Mr. Richard A. Mustico, P.E.
NYSDEC Region 4
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Schenectady, New York 12306-2014

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ENVIRONMENT

Subject:
Erie Boulevard Hydropower, L.P.
Former Fire Training Area
School Street Hydroelectric Station
Town of Colonie, New York
PFAS Groundwater Investigation Report &
Proposed Monitoring Well Decommissioning Plan

Date:
February 22, 2017

Contact:
John C. Brussel, P.E.

Phone:
315.671.9441

Email:
John.Brussel@arcadis.com

Our ref:
B0036643.0001 #10

Dear Mr. Mustico:

On behalf of National Grid and Erie Boulevard Hydropower, L.P., this letter summarizes the work performed and findings of the December 2016 perfluoroalkyl substances (PFAS) groundwater investigation performed at the School Street Hydroelectric Station in Cohoes, New York. The PFAS groundwater investigation was conducted to assess the potential presence of PFAS constituents (if any) in groundwater within the former fire training area. The PFAS groundwater investigation was implemented by Arcadis of New York, Inc. (Arcadis) in accordance with the following:

- The work plan contained in a November 14, 2016 letter from Arcadis to the New York State Department of Environmental Conservation (NYSDEC).
- December 9, 2016 e-mail correspondence from Arcadis to the NYSDEC addressing the NYSDEC's comments on the above-referenced work plan.

NYSDEC approval of the work plan, as modified by the December 9, 2016 e-mail correspondence, was provided on December 12, 2016.

As summarized herein, the PFASs commonly associated with former fighting foams (perfluorooctane sulfonate [PFOS] and perfluorooctanoic acid [PFOA]) were not identified in any of the December 2016 groundwater samples above laboratory detection limits, which were well-below the United States Environmental Protection Agency (EPA) health advisory value for PFOA and PFOS combined in groundwater. Based on the PFAS groundwater investigation findings and previous completion of remedial activities addressing environmental

concerns, this letter also presents a plan for decommissioning the existing monitoring wells in the former fire training area.

Relevant background information is presented below, followed by a summary of the groundwater investigation, a plan for decommissioning the existing groundwater monitoring wells, and proposed next steps toward site closure.

I. BACKGROUND

The School Street hydroelectric station is located in the Towns of Colonie and Cohoes, Albany County, New York (Figure 1). The generating station is located along the south bank of the Mohawk River, which flows southeasterly through the City of Cohoes. An upland portion of the hydroelectric station property in the Town of Colonie was formerly used by Niagara Mohawk (now known as National Grid) for fire training activities. This former fire training area ("the site") is a listed New York State inactive hazardous waste site and has previously undergone extensive investigation and remediation. The site location relative to the generating station is shown on Figure 2. The former site layout and locations of the five groundwater monitoring wells installed as part of previous site investigations are shown on Figure 3.

Fire training activities were conducted at the site during the summer and fall from approximately 1968 to 1980. The fire training activities consisted of igniting oil (including transformer oil) that was piped to or poured over training props in an approximately 115-foot long by 35-foot wide area that sloped toward the river. Fires were extinguished at the site using a combination of dry chemical fire extinguishers and water pumped from the river. There are no records of the types of dry chemical extinguishers used for the fire training activities.

Various environmental site investigations were performed at the site between 1998 and 2001. These investigations identified polychlorinated biphenyls (PCBs) in soil and nearshore sediment at concentrations exceeding applicable cleanup levels. Several rounds of groundwater samples were collected at the site between 1999 and 2005. PCBs were not detected in any groundwater samples from monitoring wells MW-1 and MW-2D. PCBs were identified at low levels in five of the seven samples collected from monitoring well MW-3 and one of the four samples collected from monitoring well MW-4. These latter two wells were downgradient from the area where the highest PCB concentrations were identified in site soil. PCBs detected in the groundwater samples from MW-3 and MW-4 appeared to primarily be associated with suspended particulates in the samples. The potential presence of PFOA or PFOS in soil and groundwater at the site was not evaluated by the previous environmental site investigations. Unlike PCBs, which tend to adsorb to soil particles and are not typically found in groundwater, PFOA and PFOS are highly soluble in groundwater.

An interim remedial measure (IRM) was implemented in 2002 to remove PCB-impacted soil from within and around the former fire training area and PCB-impacted sediment from a small area immediately adjacent to the river bank. The IRM was conducted to limit potential direct-contact exposure and constituent migration from soil to groundwater and surface water. The IRM removal activities also addressed other constituents (e.g., semi-volatile organic compounds) that were co-located with PCBs. Approximately 3,950 cubic yards (CY) of soil and sediment were removed and transported for offsite

disposal. A final remedial measure was implemented in 2008 to address nearshore sediment containing PCBs. Approximately 100 CY of PCB-containing sediment were removed from a 200-foot long area, extending from the shoreline to 15 feet beyond the shoreline, and transported for offsite disposal.

Surface water sampling was performed in connection with the previous site investigation and remediation activities. Surface water samples were collected near the downstream end of the approximately 0.9-mile long canal referred to as the "power canal", which diverts water from the Mohawk River (via a gatehouse opposite the former fire training area) to the generating station. The sampling was performed because the City of Cohoes public drinking water supply intakes are in the power canal approximately 4,500 feet downstream from the canal's entrance. Samples of the influent water to the Cohoes Water Treatment Plant (from the "raw water reservoir") and treated water from the plant (from a "clear well") were also collected. The water samples from the power canal, raw water reservoir, and clear well were collected quarterly from March 2002 to April 2003 (before, during, and after the IRM soil/sediment removal) and analyzed for PCBs. The laboratory analytical results indicated that PCBs were not detected in any of the samples.

The City of Cohoes tested the treated public water supply for PFOA and PFOS quarterly in 2013 and then conducted further testing in March 2016. The laboratory analytical results indicated the following:

- *2013 Water Samples:* PFOA and PFOS were not detected in any of the four 2013 water samples above the 20 parts per trillion (ppt) detection limit.

- *2016 Water Sample:* PFOS was not detected in this sample above the 0.67 ppt laboratory detection limit in this sample. PFOA was identified in the sample at an estimated concentration of 2.3 ppt, which was well-below the health advisory value that the EPA had lowered to 70 ppt in May 2016.

Based on the PFOA/PFOS results and test results for other water quality parameters, the 2016 City of Cohoes Annual Water Quality Report indicates that the City's water supply is safe for use.

II. PFAS GROUNDWATER INVESTIGATION SUMMARY

A. Groundwater Investigation Field Activities

The PFAS groundwater investigation involved monitoring well integrity assessments and redevelopment, followed by PFAS groundwater sampling and analysis, as described below.

Monitoring Well Integrity Assessments and Redevelopment

As summarized in November 28, 2016 e-mail correspondence from Arcadis to the NYSDEC, an Arcadis geologist was onsite November 23, 2016 to field-locate the groundwater monitoring wells in the former fire training area, perform monitoring well integrity assessments, and redevelop the wells (as needed) in preparation for sampling. Three of the five monitoring wells (MW-1, MW-2D, and MW-3) were located. Despite extensive reconnaissance by Erie Boulevard Hydropower and Arcadis, monitoring wells MW-2S and MW-4 could not be located.

Following the reconnaissance, Arcadis conducted integrity assessments at monitoring wells MW-1, MW-2D, and MW-3 to evaluate the viability of these wells for sampling. The wells were found to be in generally good condition, except the 6-inch diameter outer steel protective casing at MW-2D (stickup well) had been sheared off. The 2-inch diameter inner well casing was in-tact and covered by the outer metal casing lid. A missing J-plug at MW-2D was replaced by Arcadis and Erie Boulevard Hydropower following the well redevelopment. Soft sediment was identified in the bottom of each well based on probing and comparing depth-to-bottom measurements vs. the installed well depth recorded on monitoring well construction logs. The monitoring well integrity assessment findings are documented on the forms included in Attachment A.

After the integrity assessments were completed, Arcadis redeveloped monitoring wells MW-1, MW-2D, and MW-3. The redevelopment consisted of surging the well screen with a bailer, followed by purging water from the well. Monitoring wells MW-1 and MW-3 were both purged until they went dry. Both wells were allowed to recharge, and purging continued (for a total of three cycles of purging/recharge). Approximately 3.5 and 4.0 gallons of water were purged from MW-1 and MW-3, respectively. Approximately 10 well volumes (32 gallons) of water were purged from monitoring well MW-2D, and the redevelopment resulted in the majority of the sediment from MW-2D being removed.

The water generated by the well redevelopment was containerized in one steel 55-gallon drum for offsite treatment/disposal by Erie Boulevard Hydropower.

PFAS Groundwater Sampling

Arcadis returned to the site on December 14, 2016 for PFAS groundwater sampling at MW-1, MW-2D, and MW-3. These wells provided representative locations for sampling groundwater in the former fire training area for PFAS, as follows:

- MW-1 is an upgradient well appropriate for evaluating potential background conditions.
- MW-2D and MW-3 are downgradient from the former fire training area.

Groundwater purging and sampling was performed using the low-flow techniques presented in the work plan. Purging/sampling was performed at a rate of approximately 250 milliliters per minute using a peristaltic pump and high-density polyethylene (HDPE) tubing (separate tubing for each well). Monitoring well MW-3 went dry before field parameters stabilized. MW-3 was sampled after the water level recovered sufficiently to support the required sample volume. Field parameters measured during purging and immediately prior to sampling are presented on the groundwater sampling logs included in Attachment B.

The groundwater samples were submitted to TestAmerica of Sacramento, California where they were analyzed for PFAS using Modified EPA Method 537. One set of quality assurance/quality control samples, consisting of a field duplicate, equipment (rinse) blank, trip blank, matrix spike, and matrix spike duplicate sample, was also collected and analyzed for PFAS.

B. Groundwater Investigation Results

Arcadis validated the PFAS groundwater analytical results and found the results to be useable as intended. The data validation report and the full laboratory analytical data report are provided in Attachments C and D, respectively. The electronic data deliverables (EDDs) will be e-mailed to the NYSDEC separately for upload to the NYSDEC's EQuIS database. The validated PFAS groundwater analytical results are presented in Table 1.

As indicated in Table 1, PFOS and PFOA (the PFASs commonly associated with former fighting foams) were not identified above laboratory detection limits in any of the December 2016 groundwater samples. The reporting limits for these PFASs ranged from 1.7 ppt to 1.9 ppt, which are well-below the 70 ppt EPA health advisory value for PFOA and PFOS combined in groundwater.

Only one PFAS was identified in groundwater at the site. Perfluorobutanoic acid (PFBA) was identified at an estimated concentration of 1.6 ppt in the groundwater sample collected from monitoring well MW-1 (the upgradient well). The PFBA concentration identified in that sample is very low and below the corresponding 1.8 ppt laboratory reporting limit. This concentration is well-below any internationally set standard for this particular compound, especially considering that no other PFASs were detected.

C. Conclusions and Recommendations

Because the PFAS groundwater samples were collected from areas directly within or downgradient from where former fire training activities were performed, the samples are appropriate to characterize potential sources of contamination. Based on the validated laboratory analytical results as summarized above, the site clearly does not have a PFAS issue.

With the PFAS groundwater investigation completed and several years of post-IRM groundwater monitoring data showing that groundwater in the former fire training area meets groundwater quality standards for site-related constituents, National Grid and Erie Boulevard Hydropower propose to decommission the existing groundwater monitoring wells at the site in preparation for site closure. The proposed monitoring well decommissioning plan is presented below.

III. MONITORING WELL DECOMMISSIONING PLAN

Arcadis will decommission the three remaining groundwater monitoring wells in the former fire training area (MW-1, MW-2D, and MW-3). Considering the extensive efforts already taken to locate monitoring wells MW-2S and MW-4, these wells are now considered lost. The proposed monitoring well decommissioning will be performed in accordance with the following:

- American Society for Testing Materials (ASTM) Method D5299 (Standard Guide for Decommissioning of Groundwater Wells, Vadose Zone Monitoring Devices, Boreholes, and Other Devices for Environmental Activities).

- NYSDEC's policy document titled "CP-43: Groundwater Monitoring Well Decommissioning Policy" dated November 3, 2009.

The proposed monitoring well decommissioning activities will be performed by Arcadis using a truck-mounted direct-push drill rig. The monitoring wells will be decommissioned using the casing perforating/ grout-in-place method. The bottoms of the polyvinyl chloride wells will be detached, and the wells will be tremie-grouted to ground surface using a cement/grout mixture. The steel casings grouted into bedrock will be cut-off below ground level, and the surface will be restored to match the surrounding area.

The removed monitoring well materials, soil cuttings, drilling fluids, purge water, decontamination fluids, and personal protective equipment generated during the well decommissioning activities will be placed into steel 55-gallon drums. The wastes will be staged onsite in a secure location as determined by Erie Boulevard Hydropower for offsite transportation and disposal in accordance with applicable regulations.

IV. NEXT STEPS

As indicated above in Section II., Arcadis will submit an EDD for the PFAS groundwater investigation to the NYSDEC for upload to EQuIS. Arcadis previously submitted an EDD to the NYSDEC containing all of the historical analytical data for the site (all data minus the results of the December 2016 PFAS groundwater investigation). Based on September 7, 2016 e-mail correspondence from the NYSDEC's Electronic Information Management System (EIMS) team, we understand that the NYSDEC has accepted the EDD. In addition, the NYSDEC approved the Site Management Plan (SMP) on June 21, 2016, and a finalized version of the SMP (with the stamp and signature of a professional engineer licensed to practice in New York State) was submitted to the NYSDEC on June 20, 2016. Once proposed Environmental Easement (EE) language is acceptable to the Federal Energy Regulatory Commission (FERC), NYSDEC, National Grid, and Erie Boulevard Hydropower, the EE will be executed and recorded/filed with the Town of Colonie.

The proposed groundwater monitoring well decommissioning work will be performed in April/May 2017, pending NYSDEC approval of this letter report/work plan. Arcadis will notify the NYSDEC after the groundwater monitoring well decommissioning work is completed. Arcadis will then update the existing "draft" Final Engineering Report (FER) to:

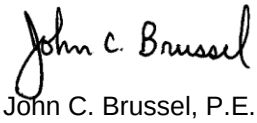
- Reference the completion of the PFAS groundwater investigation and document findings.
- Reflect that the groundwater monitoring wells at the site have been decommissioned.
- Address NYSDEC's comments on the FER, which are presented in an August 9, 2016 letter to National Grid.

Once changes to the FER are acceptable to the NYSDEC and the EE has been executed, a finalized version of the FER containing the stamp and signature of a professional engineer licensed to practice in New York State, will be submitted to the NYSDEC. National Grid and Erie Boulevard Hydropower will assist the NYSDEC with the final remaining steps for issuance of a Certificate of Completion.

Please do not hesitate to call Mr. James F. Morgan of National Grid at 315.428.3101 or me at 315.671.9441 if you have any questions or require additional information regarding the PFAS groundwater investigation or the remaining steps toward project closure.

Sincerely,

Arcadis of New York, Inc.



John C. Brussel, P.E.
Principal Engineer

Copies:
Julia Kenney, NYSDOH (via e-mail)
James F. Morgan, National Grid (via e-mail)
Joseph S. Giordano, National Grid (via e-mail)
Ian Borlang, Brookfield Renewable (via e-mail)
Matthew Johnson, Brookfield Renewable (via e-mail)
Jason Zehr, Brookfield Renewable (via e-mail)

Enclosures:

Table

1 PFAS Groundwater Analytical Results

Figures

1 Site Location Map
2 Site Plan
3 Monitoring Well Locations

Attachments

A Monitoring Well Integrity Assessment Forms
B Groundwater Sampling Logs
C Data Validation Report
D Laboratory Analytical Data Report

TABLE

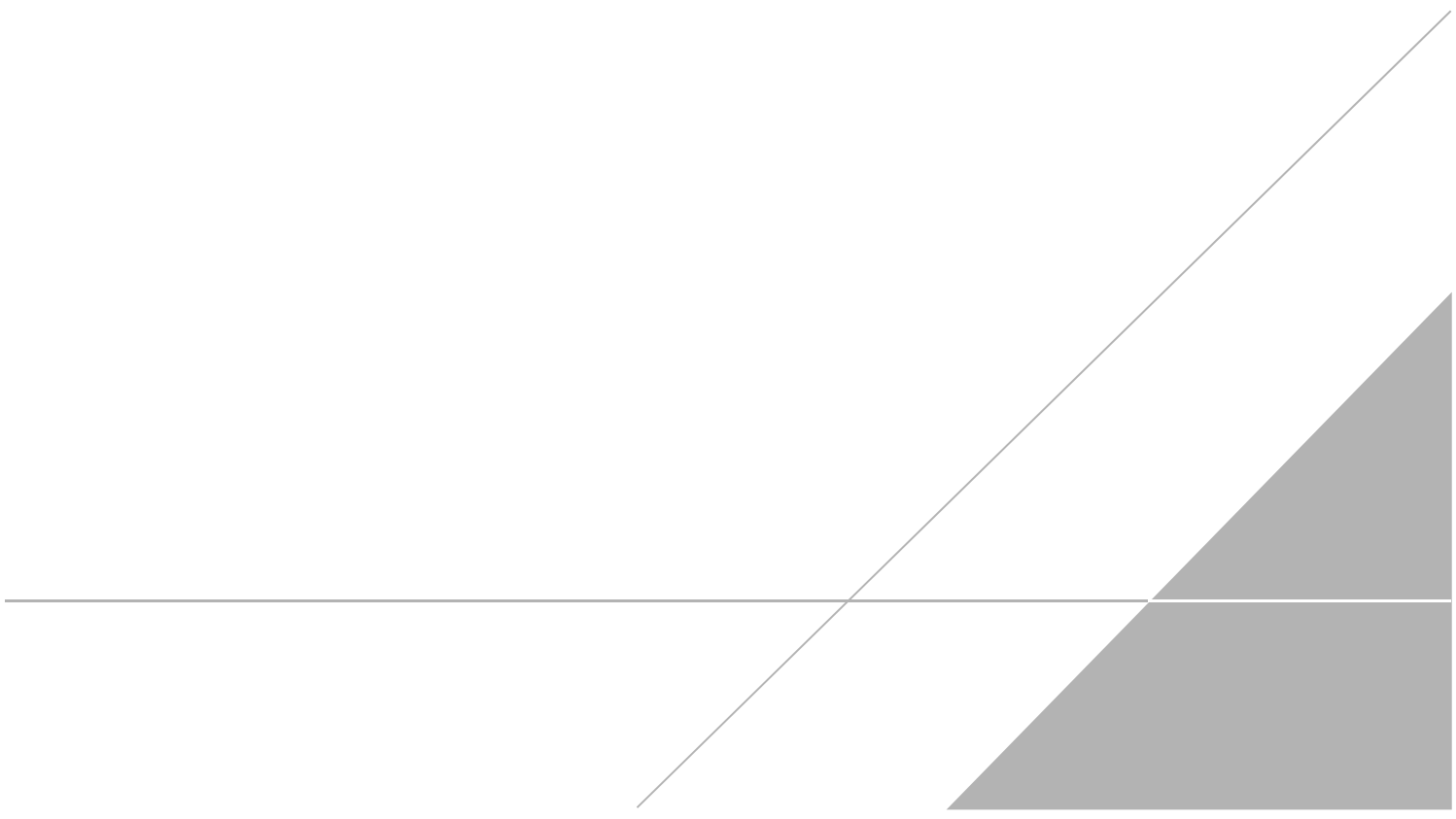


Table 1
PFAS Groundwater Analytical Results (ppt)

ARCADIS Design & Consultancy for natural and built assets

Former Fire Training Area
School Street Hydroelectric Station
Town of Colonie, New York

Location ID: / Date Collected:	MW-1 12/14/16	MW-2D 12/14/16	MW-3 12/14/16
Perfluorobutanesulfonic acid (PFBS)	<1.8	<1.9 [<1.8]	<1.7
Perfluorobutanoic acid (PFBA)	**1.6 J**	<1.9 [<1.8]	<1.7
Perfluorodecanesulfonic acid (PFDS)	<1.8	<1.9 [<1.8]	<1.7
Perfluorodecanoic acid (PFDA)	<1.8 J	<1.9 [<1.8]	<1.7
Perfluorododecanoic acid (PFDoA)	<1.8	<1.9 [<1.8]	<1.7
Perfluoroheptanesulfonic Acid (PFHpS)	<1.8	<1.9 [<1.8]	<1.7
Perfluoroheptanoic acid (PFHpA)	<1.8	<1.9 [<1.8]	<1.7
Perfluorohexanesulfonic acid (PFHxS)	<1.8	<1.9 [<1.8]	<1.7
Perfluorohexanoic acid (PFHxA)	<1.8	<1.9 [<1.8]	<1.7
Perfluorononanoic acid (PFNA)	<1.8	<1.9 [<1.8]	<1.7
Perfluorooctane Sulfonamide (FOSA)	R	R [R]	R
Perfluorooctanesulfonic acid (PFOS)	<1.8	<1.9 J [<1.8]	<1.7
Perfluorooctanoic acid (PFOA)	<1.8	<1.9 [<1.8]	<1.7
Perfluoropentanoic acid (PFPeA)	<1.8	<1.9 [<1.8]	<1.7
Perfluorotetradecanoic acid (PFTeA)	<1.8 B	<1.9 B [<1.8 B]	<1.7 B
Perfluorotridecanoic Acid (PFTriA)	<1.8	<1.9 [<1.8]	<1.7
Perfluoroundecanoic acid (PFUnA)	<1.8	<1.9 [<1.8]	<1.7

Notes:

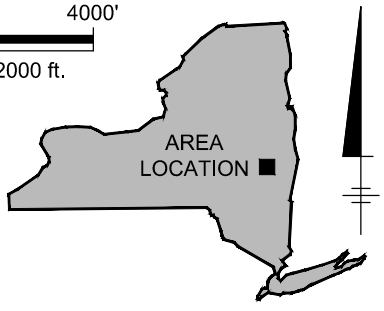
1. Samples were collected by Arcadis of New York, Inc. (Arcadis) on December 14, 2016.
2. PFAS = Perfluoroalkyl substances.
3. Laboratory analysis was performed by Test America located in Sacramento, California for PFAS using United States Environmental Protection Agency Method 537 Modified for groundwater.
4. Concentrations reported in parts per trillion (ppt), which is equivalent to nanograms per liter (ng/L).
5. Field duplicate sample results are presented in brackets [ ].
6. Data qualifiers are defined as follows:
   - < - Constituent not detected at a concentration above the reported detection limit.
   - J - Indicates that the associated numerical value is an estimated concentration.
   - B - Indicates that the compound was identified in the sample as well as its associated rinse blank.
   - R - The sample results are rejected.
7. Bolded result indicates that the analyte was detected.
8. The data have been validated.

FIGURES

REFERENCE: BASE MAP USGS 7.5. MIN. TOPO. QUAD., TROY NORTH, NY, 2013.

0 2000' 4000'

Approximate Scale: 1 in. = 2000 ft.



ERIE BOULEVARD HYDROPOWER, L.P.
FORMER NATIONAL GRID
SCHOOL ST. HYDROELECTRIC STATION - TOWN OF COLONIE, NY

PFAS GROUNDWATER INVESTIGATION REPORT

SITE LOCATION MAP

ARCADIS Design & Consultancy for natural and built assets

FIGURE 1

CITY: SYRACUSE NY DIV/GROUP: EnvCAD DB: E. KRAHMER, R. ALLEN PIC: PM: TM: TR: C. HEALY LYR: ON=*;OFF=*REF*
G:\ENVCAD\SYRACUSE\ACT\B0036643\0001\00004\DWG\PFAS-GW-IR36643N02.dwg LAYOUT: 1 SAVED: 2/17/2017 3:46 PM ACADVER: 19.1S (LMS TECH) PAGESETUP: --- PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 2/17/2017 3:47 PM BY: ALLEN, ROYCE
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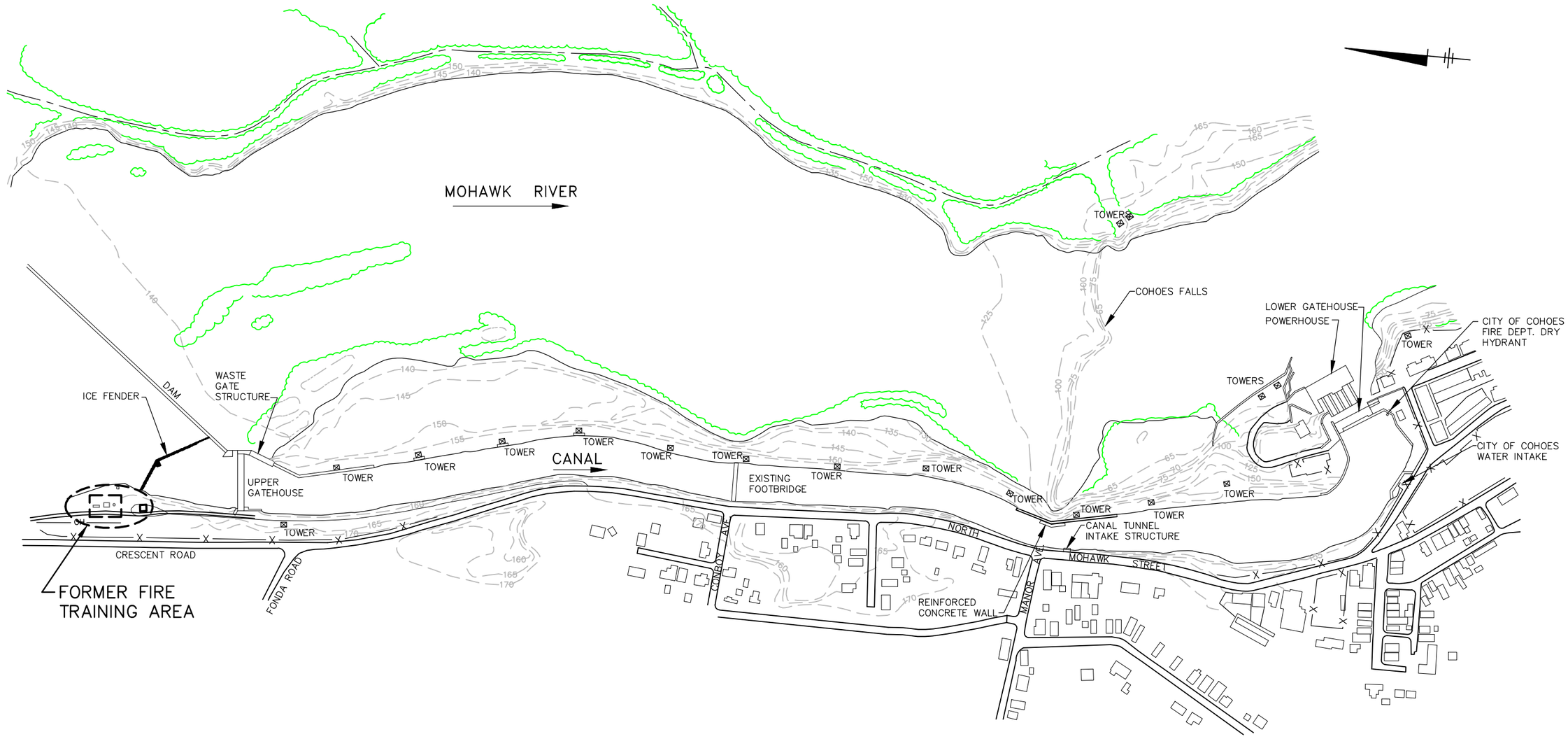


NOTES:

1. BASE MAP DEVELOPED FROM NIAGARA MOHAWK POWER CORPORATION, ACQUIRED BY AND NOW REFERRED TO AS NATIONAL GRID, AS-BUILT DRAWING ENTITLED "SCHOOL STREET HYDRO DEVELOPMENT: CANAL WALL REPLACEMENT GENERAL PLAN, LOCATION MAP, GENERAL NOTES AND DWG. INDEX," FILE INDEX NO. 2.0-S12-H4, DRAWING NO. D-30664-E, ORIGINAL ISSUE DATE 6/30/94, AS-BUILT 9/95, AT A SCALE OF 1"=200'.

2. BASE MAP ALSO DEVELOPED FROM SITE SURVEY COMPLETED BY NATIONAL GRID (AS PRESENTED ON THE NATIONAL GRID DRAWING ENTITLED "SCHOOL STREET DEVELOPMENT SAMPLING LOCATIONS, INDEX NO. 2.0-S12-M5, DRAWING NO. B-33591-E, DATED APRIL 1999, LATEST REVISION MARCH 2001, AT A SCALE OF 1"=60'). LOCATION OF ICE FENDER IS FROM SURVEY ACTIVITIES COMPLETED ARCADIS OF NEW YORK, INC., FORMERLY KNOWN AS BLASLAND, BOUCK & LEE, INC., DURING NOVEMBER 1999.

3. PFOA/PFOS = PERFLUOROOCTANOIC ACID AND PERFLUOROOCTYL SULFONATE.

0 400' 800'

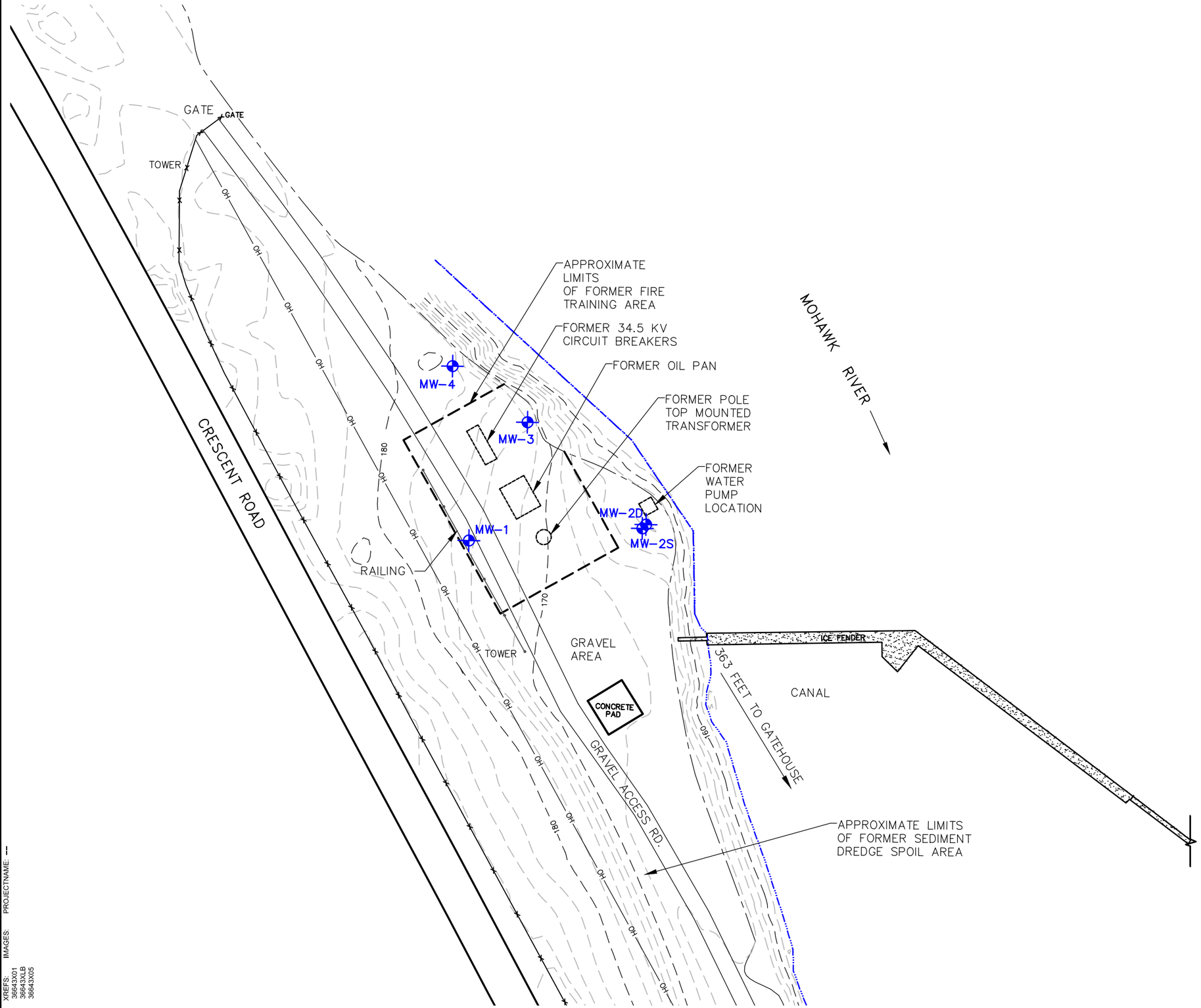
GRAPHIC SCALE

ERIE BOULEVARD HYDROPOWER, L.P.
FORMER NATIONAL GRID
SCHOOL ST. HYDROELECTRIC STATION - TOWN OF COLONIE, NY
PFAS GROUNDWATER INVESTIGATION REPORT

SITE PLAN

ARCADIS Design & Consultancy for natural and built assets

FIGURE
2



LEGEND:

- MW-1 — MONITORING WELL LOCATION
- SHORELINE
- TOP OF BANK
- FENCE
- OVERHEAD HIGH VOLTAGE ELECTRIC LINE
- GROUND SURFACE CONTOUR LINE (ELEVATION IN FEET ABOVE MEAN SEA LEVEL)

NOTES:

1. BASE MAP DEVELOPED FROM SITE SURVEY COMPLETED BY NIAGARA MOHAWK POWER CORPORATION, ACQUIRED BY AND NOW REFERRED TO AS NATIONAL GRID (AS PRESENTED ON THE NATIONAL GRID DRAWING ENTITLED "SCHOOL STREET DEVELOPMENT SAMPLING LOCATIONS, INDEX NO. 2.0-S12-M5, DRAWING NO. B-33591-E, DATED APRIL 1999, LATEST REVISION MARCH 2001, AT A SCALE OF 1"=60'). LOCATION OF ICE FENDER, TOP OF BANK, AND HIGH VOLTAGE LINE ARE FROM SURVEY ACTIVITIES COMPLETED BY ARCADIS OF NEW YORK, INC., FORMERLY KNOWN AS BLASLAND, BOUCK & LEE, INC. DURING NOVEMBER 1999.
2. GROUND SURFACE CONTOUR LINES INDICATE TOPOGRAPHY OF SITE PRIOR TO IMPLEMENTATION OF INTERIM REMEDIAL MEASURES (WHICH WAS COMPLETED DURING 2002).
3. MONITORING WELL LOCATIONS MW-1 THROUGH MW-3 WERE SURVEYED BY NATIONAL GRID.
4. MONITORING WELL MW-4 WAS SURVEYED BY ARCADIS.
5. MONITORING WELL LOCATION MW-2S IS AN OVERBURDEN MONITORING WELL WHILE MONITORING WELL MW-2D IS A BEDROCK WELL.
6. PFOA/PFOS = PERFLUOROOCTANOIC ACID AND PERFLUOROOCTYL SULFONATE.

0 60' 120'

GRAPHIC SCALE

ERIE BOULEVARD HYDROPOWER, L.P.
FORMER NATIONAL GRID
SCHOOL ST. HYDROELECTRIC STATION - TOWN OF COLONIE, NY
PFAS GROUNDWATER INVESTIGATION REPORT

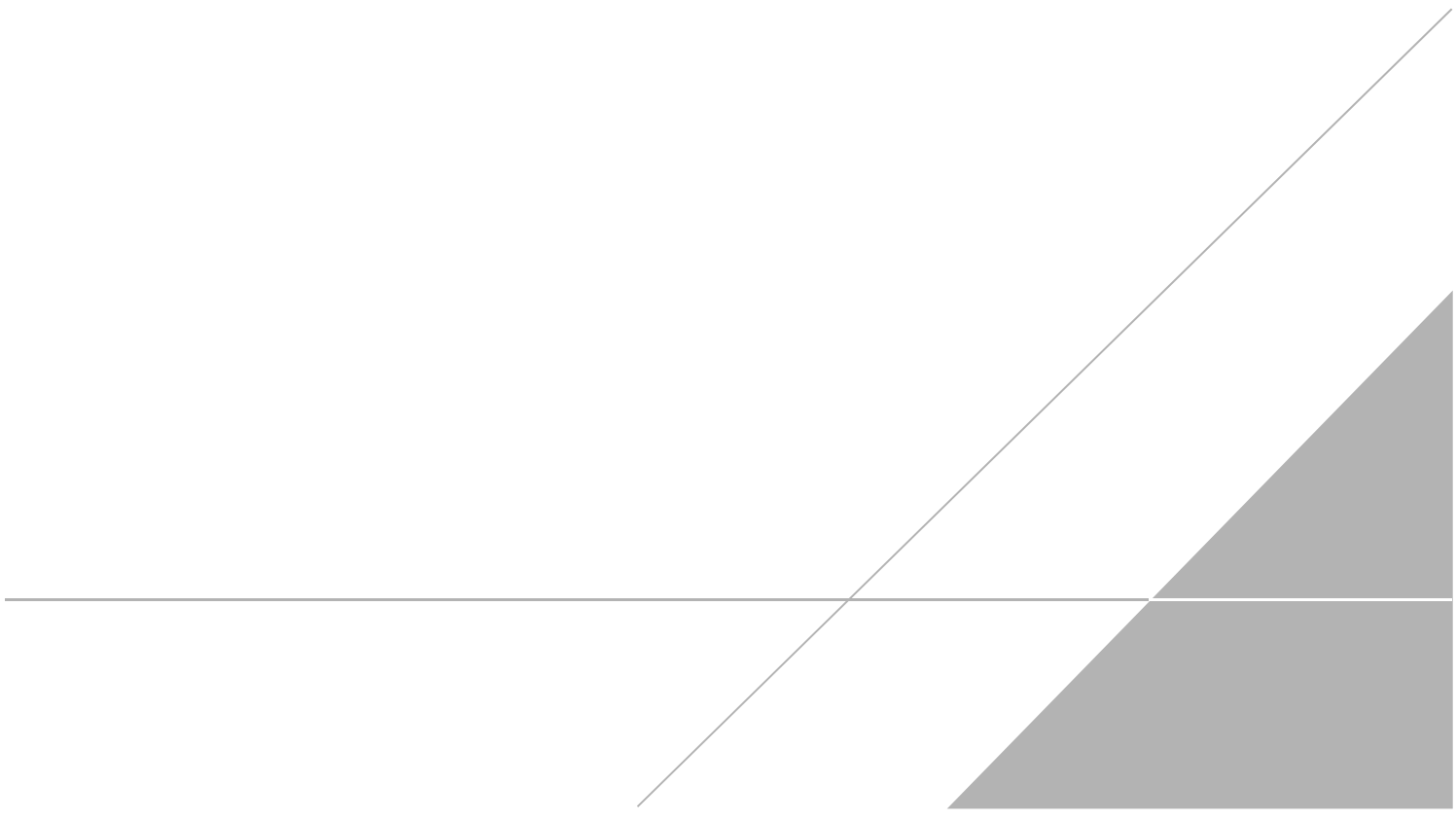
MONITORING WELL LOCATIONS

ARCADIS Design & Consultancy for natural and built assets

FIGURE 3

ATTACHMENT A

Monitoring Well Integrity Assessment Forms



WELL INTEGRITY ASSESSMENT FORM

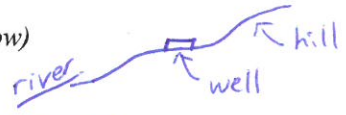
Site Name: School St. Hydro Station
Well I.D.: MW-1
Date: 11-23-11e

(For each item, circle the appropriate response or fill in the blank)

Well I.D. Clearly Marked: YES (NO)
Well Completion: (FLUSH MOUNT) ABOVE-GRADE STANDPIPE
Lockable Cover: YES (NO) DAMAGED *(Describe below)*
Lock Present: YES (NO) ADDED Key Brand/Number: _____
Measuring Point Marked: YES (NO) ADDED
Well Riser Diameter (inches): 2
Well Riser Type: (PVC) Stainless Steel Other *(Describe)* _____

Surface Condition

Cement Intact: (YES) NO *(Describe below)*
Curb Box/Well Cover Present: (YES) NO DAMAGED *(Describe below)*
All Bolts Present: (YES) NO *(Describe below)* NOT APPLICABLE
Ground Surface Slopes
Away from Well YES (NO) *(Describe below)*



Well Condition

Well Cap: PVC Slip Cap (Pressure-fit Cap) None
Well Vent: Slot Cut in Riser Vent Hole in Cap (None) Not Applicable *(Flush Mount Well)*
Reported Well Riser Stickup (feet): +0.2 *(use negative number if below grade)*
Measured Well Riser Stickup (feet): -0.2 *(use negative number if below grade)*

Depth to Water (feet from Top of Well Riser): 0.5 -or- DRY

Reported Total Depth of Well (feet below grade): 18
Measured Total Depth of Well (feet below grade): 17.04
Well Obstructed: YES (NO) If yes, list depth in feet from Top of Well Riser: _____
Well Bottom: (SOFT *(contains sediment)* FIRM *(no sediment)*

Recommendations

Repair Concrete/Surface Completion: YES NO If yes, list date performed: _____
Re-Survey Well: YES NO If yes, list date performed: _____
Remove Sediment and Re-Measure Depth: YES NO If yes, list date performed: _____
Replace Well Cap: YES NO If yes, list date performed: _____
Replace Bolts: YES NO If yes, list date performed: _____
Replace Lock: YES NO If yes, list date performed: _____
Other/Miscellaneous Observations:
I added a stake with flagging to locate well for sampling.

Inspector(s): Danielle Crump

WELL INTEGRITY ASSESSMENT FORM

Site Name: School St. Hydro Station
Well I.D.: MW-2D
Date: _____

(For each item, circle the appropriate response or fill in the blank)

Well I.D. Clearly Marked: YES (NO)
Well Completion: FLUSH MOUNT (ABOVE-GRADE STANDPIPE)
Lockable Cover: (YES) NO DAMAGED *(Describe below)*
Lock Present: YES (NO) ADDED Key Brand/Number: _____
Measuring Point Marked: YES (NO) ADDED
Well Riser Diameter (inches): 2
Well Riser Type: (PVC) Stainless Steel Other *(Describe)* _____

Surface Condition

Cement Intact: YES (NO) *(Describe below)*
Curb Box/Well Cover Present: (YES) NO DAMAGED *(Describe below)*
All Bolts Present: YES (NO) *(Describe below)* NOT APPLICABLE
Ground Surface Slopes Away from Well (YES) NO *(Describe below)*

Well Condition

Well Cap: PVC Slip Cap Pressure-fit Cap (None) — added J Plug
Well Vent: Slot Cut in Riser Vent Hole in Cap None Not Applicable *(Flush Mount Well)*
Reported Well Riser Stickup (feet): _____ *(use negative number if below grade)*
Measured Well Riser Stickup (feet): .5 *(use negative number if below grade)*

Depth to Water (feet from Top of Well Riser): 1.46 -or- DRY

Reported Total Depth of Well (feet below grade): 21.0
Measured Total Depth of Well (feet below grade): 19.6
Well Obstructed: (YES) NO If yes, list depth in feet from Top of Well Riser: steel outer casing bent, blocking PVC
Well Bottom: (SOFT *(contains sediment)*) FIRM *(no sediment)*

Recommendations

Repair Concrete/Surface Completion: YES NO If yes, list date performed: _____
Re-Survey Well: YES NO If yes, list date performed: _____
Remove Sediment and Re-Measure Depth: YES NO If yes, list date performed: _____
Replace Well Cap: (YES) NO If yes, list date performed: 11-23-10
Replace Bolts: YES NO If yes, list date performed: _____
Replace Lock: YES NO If yes, list date performed: _____

Other/Miscellaneous Observations:
Brookfield personnel to return to site and cut steel casing back so PVC is more accessible. Gave Brookfield a J-Plug to keep well covered.

Inspector(s): Danielle Grme

WELL INTEGRITY ASSESSMENT FORM

Site Name: School St. Hydro Station
Well I.D.: MW-3
Date: 4/23/16

(For each item, circle the appropriate response or fill in the blank)

Well I.D. Clearly Marked: YES (NO)
Well Completion: (FLUSH MOUNT) ABOVE-GRADE STANDPIPE
Lockable Cover: YES (NO) DAMAGED *(Describe below)*
Lock Present: YES NO ADDED Key Brand/Number: ~~key~~ lock on J-Plug
Measuring Point Marked: YES (NO) ADDED
Well Riser Diameter (inches): 2
Well Riser Type: (PVC) Stainless Steel Other *(Describe)* _____

Surface Condition

Cement Intact: (YES) NO *(Describe below)*
Curb Box/Well Cover Present: (YES) NO DAMAGED *(Describe below)*
All Bolts Present: (YES) NO *(Describe below)* NOT APPLICABLE
Ground Surface Slopes
Away from Well (YES) NO *(Describe below)*

Well Condition

lock on J-Plug

Well Cap: PVC Slip Cap (Pressure-fit Cap) None
Well Vent: Slot Cut in Riser Vent Hole in Cap None (Not Applicable *(Flush Mount Well)*)
Reported Well Riser Stickup (feet): _____ *(use negative number if below grade)*
Measured Well Riser Stickup (feet): _____ *(use negative number if below grade)*

Depth to Water (feet from Top of Well Riser): 5.43 -*or*- DRY

Reported Total Depth of Well (feet below grade): 18
Measured Total Depth of Well (feet below grade): 14.85
Well Obstructed: YES (NO) If yes, list depth in feet from Top of Well Riser: _____
Well Bottom: (SOFT *(contains sediment)*) FIRM *(no sediment)*

Recommendations

Repair Concrete/Surface Completion: YES NO If yes, list date performed: _____
Re-Survey Well: YES NO If yes, list date performed: _____
Remove Sediment and Re-Measure Depth: YES NO If yes, list date performed: _____
Replace Well Cap: YES NO If yes, list date performed: _____
Replace Bolts: YES NO If yes, list date performed: _____
Replace Lock: YES NO If yes, list date performed: _____
Other/Miscellaneous Observations:
Added flagging to pre-existing stake.

Inspector(s): Danielle Gnup

ATTACHMENT B

Groundwater Sampling Logs

ARCADIS

Groundwater Sampling Form

Project No. B003664 3.0001.00004 | Well ID MW-1 | Date 12-14-16

Project Name/Location School Street Hydro, Cohoes NY | Weather Cold 29°

Measuring Pt. Description | Screen Setting (ft-bmp) | Casing Diameter (in.) | Well Material [X] PVC [ ] SS [ ] Other

Total Depth (ft-bmp) | Static Water Level (ft-bmp) 0.8 | Water Column in Well | Gallons in Well

Calc. Gallons Purged | Pump Intake (ft-bmp) | Purge Method: Centrifugal / Submersible / Disp. Bailer / Other | Sample Method Peristaltic

Gallons Purged | MP Elevation | Pump On/Off

Sample Time: Label | Replicate/ Code No. | Sampled by DLG

Time	Minutes Elapsed	Rate (gpm) (mL/min)	Depth to Water (ft) TOC	Gallons Purged	pH	Cond. (µmhos) (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temp. (°C) (°F)	Redox (mV)	Appearance Color	Appearance Odor
8:37					7.12	2.12	32.9	11.23	11.59	156		
8:43			3.96		6.93	2.14	32.7	8.04	10.37	150		
8:48					6.92	2.14	31.5	7.79	10.25	148		
8:53					6.91	2.14	31.5	7.48	10.04	147		
9:03			9.32	2	6.90	2.15	30.5	7.39	9.87	145		

Constituents Sampled	Container	Number	Preservative
PFAS standard list	(2) 250 ml Plastic	2	→

Well Information

Well Location:

Condition of Well: Good

Well Completion: (Flush Mount) Stick Up

Well Locked at Arrival: (Yes) / No

Well Locked at Departure: (Yes) / No

Key Number To Well:

NOTES: MW-1-12142016 @ 9:03

Well Casing Volumes

Gallons/Foot					
	1" = 0.04	1.5" = 0.09	2.5" = 0.26	3.5" = 0.50	6" = 1.47
	1.25" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65	

ARCADIS

Groundwater Sampling Form

Project No. B003664 3.0001.00004 Well ID MW-2D Date 12-14-16

Project Name/Location School St. hydro Weather 29°

Measuring Pt. Description _____ Screen Setting (ft-bmp) _____ Casing Diameter (in.) _____ Well Material ___ PVC ___ SS ___ Other

Total Depth (ft-bmp) _____ Static Water Level (ft-bmp) 0.73 Water Column in Well _____ Gallons in Well _____

Calc.Gallons Purged _____ Pump Intake (ft-bmp) _____ Purge Method: Centrifugal _____ Sample Method peri

Gallons Purged _____ MP Elevation _____ Submersible _____

Disp. Bailer _____ Pump On/Off _____

Sample Time: Label _____ Replicate/ Code No. _____ Other _____ Sampled by DLG

Time	Minutes Elapsed	Rate (gpm) (mL/min)	Depth to Water (ft) TOC	Gallons Purged	pH	Cond. (µmhos) (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temp. (°C) (°F)	Redox (mV)	Appearance	
											Color	Odor
10:20					7.07	2.22	33.9	3.35	10.25	-194		
10:40					7.04	2.22	29.4	6.37	10.01	-224		
10:45					7.03	2.21	26.2	5.33	9.89	-230		
10:50					7.02	2.22	10.8	4.62	10.04	-276		
10:55					7.02	2.21	11.4	4.35	10.12	-299		
11:00					7.02	2.21	10.5	4.17	10.23	-296		
11:05					7.03	2.21	10.4	4.12	10.09	-295		
11:10					7.02	2.21	10.4	4.13	10.03	-296		

Constituents Sampled	Container	Number	Preservative
PFAS standard list	250 ml Plastic	6	—

Well Information

Well Location: _____ Well Locked at Arrival: Yes / (No)

Condition of Well: damaged Well Locked at Departure: Yes / (No)

Well Completion: Flush Mount / (Stick Up) Key Number To Well: _____

NOTES: MW-2D-12142016 @ 11:10 plus MS/MSD

Duplicate: MW-X-12142016 @ 1200

Well Casing Volumes

Gallons/Foot					
	1" = 0.04	1.5" = 0.09	2.5" = 0.26	3.5" = 0.50	6" = 1.47
	1.25" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65	

ARCADIS

Groundwater Sampling Form

Page 1 of 1

Project No. B0036643.0001.00004 Well ID MW-3 Date 12-14-16

Project Name/Location School Street hydro Weather Cold 29°

Measuring Pt. Description _____ Screen Setting (ft-bmp) _____ Casing Diameter (in.) _____ Well Material [X] PVC [ ] SS [ ] Other

Total Depth (ft-bmp) _____ Static Water Level (ft-bmp) 4.62 Water Column in Well _____ Gallons in Well _____

Calc. Gallons Purged _____ Pump Intake (ft-bmp) _____ Purge Method: Centrifugal _____ Sample Method Peri

Gallons Purged _____ MP Elevation _____ Submersible _____

Disp. Bailer _____ Pump On/Off _____

Sample Time: Label _____ Replicate/ Code No. _____ Other _____ Sampled by _____

Time	Minutes Elapsed	Rate (gpm) (mL/min)	Depth to Water (ft) TOC	Gallons Purged	pH	Cond. (µmhos) (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temp. (°C) (°F)	Redox (mV)	Appearance Color	Appearance Odor
9:45					7.11	1.32	20.6	5.09	10.42	132		
9:50			6.08		7.07	1.31	17.0	4.92	10.93	135		
9:55					7.06	1.30	17.0	4.65	10.84	132		
10:00			9.83		7.07	1.28	20.3	3.45	10.97	130		
10:05			DRY									
11:30			collect sample									

Constituents Sampled	Container	Number	Preservative
PFAS - standard list	250 ml Plastic	2	—

Well Information

Well Location: _____ Well Locked at Arrival: Yes / (No)

Condition of Well: Good Well Locked at Departure: Yes / (No)

Well Completion: (Flush Mount) / Stick Up Key Number To Well: _____

NOTES: MW-3-12142016 @ 11:30

Well Casing Volumes

Gallons/Foot					
	1" = 0.04	1.5" = 0.09	2.5" = 0.26	3.5" = 0.50	6" = 1.47
	1.25" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65	

ATTACHMENT C

Data Validation Report

ARCADIS Design & Consultancy for natural and built assets

National Grid

School St. Former Fire Training Area

DATA REVIEW

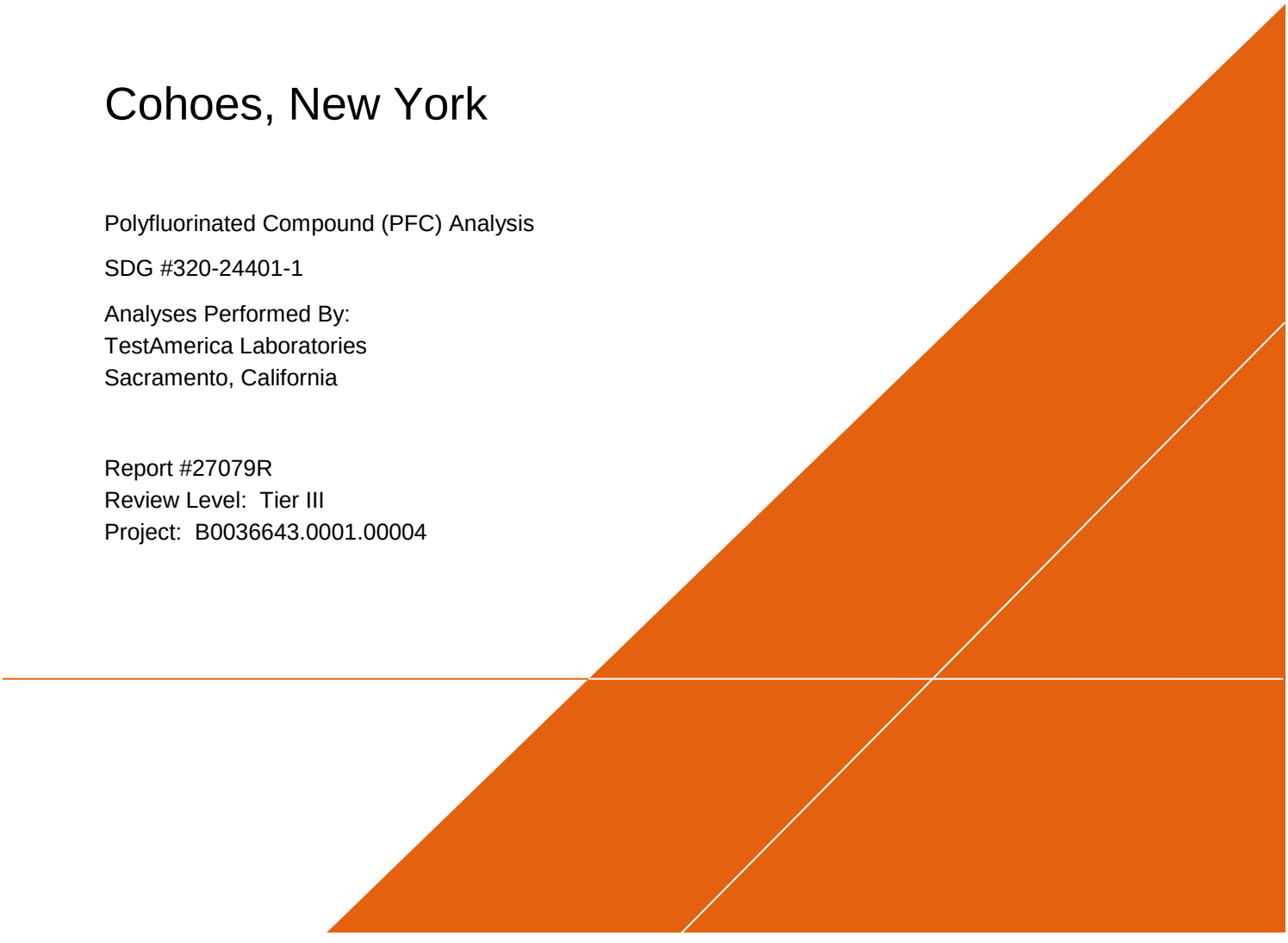
Cohoes, New York

Polyfluorinated Compound (PFC) Analysis

SDG #320-24401-1

Analyses Performed By:
TestAmerica Laboratories
Sacramento, California

Report #27079R
Review Level: Tier III
Project: B0036643.0001.00004



SUMMARY

This data quality assessment summarizes the review of Sample Delivery Group (SDG) #320-24401-1 for samples collected in association with the National Grid School St. Site. The review was conducted as a Tier III evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis				
					PFCs	SVOC	PCB	MET	MISC
MW-1-12142016	320-24401-1	Water	12/14/2016		X				
MW-3-12142016	320-24401-2	Water	12/14/2016		X				
MW-2D-12142016	320-24401-3	Water	12/14/2016		X				
MW-X-12142016	320-24401-4	Water	12/14/2016	MW-2D-12142016	X				
RB-1-12142016	320-24401-5	Water	12/14/2016		X				
TRIP BLANK FRB	320-24401-6	Water	12/14/2016		X				

ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X		X	
3. Master tracking list		X		X	
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of QA or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

Note:
QA - Quality Assurance

ORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) Modified Method 537. Data were reviewed in accordance with USEPA Method 537, TestAmerica SOP No. WS-LC-0025 (Perfluorinated Compounds (PFCs) in Water, Soils, Sediments and Tissue), USEPA National Functional Guidelines (October 1999), and Region II SOPs. USEPA NFGs and Region II SOPs were followed for qualification purposes.

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and had already been subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with USEPA National Functional Guidelines:

- Concentration (C) Qualifiers

  U The compound was analyzed for but not detected. The associated value is the compound quantitation limit.

  B The compound has been found in the sample as well as its associated blank, its presence in the sample may be suspect.

- Quantitation (Q) Qualifiers

  E The compound was quantitated above the calibration range.

  D Concentration is based on a diluted sample analysis.

- Validation Qualifiers

  J The compound was positively identified; however, the associated numerical value is an estimated concentration only.

  UJ The compound was not detected above the reported sample quantitation limit. However, the reported limit is approximate and may or may not represent the actual limit of quantitation.

  JN The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification. The associated numerical value is an estimated concentration only.

  UB Compound considered non-detect at the listed value due to associated blank contamination.

  N The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification.

  R The sample results are rejected.

Two facts should be noted by all data users. First, the "R" flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. "R" values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is

that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

POLYFLUORINATED COMPOUND (PFC) ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
USEPA 537 Modified	Water	14 days from collection to analysis	Cool to <6 °C; preserved with Trizma buffer

All samples were analyzed within the specified holding time criteria.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

All compounds associated with the QA blanks exhibited a concentration less than the MDL, with the exception of the compounds listed in the following table. Sample results less than the BAL associated with the following sample locations were qualified as listed in the following table.

Sample Locations	Analytes	Sample Result	Qualification
MW-1-12142016 MW-3-12142016 MW-2D-12142016 MW-X-12142016	Perfluorotetradecanoic acid (PFTeA) (MB, RB,TB)	Detected sample results <RL and <BAL	"UB" at the RL

Note:
RL Reporting limit
MB Method blank
RB Rinse Blank
TB Trip blank

3. Mass Spectrometer Tuning

Mass spectrometer performance was acceptable.

System performance and column resolution were acceptable.

4. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of

acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

4.1 Initial Calibration

The method specifies percent relative standard deviation (%RSD) and relative response factor (RRF) limits for select compounds only. A technical review of the data applies limits to all compounds with no exceptions.

All target compounds associated with the initial calibration standards must exhibit a %RSD less than the control limit (35%).

4.2 Continuing Calibration

All target compounds associated with the continuing calibration standard must exhibit a percent difference (%D) less than the control limit of 40%.

All compounds associated with the calibrations were within the specified control limits

5. Isotope Dilution/System Monitoring Compounds

All samples to be analyzed for PFC compounds are spiked with system monitoring compounds (SMCs) prior to sample preparation to evaluate overall laboratory performance and efficiency of the analytical technique. The system monitoring compounds are individual isotopically-enriched analogs of the analytes of interest. All system monitoring compounds associated with the analysis must exhibit recoveries within the limits of 25-150%.

Sample locations associated with recovery standards exhibiting recoveries outside of the control limits are presented in the following table.

Sample Locations	SMC	Associated Compound	Recovery
MW-1-12142016 MW-3-12142016 MW-2D-12142016 MW-X-12142016	13C8 FOSA	Perfluorooctane Sulfonamide (FOSA)	< 10%
TRIP BLANK FRB	13C8 FOSA	Perfluorooctane Sulfonamide (FOSA)	< LL but > 10%
MW-1-12142016	13C2 PFDA	Perfluorodecanoic acid (PFDA)	<LL but > 10%

Notes.

Lower control limit (LL)

The criteria used to evaluate the surrogate recoveries are presented in the following table. In the case of a surrogate deviation, the sample results associated with the deviant fraction are qualified as documented in the table below.

Control Limit	Sample Result	Qualification
< LL but > 10%	Non-detect	J
	Detect	J
< 10%	Non-detect	R
	Detect	J

6. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis

MS/MSD data are used to assess the precision and accuracy of the analytical method. The compounds used to perform the MS/MSD analysis must exhibit a percent recovery within the laboratory-established acceptance limits. The relative percent difference (RPD) between the MS/MSD recoveries must exhibit an RPD within the laboratory-established acceptance limits.

Note: The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the compound concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

Sample locations associated with the MS/MSD exhibiting recoveries outside of the control limits are presented in the following table.

Sample Locations	Compound	MS Recovery	MSD Recovery
MW-2D-12142016	Perfluorotetradecanoic acid (PFTeA)	>UL	>UL
	Perfluorooctanesulfonic acid (PFOS)	AC	>UL

Note:

AC Acceptable

The criteria used to evaluate the MS/MSD recoveries are presented in the following table. In the case of an MS/MSD deviation, the sample results are qualified as documented in the table below.

Control Limit	Sample Result	Qualification
> the upper control limit (UL)	Non-detect	No Action
	Detect	J
< the lower control limit (LL) but > 10%	Non-detect	UJ
	Detect	J
< 10%	Non-detect	R
	Detect	J
Parent sample concentration > four times the MS/MSD spiking solution concentration.	Detect	No Action
	Non-detect	

Sample locations associated with MS/MSD recoveries exhibiting an RPD greater than of the control limit presented in the following table.

Sample Locations	Compound
MW-2D-12142016	Perfluorooctanesulfonic acid (PFOS)

The criteria used to evaluate the RPD between the MS/MSD recoveries are presented in the following table. In the case of an RPD deviation, the sample results are qualified as documented in the table below.

Control Limit	Sample Result	Qualification
> UL	Non-detect	UJ
	Detect	J

7. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the accuracy of the analytical method independent of matrix interferences. The compounds associated with the LCS analysis must exhibit a percent recovery within the laboratory-established acceptance limits.

All compounds associated with the LCS analysis exhibited recoveries within the control limits.

8. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 30% for water matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of two times the RL is applied for water matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Compound	Sample Result	Duplicate Result	RPD
MW-2D-12142016/ MW-X-12142016	All Compounds	U	U	AC

Notes:

AC Acceptable

The calculated RPDs between the parent sample and field duplicate were acceptable.

9. Compound Identification

PFC analytes are identified by using the compound's ion abundance ratios, signal-to-noise values, and relative retention times.

All identified compounds met method criteria.

10. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA VALIDATION CHECKLIST FOR PFAs

PFAs: 537 M	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
LIQUID CHROMATOGRAPHY/MASS SPECTROMETRY (LC/MS/MS)					
Tier II Validation					
Holding times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Method blanks		X	X		
B. Equipment blanks		X	X		
C. Trip blanks		X	X		
Laboratory Control Sample (LCS)		X		X	
Laboratory Control Sample Duplicate(LCSD)	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS)		X	X		
Matrix Spike Duplicate(MSD)		X	X		
MS/MSD Precision (RPD)		X	X		
Field/Lab Duplicate (RPD)		X		X	
System Monitoring Compound Recoveries		X	X		
Dilution Factor		X		X	
Moisture Content	X				X
Tier III Validation					
System performance and column resolution		X		X	
Initial calibration %RSDs		X		X	
Continuing calibration %Ds		X		X	
Instrument tune and performance check		X		X	
Ion abundance criteria for each instrument used		X		X	
Compound identification and quantitation					
A. Reconstructed ion chromatograms		X		X	
B. Quantitation Reports		X		X	
C. RT of sample compounds within the established RT windows		X		X	
D. Transcription/calculation errors present		X		X	

PFAs: 537 M	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
LIQUID CHROMATOGRAPHY/MASS SPECTROMETRY (LC/MS/MS)					
E. Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%RSD Relative standard deviation

%R Percent recovery

RPD Relative percent difference

%D Percent difference

DATA REVIEW REPORT

VALIDATION PERFORMED BY: Andrew Korycinski

SIGNATURE: 

DATE: February 7, 2017

PEER REVIEW: Dennis Capria

DATE: February 8, 2017

CHAIN OF CUSTODY

CORRECTED SAMPLE ANALYSIS DATA SHEETS

TestAmerica Sacramento
880 Riverside Parkway

West Sacramento, CA 95605-1500
phone 916.373.5600 fax 303.467.7248

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

TestAmerica Laboratories, Inc.

Client Contact	Project Manager: John Brussel	Site Contact: Danielle Giroux	Date: 12-14-16	COC No:
Arcadis	Tel/Fax: 315 671 9441	Lab Contact: Jill Kellman	Carrier: Fed Ex	____ of ____ COCs
855 Rte 146, Ste 210	Analysis Turnaround Time			Sampler:
Clifton Park, NY 12065	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
518-250-7300	TAT if different from Below ___standard___			Walk-in Client:
518-250-7301	☐ 2 weeks			Lab Sampling:
Project Name: School Street Former Fire Training Area	☐ 1 week			
Site: School Street Hydroelectric Station	☐ 2 days			Job / SDG No.:
P O # B0036643.0001.00004	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	PFAS-standard list	Sample Specific Notes:
MW-1-12142016	12-14-16	9:03	G	AQ	2			X	
MW-3-12142016		11:30			2			X	
* MW-2D-12142016		11:10			3		X	X	
MW-X-12142016		12:00			2			X	
RB-1-12142016		11:45			2			X	
Trip Blank FRB		900			1			X	

320-24401 Chain of Custody

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☒ Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments:

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temp. (°C): Obs'd: 1.6 Corr'd: 0.7 | Therm ID No.: 17

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Danielle Giroux	Arcadis	12-14-16/1600		TAWS	12/15/16 1015
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

only 6 Bottle received for Sample, MS, MSD CMR 12/15/16

Client Sample ID: MW-1-12142016

Date Collected: 12/14/16 09:03
Date Received: 12/15/16 10:15

Lab Sample ID: 320-24401-1
Matrix: Water

Method: 537 (modified) - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	**1.6**	**J**	1.8	0.40	ng/L		12/21/16 14:17	12/30/16 22:56	1
Perfluoropentanoic acid (PFPeA)	ND		1.8	0.87	ng/L		12/21/16 14:17	12/30/16 22:56	1
Perfluorohexanoic acid (PFHxA)	ND		1.8	0.69	ng/L		12/21/16 14:17	12/30/16 22:56	1
Perfluoroheptanoic acid (PFHpA)	ND		1.8	0.70	ng/L		12/21/16 14:17	12/30/16 22:56	1
Perfluorooctanoic acid (PFOA)	ND		1.8	0.65	ng/L		12/21/16 14:17	12/30/16 22:56	1
Perfluorononanoic acid (PFNA)	ND		1.8	0.57	ng/L		12/21/16 14:17	12/30/16 22:56	1
Perfluorodecanoic acid (PFDA)	ND	UJ	1.8	0.39	ng/L		12/21/16 14:17	12/30/16 22:56	1
Perfluoroundecanoic acid (PFUnA)	ND		1.8	0.65	ng/L		12/21/16 14:17	12/30/16 22:56	1
Perfluorododecanoic acid (PFDoA)	ND		1.8	0.51	ng/L		12/21/16 14:17	12/30/16 22:56	1
Perfluorotridecanoic Acid (PFTriA)	ND		1.8	0.48	ng/L		12/21/16 14:17	12/30/16 22:56	1
Perfluorotetradecanoic acid (PFTeA)	~~0.37 J B~~	1.8 UB	1.8	0.17	ng/L		12/21/16 14:17	12/30/16 22:56	1
Perfluorobutanesulfonic acid (PFBS)	ND		1.8	0.80	ng/L		12/21/16 14:17	12/30/16 22:56	1
Perfluorohexanesulfonic acid (PFHxS)	ND		1.8	0.76	ng/L		12/21/16 14:17	12/30/16 22:56	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		1.8	0.62	ng/L		12/21/16 14:17	12/30/16 22:56	1
Perfluorodecanesulfonic acid (PFDS)	ND		1.8	1.1	ng/L		12/21/16 14:17	12/30/16 22:56	1
Perfluorooctanesulfonic acid (PFOS)	ND		1.8	1.1	ng/L		12/21/16 14:17	12/30/16 22:56	1
Perfluorooctane Sulfonamide (FOSA)	R ~~ND~~		~~1.8~~	~~0.56~~	~~ng/L~~		12/21/16 14:17	12/30/16 22:56	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C8 FOSA	*1*	*	*25 - 150*	*12/21/16 14:17*	*12/30/16 22:56*	*1*
13C4 PFBA	*80*		*25 - 150*	*12/21/16 14:17*	*12/30/16 22:56*	*1*
13C2 PFHxA	*79*		*25 - 150*	*12/21/16 14:17*	*12/30/16 22:56*	*1*
13C4 PFOA	*65*		*25 - 150*	*12/21/16 14:17*	*12/30/16 22:56*	*1*
13C5 PFNA	*50*		*25 - 150*	*12/21/16 14:17*	*12/30/16 22:56*	*1*
13C2 PFDA	*24*	*	*25 - 150*	*12/21/16 14:17*	*12/30/16 22:56*	*1*
13C2 PFUnA	*38*		*25 - 150*	*12/21/16 14:17*	*12/30/16 22:56*	*1*
13C2 PFDoA	*43*		*25 - 150*	*12/21/16 14:17*	*12/30/16 22:56*	*1*
18O2 PFHxS	*108*		*25 - 150*	*12/21/16 14:17*	*12/30/16 22:56*	*1*
13C4 PFOS	*105*		*25 - 150*	*12/21/16 14:17*	*12/30/16 22:56*	*1*
13C4-PFHpA	*79*		*25 - 150*	*12/21/16 14:17*	*12/30/16 22:56*	*1*
13C5 PFPeA	*95*		*25 - 150*	*12/21/16 14:17*	*12/30/16 22:56*	*1*

Client Sample ID: MW-3-12142016

Date Collected: 12/14/16 11:30
Date Received: 12/15/16 10:15

Lab Sample ID: 320-24401-2
Matrix: Water

Method: 537 (modified) - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	ND		1.7	0.39	ng/L		12/21/16 14:17	12/30/16 23:04	1
Perfluoropentanoic acid (PFPeA)	ND		1.7	0.85	ng/L		12/21/16 14:17	12/30/16 23:04	1
Perfluorohexanoic acid (PFHxA)	ND		1.7	0.67	ng/L		12/21/16 14:17	12/30/16 23:04	1
Perfluoroheptanoic acid (PFHpA)	ND		1.7	0.69	ng/L		12/21/16 14:17	12/30/16 23:04	1
Perfluorooctanoic acid (PFOA)	ND		1.7	0.64	ng/L		12/21/16 14:17	12/30/16 23:04	1
Perfluorononanoic acid (PFNA)	ND		1.7	0.56	ng/L		12/21/16 14:17	12/30/16 23:04	1
Perfluorodecanoic acid (PFDA)	ND		1.7	0.38	ng/L		12/21/16 14:17	12/30/16 23:04	1
Perfluoroundecanoic acid (PFUnA)	ND		1.7	0.64	ng/L		12/21/16 14:17	12/30/16 23:04	1
Perfluorododecanoic acid (PFDoA)	ND		1.7	0.50	ng/L		12/21/16 14:17	12/30/16 23:04	1
Perfluorotridecanoic Acid (PFTriA)	ND		1.7	0.47	ng/L		12/21/16 14:17	12/30/16 23:04	1

Client Sample ID: MW-3-12142016
Lab Sample ID: 320-24401-2
Date Collected: 12/14/16 11:30
Matrix: Water
Date Received: 12/15/16 10:15

Method: 537 (modified) - Perfluorinated Hydrocarbons (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorotetradecanoic acid (PFTeA)	~~0.90~~	~~J B~~ 1.7 UB	1.7	0.17	ng/L		12/21/16 14:17	12/30/16 23:04	1
Perfluorobutanesulfonic acid (PFBS)	ND		1.7	0.79	ng/L		12/21/16 14:17	12/30/16 23:04	1
Perfluorohexanesulfonic acid (PFHxS)	ND		1.7	0.75	ng/L		12/21/16 14:17	12/30/16 23:04	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		1.7	0.61	ng/L		12/21/16 14:17	12/30/16 23:04	1
Perfluorodecanesulfonic acid (PFDS)	ND		1.7	1.0	ng/L		12/21/16 14:17	12/30/16 23:04	1
Perfluorooctanesulfonic acid (PFOS)	ND		1.7	1.1	ng/L		12/21/16 14:17	12/30/16 23:04	1
Perfluorooctane Sulfonamide (FOSA)	R ~~ND~~		~~1.7~~	~~0.55~~	~~ng/L~~		12/21/16 14:17	12/30/16 23:04	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C8 FOSA	*4*	*	*25 - 150*	*12/21/16 14:17*	*12/30/16 23:04*	*1*
13C4 PFBA	*45*		*25 - 150*	*12/21/16 14:17*	*12/30/16 23:04*	*1*
13C2 PFHxA	*97*		*25 - 150*	*12/21/16 14:17*	*12/30/16 23:04*	*1*
13C4 PFOA	*85*		*25 - 150*	*12/21/16 14:17*	*12/30/16 23:04*	*1*
13C5 PFNA	*71*		*25 - 150*	*12/21/16 14:17*	*12/30/16 23:04*	*1*
13C2 PFDA	*60*		*25 - 150*	*12/21/16 14:17*	*12/30/16 23:04*	*1*
13C2 PFUnA	*51*		*25 - 150*	*12/21/16 14:17*	*12/30/16 23:04*	*1*
13C2 PFDoA	*50*		*25 - 150*	*12/21/16 14:17*	*12/30/16 23:04*	*1*
18O2 PFHxS	*100*		*25 - 150*	*12/21/16 14:17*	*12/30/16 23:04*	*1*
13C4 PFOS	*100*		*25 - 150*	*12/21/16 14:17*	*12/30/16 23:04*	*1*
13C4-PFHpA	*94*		*25 - 150*	*12/21/16 14:17*	*12/30/16 23:04*	*1*
13C5 PFPeA	*84*		*25 - 150*	*12/21/16 14:17*	*12/30/16 23:04*	*1*

Client Sample ID: MW-2D-12142016
Lab Sample ID: 320-24401-3
Date Collected: 12/14/16 11:10
Matrix: Water
Date Received: 12/15/16 10:15

Method: 537 (modified) - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	ND		1.9	0.44	ng/L		12/21/16 14:17	12/30/16 23:11	1
Perfluoropentanoic acid (PFPeA)	ND		1.9	0.95	ng/L		12/21/16 14:17	12/30/16 23:11	1
Perfluorohexanoic acid (PFHxA)	ND		1.9	0.75	ng/L		12/21/16 14:17	12/30/16 23:11	1
Perfluoroheptanoic acid (PFHpA)	ND		1.9	0.77	ng/L		12/21/16 14:17	12/30/16 23:11	1
Perfluorooctanoic acid (PFOA)	ND		1.9	0.72	ng/L		12/21/16 14:17	12/30/16 23:11	1
Perfluorononanoic acid (PFNA)	ND		1.9	0.63	ng/L		12/21/16 14:17	12/30/16 23:11	1
Perfluorodecanoic acid (PFDA)	ND		1.9	0.42	ng/L		12/21/16 14:17	12/30/16 23:11	1
Perfluoroundecanoic acid (PFUnA)	ND		1.9	0.72	ng/L		12/21/16 14:17	12/30/16 23:11	1
Perfluorododecanoic acid (PFDoA)	ND		1.9	0.56	ng/L		12/21/16 14:17	12/30/16 23:11	1
Perfluorotridecanoic Acid (PFTriA)	ND		1.9	0.53	ng/L		12/21/16 14:17	12/30/16 23:11	1
Perfluorotetradecanoic acid (PFTeA)	~~0.93~~	~~J B F1~~ 1.9 UB	1.9	0.19	ng/L		12/21/16 14:17	12/30/16 23:11	1
Perfluorobutanesulfonic acid (PFBS)	ND		1.9	0.88	ng/L		12/21/16 14:17	12/30/16 23:11	1
Perfluorohexanesulfonic acid (PFHxS)	ND		1.9	0.83	ng/L		12/21/16 14:17	12/30/16 23:11	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		1.9	0.68	ng/L		12/21/16 14:17	12/30/16 23:11	1
Perfluorodecanesulfonic acid (PFDS)	ND		1.9	1.2	ng/L		12/21/16 14:17	12/30/16 23:11	1
Perfluorooctanesulfonic acid (PFOS)	ND	~~F1 F2~~ UJ	1.9	1.2	ng/L		12/21/16 14:17	12/30/16 23:11	1
Perfluorooctane Sulfonamide (FOSA)	R ~~ND~~		~~1.9~~	~~0.61~~	~~ng/L~~		12/21/16 14:17	12/30/16 23:11	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C8 FOSA	*3*	*	*25 - 150*	*12/21/16 14:17*	*12/30/16 23:11*	*1*

Client Sample ID: MW-2D-12142016
Lab Sample ID: 320-24401-3

Date Collected: 12/14/16 11:10
Matrix: Water
Date Received: 12/15/16 10:15

Method: 537 (modified) - Perfluorinated Hydrocarbons (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4 PFBA	82		25 - 150	12/21/16 14:17	12/30/16 23:11	1
13C2 PFHxA	76		25 - 150	12/21/16 14:17	12/30/16 23:11	1
13C4 PFOA	69		25 - 150	12/21/16 14:17	12/30/16 23:11	1
13C5 PFNA	56		25 - 150	12/21/16 14:17	12/30/16 23:11	1
13C2 PFDA	51		25 - 150	12/21/16 14:17	12/30/16 23:11	1
13C2 PFUnA	54		25 - 150	12/21/16 14:17	12/30/16 23:11	1
13C2 PFDoA	65		25 - 150	12/21/16 14:17	12/30/16 23:11	1
18O2 PFHxS	108		25 - 150	12/21/16 14:17	12/30/16 23:11	1
13C4 PFOS	105		25 - 150	12/21/16 14:17	12/30/16 23:11	1
13C4-PFHpA	81		25 - 150	12/21/16 14:17	12/30/16 23:11	1
13C5 PFPeA	100		25 - 150	12/21/16 14:17	12/30/16 23:11	1

Client Sample ID: MW-X-12142016
Lab Sample ID: 320-24401-4

Date Collected: 12/14/16 12:00
Matrix: Water
Date Received: 12/15/16 10:15

Method: 537 (modified) - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	ND		1.8	0.40	ng/L		12/21/16 14:17	12/30/16 23:34	1
Perfluoropentanoic acid (PFPeA)	ND		1.8	0.87	ng/L		12/21/16 14:17	12/30/16 23:34	1
Perfluorohexanoic acid (PFHxA)	ND		1.8	0.69	ng/L		12/21/16 14:17	12/30/16 23:34	1
Perfluoroheptanoic acid (PFHpA)	ND		1.8	0.71	ng/L		12/21/16 14:17	12/30/16 23:34	1
Perfluorooctanoic acid (PFOA)	ND		1.8	0.66	ng/L		12/21/16 14:17	12/30/16 23:34	1
Perfluorononanoic acid (PFNA)	ND		1.8	0.58	ng/L		12/21/16 14:17	12/30/16 23:34	1
Perfluorodecanoic acid (PFDA)	ND		1.8	0.39	ng/L		12/21/16 14:17	12/30/16 23:34	1
Perfluoroundecanoic acid (PFUnA)	ND		1.8	0.66	ng/L		12/21/16 14:17	12/30/16 23:34	1
Perfluorododecanoic acid (PFDoA)	ND		1.8	0.52	ng/L		12/21/16 14:17	12/30/16 23:34	1
Perfluorotridecanoic Acid (PFTriA)	ND		1.8	0.49	ng/L		12/21/16 14:17	12/30/16 23:34	1
Perfluorotetradecanoic acid (PFTeA)	~~0.79 J B~~ 1.8 UB		1.8	0.18	ng/L		12/21/16 14:17	12/30/16 23:34	1
Perfluorobutanesulfonic acid (PFBS)	ND		1.8	0.81	ng/L		12/21/16 14:17	12/30/16 23:34	1
Perfluorohexanesulfonic acid (PFHxS)	ND		1.8	0.77	ng/L		12/21/16 14:17	12/30/16 23:34	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		1.8	0.63	ng/L		12/21/16 14:17	12/30/16 23:34	1
Perfluorodecanesulfonic acid (PFDS)	ND		1.8	1.1	ng/L		12/21/16 14:17	12/30/16 23:34	1
Perfluorooctanesulfonic acid (PFOS)	ND		1.8	1.1	ng/L		12/21/16 14:17	12/30/16 23:34	1
Perfluorooctane Sulfonamide (FOSA)	R ~~ND~~		1.8	0.56	ng/L		12/21/16 14:17	12/30/16 23:34	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C8 FOSA	2	*	25 - 150	12/21/16 14:17	12/30/16 23:34	1
13C4 PFBA	82		25 - 150	12/21/16 14:17	12/30/16 23:34	1
13C2 PFHxA	83		25 - 150	12/21/16 14:17	12/30/16 23:34	1
13C4 PFOA	60		25 - 150	12/21/16 14:17	12/30/16 23:34	1
13C5 PFNA	49		25 - 150	12/21/16 14:17	12/30/16 23:34	1
13C2 PFDA	49		25 - 150	12/21/16 14:17	12/30/16 23:34	1
13C2 PFUnA	54		25 - 150	12/21/16 14:17	12/30/16 23:34	1
13C2 PFDoA	64		25 - 150	12/21/16 14:17	12/30/16 23:34	1
18O2 PFHxS	107		25 - 150	12/21/16 14:17	12/30/16 23:34	1
13C4 PFOS	104		25 - 150	12/21/16 14:17	12/30/16 23:34	1
13C4-PFHpA	78		25 - 150	12/21/16 14:17	12/30/16 23:34	1
13C5 PFPeA	104		25 - 150	12/21/16 14:17	12/30/16 23:34	1

Client Sample ID: RB-1-12142016
Lab Sample ID: 320-24401-5

Date Collected: 12/14/16 11:45
Matrix: Water
Date Received: 12/15/16 10:15

Method: 537 (modified) - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	ND		1.8	0.42	ng/L		12/21/16 14:17	12/30/16 23:41	1
Perfluoropentanoic acid (PFPeA)	ND		1.8	0.91	ng/L		12/21/16 14:17	12/30/16 23:41	1
Perfluorohexanoic acid (PFHxA)	ND		1.8	0.73	ng/L		12/21/16 14:17	12/30/16 23:41	1
Perfluoroheptanoic acid (PFHpA)	ND		1.8	0.74	ng/L		12/21/16 14:17	12/30/16 23:41	1
Perfluorooctanoic acid (PFOA)	ND		1.8	0.69	ng/L		12/21/16 14:17	12/30/16 23:41	1
Perfluorononanoic acid (PFNA)	ND		1.8	0.60	ng/L		12/21/16 14:17	12/30/16 23:41	1
Perfluorodecanoic acid (PFDA)	ND		1.8	0.41	ng/L		12/21/16 14:17	12/30/16 23:41	1
Perfluoroundecanoic acid (PFUnA)	ND		1.8	0.69	ng/L		12/21/16 14:17	12/30/16 23:41	1
Perfluorododecanoic acid (PFDoA)	ND		1.8	0.54	ng/L		12/21/16 14:17	12/30/16 23:41	1
Perfluorotridecanoic Acid (PFTriA)	ND		1.8	0.51	ng/L		12/21/16 14:17	12/30/16 23:41	1
Perfluorotetradecanoic acid (PFTeA)	**0.50**	**J B**	1.8	0.18	ng/L		12/21/16 14:17	12/30/16 23:41	1
Perfluorobutanesulfonic acid (PFBS)	ND		1.8	0.85	ng/L		12/21/16 14:17	12/30/16 23:41	1
Perfluorohexanesulfonic acid (PFHxS)	ND		1.8	0.80	ng/L		12/21/16 14:17	12/30/16 23:41	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		1.8	0.66	ng/L		12/21/16 14:17	12/30/16 23:41	1
Perfluorodecanesulfonic acid (PFDS)	ND		1.8	1.1	ng/L		12/21/16 14:17	12/30/16 23:41	1
Perfluorooctanesulfonic acid (PFOS)	ND		1.8	1.2	ng/L		12/21/16 14:17	12/30/16 23:41	1
Perfluorooctane Sulfonamide (FOSA)	R ~~ND~~		1.8	0.59	ng/L		12/21/16 14:17	12/30/16 23:41	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C8 FOSA	*4*	*	*25 - 150*	*12/21/16 14:17*	*12/30/16 23:41*	*1*
13C4 PFBA	*72*		*25 - 150*	*12/21/16 14:17*	*12/30/16 23:41*	*1*
13C2 PFHxA	*72*		*25 - 150*	*12/21/16 14:17*	*12/30/16 23:41*	*1*
13C4 PFOA	*86*		*25 - 150*	*12/21/16 14:17*	*12/30/16 23:41*	*1*
13C5 PFNA	*82*		*25 - 150*	*12/21/16 14:17*	*12/30/16 23:41*	*1*
13C2 PFDA	*90*		*25 - 150*	*12/21/16 14:17*	*12/30/16 23:41*	*1*
13C2 PFUnA	*98*		*25 - 150*	*12/21/16 14:17*	*12/30/16 23:41*	*1*
13C2 PFDoA	*102*		*25 - 150*	*12/21/16 14:17*	*12/30/16 23:41*	*1*
18O2 PFHxS	*109*		*25 - 150*	*12/21/16 14:17*	*12/30/16 23:41*	*1*
13C4 PFOS	*107*		*25 - 150*	*12/21/16 14:17*	*12/30/16 23:41*	*1*
13C4-PFHpA	*83*		*25 - 150*	*12/21/16 14:17*	*12/30/16 23:41*	*1*
13C5 PFPeA	*76*		*25 - 150*	*12/21/16 14:17*	*12/30/16 23:41*	*1*

Client Sample ID: TRIP BLANK FRB
Lab Sample ID: 320-24401-6

Date Collected: 12/14/16 09:00
Matrix: Water
Date Received: 12/15/16 10:15

Method: 537 (modified) - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	ND		1.6	0.37	ng/L		12/21/16 14:17	12/30/16 23:49	1
Perfluoropentanoic acid (PFPeA)	ND		1.6	0.81	ng/L		12/21/16 14:17	12/30/16 23:49	1
Perfluorohexanoic acid (PFHxA)	ND		1.6	0.64	ng/L		12/21/16 14:17	12/30/16 23:49	1
Perfluoroheptanoic acid (PFHpA)	ND		1.6	0.66	ng/L		12/21/16 14:17	12/30/16 23:49	1
Perfluorooctanoic acid (PFOA)	ND		1.6	0.61	ng/L		12/21/16 14:17	12/30/16 23:49	1
Perfluorononanoic acid (PFNA)	ND		1.6	0.54	ng/L		12/21/16 14:17	12/30/16 23:49	1
Perfluorodecanoic acid (PFDA)	ND		1.6	0.36	ng/L		12/21/16 14:17	12/30/16 23:49	1
Perfluoroundecanoic acid (PFUnA)	ND		1.6	0.61	ng/L		12/21/16 14:17	12/30/16 23:49	1
Perfluorododecanoic acid (PFDoA)	ND		1.6	0.48	ng/L		12/21/16 14:17	12/30/16 23:49	1
Perfluorotridecanoic Acid (PFTriA)	ND		1.6	0.45	ng/L		12/21/16 14:17	12/30/16 23:49	1

Client Sample ID: TRIP BLANK FRB
Lab Sample ID: 320-24401-6

Date Collected: 12/14/16 09:00
Matrix: Water
Date Received: 12/15/16 10:15

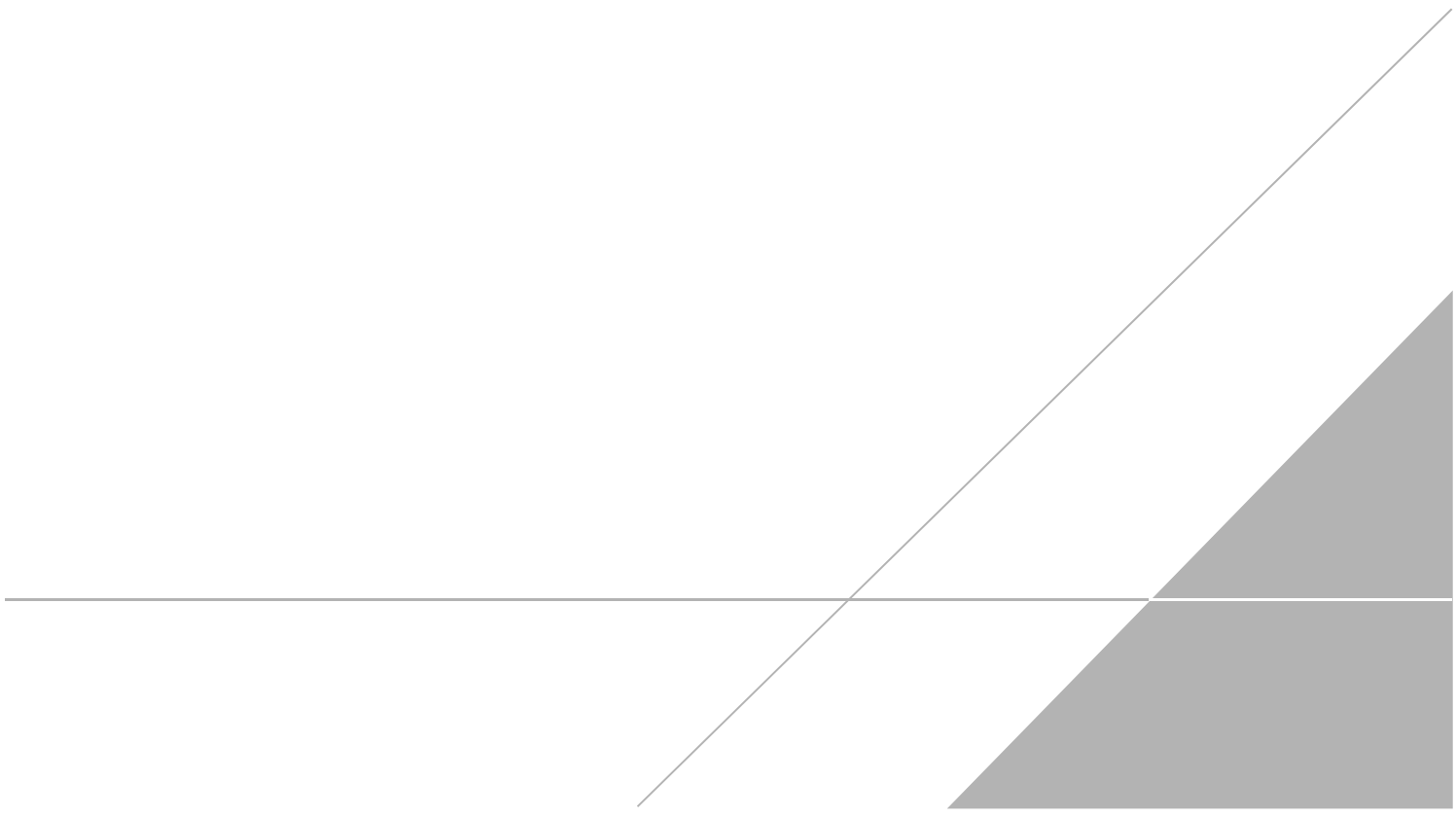
Method: 537 (modified) - Perfluorinated Hydrocarbons (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorotetradecanoic acid (PFTeA)	**0.56**	**J B**	1.6	0.16	ng/L		12/21/16 14:17	12/30/16 23:49	1
Perfluorobutanesulfonic acid (PFBS)	ND		1.6	0.75	ng/L		12/21/16 14:17	12/30/16 23:49	1
Perfluorohexanesulfonic acid (PFHxS)	ND		1.6	0.71	ng/L		12/21/16 14:17	12/30/16 23:49	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		1.6	0.58	ng/L		12/21/16 14:17	12/30/16 23:49	1
Perfluorodecanesulfonic acid (PFDS)	ND		1.6	0.99	ng/L		12/21/16 14:17	12/30/16 23:49	1
Perfluorooctanesulfonic acid (PFOS)	ND		1.6	1.0	ng/L		12/21/16 14:17	12/30/16 23:49	1
Perfluorooctane Sulfonamide (FOSA)	ND	UJ	1.6	0.52	ng/L		12/21/16 14:17	12/30/16 23:49	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C8 FOSA	*14*	*	*25 - 150*	*12/21/16 14:17*	*12/30/16 23:49*	*1*
13C4 PFBA	*111*		*25 - 150*	*12/21/16 14:17*	*12/30/16 23:49*	*1*
13C2 PFHxA	*108*		*25 - 150*	*12/21/16 14:17*	*12/30/16 23:49*	*1*
13C4 PFOA	*116*		*25 - 150*	*12/21/16 14:17*	*12/30/16 23:49*	*1*
13C5 PFNA	*111*		*25 - 150*	*12/21/16 14:17*	*12/30/16 23:49*	*1*
13C2 PFDA	*113*		*25 - 150*	*12/21/16 14:17*	*12/30/16 23:49*	*1*
13C2 PFUnA	*113*		*25 - 150*	*12/21/16 14:17*	*12/30/16 23:49*	*1*
13C2 PFDoA	*103*		*25 - 150*	*12/21/16 14:17*	*12/30/16 23:49*	*1*
18O2 PFHxS	*106*		*25 - 150*	*12/21/16 14:17*	*12/30/16 23:49*	*1*
13C4 PFOS	*105*		*25 - 150*	*12/21/16 14:17*	*12/30/16 23:49*	*1*
13C4-PFHpA	*120*		*25 - 150*	*12/21/16 14:17*	*12/30/16 23:49*	*1*
13C5 PFPeA	*111*		*25 - 150*	*12/21/16 14:17*	*12/30/16 23:49*	*1*

ATTACHMENT D

Laboratory Analytical Data Report



TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
Tel: (916)373-5600

TestAmerica Job ID: 320-24401-1
Client Project/Site: School St. Former Fire Training Area (PF

For:
ARCADIS U.S. Inc
One Lincoln Center
110 West Fayette St, Suite 300
Syracuse, New York 13202

Attn: Mr. Lawrence C Healy III

Jill Kellmann

Authorized for release by:
1/9/2017 10:27:26 AM

Jill Kellmann, Manager of Project Management
(916)374-4402
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Table of Contents

Definitions/Glossary

Client: ARCADIS U.S. Inc
Project/Site: School St. Former Fire Training Area (PF

TestAmerica Job ID: 320-24401-1

Qualifiers

LCMS

Qualifier	Qualifier Description
*	Isotope Dilution analyte is outside acceptance limits.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
B	Compound was found in the blank and sample.
F1	MS and/or MSD Recovery is outside acceptance limits.
F2	MS/MSD RPD exceeds control limits

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Job ID: 320-24401-1

Laboratory: TestAmerica Sacramento

Narrative

Receipt

The samples were received on 12/15/2016 10:15 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 0.7º C.

Receipt Exceptions

The COC states 8 containers were shipped for PFAS analysis, however, only 6 were received. MW-2D-12142016 (320-24401-3)

LCMS

Method(s) 537 (modified): The matrix spike / matrix spike duplicate (MS/MSD) recoveries for Perfluorotetradecanoic acid (PFTeA) and Perfluorooctanesulfonic acid (PFOS) preparation batch 320-143380 and analytical batch 320-144582 were outside control limits. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits.

Method(s) 537 (modified): The Isotope Dilution Analyte (IDA) recovery for 13C8 FOSA, Perfluorooctanoic acid (PFOA), and Perfluorobutanoic acid (PFBA) in the following samples is below the method recommended limit: MW-1-12142016 (320-24401-1), MW-3-12142016 (320-24401-2), MW-2D-12142016 (320-24401-3), MW-2D-12142016 (320-24401-3[MS]), MW-2D-12142016 (320-24401-3[MSD]), MW-X-12142016 (320-24401-4), RB-1-12142016 (320-24401-5) and TRIP BLANK FRB (320-24401-6). Generally, data quality is not considered affected if the IDA signal-to-noise ratio is greater than 10:1, which is achieved for all IDA in the samples.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Organic Prep

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Detection Summary

Client: ARCADIS U.S. Inc
Project/Site: School St. Former Fire Training Area (PF

TestAmerica Job ID: 320-24401-1

Client Sample ID: MW-1-12142016 — Lab Sample ID: 320-24401-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	1.6	J	1.8	0.40	ng/L	1		537 (modified)	Total/NA
Perfluorotetradecanoic acid (PFTeA)	0.37	J B	1.8	0.17	ng/L	1		537 (modified)	Total/NA

Client Sample ID: MW-3-12142016 — Lab Sample ID: 320-24401-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorotetradecanoic acid (PFTeA)	0.90	J B	1.7	0.17	ng/L	1		537 (modified)	Total/NA

Client Sample ID: MW-2D-12142016 — Lab Sample ID: 320-24401-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorotetradecanoic acid (PFTeA)	0.93	J B F1	1.9	0.19	ng/L	1		537 (modified)	Total/NA

Client Sample ID: MW-X-12142016 — Lab Sample ID: 320-24401-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorotetradecanoic acid (PFTeA)	0.79	J B	1.8	0.18	ng/L	1		537 (modified)	Total/NA

Client Sample ID: RB-1-12142016 — Lab Sample ID: 320-24401-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorotetradecanoic acid (PFTeA)	0.50	J B	1.8	0.18	ng/L	1		537 (modified)	Total/NA

Client Sample ID: TRIP BLANK FRB — Lab Sample ID: 320-24401-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorotetradecanoic acid (PFTeA)	0.56	J B	1.6	0.16	ng/L	1		537 (modified)	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: MW-1-12142016

Date Collected: 12/14/16 09:03
Date Received: 12/15/16 10:15

Lab Sample ID: 320-24401-1
Matrix: Water

Method: 537 (modified) - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	**1.6**	**J**	1.8	0.40	ng/L		12/21/16 14:17	12/30/16 22:56	1
Perfluoropentanoic acid (PFPeA)	ND		1.8	0.87	ng/L		12/21/16 14:17	12/30/16 22:56	1
Perfluorohexanoic acid (PFHxA)	ND		1.8	0.69	ng/L		12/21/16 14:17	12/30/16 22:56	1
Perfluoroheptanoic acid (PFHpA)	ND		1.8	0.70	ng/L		12/21/16 14:17	12/30/16 22:56	1
Perfluorooctanoic acid (PFOA)	ND		1.8	0.65	ng/L		12/21/16 14:17	12/30/16 22:56	1
Perfluorononanoic acid (PFNA)	ND		1.8	0.57	ng/L		12/21/16 14:17	12/30/16 22:56	1
Perfluorodecanoic acid (PFDA)	ND		1.8	0.39	ng/L		12/21/16 14:17	12/30/16 22:56	1
Perfluoroundecanoic acid (PFUnA)	ND		1.8	0.65	ng/L		12/21/16 14:17	12/30/16 22:56	1
Perfluorododecanoic acid (PFDoA)	ND		1.8	0.51	ng/L		12/21/16 14:17	12/30/16 22:56	1
Perfluorotridecanoic Acid (PFTriA)	ND		1.8	0.48	ng/L		12/21/16 14:17	12/30/16 22:56	1
Perfluorotetradecanoic acid (PFTeA)	**0.37**	**J B**	1.8	0.17	ng/L		12/21/16 14:17	12/30/16 22:56	1
Perfluorobutanesulfonic acid (PFBS)	ND		1.8	0.80	ng/L		12/21/16 14:17	12/30/16 22:56	1
Perfluorohexanesulfonic acid (PFHxS)	ND		1.8	0.76	ng/L		12/21/16 14:17	12/30/16 22:56	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		1.8	0.62	ng/L		12/21/16 14:17	12/30/16 22:56	1
Perfluorodecanesulfonic acid (PFDS)	ND		1.8	1.1	ng/L		12/21/16 14:17	12/30/16 22:56	1
Perfluorooctanesulfonic acid (PFOS)	ND		1.8	1.1	ng/L		12/21/16 14:17	12/30/16 22:56	1
Perfluorooctane Sulfonamide (FOSA)	ND		1.8	0.56	ng/L		12/21/16 14:17	12/30/16 22:56	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C8 FOSA	*1*	*	*25 - 150*	*12/21/16 14:17*	*12/30/16 22:56*	*1*
13C4 PFBA	*80*		*25 - 150*	*12/21/16 14:17*	*12/30/16 22:56*	*1*
13C2 PFHxA	*79*		*25 - 150*	*12/21/16 14:17*	*12/30/16 22:56*	*1*
13C4 PFOA	*65*		*25 - 150*	*12/21/16 14:17*	*12/30/16 22:56*	*1*
13C5 PFNA	*50*		*25 - 150*	*12/21/16 14:17*	*12/30/16 22:56*	*1*
13C2 PFDA	*24*	*	*25 - 150*	*12/21/16 14:17*	*12/30/16 22:56*	*1*
13C2 PFUnA	*38*		*25 - 150*	*12/21/16 14:17*	*12/30/16 22:56*	*1*
13C2 PFDoA	*43*		*25 - 150*	*12/21/16 14:17*	*12/30/16 22:56*	*1*
18O2 PFHxS	*108*		*25 - 150*	*12/21/16 14:17*	*12/30/16 22:56*	*1*
13C4 PFOS	*105*		*25 - 150*	*12/21/16 14:17*	*12/30/16 22:56*	*1*
13C4-PFHpA	*79*		*25 - 150*	*12/21/16 14:17*	*12/30/16 22:56*	*1*
13C5 PFPeA	*95*		*25 - 150*	*12/21/16 14:17*	*12/30/16 22:56*	*1*

Client Sample ID: MW-3-12142016

Date Collected: 12/14/16 11:30
Date Received: 12/15/16 10:15

Lab Sample ID: 320-24401-2
Matrix: Water

Method: 537 (modified) - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	ND		1.7	0.39	ng/L		12/21/16 14:17	12/30/16 23:04	1
Perfluoropentanoic acid (PFPeA)	ND		1.7	0.85	ng/L		12/21/16 14:17	12/30/16 23:04	1
Perfluorohexanoic acid (PFHxA)	ND		1.7	0.67	ng/L		12/21/16 14:17	12/30/16 23:04	1
Perfluoroheptanoic acid (PFHpA)	ND		1.7	0.69	ng/L		12/21/16 14:17	12/30/16 23:04	1
Perfluorooctanoic acid (PFOA)	ND		1.7	0.64	ng/L		12/21/16 14:17	12/30/16 23:04	1
Perfluorononanoic acid (PFNA)	ND		1.7	0.56	ng/L		12/21/16 14:17	12/30/16 23:04	1
Perfluorodecanoic acid (PFDA)	ND		1.7	0.38	ng/L		12/21/16 14:17	12/30/16 23:04	1
Perfluoroundecanoic acid (PFUnA)	ND		1.7	0.64	ng/L		12/21/16 14:17	12/30/16 23:04	1
Perfluorododecanoic acid (PFDoA)	ND		1.7	0.50	ng/L		12/21/16 14:17	12/30/16 23:04	1
Perfluorotridecanoic Acid (PFTriA)	ND		1.7	0.47	ng/L		12/21/16 14:17	12/30/16 23:04	1

Client Sample ID: MW-3-12142016

Date Collected: 12/14/16 11:30
Date Received: 12/15/16 10:15

Lab Sample ID: 320-24401-2

Matrix: Water

Method: 537 (modified) - Perfluorinated Hydrocarbons (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorotetradecanoic acid (PFTeA)	**0.90**	**J B**	1.7	0.17	ng/L		12/21/16 14:17	12/30/16 23:04	1
Perfluorobutanesulfonic acid (PFBS)	ND		1.7	0.79	ng/L		12/21/16 14:17	12/30/16 23:04	1
Perfluorohexanesulfonic acid (PFHxS)	ND		1.7	0.75	ng/L		12/21/16 14:17	12/30/16 23:04	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		1.7	0.61	ng/L		12/21/16 14:17	12/30/16 23:04	1
Perfluorodecanesulfonic acid (PFDS)	ND		1.7	1.0	ng/L		12/21/16 14:17	12/30/16 23:04	1
Perfluorooctanesulfonic acid (PFOS)	ND		1.7	1.1	ng/L		12/21/16 14:17	12/30/16 23:04	1
Perfluorooctane Sulfonamide (FOSA)	ND		1.7	0.55	ng/L		12/21/16 14:17	12/30/16 23:04	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C8 FOSA	*4*	*	*25 - 150*	*12/21/16 14:17*	*12/30/16 23:04*	*1*
13C4 PFBA	*45*		*25 - 150*	*12/21/16 14:17*	*12/30/16 23:04*	*1*
13C2 PFHxA	*97*		*25 - 150*	*12/21/16 14:17*	*12/30/16 23:04*	*1*
13C4 PFOA	*85*		*25 - 150*	*12/21/16 14:17*	*12/30/16 23:04*	*1*
13C5 PFNA	*71*		*25 - 150*	*12/21/16 14:17*	*12/30/16 23:04*	*1*
13C2 PFDA	*60*		*25 - 150*	*12/21/16 14:17*	*12/30/16 23:04*	*1*
13C2 PFUnA	*51*		*25 - 150*	*12/21/16 14:17*	*12/30/16 23:04*	*1*
13C2 PFDoA	*50*		*25 - 150*	*12/21/16 14:17*	*12/30/16 23:04*	*1*
18O2 PFHxS	*100*		*25 - 150*	*12/21/16 14:17*	*12/30/16 23:04*	*1*
13C4 PFOS	*100*		*25 - 150*	*12/21/16 14:17*	*12/30/16 23:04*	*1*
13C4-PFHpA	*94*		*25 - 150*	*12/21/16 14:17*	*12/30/16 23:04*	*1*
13C5 PFPeA	*84*		*25 - 150*	*12/21/16 14:17*	*12/30/16 23:04*	*1*

Client Sample ID: MW-2D-12142016

Date Collected: 12/14/16 11:10
Date Received: 12/15/16 10:15

Lab Sample ID: 320-24401-3

Matrix: Water

Method: 537 (modified) - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	ND		1.9	0.44	ng/L		12/21/16 14:17	12/30/16 23:11	1
Perfluoropentanoic acid (PFPeA)	ND		1.9	0.95	ng/L		12/21/16 14:17	12/30/16 23:11	1
Perfluorohexanoic acid (PFHxA)	ND		1.9	0.75	ng/L		12/21/16 14:17	12/30/16 23:11	1
Perfluoroheptanoic acid (PFHpA)	ND		1.9	0.77	ng/L		12/21/16 14:17	12/30/16 23:11	1
Perfluorooctanoic acid (PFOA)	ND		1.9	0.72	ng/L		12/21/16 14:17	12/30/16 23:11	1
Perfluorononanoic acid (PFNA)	ND		1.9	0.63	ng/L		12/21/16 14:17	12/30/16 23:11	1
Perfluorodecanoic acid (PFDA)	ND		1.9	0.42	ng/L		12/21/16 14:17	12/30/16 23:11	1
Perfluoroundecanoic acid (PFUnA)	ND		1.9	0.72	ng/L		12/21/16 14:17	12/30/16 23:11	1
Perfluorododecanoic acid (PFDoA)	ND		1.9	0.56	ng/L		12/21/16 14:17	12/30/16 23:11	1
Perfluorotridecanoic Acid (PFTriA)	ND		1.9	0.53	ng/L		12/21/16 14:17	12/30/16 23:11	1
Perfluorotetradecanoic acid (PFTeA)	**0.93**	**J B F1**	1.9	0.19	ng/L		12/21/16 14:17	12/30/16 23:11	1
Perfluorobutanesulfonic acid (PFBS)	ND		1.9	0.88	ng/L		12/21/16 14:17	12/30/16 23:11	1
Perfluorohexanesulfonic acid (PFHxS)	ND		1.9	0.83	ng/L		12/21/16 14:17	12/30/16 23:11	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		1.9	0.68	ng/L		12/21/16 14:17	12/30/16 23:11	1
Perfluorodecanesulfonic acid (PFDS)	ND		1.9	1.2	ng/L		12/21/16 14:17	12/30/16 23:11	1
Perfluorooctanesulfonic acid (PFOS)	ND	F1 F2	1.9	1.2	ng/L		12/21/16 14:17	12/30/16 23:11	1
Perfluorooctane Sulfonamide (FOSA)	ND		1.9	0.61	ng/L		12/21/16 14:17	12/30/16 23:11	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C8 FOSA	*3*	*	*25 - 150*	*12/21/16 14:17*	*12/30/16 23:11*	*1*

Client Sample ID: MW-2D-12142016

Lab Sample ID: 320-24401-3

Date Collected: 12/14/16 11:10

Matrix: Water

Date Received: 12/15/16 10:15

Method: 537 (modified) - Perfluorinated Hydrocarbons (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4 PFBA	82		25 - 150	12/21/16 14:17	12/30/16 23:11	1
13C2 PFHxA	76		25 - 150	12/21/16 14:17	12/30/16 23:11	1
13C4 PFOA	69		25 - 150	12/21/16 14:17	12/30/16 23:11	1
13C5 PFNA	56		25 - 150	12/21/16 14:17	12/30/16 23:11	1
13C2 PFDA	51		25 - 150	12/21/16 14:17	12/30/16 23:11	1
13C2 PFUnA	54		25 - 150	12/21/16 14:17	12/30/16 23:11	1
13C2 PFDoA	65		25 - 150	12/21/16 14:17	12/30/16 23:11	1
18O2 PFHxS	108		25 - 150	12/21/16 14:17	12/30/16 23:11	1
13C4 PFOS	105		25 - 150	12/21/16 14:17	12/30/16 23:11	1
13C4-PFHpA	81		25 - 150	12/21/16 14:17	12/30/16 23:11	1
13C5 PFPeA	100		25 - 150	12/21/16 14:17	12/30/16 23:11	1

Client Sample ID: MW-X-12142016

Lab Sample ID: 320-24401-4

Date Collected: 12/14/16 12:00

Matrix: Water

Date Received: 12/15/16 10:15

Method: 537 (modified) - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	ND		1.8	0.40	ng/L		12/21/16 14:17	12/30/16 23:34	1
Perfluoropentanoic acid (PFPeA)	ND		1.8	0.87	ng/L		12/21/16 14:17	12/30/16 23:34	1
Perfluorohexanoic acid (PFHxA)	ND		1.8	0.69	ng/L		12/21/16 14:17	12/30/16 23:34	1
Perfluoroheptanoic acid (PFHpA)	ND		1.8	0.71	ng/L		12/21/16 14:17	12/30/16 23:34	1
Perfluorooctanoic acid (PFOA)	ND		1.8	0.66	ng/L		12/21/16 14:17	12/30/16 23:34	1
Perfluorononanoic acid (PFNA)	ND		1.8	0.58	ng/L		12/21/16 14:17	12/30/16 23:34	1
Perfluorodecanoic acid (PFDA)	ND		1.8	0.39	ng/L		12/21/16 14:17	12/30/16 23:34	1
Perfluoroundecanoic acid (PFUnA)	ND		1.8	0.66	ng/L		12/21/16 14:17	12/30/16 23:34	1
Perfluorododecanoic acid (PFDoA)	ND		1.8	0.52	ng/L		12/21/16 14:17	12/30/16 23:34	1
Perfluorotridecanoic Acid (PFTriA)	ND		1.8	0.49	ng/L		12/21/16 14:17	12/30/16 23:34	1
Perfluorotetradecanoic acid (PFTeA)	**0.79**	**J B**	1.8	0.18	ng/L		12/21/16 14:17	12/30/16 23:34	1
Perfluorobutanesulfonic acid (PFBS)	ND		1.8	0.81	ng/L		12/21/16 14:17	12/30/16 23:34	1
Perfluorohexanesulfonic acid (PFHxS)	ND		1.8	0.77	ng/L		12/21/16 14:17	12/30/16 23:34	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		1.8	0.63	ng/L		12/21/16 14:17	12/30/16 23:34	1
Perfluorodecanesulfonic acid (PFDS)	ND		1.8	1.1	ng/L		12/21/16 14:17	12/30/16 23:34	1
Perfluorooctanesulfonic acid (PFOS)	ND		1.8	1.1	ng/L		12/21/16 14:17	12/30/16 23:34	1
Perfluorooctane Sulfonamide (FOSA)	ND		1.8	0.56	ng/L		12/21/16 14:17	12/30/16 23:34	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C8 FOSA	2	*	25 - 150	12/21/16 14:17	12/30/16 23:34	1
13C4 PFBA	82		25 - 150	12/21/16 14:17	12/30/16 23:34	1
13C2 PFHxA	83		25 - 150	12/21/16 14:17	12/30/16 23:34	1
13C4 PFOA	60		25 - 150	12/21/16 14:17	12/30/16 23:34	1
13C5 PFNA	49		25 - 150	12/21/16 14:17	12/30/16 23:34	1
13C2 PFDA	49		25 - 150	12/21/16 14:17	12/30/16 23:34	1
13C2 PFUnA	54		25 - 150	12/21/16 14:17	12/30/16 23:34	1
13C2 PFDoA	64		25 - 150	12/21/16 14:17	12/30/16 23:34	1
18O2 PFHxS	107		25 - 150	12/21/16 14:17	12/30/16 23:34	1
13C4 PFOS	104		25 - 150	12/21/16 14:17	12/30/16 23:34	1
13C4-PFHpA	78		25 - 150	12/21/16 14:17	12/30/16 23:34	1
13C5 PFPeA	104		25 - 150	12/21/16 14:17	12/30/16 23:34	1

Client Sample ID: RB-1-12142016

Lab Sample ID: 320-24401-5

Date Collected: 12/14/16 11:45

Matrix: Water

Date Received: 12/15/16 10:15

Method: 537 (modified) - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	ND		1.8	0.42	ng/L		12/21/16 14:17	12/30/16 23:41	1
Perfluoropentanoic acid (PFPeA)	ND		1.8	0.91	ng/L		12/21/16 14:17	12/30/16 23:41	1
Perfluorohexanoic acid (PFHxA)	ND		1.8	0.73	ng/L		12/21/16 14:17	12/30/16 23:41	1
Perfluoroheptanoic acid (PFHpA)	ND		1.8	0.74	ng/L		12/21/16 14:17	12/30/16 23:41	1
Perfluorooctanoic acid (PFOA)	ND		1.8	0.69	ng/L		12/21/16 14:17	12/30/16 23:41	1
Perfluorononanoic acid (PFNA)	ND		1.8	0.60	ng/L		12/21/16 14:17	12/30/16 23:41	1
Perfluorodecanoic acid (PFDA)	ND		1.8	0.41	ng/L		12/21/16 14:17	12/30/16 23:41	1
Perfluoroundecanoic acid (PFUnA)	ND		1.8	0.69	ng/L		12/21/16 14:17	12/30/16 23:41	1
Perfluorododecanoic acid (PFDoA)	ND		1.8	0.54	ng/L		12/21/16 14:17	12/30/16 23:41	1
Perfluorotridecanoic Acid (PFTriA)	ND		1.8	0.51	ng/L		12/21/16 14:17	12/30/16 23:41	1
Perfluorotetradecanoic acid (PFTeA)	**0.50**	**J B**	1.8	0.18	ng/L		12/21/16 14:17	12/30/16 23:41	1
Perfluorobutanesulfonic acid (PFBS)	ND		1.8	0.85	ng/L		12/21/16 14:17	12/30/16 23:41	1
Perfluorohexanesulfonic acid (PFHxS)	ND		1.8	0.80	ng/L		12/21/16 14:17	12/30/16 23:41	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		1.8	0.66	ng/L		12/21/16 14:17	12/30/16 23:41	1
Perfluorodecanesulfonic acid (PFDS)	ND		1.8	1.1	ng/L		12/21/16 14:17	12/30/16 23:41	1
Perfluorooctanesulfonic acid (PFOS)	ND		1.8	1.2	ng/L		12/21/16 14:17	12/30/16 23:41	1
Perfluorooctane Sulfonamide (FOSA)	ND		1.8	0.59	ng/L		12/21/16 14:17	12/30/16 23:41	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C8 FOSA	*4*	*	*25 - 150*	*12/21/16 14:17*	*12/30/16 23:41*	*1*
13C4 PFBA	*72*		*25 - 150*	*12/21/16 14:17*	*12/30/16 23:41*	*1*
13C2 PFHxA	*72*		*25 - 150*	*12/21/16 14:17*	*12/30/16 23:41*	*1*
13C4 PFOA	*86*		*25 - 150*	*12/21/16 14:17*	*12/30/16 23:41*	*1*
13C5 PFNA	*82*		*25 - 150*	*12/21/16 14:17*	*12/30/16 23:41*	*1*
13C2 PFDA	*90*		*25 - 150*	*12/21/16 14:17*	*12/30/16 23:41*	*1*
13C2 PFUnA	*98*		*25 - 150*	*12/21/16 14:17*	*12/30/16 23:41*	*1*
13C2 PFDoA	*102*		*25 - 150*	*12/21/16 14:17*	*12/30/16 23:41*	*1*
18O2 PFHxS	*109*		*25 - 150*	*12/21/16 14:17*	*12/30/16 23:41*	*1*
13C4 PFOS	*107*		*25 - 150*	*12/21/16 14:17*	*12/30/16 23:41*	*1*
13C4-PFHpA	*83*		*25 - 150*	*12/21/16 14:17*	*12/30/16 23:41*	*1*
13C5 PFPeA	*76*		*25 - 150*	*12/21/16 14:17*	*12/30/16 23:41*	*1*

Client Sample ID: TRIP BLANK FRB

Lab Sample ID: 320-24401-6

Date Collected: 12/14/16 09:00

Matrix: Water

Date Received: 12/15/16 10:15

Method: 537 (modified) - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	ND		1.6	0.37	ng/L		12/21/16 14:17	12/30/16 23:49	1
Perfluoropentanoic acid (PFPeA)	ND		1.6	0.81	ng/L		12/21/16 14:17	12/30/16 23:49	1
Perfluorohexanoic acid (PFHxA)	ND		1.6	0.64	ng/L		12/21/16 14:17	12/30/16 23:49	1
Perfluoroheptanoic acid (PFHpA)	ND		1.6	0.66	ng/L		12/21/16 14:17	12/30/16 23:49	1
Perfluorooctanoic acid (PFOA)	ND		1.6	0.61	ng/L		12/21/16 14:17	12/30/16 23:49	1
Perfluorononanoic acid (PFNA)	ND		1.6	0.54	ng/L		12/21/16 14:17	12/30/16 23:49	1
Perfluorodecanoic acid (PFDA)	ND		1.6	0.36	ng/L		12/21/16 14:17	12/30/16 23:49	1
Perfluoroundecanoic acid (PFUnA)	ND		1.6	0.61	ng/L		12/21/16 14:17	12/30/16 23:49	1
Perfluorododecanoic acid (PFDoA)	ND		1.6	0.48	ng/L		12/21/16 14:17	12/30/16 23:49	1
Perfluorotridecanoic Acid (PFTriA)	ND		1.6	0.45	ng/L		12/21/16 14:17	12/30/16 23:49	1

Client Sample ID: TRIP BLANK FRB
Date Collected: 12/14/16 09:00
Date Received: 12/15/16 10:15

Lab Sample ID: 320-24401-6
Matrix: Water

Method: 537 (modified) - Perfluorinated Hydrocarbons (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorotetradecanoic acid (PFTeA)	**0.56**	**J B**	1.6	0.16	ng/L		12/21/16 14:17	12/30/16 23:49	1
Perfluorobutanesulfonic acid (PFBS)	ND		1.6	0.75	ng/L		12/21/16 14:17	12/30/16 23:49	1
Perfluorohexanesulfonic acid (PFHxS)	ND		1.6	0.71	ng/L		12/21/16 14:17	12/30/16 23:49	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		1.6	0.58	ng/L		12/21/16 14:17	12/30/16 23:49	1
Perfluorodecanesulfonic acid (PFDS)	ND		1.6	0.99	ng/L		12/21/16 14:17	12/30/16 23:49	1
Perfluorooctanesulfonic acid (PFOS)	ND		1.6	1.0	ng/L		12/21/16 14:17	12/30/16 23:49	1
Perfluorooctane Sulfonamide (FOSA)	ND		1.6	0.52	ng/L		12/21/16 14:17	12/30/16 23:49	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C8 FOSA	*14*	*	*25 - 150*	*12/21/16 14:17*	*12/30/16 23:49*	*1*
13C4 PFBA	*111*		*25 - 150*	*12/21/16 14:17*	*12/30/16 23:49*	*1*
13C2 PFHxA	*108*		*25 - 150*	*12/21/16 14:17*	*12/30/16 23:49*	*1*
13C4 PFOA	*116*		*25 - 150*	*12/21/16 14:17*	*12/30/16 23:49*	*1*
13C5 PFNA	*111*		*25 - 150*	*12/21/16 14:17*	*12/30/16 23:49*	*1*
13C2 PFDA	*113*		*25 - 150*	*12/21/16 14:17*	*12/30/16 23:49*	*1*
13C2 PFUnA	*113*		*25 - 150*	*12/21/16 14:17*	*12/30/16 23:49*	*1*
13C2 PFDoA	*103*		*25 - 150*	*12/21/16 14:17*	*12/30/16 23:49*	*1*
18O2 PFHxS	*106*		*25 - 150*	*12/21/16 14:17*	*12/30/16 23:49*	*1*
13C4 PFOS	*105*		*25 - 150*	*12/21/16 14:17*	*12/30/16 23:49*	*1*
13C4-PFHpA	*120*		*25 - 150*	*12/21/16 14:17*	*12/30/16 23:49*	*1*
13C5 PFPeA	*111*		*25 - 150*	*12/21/16 14:17*	*12/30/16 23:49*	*1*

Isotope Dilution Summary

Client: ARCADIS U.S. Inc
Project/Site: School St. Former Fire Training Area (PF

TestAmerica Job ID: 320-24401-1

Method: 537 (modified) - Perfluorinated Hydrocarbons

Matrix: Water **Prep Type: Total/NA**

		Percent Isotope Dilution Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	3C8 FOSA (25-150)	3C4 PFBA (25-150)	3C2 PFHxA (25-150)	3C4 PFOA (25-150)	3C5 PFNA (25-150)	3C2 PFDA (25-150)	3C2 PFUnA (25-150)	3C2 PFDoA (25-150)
320-24401-1	MW-1-12142016	1 *	80	79	65	50	24 *	38	43
320-24401-2	MW-3-12142016	4 *	45	97	85	71	60	51	50
320-24401-3	MW-2D-12142016	3 *	82	76	69	56	51	54	65
320-24401-3 MS	MW-2D-12142016	2 *	76	75	59	49	45	47	54
320-24401-3 MSD	MW-2D-12142016	2 *	80	77	63	52	54	54	61
320-24401-4	MW-X-12142016	2 *	82	83	60	49	49	54	64
320-24401-5	RB-1-12142016	4 *	72	72	86	82	90	98	102
320-24401-6	TRIP BLANK FRB	14 *	111	108	116	111	113	113	103
LCS 320-143380/2-A	Lab Control Sample	29	112	105	109	102	107	106	103
MB 320-143380/1-A	Method Blank	27	105	100	105	98	103	99	95

		Percent Isotope Dilution Recovery (Acceptance Limits)			
Lab Sample ID	Client Sample ID	18O2 PFHxS (25-150)	13C4 PFOS (25-150)	13C4-PFHpA (25-150)	13C5 PFPeA (25-150)
320-24401-1	MW-1-12142016	108	105	79	95
320-24401-2	MW-3-12142016	100	100	94	84
320-24401-3	MW-2D-12142016	108	105	81	100
320-24401-3 MS	MW-2D-12142016	103	103	74	96
320-24401-3 MSD	MW-2D-12142016	105	105	77	97
320-24401-4	MW-X-12142016	107	104	78	104
320-24401-5	RB-1-12142016	109	107	83	76
320-24401-6	TRIP BLANK FRB	106	105	120	111
LCS 320-143380/2-A	Lab Control Sample	108	109	116	112
MB 320-143380/1-A	Method Blank	103	101	111	105

Surrogate Legend

13C8 FOSA = 13C8 FOSA
13C4 PFBA = 13C4 PFBA
13C2 PFHxA = 13C2 PFHxA
13C4 PFOA = 13C4 PFOA
13C5 PFNA = 13C5 PFNA
13C2 PFDA = 13C2 PFDA
13C2 PFUnA = 13C2 PFUnA
13C2 PFDoA = 13C2 PFDoA
18O2 PFHxS = 18O2 PFHxS
13C4 PFOS = 13C4 PFOS
13C4-PFHpA = 13C4-PFHpA
13C5 PFPeA = 13C5 PFPeA

Method: 537 (modified) - Perfluorinated Hydrocarbons

Lab Sample ID: MB 320-143380/1-A
Matrix: Water
Analysis Batch: 144582

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 143380

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	ND		2.0	0.46	ng/L		12/21/16 14:17	12/30/16 22:41	1
Perfluoropentanoic acid (PFPeA)	ND		2.0	0.99	ng/L		12/21/16 14:17	12/30/16 22:41	1
Perfluorohexanoic acid (PFHxA)	ND		2.0	0.79	ng/L		12/21/16 14:17	12/30/16 22:41	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		12/21/16 14:17	12/30/16 22:41	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		12/21/16 14:17	12/30/16 22:41	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		12/21/16 14:17	12/30/16 22:41	1
Perfluorodecanoic acid (PFDA)	ND		2.0	0.44	ng/L		12/21/16 14:17	12/30/16 22:41	1
Perfluoroundecanoic acid (PFUnA)	ND		2.0	0.75	ng/L		12/21/16 14:17	12/30/16 22:41	1
Perfluorododecanoic acid (PFDoA)	ND		2.0	0.58	ng/L		12/21/16 14:17	12/30/16 22:41	1
Perfluorotridecanoic Acid (PFTriA)	ND		2.0	0.55	ng/L		12/21/16 14:17	12/30/16 22:41	1
Perfluorotetradecanoic acid (PFTeA)	0.846	J	2.0	0.20	ng/L		12/21/16 14:17	12/30/16 22:41	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		12/21/16 14:17	12/30/16 22:41	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		12/21/16 14:17	12/30/16 22:41	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		2.0	0.71	ng/L		12/21/16 14:17	12/30/16 22:41	1
Perfluorodecanesulfonic acid (PFDS)	ND		2.0	1.2	ng/L		12/21/16 14:17	12/30/16 22:41	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		12/21/16 14:17	12/30/16 22:41	1
Perfluorooctane Sulfonamide (FOSA)	ND		2.0	0.64	ng/L		12/21/16 14:17	12/30/16 22:41	1

Isotope Dilution	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C8 FOSA	*27*		*25 - 150*	*12/21/16 14:17*	*12/30/16 22:41*	*1*
13C4 PFBA	*105*		*25 - 150*	*12/21/16 14:17*	*12/30/16 22:41*	*1*
13C2 PFHxA	*100*		*25 - 150*	*12/21/16 14:17*	*12/30/16 22:41*	*1*
13C4 PFOA	*105*		*25 - 150*	*12/21/16 14:17*	*12/30/16 22:41*	*1*
13C5 PFNA	*98*		*25 - 150*	*12/21/16 14:17*	*12/30/16 22:41*	*1*
13C2 PFDA	*103*		*25 - 150*	*12/21/16 14:17*	*12/30/16 22:41*	*1*
13C2 PFUnA	*99*		*25 - 150*	*12/21/16 14:17*	*12/30/16 22:41*	*1*
13C2 PFDoA	*95*		*25 - 150*	*12/21/16 14:17*	*12/30/16 22:41*	*1*
18O2 PFHxS	*103*		*25 - 150*	*12/21/16 14:17*	*12/30/16 22:41*	*1*
13C4 PFOS	*101*		*25 - 150*	*12/21/16 14:17*	*12/30/16 22:41*	*1*
13C4-PFHpA	*111*		*25 - 150*	*12/21/16 14:17*	*12/30/16 22:41*	*1*
13C5 PFPeA	*105*		*25 - 150*	*12/21/16 14:17*	*12/30/16 22:41*	*1*

Lab Sample ID: LCS 320-143380/2-A
Matrix: Water
Analysis Batch: 144582

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 143380

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorobutanoic acid (PFBA)	40.0	38.7		ng/L		97	60 - 140
Perfluoropentanoic acid (PFPeA)	40.0	38.1		ng/L		95	60 - 140
Perfluorohexanoic acid (PFHxA)	40.0	35.9		ng/L		90	60 - 140
Perfluoroheptanoic acid (PFHpA)	40.0	38.2		ng/L		96	60 - 140
Perfluorooctanoic acid (PFOA)	40.0	36.0		ng/L		90	60 - 140
Perfluorononanoic acid (PFNA)	40.0	35.1		ng/L		88	60 - 140
Perfluorodecanoic acid (PFDA)	40.0	36.0		ng/L		90	60 - 140
Perfluoroundecanoic acid (PFUnA)	40.0	35.5		ng/L		89	60 - 140
Perfluorododecanoic acid (PFDoA)	40.0	35.0		ng/L		87	60 - 140

Method: 537 (modified) - Perfluorinated Hydrocarbons (Continued)

Lab Sample ID: LCS 320-143380/2-A
Matrix: Water
Analysis Batch: 144582

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 143380

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorotridecanoic Acid (PFTriA)	40.0	36.3		ng/L		91	50 - 150
Perfluorotetradecanoic acid (PFTeA)	40.0	48.5		ng/L		121	50 - 150
Perfluorobutanesulfonic acid (PFBS)	35.4	38.7		ng/L		110	50 - 150
Perfluorohexanesulfonic acid (PFHxS)	36.4	35.2		ng/L		97	60 - 140
Perfluoroheptanesulfonic Acid (PFHpS)	38.1	36.8		ng/L		97	50 - 150
Perfluorodecanesulfonic acid (PFDS)	38.6	35.1		ng/L		91	50 - 150
Perfluorooctanesulfonic acid (PFOS)	37.1	36.8		ng/L		99	60 - 140
Perfluorooctane Sulfonamide (FOSA)	40.0	35.6		ng/L		89	60 - 140

Isotope Dilution	*LCS %Recovery*	*LCS Qualifier*	*Limits*
13C8 FOSA	*29*		*25 - 150*
13C4 PFBA	*112*		*25 - 150*
13C2 PFHxA	*105*		*25 - 150*
13C4 PFOA	*109*		*25 - 150*
13C5 PFNA	*102*		*25 - 150*
13C2 PFDA	*107*		*25 - 150*
13C2 PFUnA	*106*		*25 - 150*
13C2 PFDoA	*103*		*25 - 150*
18O2 PFHxS	*108*		*25 - 150*
13C4 PFOS	*109*		*25 - 150*
13C4-PFHpA	*116*		*25 - 150*
13C5 PFPeA	*112*		*25 - 150*

Lab Sample ID: 320-24401-3 MS
Matrix: Water
Analysis Batch: 144582

Client Sample ID: MW-2D-12142016
Prep Type: Total/NA
Prep Batch: 143380

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorobutanoic acid (PFBA)	ND		35.7	37.4		ng/L		105	60 - 140
Perfluoropentanoic acid (PFPeA)	ND		35.7	34.6		ng/L		97	60 - 140
Perfluorohexanoic acid (PFHxA)	ND		35.7	34.9		ng/L		98	60 - 140
Perfluoroheptanoic acid (PFHpA)	ND		35.7	36.6		ng/L		102	60 - 140
Perfluorooctanoic acid (PFOA)	ND		35.7	36.5		ng/L		102	60 - 140
Perfluorononanoic acid (PFNA)	ND		35.7	36.2		ng/L		101	60 - 140
Perfluorodecanoic acid (PFDA)	ND		35.7	35.6		ng/L		100	60 - 140
Perfluoroundecanoic acid (PFUnA)	ND		35.7	34.7		ng/L		97	60 - 140
Perfluorododecanoic acid (PFDoA)	ND		35.7	35.9		ng/L		101	60 - 140
Perfluorotridecanoic Acid (PFTriA)	ND		35.7	45.3		ng/L		127	50 - 150
Perfluorotetradecanoic acid (PFTeA)	0.93	J B F1	35.7	75.6	F1	ng/L		209	50 - 150

Method: 537 (modified) - Perfluorinated Hydrocarbons (Continued)

Lab Sample ID: 320-24401-3 MS
Matrix: Water
Analysis Batch: 144582

Client Sample ID: MW-2D-12142016
Prep Type: Total/NA
Prep Batch: 143380

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorobutanesulfonic acid (PFBS)	ND		31.6	41.3		ng/L		131	50 - 150
Perfluorohexanesulfonic acid (PFHxS)	ND		32.5	34.6		ng/L		106	60 - 140
Perfluoroheptanesulfonic Acid (PFHpS)	ND		34.0	37.7		ng/L		111	50 - 150
Perfluorodecanesulfonic acid (PFDS)	ND		34.4	33.7		ng/L		98	50 - 150
Perfluorooctanesulfonic acid (PFOS)	ND	F1 F2	33.1	37.9		ng/L		114	60 - 140
Perfluorooctane Sulfonamide (FOSA)	ND		35.7	36.2		ng/L		101	60 - 140

Isotope Dilution	*MS %Recovery*	*MS Qualifier*	*Limits*
13C8 FOSA	*2*	*	*25 - 150*
13C4 PFBA	*76*		*25 - 150*
13C2 PFHxA	*75*		*25 - 150*
13C4 PFOA	*59*		*25 - 150*
13C5 PFNA	*49*		*25 - 150*
13C2 PFDA	*45*		*25 - 150*
13C2 PFUnA	*47*		*25 - 150*
13C2 PFDoA	*54*		*25 - 150*
18O2 PFHxS	*103*		*25 - 150*
13C4 PFOS	*103*		*25 - 150*
13C4-PFHpA	*74*		*25 - 150*
13C5 PFPeA	*96*		*25 - 150*

Lab Sample ID: 320-24401-3 MSD
Matrix: Water
Analysis Batch: 144582

Client Sample ID: MW-2D-12142016
Prep Type: Total/NA
Prep Batch: 143380

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluorobutanoic acid (PFBA)	ND		36.9	39.0		ng/L		106	60 - 140	4	30
Perfluoropentanoic acid (PFPeA)	ND		36.9	37.4		ng/L		101	60 - 140	8	30
Perfluorohexanoic acid (PFHxA)	ND		36.9	36.6		ng/L		99	60 - 140	5	30
Perfluoroheptanoic acid (PFHpA)	ND		36.9	38.9		ng/L		106	60 - 140	6	30
Perfluorooctanoic acid (PFOA)	ND		36.9	37.7		ng/L		102	60 - 140	3	30
Perfluorononanoic acid (PFNA)	ND		36.9	37.1		ng/L		101	60 - 140	3	30
Perfluorodecanoic acid (PFDA)	ND		36.9	36.0		ng/L		98	60 - 140	1	30
Perfluoroundecanoic acid (PFUnA)	ND		36.9	36.0		ng/L		98	60 - 140	3	30
Perfluorododecanoic acid (PFDoA)	ND		36.9	38.2		ng/L		104	60 - 140	6	30
Perfluorotridecanoic Acid (PFTriA)	ND		36.9	46.3		ng/L		126	50 - 150	2	30
Perfluorotetradecanoic acid (PFTeA)	0.93	J B F1	36.9	70.8	F1	ng/L		190	50 - 150	7	30
Perfluorobutanesulfonic acid (PFBS)	ND		32.6	42.5		ng/L		130	50 - 150	3	30
Perfluorohexanesulfonic acid (PFHxS)	ND		33.5	35.8		ng/L		107	60 - 140	3	30

Method: 537 (modified) - Perfluorinated Hydrocarbons (Continued)

Lab Sample ID: 320-24401-3 MSD
Matrix: Water
Analysis Batch: 144582

Client Sample ID: MW-2D-12142016
Prep Type: Total/NA
Prep Batch: 143380

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluoroheptanesulfonic Acid (PFHpS)	ND		35.1	38.4		ng/L		109	50 - 150	2	30
Perfluorodecanesulfonic acid (PFDS)	ND		35.5	34.8		ng/L		98	50 - 150	3	30
Perfluorooctanesulfonic acid (PFOS)	ND	F1 F2	34.2	68.4	F1 F2	ng/L		200	60 - 140	57	30
Perfluorooctane Sulfonamide (FOSA)	ND		36.9	37.2		ng/L		101	60 - 140	3	30

Isotope Dilution	*MSD %Recovery*	*MSD Qualifier*	*Limits*
13C8 FOSA	*2*	*	*25 - 150*
13C4 PFBA	*80*		*25 - 150*
13C2 PFHxA	*77*		*25 - 150*
13C4 PFOA	*63*		*25 - 150*
13C5 PFNA	*52*		*25 - 150*
13C2 PFDA	*54*		*25 - 150*
13C2 PFUnA	*54*		*25 - 150*
13C2 PFDoA	*61*		*25 - 150*
18O2 PFHxS	*105*		*25 - 150*
13C4 PFOS	*105*		*25 - 150*
13C4-PFHpA	*77*		*25 - 150*
13C5 PFPeA	*97*		*25 - 150*

QC Association Summary

Client: ARCADIS U.S. Inc
Project/Site: School St. Former Fire Training Area (PF

TestAmerica Job ID: 320-24401-1

LCMS

Prep Batch: 143380

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-24401-1	MW-1-12142016	Total/NA	Water	3535	
320-24401-2	MW-3-12142016	Total/NA	Water	3535	
320-24401-3	MW-2D-12142016	Total/NA	Water	3535	
320-24401-4	MW-X-12142016	Total/NA	Water	3535	
320-24401-5	RB-1-12142016	Total/NA	Water	3535	
320-24401-6	TRIP BLANK FRB	Total/NA	Water	3535	
MB 320-143380/1-A	Method Blank	Total/NA	Water	3535	
LCS 320-143380/2-A	Lab Control Sample	Total/NA	Water	3535	
320-24401-3 MS	MW-2D-12142016	Total/NA	Water	3535	
320-24401-3 MSD	MW-2D-12142016	Total/NA	Water	3535	

Analysis Batch: 144582

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-24401-1	MW-1-12142016	Total/NA	Water	537 (modified)	143380
320-24401-2	MW-3-12142016	Total/NA	Water	537 (modified)	143380
320-24401-3	MW-2D-12142016	Total/NA	Water	537 (modified)	143380
320-24401-4	MW-X-12142016	Total/NA	Water	537 (modified)	143380
320-24401-5	RB-1-12142016	Total/NA	Water	537 (modified)	143380
320-24401-6	TRIP BLANK FRB	Total/NA	Water	537 (modified)	143380
MB 320-143380/1-A	Method Blank	Total/NA	Water	537 (modified)	143380
LCS 320-143380/2-A	Lab Control Sample	Total/NA	Water	537 (modified)	143380
320-24401-3 MS	MW-2D-12142016	Total/NA	Water	537 (modified)	143380
320-24401-3 MSD	MW-2D-12142016	Total/NA	Water	537 (modified)	143380

Lab Chronicle

Client: ARCADIS U.S. Inc
Project/Site: School St. Former Fire Training Area (PF

TestAmerica Job ID: 320-24401-1

Client Sample ID: MW-1-12142016
Date Collected: 12/14/16 09:03
Date Received: 12/15/16 10:15

Lab Sample ID: 320-24401-1
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			285.5 mL	0.5 mL	143380	12/21/16 14:17	ERW	TAL SAC
Total/NA	Analysis	537 (modified)		1			144582	12/30/16 22:56	SBC	TAL SAC

Client Sample ID: MW-3-12142016
Date Collected: 12/14/16 11:30
Date Received: 12/15/16 10:15

Lab Sample ID: 320-24401-2
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			291.8 mL	0.5 mL	143380	12/21/16 14:17	ERW	TAL SAC
Total/NA	Analysis	537 (modified)		1			144582	12/30/16 23:04	SBC	TAL SAC

Client Sample ID: MW-2D-12142016
Date Collected: 12/14/16 11:10
Date Received: 12/15/16 10:15

Lab Sample ID: 320-24401-3
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			261.1 mL	0.5 mL	143380	12/21/16 14:17	ERW	TAL SAC
Total/NA	Analysis	537 (modified)		1			144582	12/30/16 23:11	SBC	TAL SAC

Client Sample ID: MW-X-12142016
Date Collected: 12/14/16 12:00
Date Received: 12/15/16 10:15

Lab Sample ID: 320-24401-4
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			282.8 mL	0.5 mL	143380	12/21/16 14:17	ERW	TAL SAC
Total/NA	Analysis	537 (modified)		1			144582	12/30/16 23:34	SBC	TAL SAC

Client Sample ID: RB-1-12142016
Date Collected: 12/14/16 11:45
Date Received: 12/15/16 10:15

Lab Sample ID: 320-24401-5
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			270.7 mL	0.5 mL	143380	12/21/16 14:17	ERW	TAL SAC
Total/NA	Analysis	537 (modified)		1			144582	12/30/16 23:41	SBC	TAL SAC

Client Sample ID: TRIP BLANK FRB
Date Collected: 12/14/16 09:00
Date Received: 12/15/16 10:15

Lab Sample ID: 320-24401-6
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			305.6 mL	0.5 mL	143380	12/21/16 14:17	ERW	TAL SAC
Total/NA	Analysis	537 (modified)		1			144582	12/30/16 23:49	SBC	TAL SAC

Lab Chronicle

Client: ARCADIS U.S. Inc
Project/Site: School St. Former Fire Training Area (PF

TestAmerica Job ID: 320-24401-1

Laboratory References:

TAL SAC = TestAmerica Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Certification Summary

Client: ARCADIS U.S. Inc
Project/Site: School St. Former Fire Training Area (PF

TestAmerica Job ID: 320-24401-1

Laboratory: TestAmerica Sacramento

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
A2LA	DoD ELAP		2928-01	01-31-17
Alaska (UST)	State Program	10	UST-055	12-18-17
Arizona	State Program	9	AZ0708	08-11-17
Arkansas DEQ	State Program	6	88-0691	06-17-17
California	State Program	9	2897	01-31-18
Colorado	State Program	8	CA00044	08-31-17
Connecticut	State Program	1	PH-0691	06-30-17
Florida	NELAP	4	E87570	06-30-17
Hawaii	State Program	9	N/A	01-31-17
Illinois	NELAP	5	200060	03-17-17
Kansas	NELAP	7	E-10375	10-31-17
Louisiana	NELAP	6	30612	06-30-17
Maine	State Program	1	CA0004	04-18-18
Michigan	State Program	5	9947	01-31-18
Nevada	State Program	9	CA00044	07-31-17
New Jersey	NELAP	2	CA005	06-30-17
New York	NELAP	2	11666	04-01-17
Oregon	NELAP	10	4040	01-28-18
Pennsylvania	NELAP	3	68-01272	03-31-17
Texas	NELAP	6	T104704399	07-31-17
US Fish & Wildlife	Federal		LE148388-0	10-31-17
USDA	Federal		P330-11-00436	12-30-17
USEPA UCMR	Federal	1	CA00044	11-06-18
Utah	NELAP	8	CA00044	02-28-17
Virginia	NELAP	3	460278	03-14-17
Washington	State Program	10	C581	05-05-17
West Virginia (DW)	State Program	3	9930C	12-31-16 *
Wyoming	State Program	8	8TMS-L	01-29-17

* Certification renewal pending - certification considered valid.

Method Summary

Client: ARCADIS U.S. Inc
Project/Site: School St. Former Fire Training Area (PF

TestAmerica Job ID: 320-24401-1

Method	Method Description	Protocol	Laboratory
537 (modified)	Perfluorinated Hydrocarbons	EPA	TAL SAC

Protocol References:

EPA = US Environmental Protection Agency

Laboratory References:

TAL SAC = TestAmerica Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Sample Summary

Client: ARCADIS U.S. Inc
Project/Site: School St. Former Fire Training Area (PF

TestAmerica Job ID: 320-24401-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-24401-1	MW-1-12142016	Water	12/14/16 09:03	12/15/16 10:15
320-24401-2	MW-3-12142016	Water	12/14/16 11:30	12/15/16 10:15
320-24401-3	MW-2D-12142016	Water	12/14/16 11:10	12/15/16 10:15
320-24401-4	MW-X-12142016	Water	12/14/16 12:00	12/15/16 10:15
320-24401-5	RB-1-12142016	Water	12/14/16 11:45	12/15/16 10:15
320-24401-6	TRIP BLANK FRB	Water	12/14/16 09:00	12/15/16 10:15

TestAmerica Sacramento
880 Riverside Parkway

West Sacramento, CA 95605-1500
phone 916.373.5600 fax 303.467.7248

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

TestAmerica Laboratories, Inc.

Client Contact	Project Manager: John Brussel	Site Contact: Danielle Giroux	Date: 12-14-16	COC No:
Arcadis	Tel/Fax: 315 671 9441	Lab Contact: Jill Kellman	Carrier: Fed Ex	____ of ____ COCs
855 Rte 146, Ste 210	Analysis Turnaround Time			Sampler:
Clifton Park, NY 12065	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
518-250-7300	TAT if different from Below ___standard___			Walk-in Client:
518-250-7301	☐ 2 weeks			Lab Sampling:
Project Name: School Street Former Fire Training Area	☐ 1 week			
Site: School Street Hydroelectric Station	☐ 2 days			Job / SDG No.:
P O # B0036643.0001.00004	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	PFAS - standard list	Sample Specific Notes:
MW-1-12142016	12-14-16	9:03	G	AQ	2			X	
MW-3-12142016		11:30			2			X	
* MW-2D-12142016		11:10			3		X	X	
MW-X-12142016		12:00			2			X	
RB-1-12142016		11:45			2			X	
Trip Blank FRB		900			1			X	

320-24401 Chain of Custody

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☒ Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments:

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No.:		Cooler Temp. (°C): Obs'd: 1.6 Corr'd: 0.7		Therm ID No.: 12
Relinquished by: Danielle Giroux	Company: Arcadis	Date/Time: 12-14-16/1600	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time: 12/15/16 1015
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

* only 6 Bottle received for Sample, MS, MSD CMR 12/15/16

Form No. CA-C-WI-002, Rev. 4.10, dated 11/7/2016

1/9/2017

Login Sample Receipt Checklist

Client: ARCADIS U.S. Inc

Job Number: 320-24401-1

Login Number: 24401
List Number: 1
Creator: Nelson, Kym D

List Source: TestAmerica Sacramento

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	False	Refer to Job Narrative for details.
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	