	27	11
PFOA (ug/kg)	0.98	0.51 J
PFBS (ug/kg)	0.12 J	< 0.37 U

DPT-16-29		
Soil Depth Interval:	0 - 1 ft	14 - 15 ft
Sample Date:	11/2/2016	11/18/2016
PFOS (ug/kg)	38	1.5
PFOA (ug/kg)	1.8	0.49 J
PFBS (ug/kg)	0.19 J	< 0.37 U

DPT-16-35		
Soil Depth Interval:	0 - 1 ft	19 - 20 ft
Sample Date:	11/2/2016	11/21/2016
PFOS (ug/kg)	28	4.0
PFOA (ug/kg)	12	0.56 J
PFBS (ug/kg)	0.21 J	< 0.36 U

DPT-16-19		
Soil Depth Interval:	0 - 1 ft	17 - 17 ft
Sample Date:	11/22/2016	11/22/2016
PFOS (ug/kg)	170	6.5
PFOA (ug/kg)	3.8	0.37 J
PFBS (ug/kg)	0.18 J	< 0.37 U

DPT-16-34		
Soil Depth Interval:	0 - 1 ft	14 - 15 ft
Sample Date:	11/2/2016	11/14/2016
PFOS (ug/kg)	80	35
PFOA (ug/kg)	8.9	3.2 J+
PFBS (ug/kg)	< 0.33 U	< 0.37 U

DPT-16-20		
Soil Depth Interval:	0 - 1 ft	16 - 17 ft
Sample Date:	11/2/2016	11/15/2016
PFOS (ug/kg)	12	10 J
PFOA (ug/kg)	0.70	0.46 J
PFBS (ug/kg)	< 0.33 U	< 0.37 U

DPT-16-30		
Soil Depth Interval:	0 - 1 ft	14 - 15 ft
Sample Date:	11/2/2016	11/21/2016
PFOS (ug/kg)	20	57
PFOA (ug/kg)	1.0	5.5
PFBS (ug/kg)	0.12 J	< 0.36 U

DPT-17-26		
Soil Depth Interval:	0 - 1 ft	12 - 13 ft
Sample Date:	1/12/2017	1/12/2017
PFOS (ug/kg)	0.25 J	< 0.36 U
PFOA (ug/kg)	0.22 J	< 0.36 U
PFBS (ug/kg)	< 0.36 U	< 0.36 U

DPT-17-27		
Soil Depth Interval:	0 - 1 ft	13 - 14 ft
Sample Date:	1/12/2017	1/12/2017
PFOS (ug/kg)	< 0.36 U	< 0.36 U
PFOA (ug/kg)	0.25 J	< 0.36 U
PFBS (ug/kg)	< 0.36 U	< 0.36 U

SWSD-16-01-SD	
Sample Date:	11/2/2016
PFOS (ug/kg)	1.7
PFOA (ug/kg)	0.23 J
PFBS (ug/kg)	< 0.37 U

DPT-16-31		
Soil Depth Interval:	0 - 1 ft	14 - 15 ft
Sample Date:	11/2/2016	11/21/2016
PFOS (ug/kg)	5.9	11
PFOA (ug/kg)	0.26 J	0.27 J
PFBS (ug/kg)	< 0.33 U	< 0.36 U

DPT-16-32		
Soil Depth Interval:	0 - 1 ft	14 - 15 ft
Sample Date:	11/2/2016	11/21/2016
PFOS (ug/kg)	10	46
PFOA (ug/kg)	0.24 J	1.1
PFBS (ug/kg)	< 0.35 U	< 0.36 U

Legend

- Surface Water and Sediment Sample
- Soil / GW Sample adjacent to Historic RI
- GW Sample and HPT Survey
- Soil and GW Sample
- Groundwater Sample
- Soil Sample, GW Sample, and HTP Survey
- Former Bay Head Road Annex Facility
- Former Burn Pad
- Former Evaporation Pond
- 1-ft Contour
- Surface Water
- Groundwater Flow Direction

SEDIMENT ANALYTICAL RESULTS

SOIL ANALYTICAL RESULTS

Notes:
 U indicates value below reporting detection limit
 J indicates estimated value
 J+ indicates estimated value on the high side
 J- indicates estimated value on the low side
 0.12 / 0.12 = Parent Sample / Duplicate Sample
 PFBS = Perfluorobutanesulfonic Acid
 PFOS = Perfluorooctane Sulfonate
 PFOA = Perfluorooctanoic Acid



CONTRACT NO 60444465	
CARTOGRAPHY BY A. Carr	
CHECKED BY C. Mitchell	DATE February 2017
SCALE 1" = 61'	SHEET 1 of 1
Fig_10-3 _Historic_and_Proposed_ Sample_Locations.mxd	

Former Bay Head Road Annex Facility
 Figure 2
 Soil and Sediment Analytical Results
 Former Bay Head Road Annex Facility
 Annapolis, MD



Source: ESRI, 2015; USGS National Hydrography Dataset, 2005