June 8, 2017

Data_17F0161

ARI ID	Client ID	Proj ID	Matrix	Sampled	Rec	Prep	Analyzed	Method	CAS	Compound	Value	Q	Units
17F0161-01	WUFF-IN	13-05605-000	Stormwater	06/09/2017	06/09/2017	06/13/2017	06/14/2017	SM 2340 B-97		Hardness	66.3		mg/L
17F0161-05	WUFF-IN (QA)	13-05605-000	Stormwater	06/09/2017	06/09/2017	06/13/2017	06/14/2017	SM 2340 B-97		Hardness	64.2		mg/L
17F0161-03	WUFF-OUT	13-05605-000	Stormwater	06/09/2017	06/09/2017	06/13/2017	06/14/2017	SM 2340 B-97		Hardness	61.0		mg/L
17F0161-01	WUFF-IN	13-05605-000	Stormwater	06/09/2017	06/09/2017	07/24/2017	07/24/2017	ASTM D3977	SC_>63	> 63 µm	66.55		mg/L
17F0161-05	WUFF-IN (QA)	13-05605-000	Stormwater	06/09/2017	06/09/2017	07/24/2017	07/24/2017	ASTM D3977	SC_>63	> 63 µm	59.56		mg/L
17F0161-03	WUFF-OUT	13-05605-000	Stormwater	06/09/2017	06/09/2017	07/24/2017	07/24/2017	ASTM D3977	SC_>63	> 63 µm	6.57		mg/L
17F0161-01	WUFF-IN	13-05605-000	Stormwater	06/09/2017	06/09/2017	07/24/2017	07/24/2017	ASTM D3977	SC_<63	< 63 µm	73.64		mg/L
17F0161-05	WUFF-IN (QA)	13-05605-000	Stormwater	06/09/2017	06/09/2017	07/24/2017	07/24/2017	ASTM D3977	SC_<63	< 63 µm	67.43		mg/L
17F0161-03	WUFF-OUT	13-05605-000	Stormwater	06/09/2017	06/09/2017	07/24/2017	07/24/2017	ASTM D3977	SC_<63	< 63 µm	5.48		mg/L
17F0161-01	WUFF-IN	13-05605-000	Stormwater	06/09/2017	06/09/2017	07/24/2017	07/24/2017	ASTM D3977	SC_TOTAL	Total SSC	140.19		mg/L
17F0161-05	WUFF-IN (QA)	13-05605-000	Stormwater	06/09/2017	06/09/2017	07/24/2017	07/24/2017	ASTM D3977	SC_TOTAL	Total SSC	126.99		mg/L
17F0161-03	WUFF-OUT	13-05605-000	Stormwater	06/09/2017	06/09/2017	07/24/2017	07/24/2017	ASTM D3977	SC_TOTAL	Total SSC	12.05		mg/L
BFF0260-BLK1	Blank	13-05605-000	Water			06/09/2017	06/09/2017	SM 4500-P E-99	1426-54-42	Orthophosphorus	0.0040	U	mg-P/L
BFF0260-BS1	LCS	13-05605-000	Water			06/09/2017	06/09/2017	SM 4500-P E-99	1426-54-42	Orthophosphorus	0.146		mg-P/L
17F0161-01	WUFF-IN	13-05605-000	Stormwater	06/09/2017	06/09/2017	06/09/2017	06/09/2017	SM 4500-P E-99	1426-54-42	Orthophosphorus	0.0100		mg-P/L
17F0161-05	WUFF-IN (QA)	13-05605-000	Stormwater	06/09/2017	06/09/2017	06/09/2017	06/09/2017	SM 4500-P E-99	1426-54-42	Orthophosphorus	0.0090		mg-P/L
17F0161-03	WUFF-OUT	13-05605-000	Stormwater	06/09/2017	06/09/2017	06/09/2017	06/09/2017	SM 4500-P E-99	1426-54-42	Orthophosphorus	0.0240		mg-P/L
BFF0310-BLK2	Blank	13-05605-000	Water			06/13/2017	06/19/2017	EPA 200.8	7440-50-8	Copper	0.500	U	ug/L
BFF0310-BS2	LCS	13-05605-000	Water			06/13/2017	06/19/2017	EPA 200.8	7440-50-8	Copper	27.8		ug/L
17F0161-01	WUFF-IN	13-05605-000	Stormwater	06/09/2017	06/09/2017	06/13/2017	06/19/2017	EPA 200.8	7440-50-8	Copper	79.7	D	ug/L
17F0161-05	WUFF-IN (QA)	13-05605-000	Stormwater	06/09/2017	06/09/2017	06/13/2017	06/19/2017	EPA 200.8	7440-50-8	Copper	76.4	D	ug/L
17F0161-03	WUFF-OUT	13-05605-000	Stormwater	06/09/2017	06/09/2017	06/13/2017	06/19/2017	EPA 200.8	7440-50-8	Copper	34.9		ug/L
BFF0310-BLK2	Blank	13-05605-000	Water			06/13/2017	06/19/2017	EPA 200.8	7440-50-8	Copper	0.500	U	ug/L
BFF0310-BS2	LCS	13-05605-000	Water			06/13/2017	06/19/2017	EPA 200.8	7440-50-8	Copper	27.3		ug/L
BFF0310-BLK2	Blank	13-05605-000	Water			06/13/2017	06/19/2017	EPA 200.8	7440-66-6	Zinc	4.00	U	ug/L
BFF0310-BS2	LCS	13-05605-000	Water			06/13/2017	06/19/2017	EPA 200.8	7440-66-6	Zinc	88.5		ug/L
17F0161-05	WUFF-IN (QA)	13-05605-000	Stormwater	06/09/2017	06/09/2017	06/13/2017	06/19/2017	EPA 200.8	7440-66-6	Zinc	280	D	ug/L
17F0161-03	WUFF-OUT	13-05605-000	Stormwater	06/09/2017	06/09/2017	06/13/2017	06/19/2017	EPA 200.8	7440-66-6	Zinc	66.7		ug/L
BFF0310-BLK2	Blank	13-05605-000	Water			06/13/2017	06/19/2017	EPA 200.8	7440-66-6	Zinc	4.00	U	ug/L
BFF0310-BS2	LCS	13-05605-000	Water			06/13/2017	06/19/2017	EPA 200.8	7440-66-6	Zinc	86.8		ug/L
17F0161-01	WUFF-IN	13-05605-000	Stormwater	06/09/2017	06/09/2017	06/13/2017	06/19/2017	EPA 200.8	7440-66-6	Zinc	329	D	ug/L
BFF0312-BLK1	Blank	13-05605-000	Water			06/13/2017	06/14/2017	EPA 6010C	7440-70-2	Calcium	0.0500	U	mg/L
BFF0312-BS1	LCS	13-05605-000	Water			06/13/2017	06/14/2017	EPA 6010C	7440-70-2	Calcium	9.82		mg/L
17F0161-01	WUFF-IN	13-05605-000	Stormwater	06/09/2017	06/09/2017	06/13/2017	06/14/2017	EPA 6010C	7440-70-2	Calcium	19.9		mg/L
17F0161-05	WUFF-IN (QA)	13-05605-000	Stormwater	06/09/2017	06/09/2017	06/13/2017	06/14/2017	EPA 6010C	7440-70-2	Calcium	19.2		mg/L
17F0161-03	WUFF-OUT	13-05605-000	Stormwater	06/09/2017	06/09/2017	06/13/2017	06/14/2017	EPA 6010C	7440-70-2	Calcium	18.4		mg/L
BFF0312-BLK1	Blank	13-05605-000	Water			06/13/2017	06/14/2017	EPA 6010C	7439-95-4	Magnesium	0.0500	U	mg/L
BFF0312-BS1	LCS	13-05605-000	Water			06/13/2017	06/14/2017	EPA 6010C	7439-95-4	Magnesium	10.2		mg/L
17F0161-01	WUFF-IN	13-05605-000	Stormwater	06/09/2017	06/09/2017	06/13/2017	06/14/2017	EPA 6010C	7439-95-4	Magnesium	4.02		mg/L
17F0161-05	WUFF-IN (QA)	13-05605-000	Stormwater	06/09/2017	06/09/2017	06/13/2017	06/14/2017	EPA 6010C	7439-95-4	Magnesium	3.96		mg/L
17F0161-03	WUFF-OUT	13-05605-000	Stormwater	06/09/2017	06/09/2017	06/13/2017	06/14/2017	EPA 6010C	7439-95-4	Magnesium	3.66		mg/L
BFF0314-BLK1	Blank	13-05605-000	Water			06/13/2017	06/13/2017	EPA 200.8-Dissolved	7440-50-8	Copper	0.500	U	ug/L
BFF0314-BS1	LCS	13-05605-000	Water			06/13/2017	06/13/2017	EPA 200.8-Dissolved	7440-50-8	Copper	28.0		ug/L
17F0161-02	WUFF-IN	13-05605-000	Stormwater	06/09/2017	06/09/2017	06/13/2017	06/14/2017	EPA 200.8-Dissolved	7440-50-8	Copper	25.3		ug/L
17F0161-06	WUFF-IN (QA)	13-05605-000	Stormwater	06/09/2017	06/09/2017	06/13/2017	06/14/2017	EPA 200.8-Dissolved	7440-50-8	Copper	23.5		ug/L
17F0161-04	WUFF-OUT	13-05605-000	Stormwater	06/09/2017	06/09/2017	06/13/2017	06/14/2017	EPA 200.8-Dissolved	7440-50-8	Copper	26.9		ug/L
BFF0314-BLK1	Blank	13-05605-000	Water			06/13/2017	06/13/2017	EPA 200.8-Dissolved	7440-50-8	Copper	0.500	U	ug/L
BFF0314-BS1	LCS	13-05605-000	Water			06/13/2017	06/13/2017	EPA 200.8-Dissolved	7440-50-8	Copper	27.6		ug/L
BFF0314-BLK1	Blank	13-05605-000	Water			06/13/2017	06/13/2017	EPA 200.8-Dissolved	7440-66-6	Zinc	4.00	U	ug/L
BFF0314-BS1	LCS	13-05605-000	Water			06/13/2017	06/13/2017	EPA 200.8-Dissolved	7440-66-6	Zinc	85.3		ug/L
17F0161-02	WUFF-IN	13-05605-000	Stormwater	06/09/2017	06/09/2017	06/13/2017	06/14/2017	EPA 200.8-Dissolved	7440-66-6	Zinc	50.3		ug/L
17F0161-06	WUFF-IN (QA)	13-05605-000	Stormwater	06/09/2017	06/09/2017	06/13/2017	06/14/2017	EPA 200.8-Dissolved	7440-66-6	Zinc	42.0		ug/L
17F0161-04	WUFF-OUT	13-05605-000	Stormwater	06/09/2017	06/09/2017	06/13/2017	06/14/2017	EPA 200.8-Dissolved	7440-66-6	Zinc	50.5		ug/L
BFF0314-BLK1	Blank	13-05605-000	Water			06/13/2017	06/13/2017	EPA 200.8-Dissolved	7440-66-6	Zinc	4.00	U	ug/L
BFF0314-BS1	LCS	13-05605-000	Water			06/13/2017	06/13/2017	EPA 200.8-Dissolved	7440-66-6	Zinc	80.3		ug/L
BFF0544-BLK1	Blank	13-05605-000	Water			06/20/2017	06/22/2017	SM 4500-P E-99	7723-14-0	Total Phosphorus	0.00800	U	mg-P/L
BFF0544-BLK2	Blank	13-05605-000	Water			06/20/2017	06/22/2017	SM 4500-P E-99	7723-14-0	Total Phosphorus	0.00800	U	mg-P/L
BFF0544-BLK3	Blank	13-05605-000	Water			06/20/2017	06/22/2017	SM 4500-P E-99	7723-14-0	Total Phosphorus	0.00800	U	mg-P/L
BFF0544-BS1	LCS	13-05605-000	Water			06/20/2017	06/22/2017	SM 4500-P E-99	7723-14-0	Total Phosphorus	0.160		mg-P/L
BFF0544-BS2	LCS	13-05605-000	Water			06/20/2017	06/22/2017	SM 4500-P E-99	7723-14-0	Total Phosphorus	0.157		mg-P/L
BFF0544-BS3	LCS	13-05605-000	Water			06/20/2017	06/22/2017	SM 4500-P E-99	7723-14-0	Total Phosphorus	0.156		mg-P/L
BFF0544-DUP1	WUFF-IN	13-05605-000	Stormwater	06/09/2017	06/09/2017	06/20/2017	06/22/2017	SM 4500-P E-99	7723-14-0	Total Phosphorus	0.372		mg-P/L
BFF0544-MS1	WUFF-IN	13-05605-000	Stormwater	06/09/2017	06/09/2017	06/20/2017	06/22/2017	SM 4500-P E-99	7723-14-0	Total Phosphorus	2.38	D	mg-P/L
17F0161-01	WUFF-IN	13-05605-000	Stormwater	06/09/2017	06/09/2017	06/20/2017	06/22/2017	SM 4500-P E-99	7723-14-0	Total Phosphorus	0.360		mg-P/L
17F0161-05	WUFF-IN (QA)	13-05605-000	Stormwater	06/09/2017	06/09/2017	06/20/2017	06/22/2017	SM 4500-P E-99	7723-14-0	Total Phosphorus	0.532		mg-P/L
17F0161-03	WUFF-OUT	13-05605-000	Stormwater	06/09/2017	06/09/2017	06/20/2017	06/22/2017	SM 4500-P E-99	7723-14-0	Total Phosphorus	0.100		mg-P/L

Analytical Resources, Incorporated
Analytical Chemists and Consultants

25 July 2017

Dylan Ahearn
Herrera Environmental Consultants
2200 6th Avenue, Suite 1100
Seattle, WA 98121

RE: Hydro International

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

Associated Work Order(s)	Associated SDG ID(s)
17F0161	N/A

Amanda Volgardsen

Digitally signed by Amanda Volgardsen
DN: c=US, st=Washington, l=Tukwila, o=Analytical Resources, Inc., ou=Client Services, cn=Amanda Volgardsen, email=amandav@arilabs.com
Date: 2017.07.25 15:23:45 -07'00'

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclose Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the reqirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, Inc.

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in it- entirety.

Accredited in accordance with nelac Cert# 100006

PJLA Testing Accreditation # 66169

17F0161

HERRERA
2200 Sixth Avenue | Suite 1100
Seattle, Washington | 98121
p 206 441 9080 | f 206 441 9108

Chain of Custody Record

Project Name:	Project Number:	Client:
Hydro International Up-flo Filter	13-05605-000	Herrera Environmental
Report To:		Copy To:
Dylan Ahearn		
Sampled By:		Delivery Method:
M Mullen		ice cooler hand delivered
Laboratory:	Requested Completion Date:	Total No. of Containers:
Analytical Resources Inc.		3

Sample ID	Date	Time	Sample Type (see codes)	Preser-vative? (Y/N)	Matrix (see codes)	Total Suspended Solids- SM 2540D	Analyses Requested: Suspended Sediment Concentration – SMD3977	Total volatile Suspended solids - SM2540-E	Particle size Distribution - ASTM 3977	Total phosphorus - EPA 365.3	Orthophosphorus - EPA 365.3	Hardness as CaCO3-SM 2340B	Copper, dissolved - EPA 200.8	Copper, total - EPA 200.8	Zinc, dissolved - EPA 200.8	Zinc, total - EPA 200.8	Lab ID No.
WUFF-IN	6.9.17	11:15	C	N	SW	x	X	x	X	X	X	X	X	X	X	X	
WUFF-OUT	6.9.17	11:15	C	N	SW	x	X	X	X	X	X	X	X	X	X	X	
WUFF-IN (QA)	6.9.17	11:15	C	N	SW	x	x	x	x	x	x	x	x	x	x	x	
~~WUFF-OUT (Dup)~~			C	N	SW	x	x	x	x	x	x	x	x	x	x	x	

Comments/Special Instructions: split samples for duplicates (QA)

Send 1 liter to ETS, Inc 975 Transport Way, Suite 2, Petaluma, CA for PSD, TSS, and TVSS. PSD to be run for >500, 500-125, 125-62.5, 62.5-4, <4.

Relinquished by (Name/CO/	Signature	Date/Time	Received By (Name/CO)	Signature	Date/Time
Meghan Mullen/Herrera	Meghan Mullen	6.9.17 12:00	ARI	A. Volgardsen	6/9/17 1200
Relinquished by (Name/CO/	Signature	Date/Time	Received By (Name/CO)	Signature	Date/Time

Sample Type: G=Grab C=Composite **Matrix Codes:** A=Air GW=Groundwater SE=Sediment SO=Soil SW=Surface Water W=Water (blanks) M=Material O=Other (specify)

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: ~~Herra~~ Herrera

Project Name: Hydro International

COC No(s): ______ NA

Delivered by: Fed-Ex UPS Courier (Hand Delivered) Other: ______

Assigned ARI Job No: 17F0161

Tracking No: ______ (NA)

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler?		YES	(NO)
Were custody papers included with the cooler?		(YES)	NO
Were custody papers properly filled out (ink, signed, etc.)		(YES)	NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry) 4.0 4.9 6.0 5.7 4.9 4.6
Time: ______

If cooler temperature is out of compliance fill out form 00070F

Temp Gun ID#: D005206

Cooler Accepted by: AV Date: 6/9/17 Time: 1200

Complete custody forms and attach all shipping documents

Log-In Phase:

	NA	YES	NO
Was a temperature blank included in the cooler?		YES	(NO)
What kind of packing material was used? ... Bubble Wrap (Wet Ice) Gel Packs Baggies Foam Block Paper Other: ______			
Was sufficient ice used (if appropriate)?	NA	(YES)	NO
Were all bottles sealed in individual plastic bags?		YES	(NO)
Did all bottles arrive in good condition (unbroken)?		(YES)	NO
Were all bottle labels complete and legible?		(YES)	NO
Did the number of containers listed on COC match with the number of containers received?		(YES)	NO
Did all bottle labels and tags agree with custody papers?		(YES)	NO
Were all bottles used correct for the requested analyses?		(YES)	NO
Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)...	NA	(YES)	NO
Were all VOC vials free of air bubbles?	(NA)	YES	NO
Was sufficient amount of sample sent in each bottle?		(YES)	NO
Date VOC Trip Blank was made at ARI ... 15 B.H.	(NA)		

Was Sample Split by ARI : NA (YES) Date/Time: 6/9/17 3:15 Equipment: Churn Splitter Split by: B.H.

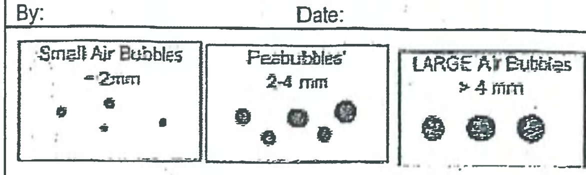
Samples Logged by: B.H. Date: 6/9/17 Time: 15:23

*** Notify Project Manager of discrepancies or concerns ***

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

By: Date:



Small → "sm"	(<2 mm)
Peabubbles → "pb"	(2 to <4 mm)
Large → "lg"	(4 to <6 mm)
Headspace → "hs"	(>6 mm)

WORK ORDER

17F0161

Client: Herrera Environmental Consultants	**Project Manager:** Mark Harris
Project: Hydro International	**Project Number:** 13-05605-000

Preservation Confirmation

Container ID	Container Type	pH
17F0161-01 A	Small OJ, 500 mL	
17F0161-01 B	Small OJ, 500 mL, 9N H2SO4	<2 Pass
17F0161-01 C	HDPE NM, 500 mL, 1:1 HNO3	<2 Pass
17F0161-01 D	Large OJ, 1000 mL	
17F0161-01 E	Large OJ, 1000 mL	
17F0161-01 F	Large OJ, 1000 mL	
17F0161-01 G	Large OJ, 1000 mL	
17F0161-02 A	HDPE NM, 500 mL	>2 Fail
17F0161-03 A	Small OJ, 500 mL	
17F0161-03 B	Small OJ, 500 mL, 9N H2SO4	<2 Pass
17F0161-03 C	HDPE NM, 500 mL, 1:1 HNO3	<2 Pass
17F0161-03 D	Large OJ, 1000 mL	
17F0161-03 E	Large OJ, 1000 mL	
17F0161-03 F	Large OJ, 1000 mL	
17F0161-03 G	Large OJ, 1000 mL	
17F0161-04 A	HDPE NM, 500 mL	>2 Fail
17F0161-05 A	Small OJ, 500 mL	
17F0161-05 B	Small OJ, 500 mL, 9N H2SO4	<2 Pass
17F0161-05 C	HDPE NM, 500 mL, 1:1 HNO3	<2 Pass
17F0161-05 D	Large OJ, 1000 mL	
17F0161-05 E	Large OJ, 1000 mL	
17F0161-05 F	Large OJ, 1000 mL	
17F0161-05 G	Large OJ, 1000 mL	
17F0161-06 A	HDPE NM, 500 mL	>2 Fail

B.H. — Preservation Confirmed By

6/9/17 — Date

B.H. — Reviewed By

6/9/17 — Date

Analytical Resources, Incorporated
Analytical Chemists and Consultants

SUBCONTRACT ORDER
To: Environmental Technical Services
ARI Work Order:17F0161

SENDING LABORATORY:

Analytical Resources, Inc.
4611 S. 134th Place, Suite 100
Tukwila, WA 98168
Phone: (206) 695-6200
Fax: (206) 695-6201
Project Manager: Mark Harris
E-Mail: markh@arilabs.com

RECEIVING LABORATORY:

Environmental Technical Services
975 Transport Way, Suite 2
Petaluma, CA 94954
Phone :(707) 778-9605
Fax:

Analysis	Due	Expires	Sub Laboratory ID	Comments
Sample ID: 17F0161-01 **Sampled: 06/09/17 11:15 Matrix: Water**				
Solids, Total Volatile Suspended SM 2540 E-97	06/23/17	06/16/17 11:15		
Solids, Total Suspended SM 2540 D-97	06/23/17	06/16/17 11:15		
PSD (Particle Size Distribution by Laser) (Sub	06/23/17	06/16/17 11:15		
Containers Supplied:				
17F0161-01 D Large OJ, 1000 mL				
17F0161-01 E Large OJ, 1000 mL				
17F0161-01 F Large OJ, 1000 mL				
Sample ID: 17F0161-03 **Sampled: 06/09/17 11:15 Matrix: Water**				
Solids, Total Volatile Suspended SM 2540 E-97	06/23/17	06/16/17 11:15		
Solids, Total Suspended SM 2540 D-97	06/23/17	06/16/17 11:15		
PSD (Particle Size Distribution by Laser) (Sub	06/23/17	06/16/17 11:15		
Containers Supplied:				
17F0161-03 D Large OJ, 1000 mL				
17F0161-03 E Large OJ, 1000 mL				
17F0161-03 F Large OJ, 1000 mL				
Sample ID: 17F0161-05 **Sampled: 06/09/17 11:15 Matrix: Water**				
Solids, Total Volatile Suspended SM 2540 E-97	06/23/17	06/16/17 11:15		
Solids, Total Suspended SM 2540 D-97	06/23/17	06/16/17 11:15		
PSD (Particle Size Distribution by Laser) (Sub	06/23/17	06/16/17 11:15		
Containers Supplied:				
17F0161-05 D Large OJ, 1000 mL				
17F0161-05 E Large OJ, 1000 mL				
17F0161-05 F Large OJ, 1000 mL				

Released By	Date	Received By	Date
Released By	Date	Received By	Date

Printed: 6/9/2017 3:31:23PM

Analytical Resources, Incorporated
Analytical Chemists and Consultants

SUBCONTRACT ORDER
To: Materials Testing & Consulting, Inc. (Tukwila)
ARI Work Order:17F0161

SENDING LABORATORY:

Analytical Resources, Inc.
4611 S. 134th Place, Suite 100
Tukwila, WA 98168
Phone: (206) 695-6200
Fax: (206) 695-6201
Project Manager: Mark Harris
E-Mail: markh@arilabs.com

RECEIVING LABORATORY:

Materials Testing & Consulting, Inc. (Tukwila)
4611 S 134th Place, Ste 200
Tukwila, WA 98296
Phone :-
Fax: -

Analysis	Due	Expires	Sub Laboratory ID	Comments
Sample ID: 17F0161-01 **Sampled: 06/09/17 11:15 Matrix: Water**				
Stormwater Sed Conc (SSC) ASTM D3977 (St	06/23/17	06/16/17 11:15		
Containers Supplied: **17F0161-01 G** Large OJ, 1000 mL				
Sample ID: 17F0161-03 **Sampled: 06/09/17 11:15 Matrix: Water**				
Stormwater Sed Conc (SSC) ASTM D3977 (St	06/23/17	06/16/17 11:15		
Containers Supplied: **17F0161-03 G** Large OJ, 1000 mL				
Sample ID: 17F0161-05 **Sampled: 06/09/17 11:15 Matrix: Water**				
Stormwater Sed Conc (SSC) ASTM D3977 (St	06/23/17	06/16/17 11:15		
Containers Supplied: **17F0161-05 G** Large OJ, 1000 mL				

Released By	Date	Received By	Date
Released By	Date	Received By	Date

E T S

Environmental Technical Services

975 Transport Way, Suite 2
Petaluma, CA 94954
(707) 778-9605/FAX 778-9612
e-mail: *entech@pacbell.net*

-Soil, Water & Air Testing & Monitoring
-Analytical Labs
-Technical Support

Serving people and the environment so that both benefit.

COMPANY:	Analytical Resources, Inc., 4611 S. 134th Place, Suite 100, Tukwila, WA 98168				ANALYST(S)	SUPERVISOR
ATTN:	Mark Harris	DATE	DATE	DATE	S. Santos	D. Jacobson
JOB:	Hydro International Up-Flo Filter	COLLECTED	RECEIVED	COMPLETED	G.Hernandez	LAB DIRECTOR
SITE:	Oregon-Washington	6/9/2017	6/16/2017	6/26/2017		G.S. Conrad,PhD

PARTICLE SIZE DISTRIBUTION (PSD) ANALYSIS & REPORT – 5 PART

LAB SAMPLE NUMBER	SAMPLE ID	SOURCE of WATER	SUSPENDED SOLIDS mg/l @ ≥500 µ	SUSPENDED SOLIDS mg/l @ 125 µ	SUSPENDED SOLIDS mg/l @ 63 µ	SUSPENDED SOLIDS mg/l @ 32 µ	SUSPENDED SOLIDS mg/l @ 4 µ	SUSPENDED SOLIDS mg/l @ 1 µ	SUSPENDED SEDIMENT CONC TSS mg/l
07395-1	HI-26/RW 17F0161-01 D	WUFF-IN	**18.5** 20.5%	**20.0** 22.1%	**17.0** 18.8%		**30.8** 34.1%	**4.0** 4.4%	**98.0**
							Total SSC by Summation →	**90.3**	
07395-2	HI-27/RW 17F0161-03 D	WUFF-OUT	**0.0** 0.0%	**1.0** 23.8%	**2.0** 47.6%		**0.0** 0.0%	**1.2** 28.6%	**5.0**
							Total SSC by Summation →	**4.2**	
07395-3	HI-28/RW 17F0161-05 D	-IN DUP	**17.5** 22.0%	**16.5** 20.7%	**14.0** 17.6%	#DIV/0!	**27.4** 34.4%	**4.2** 5.3%	**74.0**
							Total SSC by Summation →	**79.6**	
			#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	
							Total SSC by Summation →	**0.0**	

LAB SAMPLE NUMBER	SAMPLE ID	SOURCE of WATER	Water pH -log[H+]	ECw [Spec Cond] µS/cm	COLOR, TRUE PtCo Units	COLOR APPARENT PtCo Units	TOTAL IRON Fe (diss.) mg/l	TOTAL VOLATILE SUSPENDED SOLIDS (TVSS) mg/l
07395-1	HI-26/RW 17F0161-01 D	WUFF-IN						**76.0**
07395-2	HI-27/RW 17F0161-03 D	WUFF-OUT						**5.0**
07395-3	HI-28/RW 17F0161-05 D	-IN DUP						**57.0**

COMMENTS

The matrix has a low concentration of TSS particles amounting to nearly 100 ppm in the input samples; and the output sample is extremely low at 4-5 ppm. For the -IN & -OUT pair of samples, the overall reduction averaged just over 95% (i.e., TSS by summation vs tested TSS). The specific fraction reductions going from coarsest to finest sizes are as follows: 100%, 95.0%, 88.2%, 100%, and 70.0%. The TVSS values are different, but not by a lot. The proportion that is volatile suspended solids in the input samples (-IN & -IN DUP) is at 77%-78%, and for the output sample it is at 100%, different but all are high. Thus, in these cases volatile suspended solids are three-quarters to all of the suspended particulates, depending on which sample, the Input or the output. So, it appears there is greater removal of organics as they go from roughly three-quaters to all being removed by filtration. There is satisfactory agreement between -IN & -IN DUP, all variables considered. The RPDs are excellent to very good as follows: ±4.1%; ±8.7%; and ±3.7%.

\\\ NOTES: Tests were done according to methodology as per Association of Testing Materials (ASTM): Suspended Sediment Concentration – Modified ASTM D3977 (Practice for Determining Suspended-Sediment Concentration in Water Samples). Standard Methods is followed for the other tests: Color - 2120 C; Spec Cond. (ECw) - 2510 B; Iron - 3500-Fe B; pH - 4500-H+ B; TRPH - 5520 C.

Materials Testing & Consulting, Inc.

Geotechnical Engineering • Special Inspection • Materials Testing • Environmental Consulting

Project:	Hydro International Up-flo Filter (17F0161)	**Date Received:**	June 14, 2017
Project #:	16T001-035	**Sampled By:**	Others
Client :	Analytical Resources, Inc.	**Date Reported:**	July 25, 2017
Source:	Multiple	**Tested By:**	B. Goble
MTC Sample#:	Multiple		

CASE NARRATIVE

1. Four samples were submitted for sediment concentration by ASTM D3977, Method C.
2. The coarse material was screened over a No. 230 sieve.
3. The suspended solids are reported in mg/L.
4. The data is provided in a summary table.
5. There were no other noted anomalies in this project.

Reviewed by: EJ Goble

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Materials Testing & Consulting, Inc.

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Hydro International Up-flo Filter

Project: (17F0161)
Project #: 16T001-035
Date Received: June 14, 2017
Date Tested: July 24, 2017

Client: Analytical Resources, Inc.

Sampled by: Others
Tested by: B. Goble

Suspended Sediment Concentration
ASTM D3977 Method C

Client Sample ID	MTC Sample ID	Sampling Date	Coarse Fraction SSC (>63µm) (mg/L)	FineFraction SSC (<63µm) (mg/L)	Total Suspended Sediment Concentration (mg/L)
WUFF-IN	T17-1058	6/9/2017	66.5	73.6	140.2
WUFF-OUT	T17-1059	6/9/2017	6.6	5.5	12.1
WUFF-IN (QA)	T17-1060	6/9/2017	59.6	67.4	127.0

Reviewed by: EJ Goble

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Herrera Environmental Consultants	Project: Hydro International	
2200 6th Avenue, Suite 1100	Project Number: 13-05605-000	**Reported:**
Seattle WA, 98121	Project Manager: Dylan Ahearn	25-Jul-2017 15:19

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
WUFF-IN	17F0161-01	Water	09-Jun-2017 11:15	09-Jun-2017 12:00
WUFF-IN	17F0161-02	Water	09-Jun-2017 11:15	09-Jun-2017 12:00
WUFF-OUT	17F0161-03	Water	09-Jun-2017 11:15	09-Jun-2017 12:00
WUFF-OUT	17F0161-04	Water	09-Jun-2017 11:15	09-Jun-2017 12:00
WUFF-IN (QA)	17F0161-05	Water	09-Jun-2017 11:15	09-Jun-2017 12:00
WUFF-IN (QA)	17F0161-06	Water	09-Jun-2017 11:15	09-Jun-2017 12:00

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Herrera Environmental Consultants	Project: Hydro International	
2200 6th Avenue, Suite 1100	Project Number: 13-05605-000	**Reported:**
Seattle WA, 98121	Project Manager: Dylan Ahearn	25-Jul-2017 15:19

Case Narrative

Sample receipt

Samples as listed on the preceding page were received June 9, 2017 under ARI workorder 17F0161. For details regarding sample receipt, please refer to the Cooler Receipt Form. The TSS, PSD and TVS were subcontracted to ETS Labs. The SSC was subcontracted to MTC Labs.

Total and Dissolved Metals - EPA Method 200.8

The samples were digested and analyzed within the recommended holding times.

There were no target compounds detected in the method blanks.

The LCS percent recoveries were within control limits.

Total Metals - EPA Method 6010C

The samples were digested and analyzed within the recommended holding times.

There were no target compounds detected in the method blank.

The LCS percent recoveries were within control limits.

Wet Chemistry (O-Phos and T-Phos)

The samples were prepared and analyzed within the recommended holding times.

The method blank has total phosphorus detected above the reporting limit. Associated detected results have been flagged with a "B" qualifier. No further corrective action was taken.

The LCS percent recoveries were within control limits.

A total phosphorus matrix spike and duplicate were prepared in conjunction with sample WUFF -IN. The matrix spike percent recovery and duplicate RPD were within QC limits.

Herrera Environmental Consultants	Project: Hydro International	
2200 6th Avenue, Suite 1100	Project Number: 13-05605-000	**Reported:**
Seattle WA, 98121	Project Manager: Dylan Ahearn	25-Jul-2017 15:19

WUFF-IN

17F0161-01 (Water)

Metals and Metallic Compounds

Method: EPA 200.8 — Sampled: 06/09/2017 11:15
Instrument: ICPMS1 — Analyzed: 19-Jun-2017 18:49

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
Preparation Batch: BFF0310 — Sample Size: 25 mL
Prepared: 13-Jun-2017 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Copper	7440-50-8	2	1.00	**79.7**	ug/L	D
Zinc	7440-66-6	2	8.00	**329**	ug/L	D

Herrera Environmental Consultants	Project: Hydro International	
2200 6th Avenue, Suite 1100	Project Number: 13-05605-000	**Reported:**
Seattle WA, 98121	Project Manager: Dylan Ahearn	25-Jul-2017 15:19

WUFF-IN

17F0161-01 (Water)

Metals and Metallic Compounds

Method: EPA 6010C — Sampled: 06/09/2017 11:15

Instrument: ICP2 — Analyzed: 14-Jun-2017 16:37

Sample Preparation: Preparation Method: TWC EPA 3010A
Preparation Batch: BFF0312 — Sample Size: 25 mL
Prepared: 13-Jun-2017 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Calcium	7440-70-2	1	0.0500	**19.9**	mg/L	
Magnesium	7439-95-4	1	0.0500	**4.02**	mg/L	

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Herrera Environmental Consultants	Project: Hydro International	
2200 6th Avenue, Suite 1100	Project Number: 13-05605-000	**Reported:**
Seattle WA, 98121	Project Manager: Dylan Ahearn	25-Jul-2017 15:19

WUFF-IN

17F0161-01 (Water)

Wet Chemistry

Method: SM 4500-P E-99
Instrument: UV1800-2

Sampled: 06/09/2017 11:15
Analyzed: 09-Jun-2017 19:10

Sample Preparation: Preparation Method: No Prep Wet Chem
Preparation Batch: BFF0260
Prepared: 09-Jun-2017
Sample Size: 10 mL
Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Orthophosphorus	1426-54-42	1	0.0040	**0.0100**	mg-P/L	

Sample Preparation: Preparation Method: SM 4500-P B-4 Strong Acid
Preparation Batch: BFF0544
Prepared: 20-Jun-2017
Sample Size: 25 mL
Final Volume: 50 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Total Phosphorus	7723-14-0	1	0.00800	**0.360**	mg-P/L	

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Herrera Environmental Consultants	Project: Hydro International	
2200 6th Avenue, Suite 1100	Project Number: 13-05605-000	**Reported:**
Seattle WA, 98121	Project Manager: Dylan Ahearn	25-Jul-2017 15:19

WUFF-IN

17F0161-01 (Water)

Calculation

Method: SM 2340 B-97 — Sampled: 06/09/2017 11:15

Instrument: [CALC] — Analyzed: 14-Jun-2017 16:37

Sample Preparation: Preparation Method: [CALC]
Preparation Batch: [CALC]
Prepared: 13-Jun-2017 Final Volume: 1

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Hardness		1	0.331	**66.3**	mg/L	

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Herrera Environmental Consultants	Project: Hydro International	
2200 6th Avenue, Suite 1100	Project Number: 13-05605-000	**Reported:**
Seattle WA, 98121	Project Manager: Dylan Ahearn	25-Jul-2017 15:19

Analysis by: Materials Testing & Consulting, Inc. (Tukwila)

WUFF-IN

17F0161-01 (Water)

***** DEFAULT GENERAL METHOD *****

Method: ASTM D3977 — Sampled: 06/09/2017 11:15

Instrument: MT&C — Analyzed: 24-Jul-2017 00:00

Sample Preparation: Preparation Method: No Prep Geo
Preparation Batch: B072417
Prepared: 24-Jul-2017 Final Volume:

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
> 63 µm	SC_>63	1	0.1	**66.55**	mg/L	
< 63 µm	SC_<63	1	0.1	**73.64**	mg/L	
Total SSC	SC_TOTAL	1	0.1	**140.19**	mg/L	

Herrera Environmental Consultants	Project: Hydro International	
2200 6th Avenue, Suite 1100	Project Number: 13-05605-000	**Reported:**
Seattle WA, 98121	Project Manager: Dylan Ahearn	25-Jul-2017 15:19

Analysis by: Materials Testing & Consulting, Inc. (Tukwila)

WUFF-IN

17F0161-02 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 200.8 — Sampled: 06/09/2017 11:15

Instrument: ICPMS2 — Analyzed: 14-Jun-2017 19:31

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
Preparation Batch: BFF0314 — Sample Size: 25 mL
Prepared: 13-Jun-2017 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Copper, Dissolved	7440-50-8	1	0.500	**25.3**	ug/L	
Zinc, Dissolved	7440-66-6	1	4.00	**50.3**	ug/L	

Herrera Environmental Consultants	Project: Hydro International	
2200 6th Avenue, Suite 1100	Project Number: 13-05605-000	**Reported:**
Seattle WA, 98121	Project Manager: Dylan Ahearn	25-Jul-2017 15:19

WUFF-OUT

17F0161-03 (Water)

Metals and Metallic Compounds

Method: EPA 200.8 — Sampled: 06/09/2017 11:15
Instrument: ICPMS1 — Analyzed: 19-Jun-2017 18:53

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
Preparation Batch: BFF0310 — Sample Size: 25 mL
Prepared: 13-Jun-2017 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Copper	7440-50-8	1	0.500	**34.9**	ug/L	
Zinc	7440-66-6	1	4.00	**66.7**	ug/L	

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Herrera Environmental Consultants	Project: Hydro International	
2200 6th Avenue, Suite 1100	Project Number: 13-05605-000	**Reported:**
Seattle WA, 98121	Project Manager: Dylan Ahearn	25-Jul-2017 15:19

WUFF-OUT

17F0161-03 (Water)

Metals and Metallic Compounds

Method: EPA 6010C — Sampled: 06/09/2017 11:15
Instrument: ICP2 — Analyzed: 14-Jun-2017 16:41

Sample Preparation: Preparation Method: TWC EPA 3010A
Preparation Batch: BFF0312 — Sample Size: 25 mL
Prepared: 13-Jun-2017 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Calcium	7440-70-2	1	0.0500	**18.4**	mg/L	
Magnesium	7439-95-4	1	0.0500	**3.66**	mg/L	

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Herrera Environmental Consultants	Project: Hydro International	
2200 6th Avenue, Suite 1100	Project Number: 13-05605-000	**Reported:**
Seattle WA, 98121	Project Manager: Dylan Ahearn	25-Jul-2017 15:19

WUFF-OUT

17F0161-03 (Water)

Wet Chemistry

Method: SM 4500-P E-99
Instrument: UV1800-2

Sampled: 06/09/2017 11:15
Analyzed: 09-Jun-2017 19:12

Sample Preparation: Preparation Method: No Prep Wet Chem
Preparation Batch: BFF0260
Prepared: 09-Jun-2017
Sample Size: 10 mL
Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Orthophosphorus	1426-54-42	1	0.0040	**0.0240**	mg-P/L	

Sample Preparation: Preparation Method: SM 4500-P B-4 Strong Acid
Preparation Batch: BFF0544
Prepared: 20-Jun-2017
Sample Size: 25 mL
Final Volume: 50 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Total Phosphorus	7723-14-0	1	0.00800	**0.100**	mg-P/L	

Herrera Environmental Consultants	Project: Hydro International	
2200 6th Avenue, Suite 1100	Project Number: 13-05605-000	**Reported:**
Seattle WA, 98121	Project Manager: Dylan Ahearn	25-Jul-2017 15:19

WUFF-OUT

17F0161-03 (Water)

Calculation

Method: SM 2340 B-97 — Sampled: 06/09/2017 11:15

Instrument: [CALC] — Analyzed: 14-Jun-2017 16:41

Sample Preparation: Preparation Method: [CALC]
Preparation Batch: [CALC]
Prepared: 13-Jun-2017 Final Volume: 1

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Hardness		1	0.331	**61.0**	mg/L	

Herrera Environmental Consultants	Project: Hydro International	
2200 6th Avenue, Suite 1100	Project Number: 13-05605-000	**Reported:**
Seattle WA, 98121	Project Manager: Dylan Ahearn	25-Jul-2017 15:19

Analysis by: Materials Testing & Consulting, Inc. (Tukwila)

WUFF-OUT

17F0161-03 (Water)

***** DEFAULT GENERAL METHOD *****

Method: ASTM D3977 — Sampled: 06/09/2017 11:15

Instrument: MT&C — Analyzed: 24-Jul-2017 00:00

Sample Preparation: Preparation Method: No Prep Geo
Preparation Batch: B072417
Prepared: 24-Jul-2017 Final Volume:

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
> 63 µm	SC_>63	1	0.1	**6.57**	mg/L	
< 63 µm	SC_<63	1	0.1	**5.48**	mg/L	
Total SSC	SC_TOTAL	1	0.1	**12.05**	mg/L	

Herrera Environmental Consultants	Project: Hydro International	
2200 6th Avenue, Suite 1100	Project Number: 13-05605-000	**Reported:**
Seattle WA, 98121	Project Manager: Dylan Ahearn	25-Jul-2017 15:19

Analysis by: Materials Testing & Consulting, Inc. (Tukwila)

WUFF-OUT

17F0161-04 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 200.8 — Sampled: 06/09/2017 11:15

Instrument: ICPMS2 — Analyzed: 14-Jun-2017 17:33

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
Preparation Batch: BFF0314 — Sample Size: 25 mL
Prepared: 13-Jun-2017 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Copper, Dissolved	7440-50-8	1	0.500	**26.9**	ug/L	
Zinc, Dissolved	7440-66-6	1	4.00	**50.5**	ug/L	

Herrera Environmental Consultants	Project: Hydro International	
2200 6th Avenue, Suite 1100	Project Number: 13-05605-000	**Reported:**
Seattle WA, 98121	Project Manager: Dylan Ahearn	25-Jul-2017 15:19

WUFF-IN (QA)

17F0161-05 (Water)

Metals and Metallic Compounds

Method: EPA 200.8 — Sampled: 06/09/2017 11:15

Instrument: ICPMS1 — Analyzed: 19-Jun-2017 18:58

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
Preparation Batch: BFF0310 — Sample Size: 25 mL
Prepared: 13-Jun-2017 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Copper	7440-50-8	2	1.00	**76.4**	ug/L	D
Zinc	7440-66-6	2	8.00	**280**	ug/L	D

Herrera Environmental Consultants	Project: Hydro International	
2200 6th Avenue, Suite 1100	Project Number: 13-05605-000	**Reported:**
Seattle WA, 98121	Project Manager: Dylan Ahearn	25-Jul-2017 15:19

WUFF-IN (QA)

17F0161-05 (Water)

Metals and Metallic Compounds

Method: EPA 6010C — Sampled: 06/09/2017 11:15

Instrument: ICP2 — Analyzed: 14-Jun-2017 16:45

Sample Preparation: Preparation Method: TWC EPA 3010A
Preparation Batch: BFF0312 — Sample Size: 25 mL
Prepared: 13-Jun-2017 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Calcium	7440-70-2	1	0.0500	**19.2**	mg/L	
Magnesium	7439-95-4	1	0.0500	**3.96**	mg/L	

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Herrera Environmental Consultants	Project: Hydro International	
2200 6th Avenue, Suite 1100	Project Number: 13-05605-000	**Reported:**
Seattle WA, 98121	Project Manager: Dylan Ahearn	25-Jul-2017 15:19

WUFF-IN (QA)

17F0161-05 (Water)

Wet Chemistry

Method: SM 4500-P E-99
Instrument: UV1800-2

Sampled: 06/09/2017 11:15
Analyzed: 09-Jun-2017 19:12

Sample Preparation: Preparation Method: No Prep Wet Chem
Preparation Batch: BFF0260
Prepared: 09-Jun-2017
Sample Size: 10 mL
Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Orthophosphorus	1426-54-42	1	0.0040	**0.0090**	mg-P/L	

Sample Preparation: Preparation Method: SM 4500-P B-4 Strong Acid
Preparation Batch: BFF0544
Prepared: 20-Jun-2017
Sample Size: 25 mL
Final Volume: 50 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Total Phosphorus	7723-14-0	1	0.00800	**0.532**	mg-P/L	

Herrera Environmental Consultants	Project: Hydro International	
2200 6th Avenue, Suite 1100	Project Number: 13-05605-000	**Reported:**
Seattle WA, 98121	Project Manager: Dylan Ahearn	25-Jul-2017 15:19

WUFF-IN (QA)

17F0161-05 (Water)

Calculation

Method: SM 2340 B-97 — Sampled: 06/09/2017 11:15

Instrument: [CALC] — Analyzed: 14-Jun-2017 16:45

Sample Preparation: Preparation Method: [CALC]
Preparation Batch: [CALC]
Prepared: 13-Jun-2017 Final Volume: 1

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Hardness		1	0.331	**64.2**	mg/L	

Herrera Environmental Consultants	Project: Hydro International	
2200 6th Avenue, Suite 1100	Project Number: 13-05605-000	**Reported:**
Seattle WA, 98121	Project Manager: Dylan Ahearn	25-Jul-2017 15:19

Analysis by: Materials Testing & Consulting, Inc. (Tukwila)

WUFF-IN (QA)

17F0161-05 (Water)

***** DEFAULT GENERAL METHOD *****

Method: ASTM D3977 — Sampled: 06/09/2017 11:15

Instrument: MT&C — Analyzed: 24-Jul-2017 00:00

Sample Preparation: Preparation Method: No Prep Geo
Preparation Batch: B072417
Prepared: 24-Jul-2017 Final Volume:

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
>63 µm	SC_>63	1	0.1	**59.56**	mg/L	
<63 µm	SC_<63	1	0.1	**67.43**	mg/L	
Total SSC	SC_TOTAL	1	0.1	**126.99**	mg/L	

Herrera Environmental Consultants	Project: Hydro International	
2200 6th Avenue, Suite 1100	Project Number: 13-05605-000	**Reported:**
Seattle WA, 98121	Project Manager: Dylan Ahearn	25-Jul-2017 15:19

Analysis by: Materials Testing & Consulting, Inc. (Tukwila)

WUFF-IN (QA)

17F0161-06 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 200.8 — Sampled: 06/09/2017 11:15

Instrument: ICPMS2 — Analyzed: 14-Jun-2017 17:38

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
Preparation Batch: BFF0314 — Sample Size: 25 mL
Prepared: 13-Jun-2017 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Copper, Dissolved	7440-50-8	1	0.500	**23.5**	ug/L	
Zinc, Dissolved	7440-66-6	1	4.00	**42.0**	ug/L	

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Herrera Environmental Consultants	Project: Hydro International	
2200 6th Avenue, Suite 1100	Project Number: 13-05605-000	**Reported:**
Seattle WA, 98121	Project Manager: Dylan Ahearn	25-Jul-2017 15:19

Metals and Metallic Compounds - Quality Control

Batch BFF0310 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS1 Analyst: TCH

QC Sample/Analyte	Isotope	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BFF0310-BLK2)				Prepared: 13-Jun-2017 Analyzed: 19-Jun-2017 18:44							
Copper	63	ND	0.500	ug/L							U
Copper	65	ND	0.500	ug/L							U
Zinc	66	ND	4.00	ug/L							U
Zinc	67	ND	4.00	ug/L							U
LCS (BFF0310-BS2)				Prepared: 13-Jun-2017 Analyzed: 19-Jun-2017 19:24							
Copper	63	27.8	0.500	ug/L	25.0		111	80-120			
Copper	65	27.3	0.500	ug/L	25.0		109	80-120			
Zinc	66	88.5	4.00	ug/L	80.0		111	80-120			
Zinc	67	86.8	4.00	ug/L	80.0		109	80-120			

Herrera Environmental Consultants	Project: Hydro International	
2200 6th Avenue, Suite 1100	Project Number: 13-05605-000	**Reported:**
Seattle WA, 98121	Project Manager: Dylan Ahearn	25-Jul-2017 15:19

Metals and Metallic Compounds - Quality Control

Batch BFF0312 - TWC EPA 3010A

Instrument: ICP2 Analyst: CC

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BFF0312-BLK1)			Prepared: 13-Jun-2017 Analyzed: 14-Jun-2017 14:13							
Calcium	ND	0.0500	mg/L							U
Magnesium	ND	0.0500	mg/L							U
LCS (BFF0312-BS1)			Prepared: 13-Jun-2017 Analyzed: 14-Jun-2017 15:54							
Calcium	9.82	0.0500	mg/L	10.0		98.2	80-120			
Magnesium	10.2	0.0500	mg/L	10.0		102	80-120			

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Herrera Environmental Consultants	Project: Hydro International	
2200 6th Avenue, Suite 1100	Project Number: 13-05605-000	**Reported:**
Seattle WA, 98121	Project Manager: Dylan Ahearn	25-Jul-2017 15:19

Metals and Metallic Compounds (dissolved) - Quality Control

Batch BFF0314 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS2 Analyst: TCH

QC Sample/Analyte	Isotope	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BFF0314-BLK1)				Prepared: 13-Jun-2017 Analyzed: 13-Jun-2017 21:32							
Copper, Dissolved	63	ND	0.500	ug/L							U
Copper, Dissolved	65	ND	0.500	ug/L							U
Zinc, Dissolved	66	ND	4.00	ug/L							U
Zinc, Dissolved	67	ND	4.00	ug/L							U
LCS (BFF0314-BS1)				Prepared: 13-Jun-2017 Analyzed: 13-Jun-2017 22:16							
Copper, Dissolved	63	28.0	0.500	ug/L	25.0		112	80-120			
Copper, Dissolved	65	27.6	0.500	ug/L	25.0		110	80-120			
Zinc, Dissolved	66	85.3	4.00	ug/L	80.0		107	80-120			
Zinc, Dissolved	67	80.3	4.00	ug/L	80.0		100	80-120			

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Herrera Environmental Consultants	Project: Hydro International	
2200 6th Avenue, Suite 1100	Project Number: 13-05605-000	**Reported:**
Seattle WA, 98121	Project Manager: Dylan Ahearn	25-Jul-2017 15:19

Wet Chemistry - Quality Control

Batch BFF0260 - No Prep Wet Chem

Instrument: UV1800-2 Analyst: KK

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BFF0260-BLK1)				Prepared: 09-Jun-2017 Analyzed: 09-Jun-2017 19:03						
Orthophosphorus	ND	0.0040	mg-P/L							U
LCS (BFF0260-BS1)				Prepared: 09-Jun-2017 Analyzed: 09-Jun-2017 19:03						
Orthophosphorus	0.146	0.0040	mg-P/L	0.150		97.3	90-110			

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Herrera Environmental Consultants	Project: Hydro International	
2200 6th Avenue, Suite 1100	Project Number: 13-05605-000	**Reported:**
Seattle WA, 98121	Project Manager: Dylan Ahearn	25-Jul-2017 15:19

Wet Chemistry - Quality Control

Batch BFF0544 - SM 4500-P B-4 Strong Acid

Instrument: UV1800-2 Analyst: KK

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BFF0544-BLK1)			Prepared: 20-Jun-2017 Analyzed: 22-Jun-2017 14:24							
Total Phosphorus	ND	0.00800	mg-P/L							U
Blank (BFF0544-BLK2)			Prepared: 20-Jun-2017 Analyzed: 22-Jun-2017 14:28							
Total Phosphorus	ND	0.00800	mg-P/L							U
DL (BFF0544-BLK3)			Prepared: 20-Jun-2017 Analyzed: 22-Jun-2017 14:32							
Total Phosphorus	ND	0.00800	mg-P/L							U
LCS (BFF0544-BS1)			Prepared: 20-Jun-2017 Analyzed: 22-Jun-2017 14:24							
Total Phosphorus	0.160	0.00800	mg-P/L	0.150		107	90-110			
DL (BFF0544-BS2)			Prepared: 20-Jun-2017 Analyzed: 22-Jun-2017 14:30							
Total Phosphorus	0.157	0.00800	mg-P/L	0.150		105	90-110			
DL (BFF0544-BS3)			Prepared: 20-Jun-2017 Analyzed: 22-Jun-2017 14:32							
Total Phosphorus	0.156	0.00800	mg-P/L	0.150		104	90-110			
Duplicate (BFF0544-DUP1)		**Source: 17F0161-01**	Prepared: 20-Jun-2017 Analyzed: 22-Jun-2017 14:25							
Total Phosphorus	0.372	0.00800	mg-P/L		0.360			3.28	20	
Matrix Spike (BFF0544-MS1)		**Source: 17F0161-01**	Prepared: 20-Jun-2017 Analyzed: 22-Jun-2017 14:26							
Total Phosphorus	2.38	0.0800	mg-P/L	2.00	0.360	101	75-125			D

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Herrera Environmental Consultants	Project: Hydro International	
2200 6th Avenue, Suite 1100	Project Number: 13-05605-000	**Reported:**
Seattle WA, 98121	Project Manager: Dylan Ahearn	25-Jul-2017 15:19

Certified Analyses included in this Report

Analyte	Certifications
EPA 200.8 in Water	
Copper-63	NELAP,WADOE,WA-DW,DoD-ELAP
Copper-65	NELAP,WADOE,WA-DW,DoD-ELAP
Zinc-66	NELAP,WADOE,WA-DW,DoD-ELAP
Zinc-67	NELAP,WADOE,WA-DW,DoD-ELAP
Copper-63	NELAP,WADOE,WA-DW,DoD-ELAP
Copper-65	NELAP,WADOE,WA-DW,DoD-ELAP
Zinc-66	NELAP,WADOE,WA-DW,DoD-ELAP
Zinc-67	NELAP,WADOE,WA-DW,DoD-ELAP
EPA 6010C in Water	
Calcium	WADOE,NELAP,DoD-ELAP
Magnesium	WADOE,NELAP,DoD-ELAP
SM 4500-P E-99 in Water	
Orthophosphorus	WADOE,NELAP
Total Phosphorus	WADOE,NELAP

Code	Description	Number	Expires
ADEC	Alaska Dept of Environmental Conservation	UST-033	09/01/2017
CALAP	California Department of Public Health CAELAP	2748	02/28/2018
DoD-ELAP	DoD-Environmental Laboratory Accreditation Program	66169	02/07/2019
NELAP	ORELAP - Oregon Laboratory Accreditation Program	WA100006	05/11/2018
WADOE	WA Dept of Ecology	C558	06/30/2018
WA-DW	Ecology - Drinking Water	C558	06/30/2018

Herrera Environmental Consultants	Project: Hydro International	
2200 6th Avenue, Suite 1100	Project Number: 13-05605-000	**Reported:**
Seattle WA, 98121	Project Manager: Dylan Ahearn	25-Jul-2017 15:19

Notes and Definitions

U	This analyte is not detected above the applicable reporting or detection limit.
J	Estimated concentration value detected below the reporting limit.
D	The reported value is from a dilution
B	This analyte was detected in the method blank.
*	Flagged value is not within established control limits.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
[2C]	Indicates this result was quantified on the second column on a dual column analysis.

June 15, 2017

Data_17F0273

ARI ID	Client ID	Proj ID	Matrix	Sampled	Rec	Prep	Analyzed	Method	CAS	Compound	Value	Q	Units
BFF0453-BLK1	Blank	13-05605-000	Water			06/16/2017	06/23/2017	NWTPH-Dx		Diesel Range Organics (C12-C24)	0.100	U	mg/L
BFF0453-BS1	LCS	13-05605-000	Water			06/16/2017	06/23/2017	NWTPH-Dx		Diesel Range Organics (C12-C24)	2.43		mg/L
BFF0453-BSD1	LCS Dup	13-05605-000	Water			06/16/2017	06/23/2017	NWTPH-Dx		Diesel Range Organics (C12-C24)	2.25		mg/L
17F0273-01	WUFF-IN	13-05605-000	Stormwater	06/15/2017	06/15/2017	06/19/2017	06/23/2017	NWTPH-Dx		Diesel Range Organics (C12-C24)	1.61		mg/L
17F0273-02	WUFF-OUT	13-05605-000	Stormwater	06/15/2017	06/15/2017	06/19/2017	06/23/2017	NWTPH-Dx		Diesel Range Organics (C12-C24)	0.543		mg/L
BFF0453-BLK1	Blank	13-05605-000	Water			06/16/2017	06/23/2017	NWTPH-Dx		Motor Oil Range Organics (C24-C38)	0.200	U	mg/L
17F0273-01	WUFF-IN	13-05605-000	Stormwater	06/15/2017	06/15/2017	06/19/2017	06/23/2017	NWTPH-Dx		Motor Oil Range Organics (C24-C38)	6.34		mg/L
17F0273-02	WUFF-OUT	13-05605-000	Stormwater	06/15/2017	06/15/2017	06/19/2017	06/23/2017	NWTPH-Dx		Motor Oil Range Organics (C24-C38)	0.886		mg/L
BFF0453-BLK1	Blank	13-05605-000	Water			06/16/2017	06/23/2017	NWTPH-Dx	84-15-1	o-Terphenyl	69.2		%
BFF0453-BS1	LCS	13-05605-000	Water			06/16/2017	06/23/2017	NWTPH-Dx	84-15-1	o-Terphenyl	87.5		%
BFF0453-BSD1	LCS Dup	13-05605-000	Water			06/16/2017	06/23/2017	NWTPH-Dx	84-15-1	o-Terphenyl	75.6		%
17F0273-01	WUFF-IN	13-05605-000	Stormwater	06/15/2017	06/15/2017	06/19/2017	06/23/2017	NWTPH-Dx	84-15-1	o-Terphenyl	83.4		%
17F0273-02	WUFF-OUT	13-05605-000	Stormwater	06/15/2017	06/15/2017	06/19/2017	06/23/2017	NWTPH-Dx	84-15-1	o-Terphenyl	76.2		%

Analytical Resources, Incorporated
Analytical Chemists and Consultants

29 June 2017

Dylan Ahearn
Herrera Environmental Consultants
2200 6th Avenue, Suite 1100
Seattle, WA 98121

RE: Hydro International

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

Associated Work Order(s)	Associated SDG ID(s)
17F0273	N/A

Amanda Volgardsen

Digitally signed by Amanda Volgardsen
DN: c=US, st=Washington, l=Tukwila, o=Analytical Resources, Inc., ou=Client Services, cn=Amanda Volgardsen, email=amandav@arilabs.com
Date: 2017.06.29 14:30:02 -07'00'

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclose Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the reqirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, Inc.

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

ACCREDITED IN ACCORDANCE WITH nelac Cert# 100006

PJLA Testing Accreditation # 66169

17F0273

HERRERA
2200 Sixth Avenue | Suite 1100
Seattle, Washington | 98121
p 206 441 9080 | f 206 441 9108
PORTLAND, OR | MISSOULA, MT | OLYMPIA, WA
WINTHROP, WA | GUANGZHOU, CHINA

Chain of Custody Record

Project Name:	Project Number:	Client:
Hydro International Up-flo Filter	13-05605-000	Herrera Environmental
Report To:		**Copy To:**
Dylan Ahearn		
Sampled By:		**Delivery Method:**
Katie Wingrove		hand delivery, ice cooler
Laboratory:	**Requested Completion Date:**	**Total No. of Containers:**
Analytical Resources Inc.		4

Lab Use:							Analyses Requested										
Sample ID	Date	Time	Sample Type (see codes)	Preserv-ative? (Y/N)	Matrix (see codes)	Number of Containers	NWTPH-Dx										Lab ID No.
WUFF-IN	6/15/17	14:30	G	N	SW	2	X										
WUFF-OUT	6/15/17	14:45	G	N	SW	2	X										

Comments/Special Instructions:

Relinquished by (Name/CO/	Signature	Date/Time	Received By (Name/CO)	Signature	Date/Time
Katie Wingrove/Herrera	Katie Wingrove	6/15/17 17:00	A. Volgardsen/ARI		6/15/17 1700
Relinquished by (Name/CO/	Signature	Date/Time	Received By (Name/CO)	Signature	Date/Time

Sample Type: G=Grab C=Composite **Matrix Codes:** A=Air GW=Groundwater SE=Sediment SO=Soil SW=Surface Water W=Water (blanks) M=Material O=Other (specify)

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Herrera

Project Name: Hydro International

COC No(s): _____ (NA)

Delivered by: Fed-Ex UPS Courier Hand Delivered Other: _____

Assigned ARI Job No: 17F0273

Tracking No: _____ (NA)

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler?	YES	(NO)
Were custody papers included with the cooler?	(YES)	NO
Were custody papers properly filled out (ink, signed, etc.)	(YES)	NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry): 0.3

Time: _____

If cooler temperature is out of compliance fill out form 00070F

Temp Gun ID#: D005206

Cooler Accepted by: AV Date: 6/15/17 Time: 1700

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler?		YES	(NO)
What kind of packing material was used? ... Bubble Wrap (Wet Ice) Gel Packs Baggies Foam Block Paper Other: _____			
Was sufficient ice used (if appropriate)?	NA	(YES)	NO
Were all bottles sealed in individual plastic bags?		YES	(NO)
Did all bottles arrive in good condition (unbroken)?		(YES)	NO
Were all bottle labels complete and legible?		(YES)	NO
Did the number of containers listed on COC match with the number of containers received?		(YES)	NO
Did all bottle labels and tags agree with custody papers?		YES	(NO)
Were all bottles used correct for the requested analyses?		(YES)	NO
Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)...	(NA)	YES	NO
Were all VOC vials free of air bubbles?	(NA)	YES	NO
Was sufficient amount of sample sent in each bottle?		(YES)	NO
Date VOC Trip Blank was made at ARI	(NA)	_____	

Was Sample Split by ARI : (NA) YES Date/Time: _____ Equipment: _____ Split by: _____

Samples Logged by: B.H. Date: 6/16/17 Time: 9:05

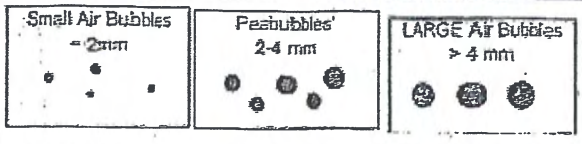
*** Notify Project Manager of discrepancies or concerns ***

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

labels for WUFF-OUT had time of 14:50, COC time was 14:45.

By: B.H. Date: 6/16/17



Small → "sm" (< 2 mm)

Peabubbles → "pb" (2 to < 4 mm)

Large → "lg" (4 to < 6 mm)

Headspace → "hs" (> 6 mm)

Herrera Environmental Consultants	Project: Hydro International	
2200 6th Avenue, Suite 1100	Project Number: 13-05605-000	**Reported:**
Seattle WA, 98121	Project Manager: Dylan Ahearn	29-Jun-2017 14:29

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
WUFF-IN	17F0273-01	Water	15-Jun-2017 14:30	15-Jun-2017 17:00
WUFF-OUT	17F0273-02	Water	15-Jun-2017 14:45	15-Jun-2017 17:00

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Herrera Environmental Consultants	Project: Hydro International	
2200 6th Avenue, Suite 1100	Project Number: 13-05605-000	**Reported:**
Seattle WA, 98121	Project Manager: Dylan Ahearn	29-Jun-2017 14:29

Case Narrative

Sample receipt

Samples as listed on the preceding page were received June 15, 2017 under ARI workorder 17F0273. For details regarding sample receipt, please refer to the Cooler Receipt Form.

Diesel/Heavy Oil Range Organics - WA-Ecology Method NW-TPHDx

The samples were extracted and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The surrogate percent recoveries were within control limits.

There were no target compounds detected in the method blank.

The LCS/LCSD percent recoveries and RPD were within control limits.

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Herrera Environmental Consultants	Project: Hydro International	
2200 6th Avenue, Suite 1100	Project Number: 13-05605-000	**Reported:**
Seattle WA, 98121	Project Manager: Dylan Ahearn	29-Jun-2017 14:29

WUFF-IN

17F0273-01 (Water)

Petroleum Hydrocarbons

Method: NWTPH-Dx — Sampled: 06/15/2017 14:30
Instrument: FID4 — Analyzed: 23-Jun-2017 22:28

Sample Preparation: Preparation Method: EPA 3510C SepF
Preparation Batch: BFF0453 — Sample Size: 500 mL
Prepared: 19-Jun-2017 — Final Volume: 1 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Diesel Range Organics (C12-C24)		1	0.100	**1.61**	mg/L	
HC ID: DRO						
Motor Oil Range Organics (C24-C38)		1	0.200	**6.34**	mg/L	
HC ID: MOTOR OIL						
Surrogate: o-Terphenyl			*50-150 %*	*83.4*	*%*	

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Herrera Environmental Consultants	Project: Hydro International	
2200 6th Avenue, Suite 1100	Project Number: 13-05605-000	**Reported:**
Seattle WA, 98121	Project Manager: Dylan Ahearn	29-Jun-2017 14:29

WUFF-OUT

17F0273-02 (Water)

Petroleum Hydrocarbons

Method: NWTPH-Dx — Sampled: 06/15/2017 14:45
Instrument: FID4 — Analyzed: 23-Jun-2017 22:50

Sample Preparation: Preparation Method: EPA 3510C SepF
Preparation Batch: BFF0453 — Sample Size: 470 mL
Prepared: 19-Jun-2017 — Final Volume: 1 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Diesel Range Organics (C12-C24)		1	0.106	**0.543**	mg/L	
HC ID: DRO						
Motor Oil Range Organics (C24-C38)		1	0.213	**0.886**	mg/L	
HC ID: MOTOR OIL						
Surrogate: o-Terphenyl			*50-150 %*	*76.2*	*%*	

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Herrera Environmental Consultants	Project: Hydro International	
2200 6th Avenue, Suite 1100	Project Number: 13-05605-000	**Reported:**
Seattle WA, 98121	Project Manager: Dylan Ahearn	29-Jun-2017 14:29

Petroleum Hydrocarbons - Quality Control

Batch BFF0453 - EPA 3510C SepF

Instrument: FID4 Analyst: JR

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BFF0453-BLK1)				Prepared: 16-Jun-2017 Analyzed: 23-Jun-2017 15:44						
Diesel Range Organics (C12-C24)	ND	0.100	mg/L							U
Motor Oil Range Organics (C24-C38)	ND	0.200	mg/L							U
Surrogate: o-Terphenyl	0.311		mg/L	*0.450*		*69.2*	*50-150*			
LCS (BFF0453-BS1)				Prepared: 16-Jun-2017 Analyzed: 23-Jun-2017 16:05						
Diesel Range Organics (C12-C24)	2.43	0.100	mg/L	3.00		81.0	56-120			
Surrogate: o-Terphenyl	0.394		mg/L	*0.450*		*87.5*	*50-150*			
LCS Dup (BFF0453-BSD1)				Prepared: 16-Jun-2017 Analyzed: 23-Jun-2017 16:26						
Diesel Range Organics (C12-C24)	2.25	0.100	mg/L	3.00		75.0	56-120	7.61	30	
Surrogate: o-Terphenyl	0.340		mg/L	*0.450*		*75.6*	*50-150*			

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2200 6th Avenue, Suite 1100	Project Number: 13-05605-000	**Reported:**
Seattle WA, 98121	Project Manager: Dylan Ahearn	29-Jun-2017 14:29

Certified Analyses included in this Report

Analyte	Certifications
NWTPH-Dx in Water	
Diesel Range Organics (C12-C24)	DoD-ELAP,NELAP,WADOE
Diesel Range Organics (C10-C25)	DoD-ELAP,NELAP,WADOE
Diesel Range Organics (Tol-C18)	DoD-ELAP,NELAP,WADOE
Diesel Range Organics (C10-24)	DoD-ELAP,NELAP,WADOE
Diesel Range Organics (C10-C28)	DoD-ELAP,NELAP,WADOE
Motor Oil Range Organics (C24-C38)	DoD-ELAP,NELAP,WADOE
Motor Oil Range Organics (C25-C36)	DoD-ELAP,NELAP,WADOE
Motor Oil Range Organics (C24-C40)	DoD-ELAP,NELAP,WADOE
Mineral Spirits Range Organics (Tol-C12)	DoD-ELAP,NELAP,WADOE
Mineral Oil Range Organics (C16-C28)	DoD-ELAP,NELAP,WADOE
Kerosene Range Organics (Tol-C18)	DoD-ELAP,NELAP,WADOE
JP8 Range Organics (C8-C18)	DoD-ELAP,NELAP,WADOE
JP5 Range Organics (C10-C16)	DoD-ELAP,NELAP,WADOE
JP4 Range Organics (Tol-C14)	DoD-ELAP,NELAP,WADOE
Jet-A Range Organics (C10-C18)	DoD-ELAP,NELAP,WADOE
Creosote Range Organics (C12-C22)	DoD-ELAP,NELAP,WADOE
Bunker C Range Organics (C10-C38)	DoD-ELAP,NELAP,WADOE
Stoddard Range Organics (C8-C12)	DoD-ELAP,NELAP,WADOE
Transformer Oil Range Organics (C12-C28)	DoD-ELAP,NELAP,WADOE

Code	Description	Number	Expires
ADEC	Alaska Dept of Environmental Conservation	UST-033	05/06/2017
CALAP	California Department of Public Health CAELAP	2748	02/28/2018
DoD-ELAP	DoD-Environmental Laboratory Accreditation Program	66169	03/30/2017
NELAP	ORELAP - Oregon Laboratory Accreditation Program	WA100006	05/11/2017
WADOE	WA Dept of Ecology	C558	06/30/2017
WA-DW	Ecology - Drinking Water	C558	06/30/2017

Herrera Environmental Consultants	Project: Hydro International	
2200 6th Avenue, Suite 1100	Project Number: 13-05605-000	**Reported:**
Seattle WA, 98121	Project Manager: Dylan Ahearn	29-Jun-2017 14:29

Notes and Definitions

U	This analyte is not detected above the applicable reporting or detection limit.
H	Hold time violation - Hold time was exceeded.
D	The reported value is from a dilution
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
[2C]	Indicates this result was quantified on the second column on a dual column analysis.

Data_17F0281

ARI ID	Client ID	Proj ID	Matrix	Sampled	Rec	Prep	Analyzed	Method	CAS	Compound	Value	Q	Units
17F0281-01	WUFF-IN	13-05605-000	Stormwater	06/16/2017	06/16/2017	06/19/2017	06/19/2017	SM 2340 B-97		Hardness	105		mg/L
17F0281-03	WUFF-OUT	13-05605-000	Stormwater	06/16/2017	06/16/2017	06/19/2017	06/19/2017	SM 2340 B-97		Hardness	122		mg/L
17F0281-01	WUFF-IN	13-05605-000	Stormwater	06/16/2017	06/16/2017	07/24/2017	07/24/2017	ASTM D3977	SC_>63	> 63 µm	18.00		mg/L
17F0281-03	WUFF-OUT	13-05605-000	Stormwater	06/16/2017	06/16/2017	07/24/2017	07/24/2017	ASTM D3977	SC_>63	> 63 µm	0.85		mg/L
17F0281-01	WUFF-IN	13-05605-000	Stormwater	06/16/2017	06/16/2017	07/24/2017	07/24/2017	ASTM D3977	SC_<63	< 63 µm	42.87		mg/L
17F0281-03	WUFF-OUT	13-05605-000	Stormwater	06/16/2017	06/16/2017	07/24/2017	07/24/2017	ASTM D3977	SC_<63	< 63 µm	1.06		mg/L
17F0281-01	WUFF-IN	13-05605-000	Stormwater	06/16/2017	06/16/2017	07/24/2017	07/24/2017	ASTM D3977	SC_TOTAL	Total SSC	60.87		mg/L
17F0281-03	WUFF-OUT	13-05605-000	Stormwater	06/16/2017	06/16/2017	07/24/2017	07/24/2017	ASTM D3977	SC_TOTAL	Total SSC	1.91		mg/L
BFF0473-BLK1	Blank	13-05605-000	Water			06/16/2017	06/16/2017	SM 4500-P E-99	1426-54-42	Orthophosphorus	0.0040	U	mg-P/L
BFF0473-BS1	LCS	13-05605-000	Water			06/16/2017	06/16/2017	SM 4500-P E-99	1426-54-42	Orthophosphorus	0.146		mg-P/L
BFF0473-DUP2	WUFF-IN	13-05605-000	Stormwater	06/16/2017	06/16/2017	06/16/2017	06/16/2017	SM 4500-P E-99	1426-54-42	Orthophosphorus	0.0160		mg-P/L
BFF0473-MS2	WUFF-IN	13-05605-000	Stormwater	06/16/2017	06/16/2017	06/16/2017	06/16/2017	SM 4500-P E-99	1426-54-42	Orthophosphorus	0.111		mg-P/L
17F0281-01	WUFF-IN	13-05605-000	Stormwater	06/16/2017	06/16/2017	06/16/2017	06/16/2017	SM 4500-P E-99	1426-54-42	Orthophosphorus	0.0170		mg-P/L
17F0281-03	WUFF-OUT	13-05605-000	Stormwater	06/16/2017	06/16/2017	06/16/2017	06/16/2017	SM 4500-P E-99	1426-54-42	Orthophosphorus	0.0250		mg-P/L
BFF0485-BLK1	Blank	13-05605-000	Water			06/19/2017	06/19/2017	EPA 6010C	7440-70-2	Calcium	0.0500	U	mg/L
BFF0485-BS1	LCS	13-05605-000	Water			06/19/2017	06/23/2017	EPA 6010C	7440-70-2	Calcium	10.2		mg/L
17F0281-01	WUFF-IN	13-05605-000	Stormwater	06/16/2017	06/16/2017	06/19/2017	06/19/2017	EPA 6010C	7440-70-2	Calcium	27.3		mg/L
17F0281-03	WUFF-OUT	13-05605-000	Stormwater	06/16/2017	06/16/2017	06/19/2017	06/19/2017	EPA 6010C	7440-70-2	Calcium	30.9		mg/L
BFF0485-BLK1	Blank	13-05605-000	Water			06/19/2017	06/19/2017	EPA 6010C	7439-95-4	Magnesium	0.0500	U	mg/L
BFF0485-BS1	LCS	13-05605-000	Water			06/19/2017	06/23/2017	EPA 6010C	7439-95-4	Magnesium	10.7		mg/L
17F0281-01	WUFF-IN	13-05605-000	Stormwater	06/16/2017	06/16/2017	06/19/2017	06/19/2017	EPA 6010C	7439-95-4	Magnesium	9.05		mg/L
17F0281-03	WUFF-OUT	13-05605-000	Stormwater	06/16/2017	06/16/2017	06/19/2017	06/19/2017	EPA 6010C	7439-95-4	Magnesium	10.8		mg/L
BFF0523-BLK1	Blank	13-05605-000	Water			06/20/2017	06/20/2017	EPA 200.8	7440-50-8	Copper	0.500	U	ug/L
BFF0523-BS1	LCS	13-05605-000	Water			06/20/2017	06/20/2017	EPA 200.8	7440-50-8	Copper	25.2		ug/L
BFF0523-DUP1	WUFF-IN	13-05605-000	Stormwater	06/16/2017	06/16/2017	06/20/2017	06/20/2017	EPA 200.8	7440-50-8	Copper	35.2		ug/L
BFF0523-MS1	WUFF-IN	13-05605-000	Stormwater	06/16/2017	06/16/2017	06/20/2017	06/20/2017	EPA 200.8	7440-50-8	Copper	58.8		ug/L
17F0281-01	WUFF-IN	13-05605-000	Stormwater	06/16/2017	06/16/2017	06/20/2017	06/20/2017	EPA 200.8	7440-50-8	Copper	35.5		ug/L
17F0281-03	WUFF-OUT	13-05605-000	Stormwater	06/16/2017	06/16/2017	06/20/2017	06/20/2017	EPA 200.8	7440-50-8	Copper	10.9		ug/L
BFF0523-BLK1	Blank	13-05605-000	Water			06/20/2017	06/20/2017	EPA 200.8	7440-50-8	Copper	0.500	U	ug/L
BFF0523-BS1	LCS	13-05605-000	Water			06/20/2017	06/20/2017	EPA 200.8	7440-50-8	Copper	24.9		ug/L
BFF0523-BLK1	Blank	13-05605-000	Water			06/20/2017	06/20/2017	EPA 200.8	7440-66-6	Zinc	4.00	U	ug/L
BFF0523-BS1	LCS	13-05605-000	Water			06/20/2017	06/20/2017	EPA 200.8	7440-66-6	Zinc	81.9		ug/L
17F0281-03	WUFF-OUT	13-05605-000	Stormwater	06/16/2017	06/16/2017	06/20/2017	06/20/2017	EPA 200.8	7440-66-6	Zinc	22.2		ug/L
BFF0523-BLK1	Blank	13-05605-000	Water			06/20/2017	06/20/2017	EPA 200.8	7440-66-6	Zinc	4.00	U	ug/L
BFF0523-BS1	LCS	13-05605-000	Water			06/20/2017	06/20/2017	EPA 200.8	7440-66-6	Zinc	74.4		ug/L
BFF0523-DUP1	WUFF-IN	13-05605-000	Stormwater	06/16/2017	06/16/2017	06/20/2017	06/20/2017	EPA 200.8	7440-66-6	Zinc	103		ug/L
BFF0523-MS1	WUFF-IN	13-05605-000	Stormwater	06/16/2017	06/16/2017	06/20/2017	06/20/2017	EPA 200.8	7440-66-6	Zinc	177		ug/L
17F0281-01	WUFF-IN	13-05605-000	Stormwater	06/16/2017	06/16/2017	06/20/2017	06/20/2017	EPA 200.8	7440-66-6	Zinc	107		ug/L
BFF0544-BLK1	Blank	13-05605-000	Water			06/20/2017	06/22/2017	SM 4500-P E-99	7723-14-0	Total Phosphorus	0.00800	U	mg-P/L
BFF0544-BLK2	Blank	13-05605-000	Water			06/20/2017	06/22/2017	SM 4500-P E-99	7723-14-0	Total Phosphorus	0.00800	U	mg-P/L
BFF0544-BLK3	Blank	13-05605-000	Water			06/20/2017	06/22/2017	SM 4500-P E-99	7723-14-0	Total Phosphorus	0.00800	U	mg-P/L
BFF0544-BS1	LCS	13-05605-000	Water			06/20/2017	06/22/2017	SM 4500-P E-99	7723-14-0	Total Phosphorus	0.160		mg-P/L
BFF0544-BS2	LCS	13-05605-000	Water			06/20/2017	06/22/2017	SM 4500-P E-99	7723-14-0	Total Phosphorus	0.157		mg-P/L
BFF0544-BS3	LCS	13-05605-000	Water			06/20/2017	06/22/2017	SM 4500-P E-99	7723-14-0	Total Phosphorus	0.156		mg-P/L
17F0281-01	WUFF-IN	13-05605-000	Stormwater	06/16/2017	06/16/2017	06/20/2017	06/22/2017	SM 4500-P E-99	7723-14-0	Total Phosphorus	0.0540		mg-P/L
17F0281-03	WUFF-OUT	13-05605-000	Stormwater	06/16/2017	06/16/2017	06/20/2017	06/22/2017	SM 4500-P E-99	7723-14-0	Total Phosphorus	0.0680		mg-P/L
BFF0563-BLK1	Blank	13-05605-000	Water			06/21/2017	06/22/2017	EPA 200.8-Dissolved	7440-50-8	Copper	0.500	U	ug/L
BFF0563-BS1	LCS	13-05605-000	Water			06/21/2017	06/22/2017	EPA 200.8-Dissolved	7440-50-8	Copper	26.8		ug/L
17F0281-02	WUFF-IN	13-05605-000	Stormwater	06/16/2017	06/16/2017	06/21/2017	06/22/2017	EPA 200.8-Dissolved	7440-50-8	Copper	13.0		ug/L

Data_17F0281

ARI ID	Client ID	Proj ID	Matrix	Sampled	Rec	Prep	Analyzed	Method	CAS	Compound	Value	Q	Units
17F0281-04	WUFF-OUT	13-05605-000	Stormwater	06/16/2017	06/16/2017	06/21/2017	06/22/2017	EPA 200.8-Dissolved	7440-50-8	Copper	9.77		ug/L
BFF0563-BLK1	Blank	13-05605-000	Water			06/21/2017	06/22/2017	EPA 200.8-Dissolved	7440-50-8	Copper	0.500	U	ug/L
BFF0563-BS1	LCS	13-05605-000	Water			06/21/2017	06/22/2017	EPA 200.8-Dissolved	7440-50-8	Copper	26.6		ug/L
BFF0563-BLK1	Blank	13-05605-000	Water			06/21/2017	06/22/2017	EPA 200.8-Dissolved	7440-66-6	Zinc	4.00	U	ug/L
BFF0563-BS1	LCS	13-05605-000	Water			06/21/2017	06/22/2017	EPA 200.8-Dissolved	7440-66-6	Zinc	84.2		ug/L
17F0281-02	WUFF-IN	13-05605-000	Stormwater	06/16/2017	06/16/2017	06/21/2017	06/22/2017	EPA 200.8-Dissolved	7440-66-6	Zinc	30.3		ug/L
17F0281-04	WUFF-OUT	13-05605-000	Stormwater	06/16/2017	06/16/2017	06/21/2017	06/22/2017	EPA 200.8-Dissolved	7440-66-6	Zinc	20.7		ug/L
BFF0563-BLK1	Blank	13-05605-000	Water			06/21/2017	06/22/2017	EPA 200.8-Dissolved	7440-66-6	Zinc	4.00	U	ug/L
BFF0563-BS1	LCS	13-05605-000	Water			06/21/2017	06/22/2017	EPA 200.8-Dissolved	7440-66-6	Zinc	79.8		ug/L

Analytical Resources, Incorporated
Analytical Chemists and Consultants

25 July 2017

Dylan Ahearn
Herrera Environmental Consultants
2200 6th Avenue, Suite 1100
Seattle, WA 98121

RE: Hydro International

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

Associated Work Order(s)	Associated SDG ID(s)
17F0281	N/A

Amanda Volgardsen

Digitally signed by Amanda Volgardsen
DN: c=US, st=Washington, l=Tukwila, o=Analytical Resources, Inc., ou=Client Services, cn=Amanda Volgardsen, email=amandav@arilabs.com
Date: 2017.07.25 15:44:10 -07'00'

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclose Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the reqirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, Inc.

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

ACCREDITED IN ACCORDANCE WITH nelac
Cert# 100006

PJLA Testing
Accreditation # 66169

4611 S. 134th Place, Suite 100 • Tukwila, WA 98168 • Ph: (206) 695-6200 • Fax: (206) 695-6202

17F0281

HERRERA
2200 Sixth Avenue | Suite 1100
Seattle, Washington | 98121
p 206 441 9080 | f 206 441 9108

Chain of Custody Record

Project Name:	Project Number:	Client:
Hydro International Up-flo Filter	13-05605-000	Herrera Environmental
Report To:		**Copy To:**
Dylan Ahearn		
Sampled By:		**Delivery Method:**
M Mullen K Wingrove		ice cooler, hand delivered
Laboratory:	**Requested Completion Date:**	**Total No. of Containers:**
Analytical Resources Inc.		
Lab Use:		

Sample ID	Date	Time	Sample Type (see codes)	Preser-vative? (Y/N)	Matrix (see codes)	Total Suspended Solids- SM 2540D	Analyses Requested: Suspended Sediment Concentration – SMD3977	Total volatile Suspended solids - SM2540-E	Particle size Distribution - ASTM 3977	Total phosphorus - EPA 365.3	Orthophosphorus - EPA 365.3	Hardness as CaCO3-SM 2340B	Copper, dissolved - EPA 200.8	Copper, total - EPA 200.8	Zinc, dissolved - EPA 200.8	Zinc, total - EPA 200.8	Lab ID No.
WUFF-IN	6-16-17	10:30	C	N	SW	x	X	x	X	X	X	X	X	X	X	X	
WUFF-OUT	6-16-17	10:30	C	N	SW	x	X	X	X	X	X	X	X	X	X	X	

Comments/Special Instructions:

Send 1 liter to ETS, Inc 975 Transport Way, Suite 2, Petaluma, CA for PSD, TSS, and TVSS. PSD to be run for >500, 500-125, 125-62.5, 62.5-4, <4.

Relinquished by (Name/CO/	Signature	Date/Time	Received By (Name/CO)	Signature	Date/Time
Katie Wingrove/Herrera	Katie Wingrove	6/16/2017 11:08	Brittney Hall/ARI	Brittney Hall	6/16/17 11:08
Relinquished by (Name/CO/	Signature	Date/Time	Received By (Name/CO)	Signature	Date/Time

Sample Type: G=Grab C=Composite

Matrix Codes: A=Air GW=Groundwater SE=Sediment SO=Soil SW=Surface Water W=Water (blanks) M=Material O=Other (specify)

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Herrera

COC No(s): _____ NA

Assigned ARI Job No: 17F0281

Project Name: Hydro International

Delivered by: Fed-Ex UPS Courier (Hand Delivered) Other: _____

Tracking No: _____ (NA)

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler?	YES	(NO)
Were custody papers included with the cooler?	(YES)	NO
Were custody papers properly filled out (ink, signed, etc.)	(YES)	NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry): 5.5

Time: 11:08

If cooler temperature is out of compliance fill out form 00070F

Temp Gun ID#: D0052060

Cooler Accepted by: B.H. Date: 6/16/17 Time: 11:08

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler?		YES	(NO)
What kind of packing material was used? ... Bubble Wrap Wet Ice Gel Packs Baggies Foam Block Paper Other: None			
Was sufficient ice used (if appropriate)?	NA	(YES)	NO
Were all bottles sealed in individual plastic bags?		YES	(NO)
Did all bottles arrive in good condition (unbroken)?		(YES)	NO
Were all bottle labels complete and legible?		(YES)	NO
Did the number of containers listed on COC match with the number of containers received?		YES	(NO)
Did all bottle labels and tags agree with custody papers?		(YES)	NO
Were all bottles used correct for the requested analyses?		(YES)	NO
Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)...	NA	(YES)	NO
Were all VOC vials free of air bubbles?	(NA)	YES	NO
Was sufficient amount of sample sent in each bottle?		(YES)	NO
Date VOC Trip Blank was made at ARI	(NA)		

Was Sample Split by ARI : (NA) YES Date/Time: _____ Equipment: _____ Split by: _____

Samples Logged by: B.H. Date: 6/16/17 Time: 15:19

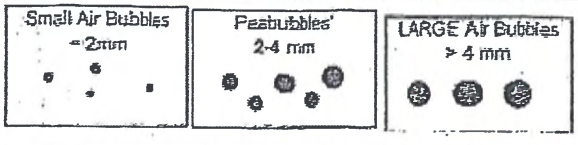
*** Notify Project Manager of discrepancies or concerns ***

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

Number of containers not given.

By: B.H. Date: 6/16/17



Small → "sm"	(< 2 mm)
Peabubbles → "pb"	(2 to < 4 mm)
Large → "lg"	(4 to < 6 mm)
Headspace → "hs"	(> 6 mm)

WORK ORDER

17F0281

Client: Herrera Environmental Consultants	**Project Manager: Amanda Volgardsen**
Project: Hydro International	**Project Number: 13-05605-000**

Preservation Confirmation

Container ID	Container Type	pH
17F0281-01 A	Small OJ, 500 mL	
17F0281-01 B	Small OJ, 500 mL, 9N H2SO4	<2 Pass
17F0281-01 C	HDPE NM, 500 mL, 1:1 HNO3	<2 Pass
17F0281-01 D	Large OJ, 1000 mL	
17F0281-01 E	Large OJ, 1000 mL	
17F0281-01 F	Large OJ, 1000 mL	
17F0281-01 G	Large OJ, 1000 mL	
17F0281-02 A	HDPE NM, 500 mL	>2 Fail
17F0281-03 A	Small OJ, 500 mL	
17F0281-03 B	Small OJ, 500 mL, 9N H2SO4	<2 Pass
17F0281-03 C	HDPE NM, 500 mL, 1:1 HNO3	<2 Pass
17F0281-03 D	Large OJ, 1000 mL	
17F0281-03 E	Large OJ, 1000 mL	
17F0281-03 F	Large OJ, 1000 mL	
17F0281-03 G	Large OJ, 1000 mL	
17F0281-04 A	HDPE NM, 500 mL	>2 Fail

B.H.
Preservation Confirmed By

6/16/17
Date

B.H.
Reviewed By

6/16/17
Date

Analytical Resources, Incorporated
Analytical Chemists and Consultants

SUBCONTRACT ORDER
To: Environmental Technical Services
ARI Work Order:17F0281

SENDING LABORATORY:

Analytical Resources, Inc.
4611 S. 134th Place, Suite 100
Tukwila, WA 98168
Phone: (206) 695-6200
Fax: (206) 695-6201
Project Manager: Amanda Volgardsen
E-Mail: av@arilabs.com

RECEIVING LABORATORY:

Environmental Technical Services
975 Transport Way, Suite 2
Petaluma, CA 94954
Phone :(707) 778-9605
Fax:

Analysis	Due	Expires	Sub Laboratory ID	Comments
Sample ID: 17F0281-01 **Sampled: 06/16/17 10:30 Matrix: Water**				
Solids, Total Volatile Suspended SM 2540 E-97	06/30/17	06/23/17 10:30		
Solids, Total Suspended SM 2540 D-97	06/30/17	06/23/17 10:30		
PSD (Particle Size Distribution by Laser) (Sub	06/30/17	06/23/17 10:30		

Containers Supplied:

17F0281-01 E Large OJ, 1000 mL	**17F0281-01 F** Large OJ, 1000 mL	**17F0281-01 G** Large OJ, 1000 mL

Analysis	Due	Expires	Sub Laboratory ID	Comments
Sample ID: 17F0281-03 **Sampled: 06/16/17 10:30 Matrix: Water**				
Solids, Total Volatile Suspended SM 2540 E-97	06/30/17	06/23/17 10:30		
Solids, Total Suspended SM 2540 D-97	06/30/17	06/23/17 10:30		
PSD (Particle Size Distribution by Laser) (Sub	06/30/17	06/23/17 10:30		

Containers Supplied:

17F0281-03 E Large OJ, 1000 mL	**17F0281-03 F** Large OJ, 1000 mL	**17F0281-03 G** Large OJ, 1000 mL

Released By	Date	Received By	Date
Released By	Date	Received By	Date

Printed: 6/16/2017 3:27:14PM

Analytical Resources, Incorporated
Analytical Chemists and Consultants

SUBCONTRACT ORDER
To: Materials Testing & Consulting, Inc. (Tukwila)
ARI Work Order:17F0281

SENDING LABORATORY:

Analytical Resources, Inc.
4611 S. 134th Place, Suite 100
Tukwila, WA 98168
Phone: (206) 695-6200
Fax: (206) 695-6201
Project Manager: Amanda Volgardsen
E-Mail: av@arilabs.com

RECEIVING LABORATORY:

Materials Testing & Consulting, Inc. (Tukwila)
4611 S 134th Place, Ste 200
Tukwila, WA 98296
Phone :-
Fax: -

Analysis	Due	Expires	Sub Laboratory ID	Comments
Sample ID: 17F0281-01				
Sampled: 06/16/17 10:30 Matrix: Water				
Stormwater Sed Conc (SSC) ASTM D3977 (St	06/30/17	06/23/17 10:30		
Containers Supplied:				
17F0281-01 D Large OJ, 1000 mL				
Sample ID: 17F0281-03				
Sampled: 06/16/17 10:30 Matrix: Water				
Stormwater Sed Conc (SSC) ASTM D3977 (St	06/30/17	06/23/17 10:30		
Containers Supplied:				
17F0281-03 D Large OJ, 1000 mL				

Released By	Date	Received By	Date
Released By	Date	Received By	Date

Printed: 6/16/2017 3:27:14PM

E T S *Environmental Technical Services*

975 Transport Way, Suite 2
Petaluma, CA 94954
(707) 778-9605/FAX 778-9612
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-Soil, Water & Air Testing & Monitoring
-Analytical Labs
-Technical Support

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COMPANY:	Analytical Resources, Inc., 4611 S. 134th Place, Suite 100, Tukwila, WA 98168				ANALYST(S)	SUPERVISOR
ATTN:	Amanda Volgardsen	DATE	DATE	DATE	S. Santos	D. Jacobson
JOB:	Hydro International Up-Flo Filter	COLLECTED	RECEIVED	COMPLETED	G.Hernandez	LAB DIRECTOR
SITE:	Oregon-Washington	6/16/2017	6/20/2017	6/28/2017		G.S. Conrad,PhD

PARTICLE SIZE DISTRIBUTION (PSD) ANALYSIS & REPORT – 5 PART

LAB SAMPLE NUMBER	SAMPLE ID	SOURCE of WATER	SUSPENDED SOLIDS mg/l @ ≥500 µ	SUSPENDED SOLIDS mg/l @ 125 µ	SUSPENDED SOLIDS mg/l @ 63 µ	SUSPENDED SOLIDS mg/l @ 32 µ	SUSPENDED SOLIDS mg/l @ 4 µ	SUSPENDED SOLIDS mg/l @ 1 µ	SUSPENDED SEDIMENT CONC TSS mg/l
07400-1	HI-29/RW	WUFF-IN	**2.0**	**8.0**	**9.0**		**27.5**	**3.9**	**55.0**
	17F0281-01 E/F		4.0%	15.9%	17.9%		54.6%	7.7%	
						Total SSC by Summation →		**50.4**	
07400-2	HI-30/RW	WUFF-OUT	**0.0**	**0.5**	**0.5**		**2.3**	**1.1**	**4.0**
	17F0281-03 E/F		0.0%	11.4%	11.4%		52.3%	25.0%	
						Total SSC by Summation →		**4.4**	
			#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	
						Total SSC by Summation →		**0.0**	
			#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	
						Total SSC by Summation →		**0.0**	

LAB SAMPLE NUMBER	SAMPLE ID	SOURCE of WATER	Water pH -log[H+]	ECw [Spec Cond] µS/cm	COLOR, TRUE PtCo Units	COLOR APPARENT PtCo Units	TOTAL IRON Fe (diss.) mg/l	TOTAL VOLATILE SUSPENDED SOLIDS (TVSS) mg/l
07400-1	HI-29/RW	WUFF-IN						**16.0**
	17F0281-01 E/F							
07400-2	HI-30/RW	WUFF-OUT						**2.0**
	17F0281-03 E/F							

COMMENTS

The matrix has a very low concentration of TSS particles amounting to only about 50 ppm in the input sample; and the output sample is extremely low at 4-5 ppm. For the -IN & -OUT pair of samples, the overall reduction averaged right at 92% (i.e., TSS by summation vs tested TSS). The specific fraction reductions going from coarsest to finest sizes are as follows: 100%, 93.8%, 94.4%, 91.6%, and 71.8%. The TVSS values are proportionally somewhat different in this case. The proportion that is volatile suspended solids in the input sample is at just 29%, but for the output sample it is at 50%. Thus, in this case volatile suspended solids are a little less than a third up to one half of the suspended particulates, depending on which sample, the input or the output. So, it appears there is proportionally greater removal of non-organic particulates in this specific situation. The RPDs are excellent as follows: ±4.4%; and ±4.8%.

\\\ NOTES: Tests were done according to methodology as per Association of Testing Materials (ASTM): Suspended Sediment Concentration – Modified ASTM D3977 (Practice for Determining Suspended-Sediment Concentration in Water Samples). Standard Methods is followed for the other tests: Color - 2120 C; Spec Cond. (ECw) - 2510 B; Iron - 3500-Fe B; pH - 4500-H+ B; TRPH - 5520 C.

Materials Testing & Consulting, Inc.

Geotechnical Engineering • Special Inspection • Materials Testing • Environmental Consulting

Project: Hydro International Up-flo Filter (17F0281)
Project #: 16T001-035
Client : Analytical Resources, Inc.
Source: Multiple
MTC Sample#: Multiple

Date Received: June 19, 2017
Sampled By: Others
Date Reported: July 25, 2017
Tested By: B. Goble

CASE NARRATIVE

1. Two samples were submitted for sediment concentration by ASTM D3977, Method C.
2. The coarse material was screened over a No. 230 sieve.
3. The suspended solids are reported in mg/L.
4. The data is provided in a summary table.
5. There were no other noted anomalies in this project.

Reviewed by: E Gabriel Goble

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Materials Testing & Consulting, Inc.

Geotechnical Engineering • Special Inspection • Materials Testing • Environmental Consulting

Hydro International Up-flo Filter

Project: (17F0281)
Project #: 16T001-035
Date Received: June 19, 2017
Date Tested: July 24, 2017

Client: Analytical Resources, Inc.
Sampled by: Others
Tested by: B. Goble

Suspended Sediment Concentration
ASTM D3977 Method C

Client Sample ID	MTC Sample ID	Sampling Date	Coarse Fraction SSC (>63µm) (mg/L)	FineFraction SSC (<63µm) (mg/L)	Total Suspended Sediment Concentration (mg/L)
WUFF-IN	T17-1074	6/16/2017	18.0	42.9	60.9
WUFF-OUT	T17-1075	6/16/2017	0.9	1.1	1.9

Reviewed by: EJ Goble

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Herrera Environmental Consultants	Project: Hydro International	
2200 6th Avenue, Suite 1100	Project Number: 13-05605-000	**Reported:**
Seattle WA, 98121	Project Manager: Dylan Ahearn	25-Jul-2017 15:42

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
WUFF-IN	17F0281-01	Water	16-Jun-2017 10:30	16-Jun-2017 11:08
WUFF-IN	17F0281-02	Water	16-Jun-2017 10:30	16-Jun-2017 11:08
WUFF-OUT	17F0281-03	Water	16-Jun-2017 10:30	16-Jun-2017 11:08
WUFF-OUT	17F0281-04	Water	16-Jun-2017 10:30	16-Jun-2017 11:08

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Herrera Environmental Consultants	Project: Hydro International	
2200 6th Avenue, Suite 1100	Project Number: 13-05605-000	**Reported:**
Seattle WA, 98121	Project Manager: Dylan Ahearn	25-Jul-2017 15:42

Case Narrative

Sample receipt

Samples as listed on the preceding page were received June 16, 2017 under ARI workorder 17F0281. For details regarding sample receipt, please refer to the Cooler Receipt Form. The TSS, PSD and TVS were subcontracted to ETS Labs. The SSC was subcontracted to MTC Labs.

Total and Dissolved Metals - EPA Method 200.8

The samples were digested and analyzed within the recommended holding times.

There were no target compounds detected in the method blanks.

The LCS percent recoveries were within control limits.

A totals matrix spike and duplicate were prepared in conjunction with sample WUFF-IN. The matrix spike percent recoveries and duplicate RPD were within QC limits.

Total Metals - EPA Method 6010C

The samples were digested and analyzed within the recommended holding times.

There were no target compounds detected in the method blank.

The LCS percent recoveries were within control limits.

Wet Chemistry (O-Phos and T-Phos)

The samples were prepared and analyzed within the recommended holding times.

There were no target compounds detected in the method blanks.

The LCS percent recoveries were within control limits.

A ortho phosphorus matrix spike and duplicate were prepared in conjunction with sample WUFF-IN. The matrix spike percent recovery and duplicate RPD were within QC limits.

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Herrera Environmental Consultants	Project: Hydro International	
2200 6th Avenue, Suite 1100	Project Number: 13-05605-000	**Reported:**
Seattle WA, 98121	Project Manager: Dylan Ahearn	25-Jul-2017 15:42

WUFF-IN

17F0281-01 (Water)

Metals and Metallic Compounds

Method: EPA 200.8 — Sampled: 06/16/2017 10:30

Instrument: ICPMS2 — Analyzed: 20-Jun-2017 20:33

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
Preparation Batch: BFF0523 — Sample Size: 25 mL
Prepared: 20-Jun-2017 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Copper	7440-50-8	1	0.500	**35.5**	ug/L	
Zinc	7440-66-6	1	4.00	**107**	ug/L	

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Herrera Environmental Consultants	Project: Hydro International	
2200 6th Avenue, Suite 1100	Project Number: 13-05605-000	**Reported:**
Seattle WA, 98121	Project Manager: Dylan Ahearn	25-Jul-2017 15:42

WUFF-IN

17F0281-01 (Water)

Metals and Metallic Compounds

Method: EPA 6010C — Sampled: 06/16/2017 10:30

Instrument: ICP2 — Analyzed: 19-Jun-2017 18:57

Sample Preparation: Preparation Method: TWC EPA 3010A
Preparation Batch: BFF0485 — Sample Size: 50 mL
Prepared: 19-Jun-2017 — Final Volume: 50 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Calcium	7440-70-2	1	0.0500	**27.3**	mg/L	
Magnesium	7439-95-4	1	0.0500	**9.05**	mg/L	

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Herrera Environmental Consultants	Project: Hydro International	
2200 6th Avenue, Suite 1100	Project Number: 13-05605-000	**Reported:**
Seattle WA, 98121	Project Manager: Dylan Ahearn	25-Jul-2017 15:42

WUFF-IN

17F0281-01 (Water)

Wet Chemistry

Method: SM 4500-P E-99
Instrument: UV1800-2

Sampled: 06/16/2017 10:30
Analyzed: 16-Jun-2017 17:33

Sample Preparation: Preparation Method: No Prep Wet Chem
Preparation Batch: BFF0473
Prepared: 16-Jun-2017
Sample Size: 10 mL
Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Orthophosphorus	1426-54-42	1	0.0040	**0.0170**	mg-P/L	

Sample Preparation: Preparation Method: SM 4500-P B-4 Strong Acid
Preparation Batch: BFF0544
Prepared: 20-Jun-2017
Sample Size: 25 mL
Final Volume: 50 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Total Phosphorus	7723-14-0	1	0.00800	**0.0540**	mg-P/L	

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Herrera Environmental Consultants	Project: Hydro International	
2200 6th Avenue, Suite 1100	Project Number: 13-05605-000	**Reported:**
Seattle WA, 98121	Project Manager: Dylan Ahearn	25-Jul-2017 15:42

WUFF-IN

17F0281-01 (Water)

Calculation

Method: SM 2340 B-97 — Sampled: 06/16/2017 10:30

Instrument: [CALC] — Analyzed: 19-Jun-2017 18:57

Sample Preparation: Preparation Method: [CALC]
Preparation Batch: [CALC]
Prepared: 19-Jun-2017 Final Volume: 1

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Hardness		1	0.331	**105**	mg/L	

Herrera Environmental Consultants	Project: Hydro International	
2200 6th Avenue, Suite 1100	Project Number: 13-05605-000	**Reported:**
Seattle WA, 98121	Project Manager: Dylan Ahearn	25-Jul-2017 15:42

Analysis by: Materials Testing & Consulting, Inc. (Tukwila)

WUFF-IN

17F0281-01 (Water)

***** DEFAULT GENERAL METHOD *****

Method: ASTM D3977 — Sampled: 06/16/2017 10:30

Instrument: MT&C — Analyzed: 24-Jul-2017 00:00

Sample Preparation: Preparation Method: No Prep Geo
Preparation Batch: B072417
Prepared: 24-Jul-2017 Final Volume:

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
>63 µm	SC_>63	1	0.1	**18.00**	mg/L	
<63 µm	SC_<63	1	0.1	**42.87**	mg/L	
Total SSC	SC_TOTAL	1	0.1	**60.87**	mg/L	

Herrera Environmental Consultants	Project: Hydro International	
2200 6th Avenue, Suite 1100	Project Number: 13-05605-000	**Reported:**
Seattle WA, 98121	Project Manager: Dylan Ahearn	25-Jul-2017 15:42

Analysis by: Materials Testing & Consulting, Inc. (Tukwila)

WUFF-IN

17F0281-02 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 200.8 — Sampled: 06/16/2017 10:30

Instrument: ICPMS2 — Analyzed: 22-Jun-2017 21:15

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
Preparation Batch: BFF0563 — Sample Size: 25 mL
Prepared: 21-Jun-2017 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Copper, Dissolved	7440-50-8	1	0.500	**13.0**	ug/L	
Zinc, Dissolved	7440-66-6	1	4.00	**30.3**	ug/L	

Herrera Environmental Consultants	Project: Hydro International	
2200 6th Avenue, Suite 1100	Project Number: 13-05605-000	**Reported:**
Seattle WA, 98121	Project Manager: Dylan Ahearn	25-Jul-2017 15:42

WUFF-OUT

17F0281-03 (Water)

Metals and Metallic Compounds

Method: EPA 200.8 — Sampled: 06/16/2017 10:30
Instrument: ICPMS2 — Analyzed: 20-Jun-2017 20:04

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
Preparation Batch: BFF0523 — Sample Size: 25 mL
Prepared: 20-Jun-2017 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Copper	7440-50-8	1	0.500	**10.9**	ug/L	
Zinc	7440-66-6	1	4.00	**22.2**	ug/L	

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Herrera Environmental Consultants	Project: Hydro International	
2200 6th Avenue, Suite 1100	Project Number: 13-05605-000	**Reported:**
Seattle WA, 98121	Project Manager: Dylan Ahearn	25-Jul-2017 15:42

WUFF-OUT

17F0281-03 (Water)

Metals and Metallic Compounds

Method: EPA 6010C — Sampled: 06/16/2017 10:30
Instrument: ICP2 — Analyzed: 19-Jun-2017 19:01

Sample Preparation: Preparation Method: TWC EPA 3010A
Preparation Batch: BFF0485 — Sample Size: 50 mL
Prepared: 19-Jun-2017 — Final Volume: 50 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Calcium	7440-70-2	1	0.0500	**30.9**	mg/L	
Magnesium	7439-95-4	1	0.0500	**10.8**	mg/L	

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2200 6th Avenue, Suite 1100	Project Number: 13-05605-000	**Reported:**
Seattle WA, 98121	Project Manager: Dylan Ahearn	25-Jul-2017 15:42

WUFF-OUT

17F0281-03 (Water)

Wet Chemistry

Method: SM 4500-P E-99 — Sampled: 06/16/2017 10:30
Instrument: UV1800-2 — Analyzed: 16-Jun-2017 17:35

Sample Preparation: Preparation Method: No Prep Wet Chem
Preparation Batch: BFF0473 — Sample Size: 10 mL
Prepared: 16-Jun-2017 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Orthophosphorus	1426-54-42	1	0.0040	**0.0250**	mg-P/L	

Sample Preparation: Preparation Method: SM 4500-P B-4 Strong Acid
Preparation Batch: BFF0544 — Sample Size: 25 mL
Prepared: 20-Jun-2017 — Final Volume: 50 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Total Phosphorus	7723-14-0	1	0.00800	**0.0680**	mg-P/L	

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Herrera Environmental Consultants	Project: Hydro International	
2200 6th Avenue, Suite 1100	Project Number: 13-05605-000	**Reported:**
Seattle WA, 98121	Project Manager: Dylan Ahearn	25-Jul-2017 15:42

WUFF-OUT

17F0281-03 (Water)

Calculation

Method: SM 2340 B-97 — Sampled: 06/16/2017 10:30
Instrument: [CALC] — Analyzed: 19-Jun-2017 19:01

Sample Preparation: Preparation Method: [CALC]
Preparation Batch: [CALC]
Prepared: 19-Jun-2017 Final Volume: 1

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Hardness		1	0.331	**122**	mg/L	

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Herrera Environmental Consultants	Project: Hydro International	
2200 6th Avenue, Suite 1100	Project Number: 13-05605-000	**Reported:**
Seattle WA, 98121	Project Manager: Dylan Ahearn	25-Jul-2017 15:42

Analysis by: Materials Testing & Consulting, Inc. (Tukwila)

WUFF-OUT

17F0281-03 (Water)

***** DEFAULT GENERAL METHOD *****

Method: ASTM D3977 — Sampled: 06/16/2017 10:30

Instrument: MT&C — Analyzed: 24-Jul-2017 00:00

Sample Preparation: Preparation Method: No Prep Geo
Preparation Batch: B072417
Prepared: 24-Jul-2017 Final Volume:

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
> 63 µm	SC_>63	1	0.1	**0.85**	mg/L	
< 63 µm	SC_<63	1	0.1	**1.06**	mg/L	
Total SSC	SC_TOTAL	1	0.1	**1.91**	mg/L	

Herrera Environmental Consultants	Project: Hydro International	
2200 6th Avenue, Suite 1100	Project Number: 13-05605-000	**Reported:**
Seattle WA, 98121	Project Manager: Dylan Ahearn	25-Jul-2017 15:42

Analysis by: Materials Testing & Consulting, Inc. (Tukwila)

WUFF-OUT

17F0281-04 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 200.8 — Sampled: 06/16/2017 10:30

Instrument: ICPMS2 — Analyzed: 22-Jun-2017 21:20

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
Preparation Batch: BFF0563 — Sample Size: 25 mL
Prepared: 21-Jun-2017 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Copper, Dissolved	7440-50-8	1	0.500	**9.77**	ug/L	
Zinc, Dissolved	7440-66-6	1	4.00	**20.7**	ug/L	

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Herrera Environmental Consultants	Project: Hydro International	
2200 6th Avenue, Suite 1100	Project Number: 13-05605-000	**Reported:**
Seattle WA, 98121	Project Manager: Dylan Ahearn	25-Jul-2017 15:42

Metals and Metallic Compounds - Quality Control

Batch BFF0485 - TWC EPA 3010A

Instrument: ICP2 Analyst: CC

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BFF0485-BLK1)			Prepared: 19-Jun-2017 Analyzed: 19-Jun-2017 17:38							
Calcium	ND	0.0500	mg/L							U
Magnesium	ND	0.0500	mg/L							U
LCS (BFF0485-BS1)			Prepared: 19-Jun-2017 Analyzed: 23-Jun-2017 14:35							
Calcium	10.2	0.0500	mg/L	10.0		102	80-120			
Magnesium	10.7	0.0500	mg/L	10.0		107	80-120			

Herrera Environmental Consultants	Project: Hydro International	
2200 6th Avenue, Suite 1100	Project Number: 13-05605-000	**Reported:**
Seattle WA, 98121	Project Manager: Dylan Ahearn	25-Jul-2017 15:42

Metals and Metallic Compounds - Quality Control

Batch BFF0523 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS2 Analyst: TCH

QC Sample/Analyte	Isotope	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BFF0523-BLK1)				Prepared: 20-Jun-2017 Analyzed: 20-Jun-2017 20:23							
Copper	63	ND	0.500	ug/L							U
Copper	65	ND	0.500	ug/L							U
Zinc	66	ND	4.00	ug/L							U
Zinc	67	ND	4.00	ug/L							U
LCS (BFF0523-BS1)				Prepared: 20-Jun-2017 Analyzed: 20-Jun-2017 20:44							
Copper	63	25.2	0.500	ug/L	25.0		101	80-120			
Copper	65	24.9	0.500	ug/L	25.0		99.5	80-120			
Zinc	66	81.9	4.00	ug/L	80.0		102	80-120			
Zinc	67	74.4	4.00	ug/L	80.0		93.0	80-120			
Duplicate (BFF0523-DUP1)		**Source: 17F0281-01**		Prepared: 20-Jun-2017 Analyzed: 20-Jun-2017 20:28							
Copper	63	35.2	0.500	ug/L		35.5			1.07	20	
Zinc	67	103	4.00	ug/L		107			3.47	20	
Matrix Spike (BFF0523-MS1)		**Source: 17F0281-01**		Prepared: 20-Jun-2017 Analyzed: 20-Jun-2017 20:38							
Copper	63	58.8	0.500	ug/L	25.0	35.5	93.0	75-125			
Zinc	67	177	4.00	ug/L	80.0	107	87.4	75-125			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

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Herrera Environmental Consultants	Project: Hydro International	
2200 6th Avenue, Suite 1100	Project Number: 13-05605-000	**Reported:**
Seattle WA, 98121	Project Manager: Dylan Ahearn	25-Jul-2017 15:42

Metals and Metallic Compounds (dissolved) - Quality Control

Batch BFF0563 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS2 Analyst: TCH

QC Sample/Analyte	Isotope	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BFF0563-BLK1)			Prepared: 21-Jun-2017 Analyzed: 22-Jun-2017 14:17								
Copper, Dissolved	63	ND	0.500	ug/L							U
Copper, Dissolved	65	ND	0.500	ug/L							U
Zinc, Dissolved	66	ND	4.00	ug/L							U
Zinc, Dissolved	67	ND	4.00	ug/L							U
LCS (BFF0563-BS1)			Prepared: 21-Jun-2017 Analyzed: 22-Jun-2017 15:02								
Copper, Dissolved	63	26.8	0.500	ug/L	25.0		107	80-120			
Copper, Dissolved	65	26.6	0.500	ug/L	25.0		107	80-120			
Zinc, Dissolved	66	84.2	4.00	ug/L	80.0		105	80-120			
Zinc, Dissolved	67	79.8	4.00	ug/L	80.0		99.8	80-120			

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Herrera Environmental Consultants	Project: Hydro International	
2200 6th Avenue, Suite 1100	Project Number: 13-05605-000	**Reported:**
Seattle WA, 98121	Project Manager: Dylan Ahearn	25-Jul-2017 15:42

Wet Chemistry - Quality Control

Batch BFF0473 - No Prep Wet Chem

Instrument: UV1800-2 Analyst: RMH

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BFF0473-BLK1)			Prepared: 16-Jun-2017 Analyzed: 16-Jun-2017 17:36							
Orthophosphorus	ND	0.0040	mg-P/L							U
LCS (BFF0473-BS1)			Prepared: 16-Jun-2017 Analyzed: 16-Jun-2017 17:37							
Orthophosphorus	0.146	0.0040	mg-P/L	0.150		97.3	90-110			
Duplicate (BFF0473-DUP2)	**Source: 17F0281-01**		Prepared: 16-Jun-2017 Analyzed: 16-Jun-2017 17:33							
Orthophosphorus	0.0160	0.0040	mg-P/L		0.0170			6.06	20	
Matrix Spike (BFF0473-MS2)	**Source: 17F0281-01**		Prepared: 16-Jun-2017 Analyzed: 16-Jun-2017 17:34							
Orthophosphorus	0.111	0.0040	mg-P/L	0.0999	0.0170	94.1	75-125			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Herrera Environmental Consultants	Project: Hydro International	
2200 6th Avenue, Suite 1100	Project Number: 13-05605-000	**Reported:**
Seattle WA, 98121	Project Manager: Dylan Ahearn	25-Jul-2017 15:42

Wet Chemistry - Quality Control

Batch BFF0544 - SM 4500-P B-4 Strong Acid

Instrument: UV1800-2 Analyst: KK

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BFF0544-BLK1)			Prepared: 20-Jun-2017 Analyzed: 22-Jun-2017 14:24							
Total Phosphorus	ND	0.00800	mg-P/L							U
Blank (BFF0544-BLK2)			Prepared: 20-Jun-2017 Analyzed: 22-Jun-2017 14:28							
Total Phosphorus	ND	0.00800	mg-P/L							U
DL (BFF0544-BLK3)			Prepared: 20-Jun-2017 Analyzed: 22-Jun-2017 14:32							
Total Phosphorus	ND	0.00800	mg-P/L							U
LCS (BFF0544-BS1)			Prepared: 20-Jun-2017 Analyzed: 22-Jun-2017 14:24							
Total Phosphorus	0.160	0.00800	mg-P/L	0.150		107	90-110			
DL (BFF0544-BS2)			Prepared: 20-Jun-2017 Analyzed: 22-Jun-2017 14:30							
Total Phosphorus	0.157	0.00800	mg-P/L	0.150		105	90-110			
DL (BFF0544-BS3)			Prepared: 20-Jun-2017 Analyzed: 22-Jun-2017 14:32							
Total Phosphorus	0.156	0.00800	mg-P/L	0.150		104	90-110			

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Herrera Environmental Consultants	Project: Hydro International	
2200 6th Avenue, Suite 1100	Project Number: 13-05605-000	**Reported:**
Seattle WA, 98121	Project Manager: Dylan Ahearn	25-Jul-2017 15:42

Certified Analyses included in this Report

Analyte	Certifications
EPA 200.8 in Water	
Copper-63	NELAP,WADOE,WA-DW,DoD-ELAP
Copper-65	NELAP,WADOE,WA-DW,DoD-ELAP
Zinc-66	NELAP,WADOE,WA-DW,DoD-ELAP
Zinc-67	NELAP,WADOE,WA-DW,DoD-ELAP
Copper-63	NELAP,WADOE,WA-DW,DoD-ELAP
Copper-65	NELAP,WADOE,WA-DW,DoD-ELAP
Zinc-66	NELAP,WADOE,WA-DW,DoD-ELAP
Zinc-67	NELAP,WADOE,WA-DW,DoD-ELAP
EPA 6010C in Water	
Calcium	WADOE,NELAP,DoD-ELAP
Magnesium	WADOE,NELAP,DoD-ELAP
SM 4500-P E-99 in Water	
Orthophosphorus	WADOE,NELAP
Total Phosphorus	WADOE,NELAP

Code	Description	Number	Expires
ADEC	Alaska Dept of Environmental Conservation	UST-033	09/01/2017
CALAP	California Department of Public Health CAELAP	2748	02/28/2018
DoD-ELAP	DoD-Environmental Laboratory Accreditation Program	66169	02/07/2019
NELAP	ORELAP - Oregon Laboratory Accreditation Program	WA100006	05/11/2018
WADOE	WA Dept of Ecology	C558	06/30/2018
WA-DW	Ecology - Drinking Water	C558	06/30/2018

Herrera Environmental Consultants	Project: Hydro International	
2200 6th Avenue, Suite 1100	Project Number: 13-05605-000	**Reported:**
Seattle WA, 98121	Project Manager: Dylan Ahearn	25-Jul-2017 15:42

Notes and Definitions

U	This analyte is not detected above the applicable reporting or detection limit.
J	Estimated concentration value detected below the reporting limit.
D	The reported value is from a dilution
B	This analyte was detected in the method blank.
*	Flagged value is not within established control limits.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
[2C]	Indicates this result was quantified on the second column on a dual column analysis.

October 18, 2017

Data_17J0342

ARI ID	Client ID	Proj ID	Matrix	Sampled	Rec	Prep	Analyzed	Method	CAS	Compound	Value	Q	Units
BFJ0573-BLK1	Blank	13-05605-000	Water			10/20/2017	10/27/2017	EPA 200.8	7440-50-8	Copper	0.687		ug/L
17J0342-01	WUFF-IN HF	13-05605-000	Water	10/18/2017	10/19/2017	10/20/2017	10/27/2017	EPA 200.8	7440-50-8	Copper	62.5	D, B	ug/L
17J0342-02	WUFF-OUT HF	13-05605-000	Water	10/18/2017	10/19/2017	10/20/2017	10/27/2017	EPA 200.8	7440-50-8	Copper	20.5	B	ug/L
BFJ0573-BLK1	Blank	13-05605-000	Water			10/20/2017	10/27/2017	EPA 200.8	7440-50-8	Copper	0.673		ug/L
BFJ0573-BLK1	Blank	13-05605-000	Water			10/20/2017	10/27/2017	EPA 200.8	7440-66-6	Zinc	4.00	U	ug/L
BFJ0573-BS1	LCS	13-05605-000	Water			10/20/2017	10/27/2017	EPA 200.8	7440-66-6	Zinc	91.6		ug/L
17J0342-01	WUFF-IN HF	13-05605-000	Water	10/18/2017	10/19/2017	10/20/2017	10/27/2017	EPA 200.8	7440-66-6	Zinc	234	D	ug/L
17J0342-02	WUFF-OUT HF	13-05605-000	Water	10/18/2017	10/19/2017	10/20/2017	10/27/2017	EPA 200.8	7440-66-6	Zinc	54.4		ug/L
BFJ0573-BLK1	Blank	13-05605-000	Water			10/20/2017	10/27/2017	EPA 200.8	7440-66-6	Zinc	4.00	U	ug/L
BFJ0573-BS1	LCS	13-05605-000	Water			10/20/2017	10/27/2017	EPA 200.8	7440-66-6	Zinc	86.0		ug/L
BFJ0585-BLK2	Blank	13-05605-000	Water			10/20/2017	10/20/2017	SM 4500-P E-99	1426-54-42	Orthophosphorus	0.0040	U	mg-P/L
BFJ0585-BS1	LCS	13-05605-000	Water			10/20/2017	10/20/2017	SM 4500-P E-99	1426-54-42	Orthophosphorus	0.151		mg-P/L
BFJ0585-DUP1	WUFF-IN HF	13-05605-000	Water	10/18/2017	10/19/2017	10/20/2017	10/20/2017	SM 4500-P E-99	1426-54-42	Orthophosphorus	0.0170		mg-P/L
BFJ0585-MS1	WUFF-IN HF	13-05605-000	Water	10/18/2017	10/19/2017	10/20/2017	10/20/2017	SM 4500-P E-99	1426-54-42	Orthophosphorus	0.117		mg-P/L
17J0342-01	WUFF-IN HF	13-05605-000	Water	10/18/2017	10/19/2017	10/20/2017	10/20/2017	SM 4500-P E-99	1426-54-42	Orthophosphorus	0.0190		mg-P/L
17J0342-02	WUFF-OUT HF	13-05605-000	Water	10/18/2017	10/19/2017	10/20/2017	10/20/2017	SM 4500-P E-99	1426-54-42	Orthophosphorus	0.0220		mg-P/L
BFJ0624-BLK1	Blank	13-05605-000	Water			10/21/2017	10/21/2017	SM 2540 D-97		Suspended Solids	1.0	U	mg/L
BFJ0624-BS1	LCS	13-05605-000	Water			10/21/2017	10/21/2017	SM 2540 D-97		Suspended Solids	49.2		mg/L
BFJ0624-DUP1	WUFF-IN HF	13-05605-000	Water	10/18/2017	10/19/2017	10/21/2017	10/21/2017	SM 2540 D-97		Suspended Solids	103		mg/L
17J0342-01	WUFF-IN HF	13-05605-000	Water	10/18/2017	10/19/2017	10/21/2017	10/21/2017	SM 2540 D-97		Suspended Solids	87.3		mg/L
17J0342-02	WUFF-OUT HF	13-05605-000	Water	10/18/2017	10/19/2017	10/21/2017	10/21/2017	SM 2540 D-97		Suspended Solids	15.6		mg/L
BFJ0773-BLK1	Blank	13-05605-000	Water			11/03/2017	11/04/2017	SM 4500-P E-99	7723-14-0	Total Phosphorus	0.0080	U	mg-P/L
BFJ0773-BLK2	Blank	13-05605-000	Water			11/03/2017	11/04/2017	SM 4500-P E-99	7723-14-0	Total Phosphorus	0.0080	U	mg-P/L
BFJ0773-BLK3	Blank	13-05605-000	Water			11/03/2017	11/04/2017	SM 4500-P E-99	7723-14-0	Total Phosphorus	0.0080	U	mg-P/L
BFJ0773-BS1	LCS	13-05605-000	Water			11/03/2017	11/04/2017	SM 4500-P E-99	7723-14-0	Total Phosphorus	0.152		mg-P/L
BFJ0773-BS2	LCS	13-05605-000	Water			11/03/2017	11/04/2017	SM 4500-P E-99	7723-14-0	Total Phosphorus	0.153		mg-P/L
BFJ0773-BS3	LCS	13-05605-000	Water			11/03/2017	11/04/2017	SM 4500-P E-99	7723-14-0	Total Phosphorus	0.152		mg-P/L
17J0342-01	WUFF-IN HF	13-05605-000	Water	10/18/2017	10/19/2017	11/03/2017	11/04/2017	SM 4500-P E-99	7723-14-0	Total Phosphorus	0.204		mg-P/L
17J0342-02	WUFF-OUT HF	13-05605-000	Water	10/18/2017	10/19/2017	11/03/2017	11/04/2017	SM 4500-P E-99	7723-14-0	Total Phosphorus	0.0680		mg-P/L
BFK0003-BLK1	Blank	13-05605-000	Water			11/01/2017	11/01/2017	EPA 200.8-Dissolved	7440-50-8	Copper	0.500	U	ug/L
BFK0003-BS1	LCS	13-05605-000	Water			11/01/2017	11/01/2017	EPA 200.8-Dissolved	7440-50-8	Copper	28.7		ug/L
BFK0003-DUP1	WUFF-IN HF	13-05605-000	Water	10/18/2017	10/19/2017	11/01/2017	11/01/2017	EPA 200.8-Dissolved	7440-50-8	Copper	11.8		ug/L
BFK0003-MS1	WUFF-IN HF	13-05605-000	Water	10/18/2017	10/19/2017	11/01/2017	11/01/2017	EPA 200.8-Dissolved	7440-50-8	Copper	39.3		ug/L
17J0342-03	WUFF-IN HF	13-05605-000	Water	10/18/2017	10/19/2017	11/01/2017	11/01/2017	EPA 200.8-Dissolved	7440-50-8	Copper	12.3		ug/L
17J0342-04	WUFF-OUT HF	13-05605-000	Water	10/18/2017	10/19/2017	11/01/2017	11/01/2017	EPA 200.8-Dissolved	7440-50-8	Copper	13.9		ug/L
BFK0003-BLK1	Blank	13-05605-000	Water			11/01/2017	11/01/2017	EPA 200.8-Dissolved	7440-50-8	Copper	0.500	U	ug/L
BFK0003-BS1	LCS	13-05605-000	Water			11/01/2017	11/01/2017	EPA 200.8-Dissolved	7440-50-8	Copper	28.6		ug/L
BFK0003-BLK1	Blank	13-05605-000	Water			11/01/2017	11/01/2017	EPA 200.8-Dissolved	7440-66-6	Zinc	4.00	U	ug/L
BFK0003-BS1	LCS	13-05605-000	Water			11/01/2017	11/01/2017	EPA 200.8-Dissolved	7440-66-6	Zinc	83.8		ug/L
BFK0003-DUP1	WUFF-IN HF	13-05605-000	Water	10/18/2017	10/19/2017	11/01/2017	11/01/2017	EPA 200.8-Dissolved	7440-66-6	Zinc	42.8		ug/L
BFK0003-MS1	WUFF-IN HF	13-05605-000	Water	10/18/2017	10/19/2017	11/01/2017	11/01/2017	EPA 200.8-Dissolved	7440-66-6	Zinc	123		ug/L
17J0342-03	WUFF-IN HF	13-05605-000	Water	10/18/2017	10/19/2017	11/01/2017	11/01/2017	EPA 200.8-Dissolved	7440-66-6	Zinc	45.7		ug/L
17J0342-04	WUFF-OUT HF	13-05605-000	Water	10/18/2017	10/19/2017	11/01/2017	11/01/2017	EPA 200.8-Dissolved	7440-66-6	Zinc	36.2		ug/L
BFK0003-BLK1	Blank	13-05605-000	Water			11/01/2017	11/01/2017	EPA 200.8-Dissolved	7440-66-6	Zinc	4.00	U	ug/L
BFK0003-BS1	LCS	13-05605-000	Water			11/01/2017	11/01/2017	EPA 200.8-Dissolved	7440-66-6	Zinc	77.2		ug/L

Analytical Resources, Incorporated
Analytical Chemists and Consultants

06 November 2017

Dylan Ahearn
Herrera Environmental Consultants
2200 6th Avenue, Suite 1100
Seattle, WA 98121

RE: Hydro International

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

Associated Work Order(s)	Associated SDG ID(s)
17J0342	N/A

Amanda Volgardsen

Digitally signed by Amanda Volgardsen
DN: c=US, st=Washington, l=Tukwila, o=Analytical Resources, Inc., ou=Client Services, cn=Amanda Volgardsen, email=amandav@arilabs.com
Date: 2017.11.06 12:38:48 -08'00'

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclose Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the reqirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, Inc.

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in it- entirety.

ACCREDITED IN ACCORDANCE WITH nelac
Cert# 100006

PJLA Testing
Accreditation # 66169

17J0342

HERRERA
2200 Sixth Avenue | Suite 1100
Seattle, Washington | 98121
p 206 441 9080 | f 206 441 9108

Chain of Custody Record

Project Name:	Project Number:	Client:
Hydro International Up-flo Filter	13-05605-000	Herrera Environmental
Report To:		**Copy To:**
Dylan Ahearn		
Sampled By:		**Delivery Method:**
M MULLEN		ice cooler hand
Laboratory:	**Requested Completion Date:**	**Total No. of Containers:**
Analytical Resources Inc.		2

Lab Use:

Sample ID	Date	Time	Sample Type (see codes)	Preser-vative? (Y/N)	Matrix (see codes)	Number of Containers	Analyses Requested: Total phosphorus - EPA 365.3	Orthophosphorus - EPA 365.3	Copper, dissolved - EPA 200.8	Copper, total - EPA 200.8	Zinc, dissolved - EPA 200.8	Zinc, total - EPA 200.8	Total Suspended Solids- SM 2540D				Lab ID No.
WUFF-IN HF	10.16.17	18:45	C ~~Stw~~	N	SW		X	X	X	X	X	X	X				
WUFF-OUT HF	10.16.17	18:45	C ~~Stw~~	N	SW		X	X	X	X	X	X	X				

Comments/Special Instructions:

Relinquished by (Name/CO/	Signature	Date/Time	Received By (Name/CO)	Signature	Date/Time
Melissa Mullen/Herrera	M Mull	10.19.17/10:40	Shelly Fisher ARI	Shelly Fisher	10/19/17 1037
Relinquished by (Name/CO/	Signature	Date/Time	Received By (Name/CO)	Signature	Date/Time

Sample Type: G=Grab C=Composite **Matrix Codes:** A=Air GW=Groundwater SE=Sediment SO=Soil SW=Surface Water W=Water (blanks) M=Material O=Other (specify)

WORK ORDER

17J0342

Client: Herrera Environmental Consultants | **Project Manager:** Amanda Volgardsen

Project: Hydro International | **Project Number:** [none]

Analysis	Due	TAT	Expires	Comments
17J0342-03 WUFF-IN HF [Water] Sampled 18-Oct-2017 18:45 (GMT-08:00) Pacific Time (US & Canada)				
Filter 0.45 micron	02-Nov-2017 15:00	10	20-Oct-2017 10:37	
Met Diss 200.8 - Cu	02-Nov-2017 15:00	10	16-Apr-2018 18:45	
Met Diss 200.8 - Zn	02-Nov-2017 15:00	10	16-Apr-2018 18:45	
17J0342-04 WUFF-OUT HF [Water] Sampled 18-Oct-2017 18:45 (GMT-08:00) Pacific Time (US & Canada)				
Met Diss 200.8 - Zn	02-Nov-2017 15:00	10	16-Apr-2018 18:45	
Filter 0.45 micron	02-Nov-2017 15:00	10	20-Oct-2017 10:37	
Met Diss 200.8 - Cu	02-Nov-2017 15:00	10	16-Apr-2018 18:45	

Preservation Confirmation

Container ID	Container Type	pH
17J0342-01 A	Glass NM, Amber, 500 mL	
17J0342-01 B	Small OJ, 500 mL, 9N H2SO4	<2 pass
17J0342-01 C	Large OJ, 1000 mL	
17J0342-01 D	HDPE NM, 500 mL, 1:1 HNO3	<2 pass
17J0342-02 A	Glass NM, Amber, 500 mL	
17J0342-02 B	Small OJ, 500 mL, 9N H2SO4	<2 pass
17J0342-02 C	Large OJ, 1000 mL	
17J0342-02 D	HDPE NM, 500 mL, 1:1 HNO3	<2 pass
17J0342-03 A	HDPE NM, 500 mL	
17J0342-04 A	HDPE NM, 500 mL	

Preservation Confirmed By _____ Date _____

Reviewed By _____ Date _____

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Herrera

Project Name: Hydro Int Upflo Filter

COC No(s): _____ NA

Delivered by: Fed-Ex UPS Courier Hand Delivered Other: _____

Assigned ARI Job No: 17J0342

Tracking No: _____ NA

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler? YES (NO)

Were custody papers included with the cooler? (YES) NO

Were custody papers properly filled out (ink, signed, etc.) (YES) NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry) 2.7

Time: 1041

If cooler temperature is out of compliance fill out form 00070F

Temp Gun ID#: D00250S

Cooler Accepted by: _____ Date: 10/19/17 Time: 1037

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler? YES (NO)

What kind of packing material was used? ... Bubble Wrap (Wet Ice) Gel Packs Baggies Foam Block Paper Other: _____

Was sufficient ice used (if appropriate)? NA (YES) NO

Were all bottles sealed in individual plastic bags? YES (NO)

Did all bottles arrive in good condition (unbroken)? (YES) NO

Were all bottle labels complete and legible? (YES) NO

Did the number of containers listed on COC match with the number of containers received? (YES) NO

Did all bottle labels and tags agree with custody papers? (YES) NO

Were all bottles used correct for the requested analyses? (YES) NO

Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)... NA (YES) NO

Were all VOC vials free of air bubbles? (NA) YES NO

Was sufficient amount of sample sent in each bottle? (YES) NO

Date VOC Trip Blank was made at ARI... (1) NA

Was Sample Split by ARI : NA (YES) Date/Time: 10/19/17 1030 Equipment: churnsplitter Split by: SLF

Samples Logged by: _____ Date: _____ Time: _____

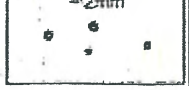
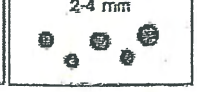
*** Notify Project Manager of discrepancies or concerns ***

(1) SLF 10/19/17

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

By: Date:

Small Air Bubbles ~2mm	Peabubbles 2-4 mm	LARGE Air Bubbles > 4 mm
		

Small → "sm" (< 2 mm)

Peabubbles → "pb" (2 to < 4 mm)

Large → "lg" (4 to < 6 mm)

Headspace → "hs" (> 6 mm)

Herrera Environmental Consultants	Project: Hydro International	
2200 6th Avenue, Suite 1100	Project Number: 13-05605-000	**Reported:**
Seattle WA, 98121	Project Manager: Dylan Ahearn	06-Nov-2017 12:37

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
WUFF-IN HF	17J0342-01	Water	18-Oct-2017 18:45	19-Oct-2017 10:37
WUFF-OUT HF	17J0342-02	Water	18-Oct-2017 18:45	19-Oct-2017 10:37
WUFF-IN HF	17J0342-03	Water	18-Oct-2017 18:45	19-Oct-2017 10:37
WUFF-OUT HF	17J0342-04	Water	18-Oct-2017 18:45	19-Oct-2017 10:37

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Herrera Environmental Consultants	Project: Hydro International	
2200 6th Avenue, Suite 1100	Project Number: 13-05605-000	**Reported:**
Seattle WA, 98121	Project Manager: Dylan Ahearn	06-Nov-2017 12:37

Case Narrative

Sample receipt

Samples as listed on the preceding page were received October 19, 2017 under ARI workorder 17J0342. For details regarding sample receipt, please refer to the Cooler Receipt Form. The samples were churn split by sample receiving prior to analysis.

Total Metals - EPA Method 200.8

The samples were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The total method blank BFJ0573 has Copper detected above the reporting limit. Associated detected results and QC have been flagged with a "B" qualifier. No further corrective action was taken.

The LCS percent recoveries were within control limits.

A dissolved matrix spike and duplilcate were prepared in conjunction with sample WUFF-IN HF. The matrix spike percent recoveries and duplicate RPD were within QC limits.

Wet Chemistry (TSS, Ortho-Phos, Total-Phos)

The samples were prepared and analyzed within the recommended holding times.

There were no target compounds detected in the method blanks.

The LCS percent recoveries were within control limits.

A TSS duplicate was prepared in conjunction with sample WUFF-IN HF. The duplicate RPD was within QC limits.

A Ortho-Phos matrix spike and duplicate were prepared in conjunction with sample WUFF-IN HF. The matrix spike percent recovery and duplicate RPD were within QC limits.

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Herrera Environmental Consultants	Project: Hydro International	
2200 6th Avenue, Suite 1100	Project Number: 13-05605-000	**Reported:**
Seattle WA, 98121	Project Manager: Dylan Ahearn	06-Nov-2017 12:37

WUFF-IN HF

17J0342-01 (Water)

Metals and Metallic Compounds

Method: EPA 200.8
Instrument: ICPMS2

Sampled: 10/18/2017 18:45
Analyzed: 27-Oct-2017 15:22

Sample Preparation:
Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
Preparation Batch: BFJ0573
Prepared: 20-Oct-2017
Sample Size: 25 mL
Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Copper	7440-50-8	5	2.50	**62.5**	ug/L	D, B
Zinc	7440-66-6	5	20.0	**234**	ug/L	D

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Herrera Environmental Consultants	Project: Hydro International	
2200 6th Avenue, Suite 1100	Project Number: 13-05605-000	**Reported:**
Seattle WA, 98121	Project Manager: Dylan Ahearn	06-Nov-2017 12:37

WUFF-IN HF

17J0342-01 (Water)

Wet Chemistry

Method: SM 2540 D-97
Instrument: N/A

Sampled: 10/18/2017 18:45
Analyzed: 21-Oct-2017 11:56

Sample Preparation: Preparation Method: No Prep Wet Chem
Preparation Batch: BFJ0624
Prepared: 21-Oct-2017
Sample Size: 300 mL
Final Volume: 1000 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Suspended Solids		1	3.3	**87.3**	mg/L	

Herrera Environmental Consultants	Project: Hydro International	
2200 6th Avenue, Suite 1100	Project Number: 13-05605-000	**Reported:**
Seattle WA, 98121	Project Manager: Dylan Ahearn	06-Nov-2017 12:37

WUFF-IN HF

17J0342-01 (Water)

Wet Chemistry

Method: SM 4500-P E-99
Instrument: UV1800-2

Sampled: 10/18/2017 18:45
Analyzed: 20-Oct-2017 12:00

Sample Preparation: Preparation Method: SM 5310 A-00, 0.45um filtration
Preparation Batch: BFJ0585 Sample Size: 50 mL
Prepared: 20-Oct-2017 Final Volume: 50 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Orthophosphorus	1426-54-42	1	0.0040	**0.0190**	mg-P/L	

Sample Preparation: Preparation Method: SM 4500-P B-4 Strong Acid
Preparation Batch: BFJ0773 Sample Size: 25 mL
Prepared: 03-Nov-2017 Final Volume: 50 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Total Phosphorus	7723-14-0	1	0.0080	**0.204**	mg-P/L	

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Herrera Environmental Consultants	Project: Hydro International	
2200 6th Avenue, Suite 1100	Project Number: 13-05605-000	**Reported:**
Seattle WA, 98121	Project Manager: Dylan Ahearn	06-Nov-2017 12:37

WUFF-OUT HF

17J0342-02 (Water)

Metals and Metallic Compounds

Method: EPA 200.8
Instrument: ICPMS2

Sampled: 10/18/2017 18:45
Analyzed: 27-Oct-2017 14:50

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
Preparation Batch: BFJ0573 Sample Size: 25 mL
Prepared: 20-Oct-2017 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Copper	7440-50-8	1	0.500	**20.5**	ug/L	B
Zinc	7440-66-6	1	4.00	**54.4**	ug/L	

Herrera Environmental Consultants	Project: Hydro International	
2200 6th Avenue, Suite 1100	Project Number: 13-05605-000	**Reported:**
Seattle WA, 98121	Project Manager: Dylan Ahearn	06-Nov-2017 12:37

WUFF-OUT HF

17J0342-02 (Water)

Wet Chemistry

Method: SM 2540 D-97
Instrument: N/A

Sampled: 10/18/2017 18:45
Analyzed: 21-Oct-2017 11:56

Sample Preparation: Preparation Method: No Prep Wet Chem
Preparation Batch: BFJ0624
Prepared: 21-Oct-2017
Sample Size: 550 mL
Final Volume: 1000 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Suspended Solids		1	1.8	**15.6**	mg/L	

Herrera Environmental Consultants	Project: Hydro International	
2200 6th Avenue, Suite 1100	Project Number: 13-05605-000	**Reported:**
Seattle WA, 98121	Project Manager: Dylan Ahearn	06-Nov-2017 12:37

WUFF-OUT HF

17J0342-02 (Water)

Wet Chemistry

Method: SM 4500-P E-99
Instrument: UV1800-2

Sampled: 10/18/2017 18:45
Analyzed: 20-Oct-2017 12:16

Sample Preparation: Preparation Method: SM 5310 A-00, 0.45um filtration
Preparation Batch: BFJ0585 Sample Size: 50 mL
Prepared: 20-Oct-2017 Final Volume: 50 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Orthophosphorus	1426-54-42	1	0.0040	**0.0220**	mg-P/L	

Sample Preparation: Preparation Method: SM 4500-P B-4 Strong Acid
Preparation Batch: BFJ0773 Sample Size: 25 mL
Prepared: 03-Nov-2017 Final Volume: 50 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Total Phosphorus	7723-14-0	1	0.0080	**0.0680**	mg-P/L	

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Seattle WA, 98121	Project Manager: Dylan Ahearn	06-Nov-2017 12:37

WUFF-IN HF

17J0342-03 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 200.8
Instrument: ICPMS2

Sampled: 10/18/2017 18:45
Analyzed: 01-Nov-2017 17:28

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
Preparation Batch: BFK0003 Sample Size: 25 mL
Prepared: 01-Nov-2017 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Copper, Dissolved	7440-50-8	1	0.500	**12.3**	ug/L	
Zinc, Dissolved	7440-66-6	1	4.00	**45.7**	ug/L	

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Herrera Environmental Consultants	Project: Hydro International	
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Seattle WA, 98121	Project Manager: Dylan Ahearn	06-Nov-2017 12:37

WUFF-OUT HF

17J0342-04 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 200.8
Instrument: ICPMS2

Sampled: 10/18/2017 18:45
Analyzed: 01-Nov-2017 18:30

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
Preparation Batch: BFK0003 Sample Size: 25 mL
Prepared: 01-Nov-2017 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Copper, Dissolved	7440-50-8	1	0.500	**13.9**	ug/L	
Zinc, Dissolved	7440-66-6	1	4.00	**36.2**	ug/L	

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Herrera Environmental Consultants	Project: Hydro International	
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Seattle WA, 98121	Project Manager: Dylan Ahearn	06-Nov-2017 12:37

Metals and Metallic Compounds - Quality Control

Batch BFJ0573 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS2 Analyst: CC

QC Sample/Analyte	Isotope	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BFJ0573-BLK1)				Prepared: 20-Oct-2017 Analyzed: 27-Oct-2017 12:54							
Copper	63	0.687	0.500	ug/L							
Copper	65	0.673	0.500	ug/L							
Zinc	66	ND	4.00	ug/L							U
Zinc	67	ND	4.00	ug/L							U
LCS (BFJ0573-BS1)				Prepared: 20-Oct-2017 Analyzed: 27-Oct-2017 13:34							
Zinc	66	91.6	4.00	ug/L	80.0		114	80-120			
Zinc	67	86.0	4.00	ug/L	80.0		108	80-120			

Herrera Environmental Consultants	Project: Hydro International	
2200 6th Avenue, Suite 1100	Project Number: 13-05605-000	**Reported:**
Seattle WA, 98121	Project Manager: Dylan Ahearn	06-Nov-2017 12:37

Metals and Metallic Compounds (dissolved) - Quality Control

Batch BFK0003 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS2 Analyst: TCH

QC Sample/Analyte	Isotope	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BFK0003-BLK1)				Prepared: 01-Nov-2017 Analyzed: 01-Nov-2017 17:51							
Copper, Dissolved	63	ND	0.500	ug/L							U
Copper, Dissolved	65	ND	0.500	ug/L							U
Zinc, Dissolved	66	ND	4.00	ug/L							U
Zinc, Dissolved	67	ND	4.00	ug/L							U
LCS (BFK0003-BS1)				Prepared: 01-Nov-2017 Analyzed: 01-Nov-2017 18:35							
Copper, Dissolved	63	28.7	0.500	ug/L	25.0		115	80-120			
Copper, Dissolved	65	28.6	0.500	ug/L	25.0		114	80-120			
Zinc, Dissolved	66	83.8	4.00	ug/L	80.0		105	80-120			
Zinc, Dissolved	67	77.2	4.00	ug/L	80.0		96.5	80-120			
Duplicate (BFK0003-DUP1)			Source: 17J0342-03	Prepared: 01-Nov-2017 Analyzed: 01-Nov-2017 17:23							
Copper, Dissolved	63	11.8	0.500	ug/L		12.3			4.49	20	
Zinc, Dissolved	66	42.8	4.00	ug/L		45.7			6.50	20	
Matrix Spike (BFK0003-MS1)			Source: 17J0342-03	Prepared: 01-Nov-2017 Analyzed: 01-Nov-2017 17:33							
Copper, Dissolved	63	39.3	0.500	ug/L	25.0	12.3	108	75-125			
Zinc, Dissolved	66	123	4.00	ug/L	80.0	45.7	97.3	75-125			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Herrera Environmental Consultants	Project: Hydro International	
2200 6th Avenue, Suite 1100	Project Number: 13-05605-000	**Reported:**
Seattle WA, 98121	Project Manager: Dylan Ahearn	06-Nov-2017 12:37

Wet Chemistry - Quality Control

Batch BFJ0585 - SM 5310 A-00, 0.45um filtration

Instrument: UV1800-2 Analyst: CDE

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BFJ0585-BLK2)			Prepared: 20-Oct-2017 Analyzed: 20-Oct-2017 11:59							
Orthophosphorus	ND	0.0040	mg-P/L							U
LCS (BFJ0585-BS1)			Prepared: 20-Oct-2017 Analyzed: 20-Oct-2017 12:00							
Orthophosphorus	0.151	0.0040	mg-P/L	0.150		101	90-110			
Duplicate (BFJ0585-DUP1)	**Source: 17J0342-01**		Prepared: 20-Oct-2017 Analyzed: 20-Oct-2017 12:01							
Orthophosphorus	0.0170	0.0040	mg-P/L		0.0190			11.10	20	
Matrix Spike (BFJ0585-MS1)	**Source: 17J0342-01**		Prepared: 20-Oct-2017 Analyzed: 20-Oct-2017 12:16							
Orthophosphorus	0.117	0.0040	mg-P/L	0.0999	0.0190	98.1	75-125			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Herrera Environmental Consultants	Project: Hydro International	
2200 6th Avenue, Suite 1100	Project Number: 13-05605-000	**Reported:**
Seattle WA, 98121	Project Manager: Dylan Ahearn	06-Nov-2017 12:37

Wet Chemistry - Quality Control

Batch BFJ0624 - No Prep Wet Chem

Instrument: N/A

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BFJ0624-BLK1)			Prepared: 21-Oct-2017 Analyzed: 21-Oct-2017 11:56							
Suspended Solids	ND	1.0	mg/L							U
LCS (BFJ0624-BS1)			Prepared: 21-Oct-2017 Analyzed: 21-Oct-2017 11:56							
Suspended Solids	49.2	1.0	mg/L	50.0		98.4	90-110			
Duplicate (BFJ0624-DUP1)	**Source: 17J0342-01**		Prepared: 21-Oct-2017 Analyzed: 21-Oct-2017 11:56							
Suspended Solids	103	4.0	mg/L		87.3			16.30	20	

Herrera Environmental Consultants	Project: Hydro International	
2200 6th Avenue, Suite 1100	Project Number: 13-05605-000	**Reported:**
Seattle WA, 98121	Project Manager: Dylan Ahearn	06-Nov-2017 12:37

Wet Chemistry - Quality Control

Batch BFJ0773 - SM 4500-P B-4 Strong Acid

Instrument: UV1800-2 Analyst: KK

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BFJ0773-BLK1)				Prepared: 03-Nov-2017 Analyzed: 04-Nov-2017 11:54						
Total Phosphorus	ND	0.0080	mg-P/L							U
Blank (BFJ0773-BLK2)				Prepared: 03-Nov-2017 Analyzed: 04-Nov-2017 12:22						
Total Phosphorus	ND	0.0080	mg-P/L							U
Blank (BFJ0773-BLK3)				Prepared: 03-Nov-2017 Analyzed: 04-Nov-2017 12:32						
Total Phosphorus	ND	0.0080	mg-P/L							U
LCS (BFJ0773-BS1)				Prepared: 03-Nov-2017 Analyzed: 04-Nov-2017 11:55						
Total Phosphorus	0.152	0.0080	mg-P/L	0.150		101	90-110			
DL (BFJ0773-BS2)				Prepared: 03-Nov-2017 Analyzed: 04-Nov-2017 12:23						
Total Phosphorus	0.153	0.0080	mg-P/L	0.150		102	90-110			
LCS (BFJ0773-BS3)				Prepared: 03-Nov-2017 Analyzed: 04-Nov-2017 12:32						
Total Phosphorus	0.152	0.0080	mg-P/L	0.150		101	90-110			

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Herrera Environmental Consultants	Project: Hydro International	
2200 6th Avenue, Suite 1100	Project Number: 13-05605-000	**Reported:**
Seattle WA, 98121	Project Manager: Dylan Ahearn	06-Nov-2017 12:37

Certified Analyses included in this Report

Analyte	Certifications
EPA 200.8 in Water	
Copper-63	NELAP,WADOE,WA-DW,DoD-ELAP
Copper-65	NELAP,WADOE,WA-DW,DoD-ELAP
Zinc-66	NELAP,WADOE,WA-DW,DoD-ELAP
Zinc-67	NELAP,WADOE,WA-DW,DoD-ELAP
Copper-63	NELAP,WADOE,WA-DW,DoD-ELAP
Copper-65	NELAP,WADOE,WA-DW,DoD-ELAP
Zinc-66	NELAP,WADOE,WA-DW,DoD-ELAP
Zinc-67	NELAP,WADOE,WA-DW,DoD-ELAP
SM 2540 D-97 in Water	
Suspended Solids	DoD-ELAP,WADOE,NELAP
SM 4500-P E-99 in Water	
Orthophosphorus	WADOE,NELAP
Total Phosphorus	WADOE,NELAP

Code	Description	Number	Expires
ADEC	Alaska Dept of Environmental Conservation	UST-033	09/01/2017
CALAP	California Department of Public Health CAELAP	2748	02/28/2018
DoD-ELAP	DoD-Environmental Laboratory Accreditation Program	66169	02/07/2019
NELAP	ORELAP - Oregon Laboratory Accreditation Program	WA100006	05/11/2018
WADOE	WA Dept of Ecology	C558	06/30/2018
WA-DW	Ecology - Drinking Water	C558	06/30/2018

Herrera Environmental Consultants	Project: Hydro International	
2200 6th Avenue, Suite 1100	Project Number: 13-05605-000	**Reported:**
Seattle WA, 98121	Project Manager: Dylan Ahearn	06-Nov-2017 12:37

Notes and Definitions

U	This analyte is not detected above the applicable reporting or detection limit.
J	Estimated concentration value detected below the reporting limit.
D	The reported value is from a dilution
B	This analyte was detected in the method blank.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
[2C]	Indicates this result was quantified on the second column on a dual column analysis.

October 27, 2017

Data_17J0549

ARI ID	Client ID	Proj ID	Matrix	Sampled	Rec	Prep	Analyzed	Method	CAS	Compound	Value	Q	Units
17J0549-01	WUFF-Sump	13-05605-000	Sediment	10/27/2017	10/27/2017	11/15/2017	11/15/2017	PSEP 1986	GS_GRAVEL	Phi Size <-1	0.2		%
17J0549-01	WUFF-Sump	13-05605-000	Sediment	10/27/2017	10/27/2017	11/15/2017	11/15/2017	PSEP 1986	GS_VCS	Phi Size -1 to 0	2.2		%
17J0549-01	WUFF-Sump	13-05605-000	Sediment	10/27/2017	10/27/2017	11/15/2017	11/15/2017	PSEP 1986	GS_CS	Phi Size 0 to 1	3.8		%
17J0549-01	WUFF-Sump	13-05605-000	Sediment	10/27/2017	10/27/2017	11/15/2017	11/15/2017	PSEP 1986	GS_MS	Phi Size 1 to 2	3.9		%
17J0549-01	WUFF-Sump	13-05605-000	Sediment	10/27/2017	10/27/2017	11/15/2017	11/15/2017	PSEP 1986	GS_FS	Phi Size 2 to 3	5.7		%
17J0549-01	WUFF-Sump	13-05605-000	Sediment	10/27/2017	10/27/2017	11/15/2017	11/15/2017	PSEP 1986	GS_VFS	Phi Size 3 to 4	4.6		%
17J0549-01	WUFF-Sump	13-05605-000	Sediment	10/27/2017	10/27/2017	11/15/2017	11/15/2017	PSEP 1986	GS_CSILT	Phi Size 4 to 5	18.5		%
17J0549-01	WUFF-Sump	13-05605-000	Sediment	10/27/2017	10/27/2017	11/15/2017	11/15/2017	PSEP 1986	GS_MSILT	Phi Size 5 to 6	33.5		%
17J0549-01	WUFF-Sump	13-05605-000	Sediment	10/27/2017	10/27/2017	11/15/2017	11/15/2017	PSEP 1986	GS_FSILT	Phi Size 6 to 7	15.1		%
17J0549-01	WUFF-Sump	13-05605-000	Sediment	10/27/2017	10/27/2017	11/15/2017	11/15/2017	PSEP 1986	GS_VFSILT	Phi Size 7 to 8	7.1		%
17J0549-01	WUFF-Sump	13-05605-000	Sediment	10/27/2017	10/27/2017	11/15/2017	11/15/2017	PSEP 1986	GS_CCLAY	Phi Size 8 to 9	1.9		%
17J0549-01	WUFF-Sump	13-05605-000	Sediment	10/27/2017	10/27/2017	11/15/2017	11/15/2017	PSEP 1986	GS_MCLAY	Phi Size 9 to 10	1.4		%
17J0549-01	WUFF-Sump	13-05605-000	Sediment	10/27/2017	10/27/2017	11/15/2017	11/15/2017	PSEP 1986	GS_FCLAY	Phi Size >10	2.0		%
17J0549-01	WUFF-Sump	13-05605-000	Sediment	10/27/2017	10/27/2017	11/15/2017	11/15/2017	PSEP 1986	GS_TOTFINES	Total Fines	79.6		%
BFJ0843-BLK1	Blank	13-05605-000	Solid			10/31/2017	11/02/2017	EPA 6020A UCT-KED	7440-50-8	Copper	0.50	U	mg/kg wet
BFJ0843-BS1	LCS	13-05605-000	Solid			10/31/2017	11/02/2017	EPA 6020A UCT-KED	7440-50-8	Copper	26.1		mg/kg wet
17J0549-01	WUFF-Sump	13-05605-000	Sediment	10/27/2017	10/27/2017	10/31/2017	11/02/2017	EPA 6020A UCT-KED	7440-50-8	Copper	456		mg/kg dry
BFJ0843-BLK1	Blank	13-05605-000	Solid			10/31/2017	11/02/2017	EPA 6020A UCT-KED	7440-50-8	Copper	0.50	U	mg/kg wet
BFJ0843-BS1	LCS	13-05605-000	Solid			10/31/2017	11/02/2017	EPA 6020A UCT-KED	7440-50-8	Copper	26.6		mg/kg wet
BFJ0843-BLK2	Blank	13-05605-000	Solid			10/31/2017	11/09/2017	EPA 6020A UCT-KED	7440-66-6	Zinc	1.5	J	mg/kg wet
BFJ0843-BS2	LCS	13-05605-000	Solid			10/31/2017	11/09/2017	EPA 6020A UCT-KED	7440-66-6	Zinc	82.7		mg/kg wet
BFJ0843-BLK2	Blank	13-05605-000	Solid			10/31/2017	11/09/2017	EPA 6020A UCT-KED	7440-66-6	Zinc	1.3	J	mg/kg wet
BFJ0843-BS2	LCS	13-05605-000	Solid			10/31/2017	11/09/2017	EPA 6020A UCT-KED	7440-66-6	Zinc	78.8		mg/kg wet
17J0549-01	WUFF-Sump	13-05605-000	Sediment	10/27/2017	10/27/2017	10/31/2017	11/09/2017	EPA 6020A UCT-KED	7440-66-6	Zinc	1700	D	mg/kg dry
BFK0061-BLK1	Blank	13-05605-000	Solid			11/02/2017	11/02/2017	PSEP 1986		Volatile Solids	0.010	U	%
BFK0061-DUP1	WUFF-Sump	13-05605-000	Sediment	10/27/2017	10/27/2017	11/02/2017	11/02/2017	PSEP 1986		Volatile Solids	30.6		%
17J0549-01	WUFF-Sump	13-05605-000	Sediment	10/27/2017	10/27/2017	11/02/2017	11/02/2017	PSEP 1986		Volatile Solids	30.2		%
BFK0061-BLK1	Blank	13-05605-000	Solid			11/02/2017	11/02/2017	SM 2540 G-97		Total Solids	0.04	U	%
BFK0061-DUP1	WUFF-Sump	13-05605-000	Sediment	10/27/2017	10/27/2017	11/02/2017	11/02/2017	SM 2540 G-97		Total Solids	40.37		%
17J0549-01	WUFF-Sump	13-05605-000	Sediment	10/27/2017	10/27/2017	11/02/2017	11/02/2017	SM 2540 G-97		Total Solids	40.66		%
BFK0307-BLK1	Blank	13-05605-000	Solid			11/10/2017	11/17/2017	SM 4500-P E-99	7723-14-0	Total Phosphorus	1.33	U	mg-P/kg wet
BFK0307-BLK2	Blank	13-05605-000	Solid			11/10/2017	11/17/2017	SM 4500-P E-99	7723-14-0	Total Phosphorus	1.33	U	mg-P/kg wet
BFK0307-BLK3	Blank	13-05605-000	Solid			11/10/2017	11/17/2017	SM 4500-P E-99	7723-14-0	Total Phosphorus	1.33	U	mg-P/kg wet
BFK0307-BLK4	Blank	13-05605-000	Solid			11/10/2017	11/17/2017	SM 4500-P E-99	7723-14-0	Total Phosphorus	1.33	U	mg-P/kg wet
BFK0307-BS1	LCS	13-05605-000	Solid			11/10/2017	11/17/2017	SM 4500-P E-99	7723-14-0	Total Phosphorus	25.8		mg-P/kg wet
BFK0307-BS2	LCS	13-05605-000	Solid			11/10/2017	11/17/2017	SM 4500-P E-99	7723-14-0	Total Phosphorus	25.8		mg-P/kg wet
BFK0307-DUP1	WUFF-Sump	13-05605-000	Sediment	10/27/2017	10/27/2017	11/10/2017	11/17/2017	SM 4500-P E-99	7723-14-0	Total Phosphorus	2210	D	mg-P/kg dry
BFK0307-MS1	WUFF-Sump	13-05605-000	Sediment	10/27/2017	10/27/2017	11/10/2017	11/17/2017	SM 4500-P E-99	7723-14-0	Total Phosphorus	2530	D	mg-P/kg dry
17J0549-01	WUFF-Sump	13-05605-000	Sediment	10/27/2017	10/27/2017	11/10/2017	11/17/2017	SM 4500-P E-99	7723-14-0	Total Phosphorus	2010	D	mg-P/kg dry

Analytical Resources, Incorporated
Analytical Chemists and Consultants

30 November 2017

Dylan Ahearn
Herrera Environmental Consultants
2200 6th Avenue, Suite 1100
Seattle, WA 98121

RE: Hydro International

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

Associated Work Order(s)	Associated SDG ID(s)
17J0549	N/A

Amanda Volgardsen

Digitally signed by Amanda Volgardsen
DN: c=US, st=Washington, l=Tukwila, o=Analytical Resources, Inc., ou=Client Services, cn=Amanda Volgardsen, email=amandav@arilabs.com
Date: 2017.11.30 16:22:48 -08'00'

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclose Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the reqirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, Inc.

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in it entirety.

ACCREDITED IN ACCORDANCE WITH nelac
Cert# 100006

PJLA Testing
Accreditation # 66169

HERRERA
2200 Sixth Avenue | Suite 1100
Seattle, Washington | 98121
p 206 441 9080 | f 206 441 9108
PORTLAND, OR | MISSOULA, MT | OLYMPIA, WA
WINTHROP, WA | GUANGZHOU, CHINA

Chain of Custody Record

Project Name:	Project Number:	Client:
Hydro International Up-flo Filter	13-05605-000	Herrera Environmental
Report To:		Copy To:
Dylan Ahearn		
Sampled By: D. Ahearn		Delivery Method: cooler
Laboratory:	Requested Completion Date:	Total No. of Containers:
Analytical Resources Inc.		3

Sample ID	Date	Time	Sample Type (see codes)	Preserv-ative? (Y/N)	Matrix (see codes)	Number of Containers	Percent Total Solids – SM 2540 B	Grain size – PSEP 1986	TVS – SM 2540 E	Tot Phos – EPA 365.3	Tot Cu – EPA 6020	Tot Zn - EPA 6020					Lab ID No.
							Analyses Requested										
WUFF-Sump	10/27/17	9:00	G	N	SE	2	X	X	X	X	X	X					

Comments/Special Instructions:

Relinquished by (Name/CO/	Signature	Date/Time	Received By (Name/CO)	Signature	Date/Time
Meghan Muiler / Herrera	Meghan Muller	10.27.17 11:00	Stephanie Fiene		10/27/17 1100
Relinquished by (Name/CO/	Signature	Date/Time	Received By (Name/CO)	Signature	Date/Time

Sample Type: G=Grab C=Composite

Matrix Codes: A=Air GW=Groundwater SE=Sediment SO=Soil SW=Surface Water W=Water (blanks) M=Material O=Other (specify)

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Herrera

Project Name: Hydro Intercontinental Vpflo Filter

COC No(s): _____ NA

Delivered by: Fed-Ex UPS Courier (Hand Delivered) Other: _____

Assigned ARI Job No: 17J0549

Tracking No: _____ NA

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler?	YES	(NO)
Were custody papers included with the cooler?	(YES)	NO
Were custody papers properly filled out (ink, signed, etc.)	(YES)	NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry) 12.2

Time: 1100

If cooler temperature is out of compliance fill out form 00070F

Temp Gun ID#: D00565

Cooler Accepted by: SF Date: 10/27/17 Time: 1100

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler?		YES	(NO)
What kind of packing material was used? ... Bubble Wrap (Wet Ice) Gel Packs Baggies Foam Block Paper Other: _____			
Was sufficient ice used (if appropriate)?	NA	YES	(NO)
Were all bottles sealed in individual plastic bags?		YES	(NO)
Did all bottles arrive in good condition (unbroken)?		(YES)	NO
Were all bottle labels complete and legible?		(YES)	NO
Did the number of containers listed on COC match with the number of containers received?		(YES)	NO
Did all bottle labels and tags agree with custody papers?		(YES)	NO
Were all bottles used correct for the requested analyses?		(YES)	NO
Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)...	NA	YES	(NO)
Were all VOC vials free of air bubbles?	(NA)	YES	NO
Was sufficient amount of sample sent in each bottle?		(YES)	NO
Date VOC Trip Blank was made at ARI	(NA)	_____	

Was Sample Split by ARI : (NA) YES Date/Time: _____ Equipment: _____ Split by: _____

Samples Logged by: SF Date: 10/30/17 Time: 1252

*** Notify Project Manager of discrepancies or concerns ***

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

By: Date:

Small → "sm" (< 2 mm)

Peabubbles → "pb" (2 to < 4 mm)

Large → "lg" (4 to < 6 mm)

Headspace → "hs" (> 6 mm)

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Temperature Compliance Form

Cooler#:	Temperature(°C): 12.2	
Sample ID	Bottle Count	Bottle Type
Samples received about 6°		

Cooler#:	Temperature(°C):	
Sample ID	Bottle Count	Bottle Type

Cooler#:	Temperature(°C):	
Sample ID	Bottle Count	Bottle Type

Cooler#:	Temperature(°C):	
Sample ID	Bottle Count	Bottle Type

Completed by: SF Date: 10/27/17 Time: 1100

Materials Testing & Consulting, Inc.

Geotechnical Engineering • Special Inspection • Materials Testing • Environmental Consulting

Project:	Hydro International (17J0549)	**Date Received:**	November 1, 2017
Project #:	16T001-035	**Sampled By:**	Others
Client :	Analytical Resources, Inc.	**Date Reported:**	November 29, 2017
Source:	WUFF-Sump	**Tested By:**	B. Goble
MTC Sample#:	T17-1587		

CASE NARRATIVE

1. One sample was submitted for grain size analysis according to Puget Sound Estuary Protocol (PSEP) methodology.
2. The sample was run in a single batch and one sample from another job was chosen for triplicate analysis. The triplicate data is reported on the QA summary.
3. The data is provided in summary tables and plots.
4. There were no other noted anomalies in this project.

Reviewed by: E Gabriel Goble

Materials Testing & Consulting, Inc.

Geotechnical Engineering • Special Inspection • Materials Testing • Environmental Consulting

Project: Hydro International (17J0549)
Project #: 16T001-035
Date Received: November 1, 2017
Date Tested: November 15, 2017

Client: Analytical Resources, Inc.
Sampled by: Others
Tested by: B. Goble

Apparent Grain Size Distribution Summary

Percent Finer Than Indicated Size

Sample No.	Gravel			Very Coarse Sand	Coarse Sand	Medium Sand	Fine Sand	Very Fine Sand	Silt				Clay	
Phi Size	-3	-2	-1	0	1	2	3	4	5	6	7	8	9	10
Sieve Size (microns)	3/8"	#4 (4750)	#10 (2000)	#18 (1000)	#35 (500)	#60 (250)	#120 (125)	#230 (63)	31.0	15.6	7.8	3.9	2.0	1.0
T17-1596	100.0	100.0	100.0	99.1	97.5	93.0	68.1	40.4	24.4	14.8	9.2	5.4	3.5	1.8
	100.0	99.6	99.1	98.3	96.8	92.3	67.3	39.9	23.9	14.4	9.0	5.0	3.2	1.7
	100.0	100.0	99.9	99.1	97.4	92.6	66.9	38.8	23.9	14.2	9.5	5.4	3.4	1.8
WUFF-SUMP	100.0	99.9	99.8	97.6	93.7	89.8	84.2	79.6	61.1	27.6	12.5	5.4	3.4	2.0

Reviewed by: E Gabriel Goble

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Regional Offices: Olympia ~ 360.534.9777 Bellingham ~ 360.647.6111 Silverdale ~ 360.698.6787 Tukwila ~ 206.241.1974
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Materials Testing & Consulting, Inc.

Geotechnical Engineering • Special Inspection • Materials Testing • Environmental Consulting

Project: Hydro International (17J0549)
Project #: 16T001-035
Date Received: November 1, 2017
Date Tested: November 15, 2017

Client: Analytical Resources, Inc.
Sampled by: Others
Tested by: B. Goble

Apparent Grain Size Distribution Summary

Percent Retained in Each Size Fraction

Sample No.	Gravel	Very Coarse Sand	Coarse Sand	Medium Sand	Fine Sand	Very Fine Sand	Coarse Silt	Medium Silt	Fine Silt	Very Fine Silt	Clay			Total Fines
Phi Size	< -1	-1 to 0	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	> 10	> 4
Sieve Size (microns)	> #10 (2000)	10-18 (2000-1000)	18-35 (1000-500)	35-60 (500-250)	60-120 (250-125)	120-230 (125-62)	62.5-31.0	31.0-15.6	15.6-7.8	7.8-3.9	3.9-2.0	2.0-1.0	<1.0	<230 (<62)
T17-1596	0.0	0.8	1.6	4.6	24.8	27.8	16.0	9.6	5.5	3.9	1.9	1.6	1.8	40.4
	0.9	0.8	1.5	4.5	24.9	27.5	15.9	9.5	5.4	4.0	1.8	1.6	1.7	39.9
	0.1	0.8	1.7	4.9	25.7	28.0	15.0	9.7	4.8	4.1	2.0	1.5	1.8	38.8
WUFF-SUMP	0.2	2.2	3.8	3.9	5.7	4.6	18.5	33.5	15.1	7.1	1.9	1.4	2.0	79.6

Reviewed by: E Gabriel Goble

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Materials Testing & Consulting, Inc.

Geotechnical Engineering • Special Inspection • Materials Testing • Environmental Consulting

Project: Hydro International (17J0549)
Project #: 16T001-035
Date Received: November 1, 2017
Date Tested: November 15, 2017

Client: Analytical Resources, Inc.
Sampled by: Others
Tested by: B. Goble

Relative Standard Deviation, By Phi Size

Sample ID	-3	-2	-1	0	1	2	3	4	5	6	7	8	9	10
T17-1596	100.0	100.0	100.0	99.1	97.5	93.0	68.1	40.4	24.4	14.8	9.2	5.4	3.5	1.8
	100.0	99.6	99.1	98.3	96.8	92.3	67.3	39.9	23.9	14.4	9.0	5.0	3.2	1.7
	100.0	100.0	99.9	99.1	97.4	92.6	66.9	38.8	23.9	14.2	9.5	5.4	3.4	1.8
AVE	100.0	99.9	99.6	98.8	97.2	92.6	67.4	39.7	24.1	14.5	9.2	5.3	3.3	1.8
STDEV	0.0	0.2	0.4	0.4	0.3	0.3	0.5	0.6	0.2	0.2	0.2	0.2	0.1	0.1
%RSD	0.0	0.2	0.4	0.4	0.3	0.3	0.8	1.6	1.0	1.5	2.1	3.3	2.9	4.9

The Triplicate Applies To The Following Samples

Client ID	Date Sampled	Date Extracted	Date Complete	QA Ratio (95-105)	Data Qualifiers	Pipette Portion (5.0-25.0g)
T17-1596	10/24/2017	11/8/2017	11/15/2017	100.0		17.3
	10/24/2017	11/8/2017	11/15/2017	101.1		17.1
	10/24/2017	11/8/2017	11/15/2017	100.7		16.5
WUFF-SUMP	10/22/2017	11/8/2017	11/15/2017	97.4		10.6

Reviewed by: E Gabriel Goble

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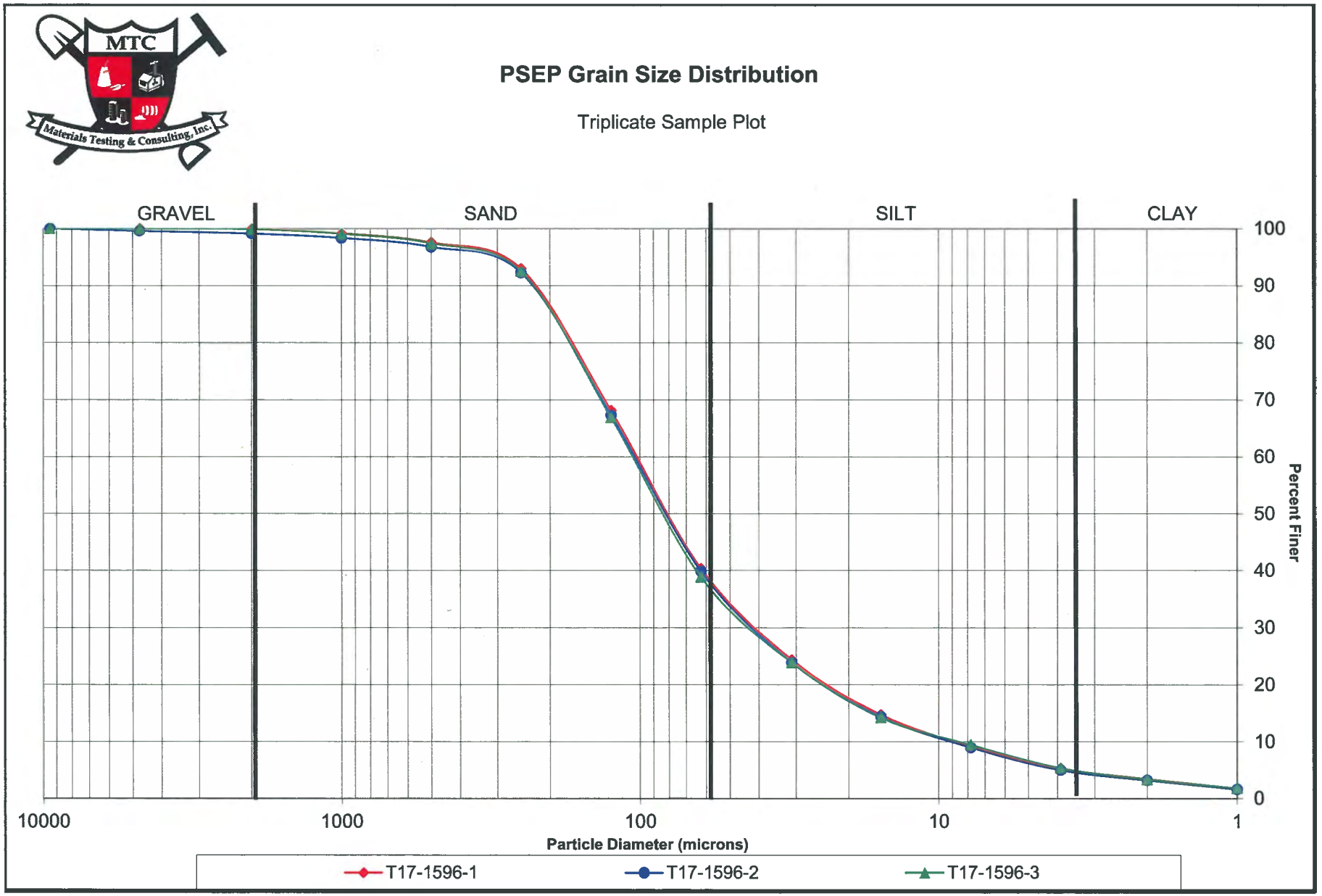
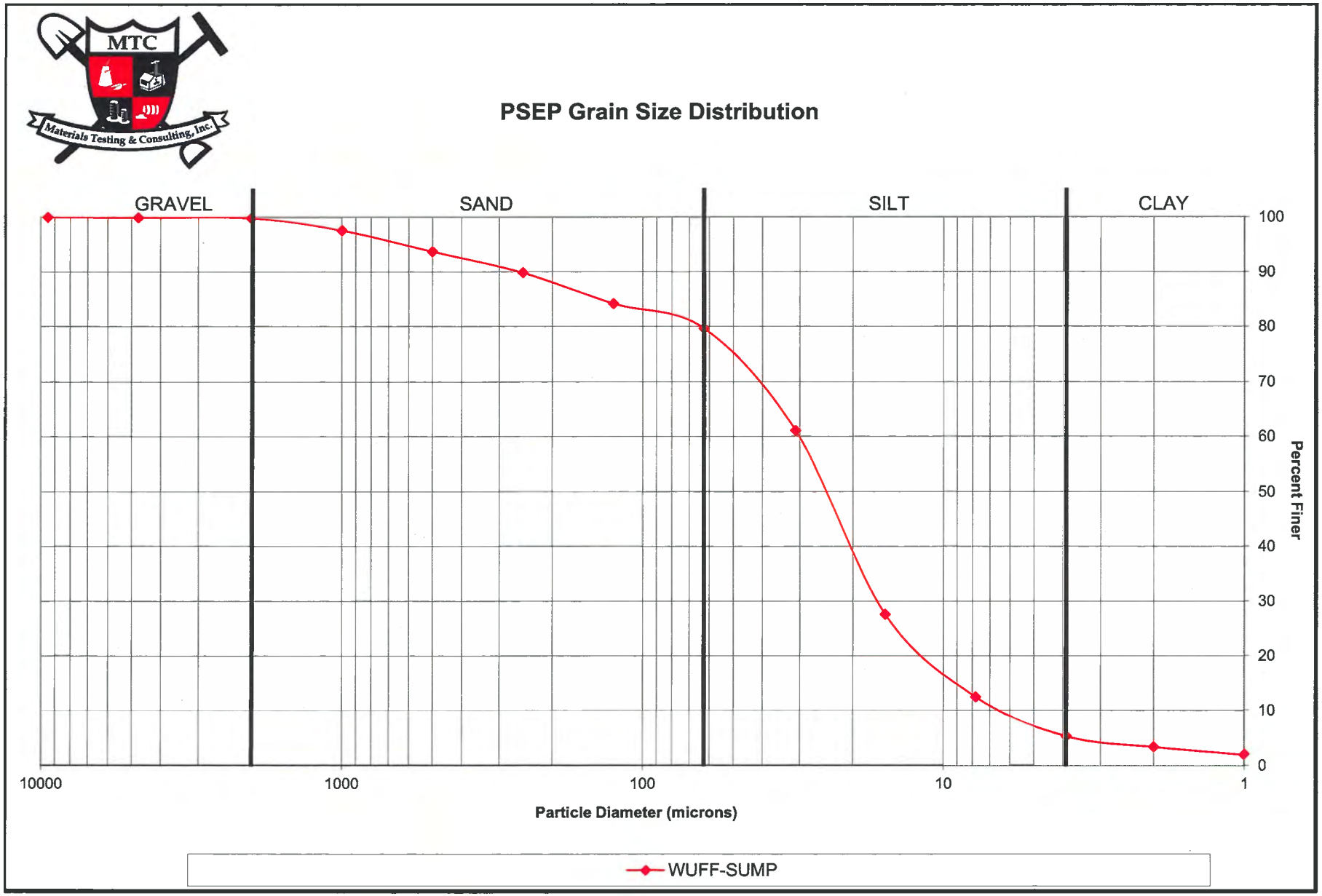

MTC
Materials Testing & Consulting, Inc.
PSEP Grain Size Distribution
Triplicate Sample Plot
GRAVEL
SAND
SILT
CLAY
100
90
80
70
60
50
40
30
20
10
0
Percent Finer
10000
1000
100
10
1
Particle Diameter (microns)
T17-1596-1
T17-1596-2
T17-1596-3


MTC
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GRAVEL
SAND
SILT
CLAY
100
90
80
70
60
50
40
30
20
10
0
Percent Finer
10000
1000
100
10
1
Particle Diameter (microns)
WUFF-SUMP

Herrera Environmental Consultants	Project: Hydro International	
2200 6th Avenue, Suite 1100	Project Number: 13-05605-000	**Reported:**
Seattle WA, 98121	Project Manager: Dylan Ahearn	30-Nov-2017 16:18

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
WUFF-Sump	17J0549-01	Solid	27-Oct-2017 09:00	27-Oct-2017 11:00

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Herrera Environmental Consultants	Project: Hydro International	
2200 6th Avenue, Suite 1100	Project Number: 13-05605-000	**Reported:**
Seattle WA, 98121	Project Manager: Dylan Ahearn	30-Nov-2017 16:18

Case Narrative

Sample receipt

One sample as listed on the preceding page was received October 27, 2017 under ARI workorder 17J0549. For details regarding sample receipt, please refer to the Cooler Receipt Form. The grainsize analysis was subcontracted to MTC Labs.

Total Metals - EPA Method 200.8

The sample was digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The method blank has Zinc detected below the reporting limit, but above the method detection limit. The Zinc has been flagged with a "J" qualifier on the method blank. No further corrective action was taken.

The LCS percent recoveries were within control limits.

Total Phosphorus and %TS - Method SM4500

The sample was prepared and analyzed within the recommended holding times.

The method blank was clean at the reporting limits.

The LCS percent recoveries were within control limits.

The matrix spike percent recovery and duplicate RPD were within QC limits.

Herrera Environmental Consultants	Project: Hydro International	
2200 6th Avenue, Suite 1100	Project Number: 13-05605-000	**Reported:**
Seattle WA, 98121	Project Manager: Dylan Ahearn	30-Nov-2017 16:18

WUFF-Sump

17J0549-01 (Solid)

Metals and Metallic Compounds

Method: EPA 6020A UCT-KED — Sampled: 10/27/2017 09:00
Instrument: ICPMS1 — Analyzed: 02-Nov-2017 14:44

Sample Preparation: Preparation Method: SWN EPA 3050B
Preparation Batch: BFJ0843 — Sample Size: 1.003 g (wet) — Dry Weight:0.41 g
Prepared: 31-Oct-2017 — Final Volume: 50 mL — % Solids: 40.66

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Copper	7440-50-8	20	0.09	1.23	**456**	mg/kg	

Instrument: ICPMS2 — Analyzed: 09-Nov-2017 04:50

Sample Preparation: Preparation Method: SWN EPA 3050B
Preparation Batch: BFJ0843 — Sample Size: 1.003 g (wet) — Dry Weight:0.41 g
Prepared: 31-Oct-2017 — Final Volume: 50 mL — % Solids: 40.66

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Zinc	7440-66-6	100	2.8	49.0	**1700**	mg/kg	D

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Herrera Environmental Consultants	Project: Hydro International	
2200 6th Avenue, Suite 1100	Project Number: 13-05605-000	**Reported:**
Seattle WA, 98121	Project Manager: Dylan Ahearn	30-Nov-2017 16:18

WUFF-Sump

17J0549-01 (Solid)

Wet Chemistry

Method: PSEP 1986
Instrument: N/A

Sampled: 10/27/2017 09:00
Analyzed: 02-Nov-2017 14:38

Sample Preparation:	Preparation Method: No Prep Wet Chem		
	Preparation Batch: BFK0061	Sample Size: 10 g (wet)	Dry Weight:4.07 g
	Prepared: 02-Nov-2017	Final Volume: 10 g	% Solids: 40.66

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Volatile Solids		1	0.010	**30.2**	%	

Herrera Environmental Consultants	Project: Hydro International	
2200 6th Avenue, Suite 1100	Project Number: 13-05605-000	**Reported:**
Seattle WA, 98121	Project Manager: Dylan Ahearn	30-Nov-2017 16:18

WUFF-Sump

17J0549-01 (Solid)

Wet Chemistry

Method: SM 2540 G-97
Instrument: N/A

Sampled: 10/27/2017 09:00
Analyzed: 02-Nov-2017 14:38

Sample Preparation: Preparation Method: No Prep Wet Chem
Preparation Batch: BFK0061
Prepared: 02-Nov-2017
Sample Size: 10 g (wet)
Final Volume: 10 g
Dry Weight:4.07 g
% Solids: 40.66

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Total Solids		1	0.04	**40.66**	%	

Herrera Environmental Consultants	Project: Hydro International	
2200 6th Avenue, Suite 1100	Project Number: 13-05605-000	**Reported:**
Seattle WA, 98121	Project Manager: Dylan Ahearn	30-Nov-2017 16:18

WUFF-Sump

17J0549-01 (Solid)

Wet Chemistry

Method: SM 4500-P E-99
Instrument: UV1800-2

Sampled: 10/27/2017 09:00
Analyzed: 17-Nov-2017 17:31

Sample Preparation: Preparation Method: SM 4500-P B-4 Strong Acid
Preparation Batch: BFK0307 | Sample Size: 0.328 g (wet) | Dry Weight:0.13 g
Prepared: 10-Nov-2017 | Final Volume: 50 mL | % Solids: 40.66

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Total Phosphorus	7723-14-0	20	60.0	**2010**	mg-P/kg	D

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Herrera Environmental Consultants	Project: Hydro International	
2200 6th Avenue, Suite 1100	Project Number: 13-05605-000	**Reported:**
Seattle WA, 98121	Project Manager: Dylan Ahearn	30-Nov-2017 16:18

Analysis by: Materials Testing & Consulting, Inc. (Tukwila)

WUFF-Sump

17J0549-01 (Solid)

Geochemical Methods

Method: PSEP 1986
Instrument: MT&C

Sampled: 10/27/2017 09:00
Analyzed: 15-Nov-2017 00:00

Sample Preparation: Preparation Method: No Prep Geo
Preparation Batch: B111517
Prepared: 15-Nov-2017 Final Volume:

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Phi Size <-1	GS_GRAVEL	1	0.1	**0.2**	%	
Phi Size -1 to 0	GS_VCS	1	0.1	**2.2**	%	
Phi Size 0 to 1	GS_CS	1	0.1	**3.8**	%	
Phi Size 1 to 2	GS_MS	1	0.1	**3.9**	%	
Phi Size 2 to 3	GS_FS	1	0.1	**5.7**	%	
Phi Size 3 to 4	GS_VFS	1	0.1	**4.6**	%	
Phi Size 4 to 5	GS_CSILT	1	0.1	**18.5**	%	
Phi Size 5 to 6	GS_MSILT	1	0.1	**33.5**	%	
Phi Size 6 to 7	GS_FSILT	1	0.1	**15.1**	%	
Phi Size 7 to 8	GS_VFSILT	1	0.1	**7.1**	%	
Phi Size 8 to 9	GS_CCLAY	1	0.1	**1.9**	%	
Phi Size 9 to 10	GS_MCLAY	1	0.1	**1.4**	%	
Phi Size >10	GS_FCLAY	1	0.1	**2.0**	%	
Total Fines	GS_TOTFINES	1	0.1	**79.6**	%	

Herrera Environmental Consultants	Project: Hydro International	
2200 6th Avenue, Suite 1100	Project Number: 13-05605-000	**Reported:**
Seattle WA, 98121	Project Manager: Dylan Ahearn	30-Nov-2017 16:18

Metals and Metallic Compounds - Quality Control

Batch BFJ0843 - SWN EPA 3050B

Instrument: ICPMS1 Analyst: TCH

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BFJ0843-BLK1)					Prepared: 31-Oct-2017 Analyzed: 02-Nov-2017 14:31							
Copper	63	ND	0.04	0.50	mg/kg							U
Copper	65	ND	0.03	0.50	mg/kg							U
LCS (BFJ0843-BS1)					Prepared: 31-Oct-2017 Analyzed: 02-Nov-2017 15:04							
Copper	63	26.1	0.04	0.50	mg/kg	25.0		104	80-120			
Copper	65	26.6	0.03	0.50	mg/kg	25.0		106	80-120			

Instrument: ICPMS2 Analyst: CC

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BFJ0843-BLK2)					Prepared: 31-Oct-2017 Analyzed: 09-Nov-2017 00:42							
Zinc	66	1.5	0.3	4.0	mg/kg							J
Zinc	67	1.3	0.2	4.0	mg/kg							J
LCS (BFJ0843-BS2)					Prepared: 31-Oct-2017 Analyzed: 09-Nov-2017 01:32							
Zinc	66	82.7	0.3	4.0	mg/kg	80.0		103	80-120			
Zinc	67	78.8	0.2	4.0	mg/kg	80.0		98.6	80-120			

Herrera Environmental Consultants	Project: Hydro International	
2200 6th Avenue, Suite 1100	Project Number: 13-05605-000	**Reported:**
Seattle WA, 98121	Project Manager: Dylan Ahearn	30-Nov-2017 16:18

Wet Chemistry - Quality Control

Batch BFK0061 - No Prep Wet Chem

Instrument: N/A

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BFK0061-BLK1)				Prepared: 02-Nov-2017 Analyzed: 02-Nov-2017 14:38						
Volatile Solids	ND	0.010	%							U
Total Solids	ND	0.04	%							U
Duplicate (BFK0061-DUP1)	**Source: 17J0549-01**			Prepared: 02-Nov-2017 Analyzed: 02-Nov-2017 14:38						
Volatile Solids	30.6	0.010	%		30.2			1.20	20	
Total Solids	40.37	0.04	%		40.66			0.73	20	

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Herrera Environmental Consultants	Project: Hydro International	
2200 6th Avenue, Suite 1100	Project Number: 13-05605-000	**Reported:**
Seattle WA, 98121	Project Manager: Dylan Ahearn	30-Nov-2017 16:18

Wet Chemistry - Quality Control

Batch BFK0307 - SM 4500-P B-4 Strong Acid

Instrument: UV1800-2 Analyst: CDE

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BFK0307-BLK1)			Prepared: 10-Nov-2017 Analyzed: 17-Nov-2017 17:28							
Total Phosphorus	ND	1.33	mg-P/kg							U
Blank (BFK0307-BLK2)			Prepared: 10-Nov-2017 Analyzed: 17-Nov-2017 17:30							
Total Phosphorus	ND	1.33	mg-P/kg							U
Blank (BFK0307-BLK3)			Prepared: 10-Nov-2017 Analyzed: 17-Nov-2017 17:34							
Total Phosphorus	ND	1.33	mg-P/kg							U
Blank (BFK0307-BLK4)			Prepared: 10-Nov-2017 Analyzed: 17-Nov-2017 17:35							
Total Phosphorus	ND	1.33	mg-P/kg							U
LCS (BFK0307-BS1)			Prepared: 10-Nov-2017 Analyzed: 17-Nov-2017 17:30							
Total Phosphorus	25.8	1.33	mg-P/kg	25.0		103	90-110			
DL (BFK0307-BS2)			Prepared: 10-Nov-2017 Analyzed: 17-Nov-2017 17:38							
Total Phosphorus	25.8	1.33	mg-P/kg	25.0		103	90-110			
Duplicate (BFK0307-DUP1)	**Source: 17J0549-01**		Prepared: 10-Nov-2017 Analyzed: 17-Nov-2017 17:32							
Total Phosphorus	2210	63.9	mg-P/kg		2010			9.59	20	D
Matrix Spike (BFK0307-MS1)	**Source: 17J0549-01**		Prepared: 10-Nov-2017 Analyzed: 17-Nov-2017 17:32							
Total Phosphorus	2530	62.2	mg-P/kg	389	2010	134	75-125			D

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Herrera Environmental Consultants	Project: Hydro International	
2200 6th Avenue, Suite 1100	Project Number: 13-05605-000	**Reported:**
Seattle WA, 98121	Project Manager: Dylan Ahearn	30-Nov-2017 16:18

Certified Analyses included in this Report

Analyte	Certifications
EPA 6020A UCT-KED in Solid	
Copper-63	NELAP,DoD-ELAP,WADOE
Copper-65	NELAP,DoD-ELAP,WADOE
Zinc-66	NELAP,DoD-ELAP,WADOE
Zinc-67	NELAP,DoD-ELAP,WADOE
SM 4500-P E-99 in Solid	
Total Phosphorus	WADOE,NELAP

Code	Description	Number	Expires
ADEC	Alaska Dept of Environmental Conservation	UST-033	05/11/2018
CALAP	California Department of Public Health CAELAP	2748	02/28/2018
DoD-ELAP	DoD-Environmental Laboratory Accreditation Program	66169	02/07/2019
NELAP	ORELAP - Oregon Laboratory Accreditation Program	WA100006	05/11/2018
WADOE	WA Dept of Ecology	C558	06/30/2018
WA-DW	Ecology - Drinking Water	C558	06/30/2018

Herrera Environmental Consultants	Project: Hydro International	
2200 6th Avenue, Suite 1100	Project Number: 13-05605-000	**Reported:**
Seattle WA, 98121	Project Manager: Dylan Ahearn	30-Nov-2017 16:18

Notes and Definitions

U	This analyte is not detected above the applicable reporting or detection limit.
J	Estimated concentration value detected below the reporting limit.
D	The reported value is from a dilution
B	This analyte was detected in the method blank.
*	Flagged value is not within established control limits.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
[2C]	Indicates this result was quantified on the second column on a dual column analysis.

October 27, 2017 – Sediment Sample

Data_17J0549

ARI ID	Client ID	Proj ID	Matrix	Sampled	Rec	Prep	Analyzed	Method	CAS	Compound	Value	Q	Units
17J0549-01	WUFF-Sump	13-05605-000	Sediment	10/27/2017	10/27/2017	11/15/2017	11/15/2017	PSEP 1986	GS_GRAVEL	Phi Size <-1	0.2		%
17J0549-01	WUFF-Sump	13-05605-000	Sediment	10/27/2017	10/27/2017	11/15/2017	11/15/2017	PSEP 1986	GS_VCS	Phi Size -1 to 0	2.2		%
17J0549-01	WUFF-Sump	13-05605-000	Sediment	10/27/2017	10/27/2017	11/15/2017	11/15/2017	PSEP 1986	GS_CS	Phi Size 0 to 1	3.8		%
17J0549-01	WUFF-Sump	13-05605-000	Sediment	10/27/2017	10/27/2017	11/15/2017	11/15/2017	PSEP 1986	GS_MS	Phi Size 1 to 2	3.9		%
17J0549-01	WUFF-Sump	13-05605-000	Sediment	10/27/2017	10/27/2017	11/15/2017	11/15/2017	PSEP 1986	GS_FS	Phi Size 2 to 3	5.7		%
17J0549-01	WUFF-Sump	13-05605-000	Sediment	10/27/2017	10/27/2017	11/15/2017	11/15/2017	PSEP 1986	GS_VFS	Phi Size 3 to 4	4.6		%
17J0549-01	WUFF-Sump	13-05605-000	Sediment	10/27/2017	10/27/2017	11/15/2017	11/15/2017	PSEP 1986	GS_CSILT	Phi Size 4 to 5	18.5		%
17J0549-01	WUFF-Sump	13-05605-000	Sediment	10/27/2017	10/27/2017	11/15/2017	11/15/2017	PSEP 1986	GS_MSILT	Phi Size 5 to 6	33.5		%
17J0549-01	WUFF-Sump	13-05605-000	Sediment	10/27/2017	10/27/2017	11/15/2017	11/15/2017	PSEP 1986	GS_FSILT	Phi Size 6 to 7	15.1		%
17J0549-01	WUFF-Sump	13-05605-000	Sediment	10/27/2017	10/27/2017	11/15/2017	11/15/2017	PSEP 1986	GS_VFSILT	Phi Size 7 to 8	7.1		%
17J0549-01	WUFF-Sump	13-05605-000	Sediment	10/27/2017	10/27/2017	11/15/2017	11/15/2017	PSEP 1986	GS_CCLAY	Phi Size 8 to 9	1.9		%
17J0549-01	WUFF-Sump	13-05605-000	Sediment	10/27/2017	10/27/2017	11/15/2017	11/15/2017	PSEP 1986	GS_MCLAY	Phi Size 9 to 10	1.4		%
17J0549-01	WUFF-Sump	13-05605-000	Sediment	10/27/2017	10/27/2017	11/15/2017	11/15/2017	PSEP 1986	GS_FCLAY	Phi Size >10	2.0		%
17J0549-01	WUFF-Sump	13-05605-000	Sediment	10/27/2017	10/27/2017	11/15/2017	11/15/2017	PSEP 1986	GS_TOTFINES	Total Fines	79.6		%
BFJ0843-BLK1	Blank	13-05605-000	Solid			10/31/2017	11/02/2017	EPA 6020A UCT-KED	7440-50-8	Copper	0.50	U	mg/kg wet
BFJ0843-BS1	LCS	13-05605-000	Solid			10/31/2017	11/02/2017	EPA 6020A UCT-KED	7440-50-8	Copper	26.1		mg/kg wet
17J0549-01	WUFF-Sump	13-05605-000	Sediment	10/27/2017	10/27/2017	10/31/2017	11/02/2017	EPA 6020A UCT-KED	7440-50-8	Copper	456		mg/kg dry
BFJ0843-BLK1	Blank	13-05605-000	Solid			10/31/2017	11/02/2017	EPA 6020A UCT-KED	7440-50-8	Copper	0.50	U	mg/kg wet
BFJ0843-BS1	LCS	13-05605-000	Solid			10/31/2017	11/02/2017	EPA 6020A UCT-KED	7440-50-8	Copper	26.6		mg/kg wet
BFJ0843-BLK2	Blank	13-05605-000	Solid			10/31/2017	11/09/2017	EPA 6020A UCT-KED	7440-66-6	Zinc	1.5	J	mg/kg wet
BFJ0843-BS2	LCS	13-05605-000	Solid			10/31/2017	11/09/2017	EPA 6020A UCT-KED	7440-66-6	Zinc	82.7		mg/kg wet
BFJ0843-BLK2	Blank	13-05605-000	Solid			10/31/2017	11/09/2017	EPA 6020A UCT-KED	7440-66-6	Zinc	1.3	J	mg/kg wet
BFJ0843-BS2	LCS	13-05605-000	Solid			10/31/2017	11/09/2017	EPA 6020A UCT-KED	7440-66-6	Zinc	78.8		mg/kg wet
17J0549-01	WUFF-Sump	13-05605-000	Sediment	10/27/2017	10/27/2017	10/31/2017	11/09/2017	EPA 6020A UCT-KED	7440-66-6	Zinc	1700	D	mg/kg dry
BFK0061-BLK1	Blank	13-05605-000	Solid			11/02/2017	11/02/2017	PSEP 1986		Volatile Solids	0.010	U	%
BFK0061-DUP1	WUFF-Sump	13-05605-000	Sediment	10/27/2017	10/27/2017	11/02/2017	11/02/2017	PSEP 1986		Volatile Solids	30.6		%
17J0549-01	WUFF-Sump	13-05605-000	Sediment	10/27/2017	10/27/2017	11/02/2017	11/02/2017	PSEP 1986		Volatile Solids	30.2		%
BFK0061-BLK1	Blank	13-05605-000	Solid			11/02/2017	11/02/2017	SM 2540 G-97		Total Solids	0.04	U	%
BFK0061-DUP1	WUFF-Sump	13-05605-000	Sediment	10/27/2017	10/27/2017	11/02/2017	11/02/2017	SM 2540 G-97		Total Solids	40.37		%
17J0549-01	WUFF-Sump	13-05605-000	Sediment	10/27/2017	10/27/2017	11/02/2017	11/02/2017	SM 2540 G-97		Total Solids	40.66		%
BFK0307-BLK1	Blank	13-05605-000	Solid			11/10/2017	11/17/2017	SM 4500-P E-99	7723-14-0	Total Phosphorus	1.33	U	mg-P/kg wet
BFK0307-BLK2	Blank	13-05605-000	Solid			11/10/2017	11/17/2017	SM 4500-P E-99	7723-14-0	Total Phosphorus	1.33	U	mg-P/kg wet
BFK0307-BLK3	Blank	13-05605-000	Solid			11/10/2017	11/17/2017	SM 4500-P E-99	7723-14-0	Total Phosphorus	1.33	U	mg-P/kg wet
BFK0307-BLK4	Blank	13-05605-000	Solid			11/10/2017	11/17/2017	SM 4500-P E-99	7723-14-0	Total Phosphorus	1.33	U	mg-P/kg wet
BFK0307-BS1	LCS	13-05605-000	Solid			11/10/2017	11/17/2017	SM 4500-P E-99	7723-14-0	Total Phosphorus	25.8		mg-P/kg wet
BFK0307-BS2	LCS	13-05605-000	Solid			11/10/2017	11/17/2017	SM 4500-P E-99	7723-14-0	Total Phosphorus	25.8		mg-P/kg wet
BFK0307-DUP1	WUFF-Sump	13-05605-000	Sediment	10/27/2017	10/27/2017	11/10/2017	11/17/2017	SM 4500-P E-99	7723-14-0	Total Phosphorus	2210	D	mg-P/kg dry
BFK0307-MS1	WUFF-Sump	13-05605-000	Sediment	10/27/2017	10/27/2017	11/10/2017	11/17/2017	SM 4500-P E-99	7723-14-0	Total Phosphorus	2530	D	mg-P/kg dry
17J0549-01	WUFF-Sump	13-05605-000	Sediment	10/27/2017	10/27/2017	11/10/2017	11/17/2017	SM 4500-P E-99	7723-14-0	Total Phosphorus	2010	D	mg-P/kg dry

Analytical Resources, Incorporated
Analytical Chemists and Consultants

30 November 2017

Dylan Ahearn
Herrera Environmental Consultants
2200 6th Avenue, Suite 1100
Seattle, WA 98121

RE: Hydro International

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

Associated Work Order(s)	Associated SDG ID(s)
17J0549	N/A

Amanda Volgardsen

Digitally signed by Amanda Volgardsen
DN: c=US, st=Washington, l=Tukwila, o=Analytical Resources, Inc., ou=Client Services, cn=Amanda Volgardsen, email=amandav@arilabs.com
Date: 2017.11.30 16:22:48 -08'00'

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclose Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the reqirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, Inc.

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

ACCREDITED IN ACCORDANCE WITH nelac
Cert# 100006

PJLA Testing
Accreditation # 66169

HERRERA
2200 Sixth Avenue | Suite 1100
Seattle, Washington | 98121
p 206 441 9080 | f 206 441 9108
PORTLAND, OR | MISSOULA, MT | OLYMPIA, WA
WINTHROP, WA | GUANGZHOU, CHINA

Chain of Custody Record

Project Name:	Project Number:	Client:
Hydro International Up-flo Filter	13-05605-000	Herrera Environmental
Report To:		Copy To:
Dylan Ahearn		
Sampled By: D. Ahearn		Delivery Method: cooler
Laboratory:	Requested Completion Date:	Total No. of Containers:
Analytical Resources Inc.		3

Sample ID	Date	Time	Sample Type (see codes)	Preserv-ative? (Y/N)	Matrix (see codes)	Number of Containers	Percent Total Solids – SM 2540 B	Grain size – PSEP 1986	TVS – SM 2540 E	Tot Phos – EPA 365.3	Tot Cu – EPA 6020	Tot Zn - EPA 6020					Lab ID No.
							Analyses Requested										
WUFF-Sump	10/27/17	9:00	G	N	SE	2	X	X	X	X	X	X					

Comments/Special Instructions:

Relinquished by (Name/CO/	Signature	Date/Time	Received By (Name/CO)	Signature	Date/Time
Meghan Muiler / Herrera	Meghan Muller	10.27.17 11:00	Stephanie Fiene		10/27/17 1100
Relinquished by (Name/CO/	Signature	Date/Time	Received By (Name/CO)	Signature	Date/Time

Sample Type: G=Grab C=Composite

Matrix Codes: A=Air GW=Groundwater SE=Sediment SO=Soil SW=Surface Water W=Water (blanks) M=Material O=Other (specify)

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Herrera

Project Name: Hydro Intercontinental Vpflo Filter

COC No(s): _____ NA

Delivered by: Fed-Ex UPS Courier (Hand Delivered) Other: _____

Assigned ARI Job No: 17J0549

Tracking No: _____ NA

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler?	YES	(NO)
Were custody papers included with the cooler?	(YES)	NO
Were custody papers properly filled out (ink, signed, etc.)	(YES)	NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry) 12.2

Time: 1100

If cooler temperature is out of compliance fill out form 00070F

Temp Gun ID#: D00565

Cooler Accepted by: SF Date: 10/27/17 Time: 1100

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler?		YES	(NO)
What kind of packing material was used? ... Bubble Wrap (Wet Ice) Gel Packs Baggies Foam Block Paper Other: _____			
Was sufficient ice used (if appropriate)?	NA	YES	(NO)
Were all bottles sealed in individual plastic bags?		YES	(NO)
Did all bottles arrive in good condition (unbroken)?		(YES)	NO
Were all bottle labels complete and legible?		(YES)	NO
Did the number of containers listed on COC match with the number of containers received?		(YES)	NO
Did all bottle labels and tags agree with custody papers?		(YES)	NO
Were all bottles used correct for the requested analyses?		(YES)	NO
Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)...	NA	YES	(NO)
Were all VOC vials free of air bubbles?	(NA)	YES	NO
Was sufficient amount of sample sent in each bottle?		(YES)	NO
Date VOC Trip Blank was made at ARI	(NA)	_____	

Was Sample Split by ARI : (NA) YES Date/Time: _____ Equipment: _____ Split by: _____

Samples Logged by: SF Date: 10/30/17 Time: 1252

*** Notify Project Manager of discrepancies or concerns ***

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

By: Date:

Small → "sm" (< 2 mm)

Peabubbles → "pb" (2 to < 4 mm)

Large → "lg" (4 to < 6 mm)

Headspace → "hs" (> 6 mm)

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Temperature Compliance Form

Cooler#:	Temperature(°C): 12.2	
Sample ID	Bottle Count	Bottle Type
Samples received about 6°		

Cooler#:	Temperature(°C):	
Sample ID	Bottle Count	Bottle Type

Cooler#:	Temperature(°C):	
Sample ID	Bottle Count	Bottle Type

Cooler#:	Temperature(°C):	
Sample ID	Bottle Count	Bottle Type

Completed by: SF Date: 10/27/17 Time: 1100

Materials Testing & Consulting, Inc.

Geotechnical Engineering • Special Inspection • Materials Testing • Environmental Consulting

Project:	Hydro International (17J0549)	**Date Received:**	November 1, 2017
Project #:	16T001-035	**Sampled By:**	Others
Client :	Analytical Resources, Inc.	**Date Reported:**	November 29, 2017
Source:	WUFF-Sump	**Tested By:**	B. Goble
MTC Sample#:	T17-1587		

CASE NARRATIVE

1. One sample was submitted for grain size analysis according to Puget Sound Estuary Protocol (PSEP) methodology.
2. The sample was run in a single batch and one sample from another job was chosen for triplicate analysis. The triplicate data is reported on the QA summary.
3. The data is provided in summary tables and plots.
4. There were no other noted anomalies in this project.

Reviewed by: E Gabriel Goble

Materials Testing & Consulting, Inc.

Geotechnical Engineering • Special Inspection • Materials Testing • Environmental Consulting

Project: Hydro International (17J0549)
Project #: 16T001-035
Date Received: November 1, 2017
Date Tested: November 15, 2017

Client: Analytical Resources, Inc.
Sampled by: Others
Tested by: B. Goble

Apparent Grain Size Distribution Summary

Percent Finer Than Indicated Size

Sample No.	Gravel			Very Coarse Sand	Coarse Sand	Medium Sand	Fine Sand	Very Fine Sand	Silt				Clay	
Phi Size	-3	-2	-1	0	1	2	3	4	5	6	7	8	9	10
Sieve Size (microns)	3/8"	#4 (4750)	#10 (2000)	#18 (1000)	#35 (500)	#60 (250)	#120 (125)	#230 (63)	31.0	15.6	7.8	3.9	2.0	1.0
T17-1596	100.0	100.0	100.0	99.1	97.5	93.0	68.1	40.4	24.4	14.8	9.2	5.4	3.5	1.8
	100.0	99.6	99.1	98.3	96.8	92.3	67.3	39.9	23.9	14.4	9.0	5.0	3.2	1.7
	100.0	100.0	99.9	99.1	97.4	92.6	66.9	38.8	23.9	14.2	9.5	5.4	3.4	1.8
WUFF-SUMP	100.0	99.9	99.8	97.6	93.7	89.8	84.2	79.6	61.1	27.6	12.5	5.4	3.4	2.0

Reviewed by: E Gabriel Goble

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Materials Testing & Consulting, Inc.

Geotechnical Engineering • Special Inspection • Materials Testing • Environmental Consulting

Project: Hydro International (17J0549)
Project #: 16T001-035
Date Received: November 1, 2017
Date Tested: November 15, 2017

Client: Analytical Resources, Inc.
Sampled by: Others
Tested by: B. Goble

Apparent Grain Size Distribution Summary

Percent Retained in Each Size Fraction

Sample No.	Gravel	Very Coarse Sand	Coarse Sand	Medium Sand	Fine Sand	Very Fine Sand	Coarse Silt	Medium Silt	Fine Silt	Very Fine Silt	Clay			Total Fines
Phi Size	< -1	-1 to 0	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	> 10	> 4
Sieve Size (microns)	> #10 (2000)	10-18 (2000-1000)	18-35 (1000-500)	35-60 (500-250)	60-120 (250-125)	120-230 (125-62)	62.5-31.0	31.0-15.6	15.6-7.8	7.8-3.9	3.9-2.0	2.0-1.0	<1.0	<230 (<62)
T17-1596	0.0	0.8	1.6	4.6	24.8	27.8	16.0	9.6	5.5	3.9	1.9	1.6	1.8	40.4
	0.9	0.8	1.5	4.5	24.9	27.5	15.9	9.5	5.4	4.0	1.8	1.6	1.7	39.9
	0.1	0.8	1.7	4.9	25.7	28.0	15.0	9.7	4.8	4.1	2.0	1.5	1.8	38.8
WUFF-SUMP	0.2	2.2	3.8	3.9	5.7	4.6	18.5	33.5	15.1	7.1	1.9	1.4	2.0	79.6

Reviewed by: E Gabriel Goble

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Materials Testing & Consulting, Inc.

Geotechnical Engineering • Special Inspection • Materials Testing • Environmental Consulting

Project: Hydro International (17J0549)
Project #: 16T001-035
Date Received: November 1, 2017
Date Tested: November 15, 2017

Client: Analytical Resources, Inc.
Sampled by: Others
Tested by: B. Goble

Relative Standard Deviation, By Phi Size

Sample ID	-3	-2	-1	0	1	2	3	4	5	6	7	8	9	10
T17-1596	100.0	100.0	100.0	99.1	97.5	93.0	68.1	40.4	24.4	14.8	9.2	5.4	3.5	1.8
	100.0	99.6	99.1	98.3	96.8	92.3	67.3	39.9	23.9	14.4	9.0	5.0	3.2	1.7
	100.0	100.0	99.9	99.1	97.4	92.6	66.9	38.8	23.9	14.2	9.5	5.4	3.4	1.8
AVE	100.0	99.9	99.6	98.8	97.2	92.6	67.4	39.7	24.1	14.5	9.2	5.3	3.3	1.8
STDEV	0.0	0.2	0.4	0.4	0.3	0.3	0.5	0.6	0.2	0.2	0.2	0.2	0.1	0.1
%RSD	0.0	0.2	0.4	0.4	0.3	0.3	0.8	1.6	1.0	1.5	2.1	3.3	2.9	4.9

The Triplicate Applies To The Following Samples

Client ID	Date Sampled	Date Extracted	Date Complete	QA Ratio (95-105)	Data Qualifiers	Pipette Portion (5.0-25.0g)
T17-1596	10/24/2017	11/8/2017	11/15/2017	100.0		17.3
	10/24/2017	11/8/2017	11/15/2017	101.1		17.1
	10/24/2017	11/8/2017	11/15/2017	100.7		16.5
WUFF-SUMP	10/22/2017	11/8/2017	11/15/2017	97.4		10.6

Reviewed by: E Gabriel Goble

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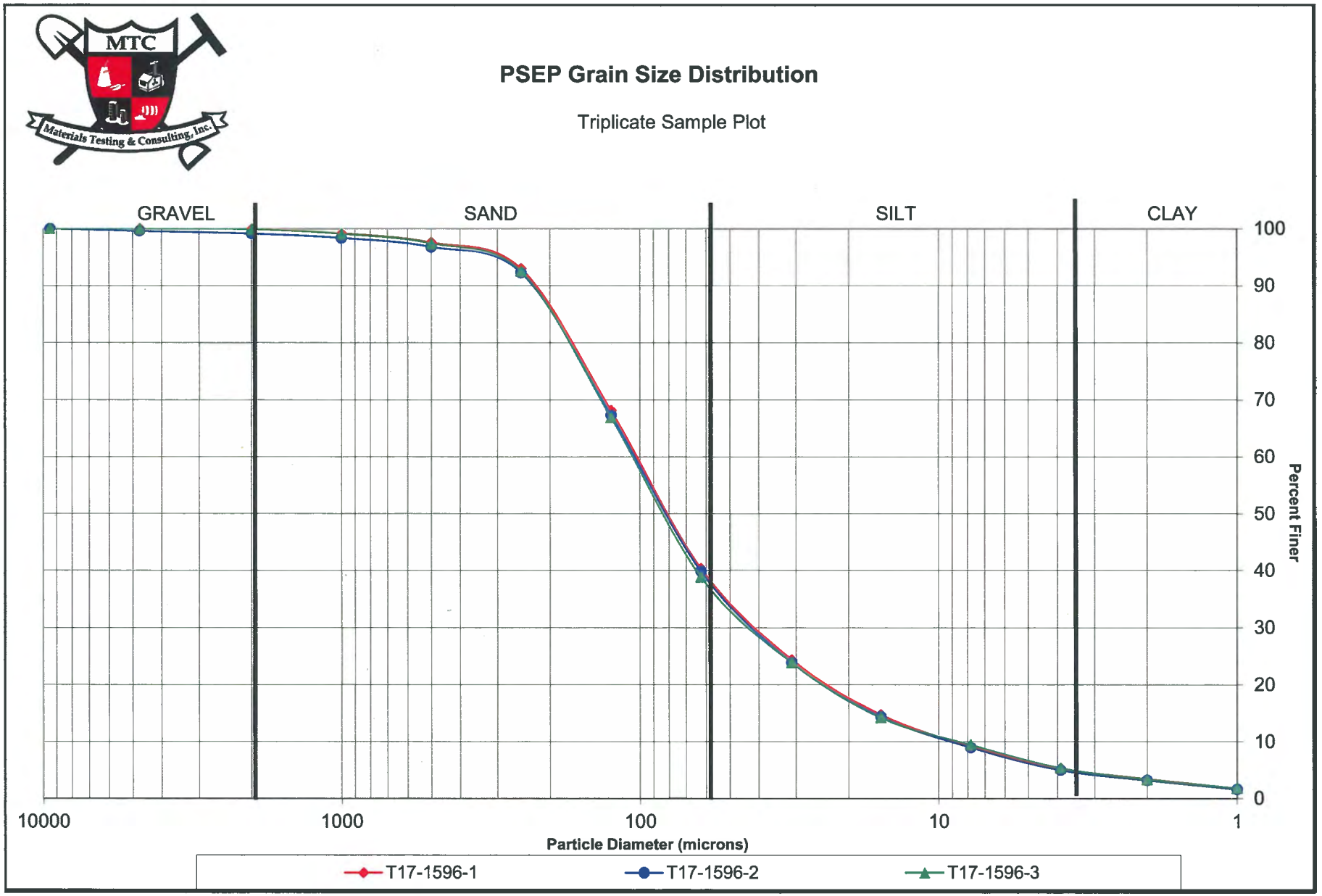
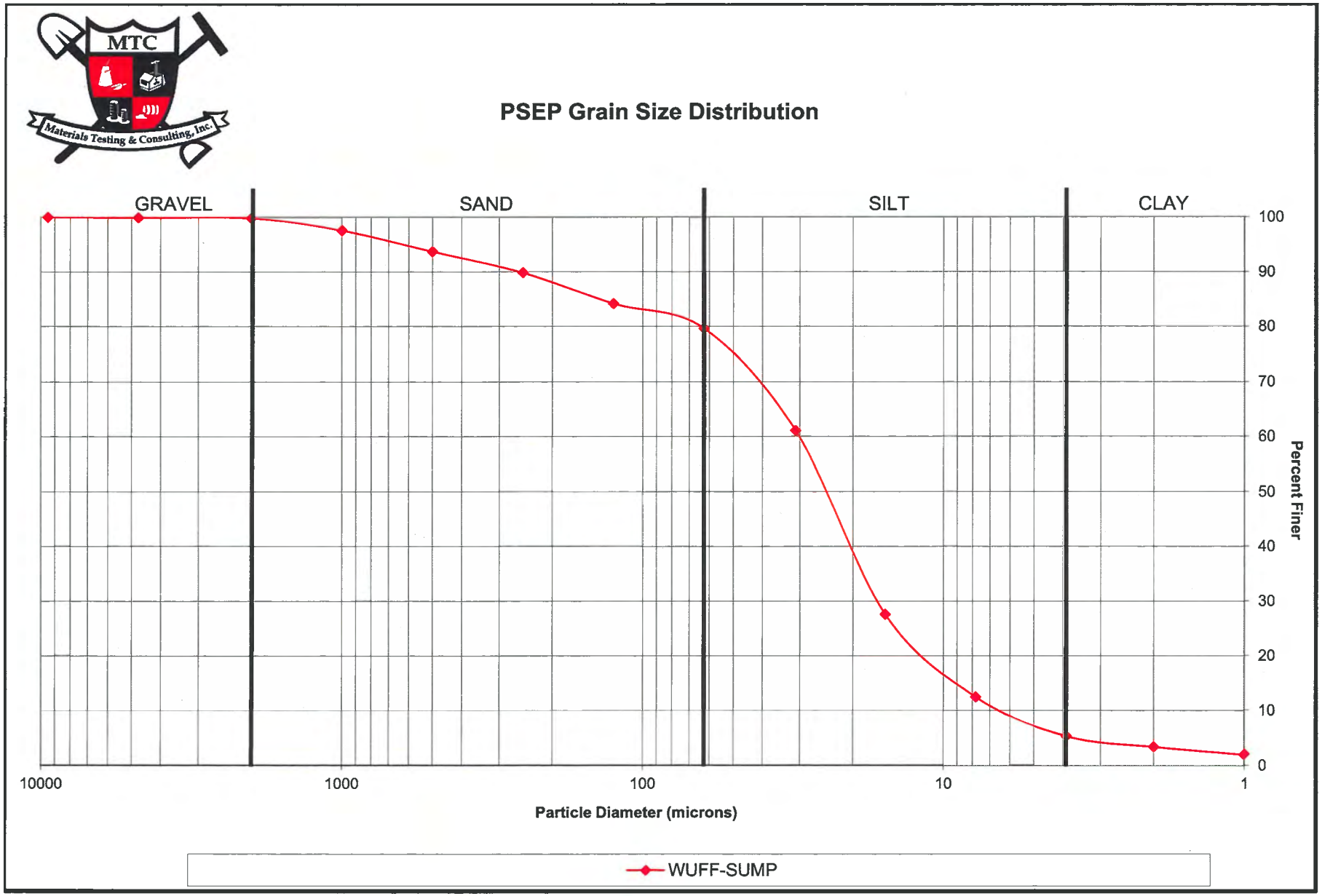

MTC
Materials Testing & Consulting, Inc.
PSEP Grain Size Distribution
Triplicate Sample Plot
GRAVEL
SAND
SILT
CLAY
100
90
80
70
60
50
40
30
20
10
0
Percent Finer
10000
1000
100
10
1
Particle Diameter (microns)
T17-1596-1
T17-1596-2
T17-1596-3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50
40
30
20
10
0
Percent Finer
10000
1000
100
10
1
Particle Diameter (microns)
WUFF-SUMP

Herrera Environmental Consultants	Project: Hydro International	
2200 6th Avenue, Suite 1100	Project Number: 13-05605-000	**Reported:**
Seattle WA, 98121	Project Manager: Dylan Ahearn	30-Nov-2017 16:18

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
WUFF-Sump	17J0549-01	Solid	27-Oct-2017 09:00	27-Oct-2017 11:00

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Herrera Environmental Consultants	Project: Hydro International	
2200 6th Avenue, Suite 1100	Project Number: 13-05605-000	**Reported:**
Seattle WA, 98121	Project Manager: Dylan Ahearn	30-Nov-2017 16:18

Case Narrative

Sample receipt

One sample as listed on the preceding page was received October 27, 2017 under ARI workorder 17J0549. For details regarding sample receipt, please refer to the Cooler Receipt Form. The grainsize analysis was subcontracted to MTC Labs.

Total Metals - EPA Method 200.8

The sample was digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The method blank has Zinc detected below the reporting limit, but above the method detection limit. The Zinc has been flagged with a "J" qualifier on the method blank. No further corrective action was taken.

The LCS percent recoveries were within control limits.

Total Phosphorus and %TS - Method SM4500

The sample was prepared and analyzed within the recommended holding times.

The method blank was clean at the reporting limits.

The LCS percent recoveries were within control limits.

The matrix spike percent recovery and duplicate RPD were within QC limits.

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WUFF-Sump

17J0549-01 (Solid)

Metals and Metallic Compounds

Method: EPA 6020A UCT-KED — Sampled: 10/27/2017 09:00
Instrument: ICPMS1 — Analyzed: 02-Nov-2017 14:44

Sample Preparation: Preparation Method: SWN EPA 3050B
Preparation Batch: BFJ0843 — Sample Size: 1.003 g (wet) — Dry Weight:0.41 g
Prepared: 31-Oct-2017 — Final Volume: 50 mL — % Solids: 40.66

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Copper	7440-50-8	20	0.09	1.23	**456**	mg/kg	

Instrument: ICPMS2 — Analyzed: 09-Nov-2017 04:50

Sample Preparation: Preparation Method: SWN EPA 3050B
Preparation Batch: BFJ0843 — Sample Size: 1.003 g (wet) — Dry Weight:0.41 g
Prepared: 31-Oct-2017 — Final Volume: 50 mL — % Solids: 40.66

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Zinc	7440-66-6	100	2.8	49.0	**1700**	mg/kg	D

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Seattle WA, 98121	Project Manager: Dylan Ahearn	30-Nov-2017 16:18

WUFF-Sump

17J0549-01 (Solid)

Wet Chemistry

Method: PSEP 1986
Instrument: N/A

Sampled: 10/27/2017 09:00
Analyzed: 02-Nov-2017 14:38

Sample Preparation:	Preparation Method: No Prep Wet Chem		
	Preparation Batch: BFK0061	Sample Size: 10 g (wet)	Dry Weight:4.07 g
	Prepared: 02-Nov-2017	Final Volume: 10 g	% Solids: 40.66

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Volatile Solids		1	0.010	**30.2**	%	

Herrera Environmental Consultants	Project: Hydro International	
2200 6th Avenue, Suite 1100	Project Number: 13-05605-000	**Reported:**
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WUFF-Sump

17J0549-01 (Solid)

Wet Chemistry

Method: SM 2540 G-97
Instrument: N/A

Sampled: 10/27/2017 09:00
Analyzed: 02-Nov-2017 14:38

Sample Preparation: Preparation Method: No Prep Wet Chem
Preparation Batch: BFK0061
Prepared: 02-Nov-2017
Sample Size: 10 g (wet)
Final Volume: 10 g
Dry Weight:4.07 g
% Solids: 40.66

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Total Solids		1	0.04	**40.66**	%	

Herrera Environmental Consultants	Project: Hydro International	
2200 6th Avenue, Suite 1100	Project Number: 13-05605-000	**Reported:**
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WUFF-Sump

17J0549-01 (Solid)

Wet Chemistry

Method: SM 4500-P E-99
Instrument: UV1800-2

Sampled: 10/27/2017 09:00
Analyzed: 17-Nov-2017 17:31

Sample Preparation: Preparation Method: SM 4500-P B-4 Strong Acid
Preparation Batch: BFK0307 | Sample Size: 0.328 g (wet) | Dry Weight:0.13 g
Prepared: 10-Nov-2017 | Final Volume: 50 mL | % Solids: 40.66

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Total Phosphorus	7723-14-0	20	60.0	**2010**	mg-P/kg	D

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Herrera Environmental Consultants	Project: Hydro International	
2200 6th Avenue, Suite 1100	Project Number: 13-05605-000	**Reported:**
Seattle WA, 98121	Project Manager: Dylan Ahearn	30-Nov-2017 16:18

Analysis by: Materials Testing & Consulting, Inc. (Tukwila)

WUFF-Sump

17J0549-01 (Solid)

Geochemical Methods

Method: PSEP 1986
Instrument: MT&C

Sampled: 10/27/2017 09:00
Analyzed: 15-Nov-2017 00:00

Sample Preparation: Preparation Method: No Prep Geo
Preparation Batch: B111517
Prepared: 15-Nov-2017 Final Volume:

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Phi Size <-1	GS_GRAVEL	1	0.1	**0.2**	%	
Phi Size -1 to 0	GS_VCS	1	0.1	**2.2**	%	
Phi Size 0 to 1	GS_CS	1	0.1	**3.8**	%	
Phi Size 1 to 2	GS_MS	1	0.1	**3.9**	%	
Phi Size 2 to 3	GS_FS	1	0.1	**5.7**	%	
Phi Size 3 to 4	GS_VFS	1	0.1	**4.6**	%	
Phi Size 4 to 5	GS_CSILT	1	0.1	**18.5**	%	
Phi Size 5 to 6	GS_MSILT	1	0.1	**33.5**	%	
Phi Size 6 to 7	GS_FSILT	1	0.1	**15.1**	%	
Phi Size 7 to 8	GS_VFSILT	1	0.1	**7.1**	%	
Phi Size 8 to 9	GS_CCLAY	1	0.1	**1.9**	%	
Phi Size 9 to 10	GS_MCLAY	1	0.1	**1.4**	%	
Phi Size >10	GS_FCLAY	1	0.1	**2.0**	%	
Total Fines	GS_TOTFINES	1	0.1	**79.6**	%	

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Metals and Metallic Compounds - Quality Control

Batch BFJ0843 - SWN EPA 3050B

Instrument: ICPMS1 Analyst: TCH

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BFJ0843-BLK1)					Prepared: 31-Oct-2017 Analyzed: 02-Nov-2017 14:31							
Copper	63	ND	0.04	0.50	mg/kg							U
Copper	65	ND	0.03	0.50	mg/kg							U
LCS (BFJ0843-BS1)					Prepared: 31-Oct-2017 Analyzed: 02-Nov-2017 15:04							
Copper	63	26.1	0.04	0.50	mg/kg	25.0		104	80-120			
Copper	65	26.6	0.03	0.50	mg/kg	25.0		106	80-120			

Instrument: ICPMS2 Analyst: CC

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BFJ0843-BLK2)					Prepared: 31-Oct-2017 Analyzed: 09-Nov-2017 00:42							
Zinc	66	1.5	0.3	4.0	mg/kg							J
Zinc	67	1.3	0.2	4.0	mg/kg							J
LCS (BFJ0843-BS2)					Prepared: 31-Oct-2017 Analyzed: 09-Nov-2017 01:32							
Zinc	66	82.7	0.3	4.0	mg/kg	80.0		103	80-120			
Zinc	67	78.8	0.2	4.0	mg/kg	80.0		98.6	80-120			

Herrera Environmental Consultants	Project: Hydro International	
2200 6th Avenue, Suite 1100	Project Number: 13-05605-000	**Reported:**
Seattle WA, 98121	Project Manager: Dylan Ahearn	30-Nov-2017 16:18

Wet Chemistry - Quality Control

Batch BFK0061 - No Prep Wet Chem

Instrument: N/A

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BFK0061-BLK1)				Prepared: 02-Nov-2017 Analyzed: 02-Nov-2017 14:38						
Volatile Solids	ND	0.010	%							U
Total Solids	ND	0.04	%							U
Duplicate (BFK0061-DUP1)	**Source: 17J0549-01**			Prepared: 02-Nov-2017 Analyzed: 02-Nov-2017 14:38						
Volatile Solids	30.6	0.010	%		30.2			1.20	20	
Total Solids	40.37	0.04	%		40.66			0.73	20	

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Wet Chemistry - Quality Control

Batch BFK0307 - SM 4500-P B-4 Strong Acid

Instrument: UV1800-2 Analyst: CDE

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BFK0307-BLK1)			Prepared: 10-Nov-2017 Analyzed: 17-Nov-2017 17:28							
Total Phosphorus	ND	1.33	mg-P/kg							U
Blank (BFK0307-BLK2)			Prepared: 10-Nov-2017 Analyzed: 17-Nov-2017 17:30							
Total Phosphorus	ND	1.33	mg-P/kg							U
Blank (BFK0307-BLK3)			Prepared: 10-Nov-2017 Analyzed: 17-Nov-2017 17:34							
Total Phosphorus	ND	1.33	mg-P/kg							U
Blank (BFK0307-BLK4)			Prepared: 10-Nov-2017 Analyzed: 17-Nov-2017 17:35							
Total Phosphorus	ND	1.33	mg-P/kg							U
LCS (BFK0307-BS1)			Prepared: 10-Nov-2017 Analyzed: 17-Nov-2017 17:30							
Total Phosphorus	25.8	1.33	mg-P/kg	25.0		103	90-110			
DL (BFK0307-BS2)			Prepared: 10-Nov-2017 Analyzed: 17-Nov-2017 17:38							
Total Phosphorus	25.8	1.33	mg-P/kg	25.0		103	90-110			
Duplicate (BFK0307-DUP1)	**Source: 17J0549-01**		Prepared: 10-Nov-2017 Analyzed: 17-Nov-2017 17:32							
Total Phosphorus	2210	63.9	mg-P/kg		2010			9.59	20	D
Matrix Spike (BFK0307-MS1)	**Source: 17J0549-01**		Prepared: 10-Nov-2017 Analyzed: 17-Nov-2017 17:32							
Total Phosphorus	2530	62.2	mg-P/kg	389	2010	134	75-125			D

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Herrera Environmental Consultants	Project: Hydro International	
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Certified Analyses included in this Report

Analyte	Certifications
EPA 6020A UCT-KED in Solid	
Copper-63	NELAP,DoD-ELAP,WADOE
Copper-65	NELAP,DoD-ELAP,WADOE
Zinc-66	NELAP,DoD-ELAP,WADOE
Zinc-67	NELAP,DoD-ELAP,WADOE
SM 4500-P E-99 in Solid	
Total Phosphorus	WADOE,NELAP

Code	Description	Number	Expires
ADEC	Alaska Dept of Environmental Conservation	UST-033	05/11/2018
CALAP	California Department of Public Health CAELAP	2748	02/28/2018
DoD-ELAP	DoD-Environmental Laboratory Accreditation Program	66169	02/07/2019
NELAP	ORELAP - Oregon Laboratory Accreditation Program	WA100006	05/11/2018
WADOE	WA Dept of Ecology	C558	06/30/2018
WA-DW	Ecology - Drinking Water	C558	06/30/2018

Herrera Environmental Consultants	Project: Hydro International	
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Notes and Definitions

U	This analyte is not detected above the applicable reporting or detection limit.
J	Estimated concentration value detected below the reporting limit.
D	The reported value is from a dilution
B	This analyte was detected in the method blank.
*	Flagged value is not within established control limits.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
[2C]	Indicates this result was quantified on the second column on a dual column analysis.