APPENDIX I

Water Quality Data Assurance Memorandum



Herrera Environmental Consultants, Inc.

Memorandum

To Project File 10-04715-003

CC Dylan Ahearn, Herrera Environmental Consultants

From Gina Catarra, Herrera Environmental Consultants

Date September 12, 2013

Subject Data Quality Assurance Review of Filterra Bioretention System Water Quality

Data

This memorandum presents a review of data quality for 51 water samples (including three field duplicates and two rinsate blank samples) collected from the inlet and outlet of a Filterra® Stormwater Bioretention Filtration System that is currently installed in the City of Bellingham, Washington, between September 2012 and June 2013. Aquatic Research Incorporated of Seattle, Washington analyzed the samples for:

- Total suspended solids (TSS) by Standard Method 2540D
- Total phosphorus (TP) by EPA method 365.1
- Hardness by Standard Method 2340B
- Orthophosphorus by EPA method 365.1
- Total and dissolved copper and zinc by EPA method 200.8
- Conductivity by EPA method 120.1
- pH by EPA method 150.1
- Turbidity by EPA method 180.1

Analytical Resources of Tukwila, Washington analyzed the samples for particle size distribution by ASTM 3977.

The laboratory's performance was reviewed in accordance with quality control (QC) criteria outlined in the *Filterra Bioretention System Phosphorus Treatment and Supplemental Peformance Monitoring Quality Assurance Project Plan* (QAPP) (Herrera 2012).

Quality control data summaries submitted by the laboratories were reviewed; raw data were not submitted by the laboratories. Data quality assurance worksheets summarizing the quality assurance and quality control (QA/QC) review were completed for each sampling event and are included as Attachment 1. Data qualifiers (flags) were added to the sample results in the laboratory reports. Data validation results are summarized below, followed by definitions of data qualifiers.

Custody, Preservation, Holding Times, and Completeness—Acceptable with Qualification

The samples were properly preserved and sample custody was maintained from sample collection to receipt at the laboratories. With the exceptions noted below, all samples were analyzed within the required holding times (Table 1). The laboratory reports were complete and contained results for all samples and tests requested on the chain-of-custody (COC) forms.

Table 1. Summary of sample collection requirements and reporting limits.

Parameter	Method Number ^a	Pre-Filtration Holding Time	Total Holding Time ^b	Laboratory Preservation	RL	Units	
Total suspended solids	SM 2540D	NA	7 days	Cool ≤6°C	0.5	mg/L	
Total phosphorus	EPA 365.1	NA	28 days	Cool \leq 4°C, HCl to pH $<$ 2	0.002	mg/L	
Orthophosphorus	EPA 365.1	12 hours ^c	48 hours ^f	Cool ≤ 6°C	0.001	mg/L	
Conductivity	EPA 120.1	NA	28 days	Cool ≤ 6°C	0.1	Umhos/cm	
pН	EPA 150.1	NA	24 hours	Cool ≤ 6°C	0.1	std units	
Turbidity	EPA 180.1	NA	48 hours	Cool ≤ 6°C	0.1	NTU	
Hardness as CaCO ₃	SM 2340C	NA	28 days	$\begin{aligned} Cool &\leq 6^{\circ}C, H_2SO_4 \\ to pH &< 2 \end{aligned}$	2.0	mg/L	
Copper, dissolved		12 hours ^c			1		
Copper, total	EPA 200.8	NA	6 months	Cool \leq 6°C, HNO ₃	1	μg/L	
Zinc, dissolved		12 hours ^c		to pH < 2	5		
Zinc, total		NA			5		
PSD	ASTM 3977	NA	7 days	Cool ≤ 6°C	1.0	micron	

SM method numbers are from APHA et al. (1998); EPA method numbers are from U.S. EPA (1983, 1984). The 18th edition of *Standard Methods for the Examination of Water and Wastewater* (APHA et al. 1992) is the current legally adopted version in the *Code of Federal Regulations*.

NA = not applicable.

The 48-hour holding time for orthophosphorus for samples collected on 2/22/2013, 3/01/2013, 3/14/2013 and 4/05/2013 was exceeded. Associated samples were qualified as estimated (J), as shown in Table 2.

The 24-hour holding time for pH and the 48 hour holding time for turbidity for samples collected on 3/14/2013 were exceeded. Associated samples were qualified as estimated (J), as shown in Table 2.

b Holding time specified in U.S. EPA guidance (U.S. EPA 1983, 1984) or referenced in APHA et al. (1992) for equivalent method.

^c U.S. EPA requires filtering for dissolved metals and orthophosphorus within 15 minutes of the collection of the last aliquot. This goal is exceedingly difficult to meet when conducting flow-weighted sampling. A more practical proxy goal for this study is 12 hours. Both goals will be reported with the data.

C = Celsius.

Table 2. Summary of sample results qualified due to holding time exceedance.

Sample ID	Sample Date	Parameter	Qualifier
FB-IN	2/22/2013	Orthophosphorus	J
FB-OUT	2/22/2013	Orthophosphorus	J
FB-IN	3/01/2013	Orthophosphorus	J
FB-OUT	3/01/2013	Orthophosphorus	J
QA-1	3/01/2013	Orthophosphorus	J
FB-IN	3/14/2013	Orthophosphorus	J
FB-OUT	3/14/2013	Orthophosphorus	J
FB-IN	3/14/2013	pН	J
FB-OUT	3/14/2013	pН	J
FB-IN	3/14/2013	Turbidity	J
FB-OUT	3/14/2013	Turbidity	J
FB-IN	4/05/2013	Orthophosphorus	J
FB-OUT	4/05/2013	Orthophosphorus	J

Laboratory Reporting Limits—Acceptable

The QAPP specified reporting limits are provided in Table 1. The laboratory reporting limits met the QAPP specified reporting limits for all analyses. No data were qualified based on laboratory reporting limits.

Blank Analysis—Acceptable

Method Blanks

Method blanks were analyzed at the required frequency. Method blanks did not contain levels of target analytes above the laboratory reporting limits.

Rinsate Blanks

A rinsate blank sample was collected from both FB-IN and FB-OUT and analyzed for TP, orthophosphorus, and total and dissolved metals in accordance with the QAPP. No results were detected above the reporting limits and no data were qualified.

Laboratory Control Sample Analysis—Acceptable

Laboratory control samples were analyzed at the required frequency. The percent recovery values for all sampling events met the laboratory criteria.

Matrix Spike Analysis—Acceptable

Matrix spike (MS) samples were analyzed at the required frequency. The percent recovery values for the MS analyses met the established control limits.

Laboratory Duplicate Analysis—Acceptable

Laboratory duplicates or laboratory control sample duplicates were analyzed at the required frequency. The relative percent difference (RPD) was calculated for each analyte where both duplicate values were greater than five times the reporting limit (RL). The difference between duplicate values was calculated if the detected compound concentration was less than five times the RL in either the sample or the field duplicate. A control limit of less than 20 percent RPD (25 percent for TSS) was established in the QAPP and a control limit of two times the RL was used to evaluate difference values. The relative percent difference (RPD) values met the control limits established by the QAPP, and all difference values were less than two times the RL.

Field Duplicates—Acceptable with Qualification

A total of three field duplicate samples were collected and analyzed for all analyses. With six exceptions, field duplicate precision met the QAPP specified criterion of less than 25 percent RPD. Table 3 summarizes the samples that were qualified as estimated (J) for field duplicate RPD exceedance. No other data associated with the sample batch were qualified due to field duplicate criteria exceedance because other quality control criteria were met.

Table 3. Summary of samples qualified due to field duplicate criteria exceedances.

Sample Date	Parameter	Sample ID	Duplicate ID	RPD (%)	Qualifier
3/01/2013	TSS	FB-IN	QA-1	64	J
3/01/2013	Total copper	FB-IN	QA-1	26	J
3/01/2013	Total zinc	FB-IN	QA-1	86	J
3/06/2013	TSS	FB-IN	QA-2	29	J
3/06/2013	Orthophosphorus	FB-IN	QA-2	40	J
3/06/2013	PSD	FB-IN	QA-2	43	J

Data Quality Assessment Summary

In general, the data quality for all parameters was found to be acceptable based on holding time, reporting limit, method blank, control standard, matrix spike, laboratory duplicate, and field duplicate criteria. Nine orthophosphorus, two pH, and two turbidity results were qualified as estimated (J) due to holding time exceedances. In addition, two TSS, one total copper, one total zinc, one orthophosphorus, and one PSD result were qualified as estimated (J) due to field duplicate precision exceedances.

Usability of the data is based on the guidance documents previously noted. Upon consideration of the information presented here, the data are acceptable as qualified.

Definition of Data Qualifiers

The following data qualifier definitions are taken from *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review* (U.S. EPA 2002).

- U The material was analyzed for, but was not detected above the level of the associated value. The associated value is either the sample quantitation limit or the sample detection limit.
- **J** The associated value is an estimated quantity.
- **UJ** The material was analyzed for, but was not detected. The associated value is an estimate and may be inaccurate or imprecise.
- **R** The data are unusable. (Note: analyte may or may not be present.)

References

APHA et al. 1992. Standard Methods for the Examination of Water and Wastewater. 18th edition. Edited by A.E. Greenberg, American Public Health Association (APHA); A.D. Eaton, American Water Works Association (AWWA); and L.S. Clesceri, Water Environment Federation (WEF).

APHA et al. 1998. Standard Methods for the Examination of Water and Wastewater. 20th edition. Edited by A.E. Greenberg, American Public Health Association (APHA); A.D. Eaton, American Water Works Association (AWWA); and L.S. Clesceri, Water Environment Federation (WEF).

Herrera. 2012. Filterra Bioretention System Phosphorus Treatment and Supplemental Basic and Enhanced Treatment Performance Monitoring Quality Assurance Project Plan. Prepared for Amercast by Herrera Environmental Consultants, Inc., Seattle, Washington. June 7, 2012.

U.S. EPA. 1983. Methods for Chemical Analysis of Water and Wastes. EPA-600/4-79-020. U.S. Environmental Protection Agency, Environmental Monitoring and Support Laboratory. Cincinnati, Ohio.

U.S. EPA. 1984. Guidelines Establishing Test Procedures for the Analysis of Pollutants under the Clean Water Act; Final Rule and Interim Final Rule. U.S. Environmental Protection Agency. 40 CFR Part 136. October 26, 1984.

U.S. EPA. 2002. Contract laboratory program national functional guidelines for inorganic data review. U.S. Environmental Protection Agency, Office of Emergency and Remedial Response, Washington, D.C. (EPA-540/R-01/008).

ATTACHMENT A

Data Quality Assurance Worksheets



		Бу	G. Catarra			
Project Name/No./Client:	Filterra Bioretention System Phosphorus Treatment/ 10-04715-000/ Filterra	Date	8/26/2013	Page	of	
Laboratory/Parameters:	Aquatic Research / TSS, TP, SRP, hardness, Total and Dissolved copper and zinc, PSD (ARI)	Checked:	initials			
Sample Date/Sample ID:	9/18/2012 / FB-IN, FB-OUT (Rinsate samples)		date			
						Ξ

		Pre-preser Holding 7 (hour	Гimes	Total Hold	-	Method Blanks	D (0/)		Lab Cor Samples Ro (%)	ecovery	Lab Duplicates RPD (%)		Field Dup RPD (Instrument	
Parameter	Completeness/ Methodology	Reported	Goal	Reported	Goal	Reporting Limit	Reported	Goal	Reported	Goal	Reported	Goal ¹	Reported	Goal ¹	Calibration/ Performance	ACTION
TSS	SM2540D	NA	NA	NA	≤7	0.5 MG/L	NA	NA	NA	±10	NA	≤ 25	NS	≤25	OK	NOT ANALYZED
TP	EPA 365.1	NA	NA	2	≤28	<0.002 0.002 MG/L	FB-OUT 102	±25	103	±10	FB-OUT NC	≤ 20	NS	≤ 25	OK	None
SRP	EPA 365.1	<12	≤12	1	≤2	<0.001 0.001 MG/L	Batch 95	±25	97	±10	Batch 0	≤ 20	NS	≤ 25	OK	None
HARDNESS	SM2340B	NA	NA	NA	≤180	0.1 MG/L	NA	±25	NA	±10	NA	≤ 20	NS	≤ 25	OK	NOT ANALYZED
TOT. CU AND ZN	EPA 200.8	NA	NA	7	≤180	1-5 UG/L	Batch 98,112	±25	98,104	±10	Batch NC	≤ 20	NS	≤ 25	OK	None
DISS. CU AND ZN	EPA 200.8	<12	≤12	13	≤180	1-5 UG/L	FB-IN 96,104	±25	98,96	±10	FB-IN NC	≤ 20	NS	≤ 25	OK	None
PSD	ASTM 3977	NA	NA	NA	≤7	NA 1 MICRON	NA	NA	NA	NA	NA	NA	NS	NA	OK	NOT ANALYZED

¹ If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available NC – not calculable due to one or more values below the detection limit NS – field duplicate not sampled.

 α



		Ву	G. Catarra			
Project Name/No./Client:	Filterra Bioretention System Phosphorus Treatment/ 10-04715-000/ Filterra	Date	08/27/13	Page	of	_
Laboratory/Parameters:	Aquatic Research / TSS, TP, SRP, hardness, Total and Dissolved copper and zinc, PSD (ARI)	Checked:	initials			
Sample Date/Sample ID:	01/09/2013 / FB-IN, FB-OUT		date			

		Pre-preser Holding 7 (hours	Γimes	Total Hold (day	-	Method Blanks	Surrog	Matrix Spikes/ Surrogate Recovery (%)		ntrol	Lab Dupl RPD (Field Dup RPD (Instrument	
Parameter	Completeness/ Methodology	Reported	Goal	Reported	Goal	Reporting Limit	Reported	Goal	Reported	Goal	Reported	Goal ¹	Reported	Goal ¹	Calibration/ Performance	ACTION
TSS	SM2540D	NA	NA	1	≤7	< 0.50	NA	NA	94	±10	Batch	≤ 25	NS	≤25	OK	NONE
155	SM12540D	NA	NA	1	2/	0.5 MG/L	NA	INA	94	±10	9	\$ 25	NS	≥ 23		
-	TD 1 0 6 5 1				100	< 0.002	Batch		00	4.0	Batch	1.00			OK	None
TP	EPA 365.1	NA	NA	6	≤28	0.002 MG/L	104	±25	98	±10	0	≤ 20	NS	≤ 25		
						< 0.001	Batch				Batch				OK	None
SRP	EPA 365.1	<12	≤12	1	≤2	0.001 MG/L	100	±25	100	±10	0	≤ 20	NS	≤ 25		
HARDNESS	SM2340B	NA	NA	12	≤180	<2.00	FB-OUT	±25	95	±10	FB-OUT	≤ 20	NS	≤25	OK	None
HARDNESS	SW12340B	IVA	NA	12	≥160	2 MG/L	97	±23	93	±10	1	S 20	No	\$ 23		
TOT. CU AND	EPA 200.8	NA	NA	5	≤180	<1,5	FB-OUT	±25	104.94	±10	FB-OUT	≤ 20	NS	≤ 25	OK	None
ZN	EFA 200.6	NA	NA	3	2100	1-5 UG/L	110,120	123	104,94	±10	13,NC	S 20	NS	<u> </u>		
DISS. CU AND	EPA 200.8	<12	≤12	1	≤180	<1,5	Batch	±25	95,102	±10	Batch	≤ 20	NS	≤ 25	OK	None
ZN	El A 200.8	<12	212	1	2100	1-5 UG/L	112,98	123	93,102	±10	2,15	<u> </u>	113	323		
DCD	A CTM 2077	NT A	NA	2	~100	NA	NIA	NT A	NI A	NA	NA	NA.	NS	NA	OK	None
PSD	ASTM 3977	NA	NA	3	≤180	1 MICRON	NA	NA	NA	NA	INA	INA	INS	INA.		

¹ If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.



		Ву	G. Catarra			
Project Name/No./Client:	Filterra Bioretention System Phosphorus Treatment/ 10-04715-000/ Filterra	Date	08/27/13	Page 1	of	1
Laboratory/Parameters:	Aquatic Research / TSS, TP, SRP, hardness, Total and Dissolved copper and zinc, PSD (ARI)	Checked:	initials			
Sample Date/Sample ID:	01/23/2013 / FB-IN, FB-OUT		date			

		Pre-preser Holding 7 (hour	Γimes	Total Hold	-	Method Blanks	Surrog	Matrix Spikes/ Surrogate Recovery (%)		ntrol	Lab Dupl RPD (Field Dup RPD (Instrument	
Parameter	Completeness/ Methodology	Reported	Goal	Reported	Goal	Reporting Limit	Reported	Goal	Reported	Goal	Reported	Goal ¹	Reported	Goal ¹	Calibration/ Performance	ACTION
TSS	SM2540D	NA	NA	6	≤7	< 0.50	NA	NA	93	±10	Batch	≤ 25	NS	≤25	OK	None
155	SM12340D	NA	NA	0	2/	0.5 MG/L	INA	NA	93	±10	0	\$ 25	NS	223		
-	FD 1 0 65 1			-	400	< 0.002	Batch		102		Batch	1.00	N.C.		OK	None
TP	EPA 365.1	NA	NA	6	≤28	0.002 MG/L	102	±25	103	±10	0	≤ 20	NS	≤25		
						< 0.001	Batch				Batch				OK	None
SRP	EPA 365.1	<12	≤12	2	≤2	0.001 MG/L	105	±25	100	±10	0	≤ 20	NS	≤25		
HARDNESS	SM2340B	NA	NA	12	≤180	<2.00	Batch	±25	96	±10	Batch	≤ 20	NS	≤25	OK	None
HARDNESS	SW12340B	IVA	NA	12	≥160	2 MG/L	96	±23	90	±10	1.4	S 20	No	\$ 23		
TOT. CU AND	EPA 200.8	NA	NA	6	≤180	<1,5	Batch	±25	95,92	±10	Batch	≤ 20	NS	≤25	OK	None
ZN	El A 200.8	IVA	IVA	U	2100	1-5 UG/L	98,100	-23	93,92	±10	4,NC	<u> </u>	143	323		
DISS. CU AND	EPA 200.8	<12	≤12	6	≤180	<1,5	FB-OUT	±25	95,92	±10	FB-OUT	≤ 20	NS	≤ 25	OK	None
ZN	2171200.0	\12	312	Ü	3100	1-5 UG/L	93,96		75,72	±10	2,NC	320	115	1		
PSD	ASTM 3977	NA	NA	6	≤7	NA	NA	NA	NA	NA	NA	NA.	NS	NA	OK	None
13D	A51W139//	11//1	IVA	0		1 MICRON	IVA	IVA	IVA	IVA	IVA	IVA	149	IVA		

¹ If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.



		By	G. Catarra				
Project Name/No./Client:	Filterra Bioretention System Phosphorus Treatment/ 10-04715-000/ Filterra	Date	08/27/13	Page	1	of	1
Laboratory/Parameters:	Aquatic Research / TSS, TP, SRP, hardness, Total and Dissolved copper and zinc, PSD (ARI)	Checked:	initials				
Sample Date/Sample ID:	01/24/2013 / FB-IN, FB-OUT		date				

		Pre-preser Holding 7 (hours	Times	Total Hold (day	_	Method Blanks	Matrix S _I Surrog Recovery	ate	Lab Cor Samples Ro (%)	ecovery	Lab Dupl RPD (Field Dup RPD (Instrument	
Parameter	Completeness/ Methodology	Reported	Goal	Reported	Goal	Reporting Limit	Reported	Goal	Reported	Goal	Reported	Goal ¹	Reported	Goal ¹	Calibration/ Performance	ACTION
TSS	SM2540D	NA	NA	5	≤7	< 0.50	NA	NA	93	±10	Batch	≤ 25	NS	≤25	OK	None
155	3W12540D	IVA	IIA	3	1	0.5 MG/L	IVA	IVA	73	±10	0	3 23	113	323		
TD	EDA 265.1	NT A	DT A	<i>-</i>	<00	< 0.002	Batch	.25	103	. 10	Batch	- 20	NS	125	ОК	None
TP	EPA 365.1	NA	NA	5	≤28	0.002 MG/L	102	±25	103	±10	0	≤ 20	NS	≤ 25		
						< 0.001	Batch				Batch				OK	None
SRP	EPA 365.1	<12	≤12	1	≤2	0.001 MG/L	105	±25	100	±10	0	≤ 20	NS	≤ 25		
HARDNESS	SM2340B	NA	NA	11	≤180	<2.00	Batch	±25	96	±10	Batch	≤ 20	NS	≤25	OK	None
HARDNESS	51412540B	IVA	IVA	11	2100	2 MG/L	96	-23	70	±10	1.4	220	145	323		
TOT. CU AND	EPA 200.8	NA	NA	5	≤180	<1,5	FB-OUT	±25	95,92	±10	FB-OUT	≤ 20	NS	≤ 25	ОК	None
ZN	Li A 200.8	IVA	IVA	3	3100	1-5 UG/L	98,100		73,72	±10	4,NC	320	145	3 23		
DISS. CU AND	EPA 200.8	<12	≤12	5	≤180	<1,5	FB-OUT	±25	95,92	±10	FB-OUT	≤ 20	NS	≤ 25	OK	None
ZN	1.11.200.0	\1Z	212	3	3100	1-5 UG/L	94,102	-23	75,72	±10	0,NC	320	110	3 23		
PSD	ASTM 3977	NA	NA	NA	≤7	NA 1 MICRON	NA	NA	NA	NA	NA	NA	NS	NA	OK	NOT ANALYZED

¹ If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.



		By	G. Catarra				
Project Name/No./Client:	Filterra Bioretention System Phosphorus Treatment/ 10-04715-000/ Filterra	Date	08/27/13	Page _	1 of	1	
Laboratory/Parameters:	Aquatic Research / TSS, TP, SRP, hardness, Total and Dissolved copper and zinc, PSD (ARI)	Checked:	initials				
Sample Date/Sample ID:	01/26/2013 / FB-IN, FB-OUT		date				

		Pre-preser Holding (hour	Гimes	Total Hold	-	Method Blanks	Matrix S _I Surrog Recovery	ate	Lab Cor Samples Ro (%)	ecovery	Lab Dupl RPD (Field Dup RPD (Instrument	
Parameter	Completeness/ Methodology	Reported	Goal	Reported	Goal	Reporting Limit	Reported	Goal	Reported	Goal	Reported	Goal ¹	Reported	Goal ¹	Calibration/ Performance	ACTION
TSS	SM2540D	NA	NA	5	≤7	< 0.50	NA	NA	94	±10	Batch	≤ 25	NS	≤25	OK	None
155	511123 102	1111	1411	3	_,	$0.5~\mathrm{MG/L}$	1111	1421			7		110			
TD	ED4 265 1	27.4	37.4	2	400	< 0.002	FB-OUT	25	103	10	FB-OUT	120	NG	425	ОК	None
TP	EPA 365.1	NA	NA	3	≤28	0.002 MG/L	102	±25	103	±10	0	≤ 20	NS	≤ 25		
						< 0.001	ED OUT				ED OUT				OK	None
SRP	EPA 365.1	<12	≤12	2	≤2	0.001 MG/L	FB-OUT 95	±25	103	±10	FB-OUT 0	≤ 20	NS	≤ 25		
HARDNESS	SM2340B	NA	NA	9	≤180	<2.00	Batch	±25	96	±10	Batch	≤ 20	NS	≤25	OK	None
TIARDNESS	5W12540B	IVA	IVA		2100	2 MG/L	96	123	70	±10	1.4	220	145	223		
TOT. CU AND	EPA 200.8	NA	NA	3	≤180	<1,5	Batch	±25	95,92	±10	Batch	≤ 20	NS	≤ 25	OK	None
ZN	EPA 200.8	NA	NA.	3	≥100	1-5 UG/L	98,100	±23	93,92	±10	4.1,NC	≥ 20	NS	≥ <u>2</u> 5		
DISS. CU AND	EPA 200.8	<12	≤12	3	≤180	<1,5	Batch	±25	95,92	±10	Batch	≤ 20	NS	≤ 25	OK	None
ZN	EFA 200.8	<12	<u> </u>	3	≥100	1-5 UG/L	93,96	±45	93,92	±10	1.7,NC	≥ 2 0	INO	≥ 2 5		
DCD	A CITIN A 2077	NIA	DT A	D.T.A.	-77	NA	NIA	37.4	NIA	27.4	NIA	27.4	NG	27.4	OK	NOT ANALYZED
PSD	ASTM 3977	NA	NA	NA	≤7	1 MICRON	NA	NA	NA	NA	NA	NA	NS	NA		

¹ If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.



		By	G. Catarra				
Project Name/No./Client:	Filterra Bioretention System Phosphorus Treatment/ 10-04715-000/ Filterra	Date	08/27/13	Page	1	of	1
Laboratory/Parameters:	Aquatic Research / TSS, TP, SRP, hardness, Total and Dissolved copper and zinc, PSD (ARI)	Checked:	initials				
Sample Date/Sample ID:	01/28/2013 / FB-IN, FB-OUT		date				

		Pre-preser Holding 7 (hours	Γimes	Total Hold (day	_	Method Blanks	Matrix S _I Surrog Recovery	ate	Lab Cor Samples Ro (%)	ecovery	Lab Dupl RPD (Field Dup RPD (Instrument	
Parameter	Completeness/ Methodology	Reported	Goal	Reported	Goal	Reporting Limit	Reported	Goal	Reported	Goal	Reported	Goal ¹	Reported	Goal ¹	Calibration/ Performance	ACTION
TSS	SM2540D	NA	NA	3	≤7	< 0.50	NA	NA	94	±10	Batch	≤ 25	NS	≤25	OK	None
155	SW12540D	IVA	IVA	3	1	0.5 MG/L	IVA	IVA	74	±10	7	3 23	113	323		
TED.	ED4 265 1	27.4	27.4		400	< 0.002	Batch	25	102	10	Batch	120	NG		OK	None
TP	EPA 365.1	NA	NA	1	≤28	0.002 MG/L	102	±25	103	±10	0	≤ 20	NS	≤ 25		
						< 0.001	Batch				Dotoh				OK	None
SRP	EPA 365.1	<12	≤12	1	≤2	0.001 MG/L	102	±25	107	±10	Batch 6.1	≤ 20	NS	≤ 25		
HARDNESS	SM2340B	NA	NA	7	≤180	<2.00	Batch	±25	96	±10	Batch	≤ 20	NS	≤25	OK	None
TIARDNESS	5W2540B	IVA	INA	,	2160	2 MG/L	96	-23	70	±10	1.4	220	145	323		
TOT. CU AND	EPA 200.8	NA	NA	11	≤180	<1,5	FB-OUT	±25	97,92	±10	FB-OUT	≤ 20	NS	≤25	OK	None
ZN	El A 200.8	IVA	IVA	11	4160	1-5 UG/L	93,102	± 2 3	91,92	±10	4.3,NC	<u> </u>	113	323		
DISS. CU AND	EPA 200.8	<12	≤12	2	≤180	<1,5	Batch	±25	104,102	±10	Batch	≤ 20	NS	≤25	OK	None
ZN	Li A 200.6	\1Z	212	2	7100	1-5 UG/L	115,116	-23	104,102	±10	0.6,NC	<u>⇒</u> 20	140	323		
PSD	ASTM 3977	NA	NA	NA	≤7	NA	NA	NA	NA	NA	NA	NA	NS	NA	OK	NOT ANALYZED
130	A31W137//	IVA	IVA	INA	11	1 MICRON	11/7	IVA	11/7	IVA	11/7	IVA	110	IVA		

¹ If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.



		By	G. Catarra				
Project Name/No./Client:	Filterra Bioretention System Phosphorus Treatment/ 10-04715-000/ Filterra	Date	08/27/13	Page	1	of	1
Laboratory/Parameters:	Aquatic Research / TSS, TP, SRP, hardness, Total and Dissolved copper and zinc, PSD (ARI)	Checked:	initials				
Sample Date/Sample ID:	01/30/2013 / FB-IN, FB-OUT		date				

		Pre-preser Holding 7 (hour	Гimes	Total Hold	-	Method Blanks	Matrix S _I Surrog Recovery	ate	Lab Cor Samples Ro (%)	ecovery	Lab Dupl RPD (Field Dup RPD (Instrument	
Parameter	Completeness/ Methodology	Reported	Goal	Reported	Goal	Reporting Limit	Reported	Goal	Reported	Goal	Reported	Goal ¹	Reported	Goal ¹	Calibration/ Performance	ACTION
TSS	SM2540D	NA	NA	2	≤7	< 0.50	NA	NA	92	±10	Batch	≤ 25	NS	≤25	OK	None
133	SW12540D	INA	NA	2	2/	0.5 MG/L	IVA	NA	92	±10	8	S 23	NS	523		
-	TD 1 0 6 5 1			10	400	< 0.002	Batch		101	10	Batch	1.00	N.C.		OK	None
TP	EPA 365.1	NA	NA	12	≤28	0.002 MG/L	102	±25	101	±10	0	≤ 20	NS	≤ 25		
						< 0.001	Batch				Batch				OK	None
SRP	EPA 365.1	<12	≤12	<1	≤2	0.001 MG/L	98	±25	101	±10	4.0	≤ 20	NS	≤ 25		
HARDNESS	SM2340B	NA	NA	5	≤180	<2.00	FB-OUT	±25	96	±10	FB-OUT	≤ 20	NS	≤25	OK	None
HARDNESS	SW12340B	IVA	NA	3	≥160	2 MG/L	96	±23	90	±10	1.4	S 20	No	\$ 23		
TOT. CU AND	EPA 200.8	NA	NA	9	≤180	<1,5	Batch	±25	97,92	±10	Batch	≤ 20	NS	≤ 25	OK	None
ZN	El A 200.8	IVA	IVA	9	2100	1-5 UG/L	93,102	±25	91,92	±10	4.3,NC	<u> </u>	143	223		
DISS. CU AND	EPA 200.8	<12	≤12	12	≤180	<1,5	FB-OUT	±25	96,92	±10	FB-OUT	≤ 20	NS	≤ 25	OK	None
ZN	El A 200.6	\1Z	212	12	2100	1-5 UG/L	98,106	123	90,92	±10	4.4,NC	<u> </u>	143	223		
PSD	ASTM 3977	NA	NA	NA	≤7	NA	NA	NA	NA	NA	NA	NA.	NS	NA	OK	NOT ANALYZED
rsu	AS 1W 39//	INA	INA	NA .		1 MICRON	IVA	INA	INA	INA	INA	INA	1/1/2	INA		

¹ If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.



		Ву	G. Catarra			
Project Name/No./Client:	Filterra Bioretention System Phosphorus Treatment/ 10-04715-000/ Filterra	Date	08/27/13	Page 1	of	1
Laboratory/Parameters:	Aquatic Research / TSS, TP, SRP, hardness, Total and Dissolved copper and zinc, PSD (ARI)	Checked:	initials			
Sample Date/Sample ID:	02/22/2013 / FB-IN, FB-OUT		date			

		Pre-preser Holding (hour	Гimes	Total Hold	-	Method Blanks	Matrix S _I Surrog Recovery	ate	Lab Cor Samples Ro (%)	ecovery	Lab Dupl RPD (Field Dup RPD (Instrument	
Parameter	Completeness/ Methodology	Reported	Goal	Reported	Goal	Reporting Limit	Reported	Goal	Reported	Goal	Reported	Goal ¹	Reported	Goal ¹	Calibration/ Performance	ACTION
TSS	SM2540D	NA	NA	5	≤7	< 0.50	NA	NA	95	±10	Batch	≤ 25	NS	≤25	OK	None
155	511123 102	1111	1411	3	_,	0.5 MG/L	1171	1421	,,,		1.9		110			
TED	ED4 265 1	27.4	37.4	2	400	< 0.002	Batch	25	101	10	Batch	120	NG	425	ОК	None
TP	EPA 365.1	NA	NA	3	≤28	0.002 MG/L	96	±25	101	±10	3.5	≤ 20	NS	≤ 25		
						< 0.001	D . 1				D . 1				OK	FLAG SAMPLES "J" DUE TO
SRP	EPA 365.1	<12	≤12	3	≤2	0.001 MG/L	Batch 100	±25	100	±10	Batch 0	≤ 20	NS	≤ 25		HOLDING TIME.
HARDNESS	SM2340B	NA	NA	10	≤180	<2.00	Batch	±25	96	±10	Batch	≤ 20	NS	≤25	OK	None
HARDNESS	3W2340B	IVA	INA.	10	2100	2 MG/L	101	123	90	±10	NC	220	113	<u> </u>		
TOT. CU AND	EPA 200.8	NA	NA	4	≤180	<1,5	Batch	±25	109,106	±10	Batch	≤ 20	NS	≤ 25	OK	None
ZN	EPA 200.8	NA	NA.	4	≥100	1-5 UG/L	95,92	±23	109,100	±10	7.6,6.1	≥ 20	NS	≥ <u>2</u> 5		
DISS. CU AND	EPA 200.8	<12	≤12	3	≤180	<1,5	Batch	±25	108,106	±10	Batch	≤ 20	NS	≤ 25	OK	None
ZN	EPA 200.8	<12	≥12	3	≥180	1-5 UG/L	103,116	±25	108,100	±10	NC,NC	≥ 20	NS	≥ 25		
ngn	A CITTLE 2077	27.4	37.4	27.4		NA		374	27.4	374	27.4	274	NG	274	OK	NOT ANALYZED
PSD	ASTM 3977	NA	NA	NA	≤7	1 MICRON	NA	NA	NA	NA	NA	NA	NS	NA		

¹ If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.



		By	G. Catarra				
Project Name/No./Client:	Filterra Bioretention System Phosphorus Treatment/ 10-04715-000/ Filterra	Date	08/27/13	Page	1	of	1
Laboratory/Parameters:	Aquatic Research / TSS, TP, SRP, hardness, Total and Dissolved copper and zinc, PSD (ARI)	Checked:	initials				
Sample Date/Sample ID:	02/25/2013 / FB-IN, FB-OUT		date				

		Pre-preser Holding T (hours	Γimes	Total Hold (day	_	Method Blanks	Matrix S _I Surrog Recovery	ate	Lab Cor Samples Ro (%)	ecovery	Lab Dupl RPD (Field Dup RPD (Instrument	
Parameter	Completeness/ Methodology	Reported	Goal	Reported	Goal	Reporting Limit	Reported	Goal	Reported	Goal	Reported	Goal ¹	Reported	Goal ¹	Calibration/ Performance	ACTION
TSS	SM2540D	NA	NA	4	≤7	< 0.50	NA	NA	95	±10	Batch	≤ 25	NS	≤25	OK	None
155	3W12J40D	NA	IVA	†	2/	$0.5~\mathrm{MG/L}$	IVA	IVA	73	±10	0	3 23	143	323		
TD	EDA 265.1	NIA	374	4	-00	< 0.002	Batch	. 25	101	.10	Batch	- 20	NS	- 25	ОК	None
TP	EPA 365.1	NA	NA	4	≤28	0.002 MG/L	100	±25	101	±10	0	≤ 20	NS	≤ 25		
						< 0.001	Batch				Batch				OK	None
SRP	EPA 365.1	<12	≤12	2	≤2	0.001 MG/L	100	±25	100	±10	0	≤ 20	NS	≤ 25		
HARDNESS	SM2340B	NA	NA	7	≤180	<2.00	Batch	±25	96	±10	Batch	≤ 20	NS	≤25	OK	None
THRONESS	514123 102	1171	11/21	,	2100	2 MG/L	101		70	210	NC		110			
TOT. CU AND	EPA 200.8	NA	NA	4	≤180	<1,5	FB-OUT	±25	104,108	±10	FB-OUT	≤ 20	NS	≤ 25	OK	None
ZN	2111200.0	1171	1421			1-5 UG/L	118,112		101,100		9.8,NC		110			
DISS. CU AND	EPA 200.8	<12	≤12	2	≤180	<1,5	FB-OUT	±25	108,106	±10	FB-OUT	≤ 20	NS	≤ 25	OK	None
ZN	2171200.0	112				1-5 UG/L	114,110		100,100		4.9,NC		110			
PSD	ASTM 3977	NA	NA	4	≤7	NA 1 MICRON	NA	NA	NA	NA	NA	NA	NS	NA	OK	None

¹ If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.



		By	G. Catarra				
Project Name/No./Client:	Filterra Bioretention System Phosphorus Treatment/ 10-04715-000/ Filterra	Date	08/27/13	Page	<u>1</u> of	f <u>1</u>	<u>l</u>
Laboratory/Parameters:	Aquatic Research / TSS, TP, SRP, hardness, Total and Dissolved copper and zinc, PSD (ARI)	Checked:	initials				
Sample Date/Sample ID:	03/01/2013 / FB-IN, FB-OUT, QA-1 (Field duplicate)		date				

		Pre-preser Holding 7 (hour	Гimes	Total Hold (day	\mathcal{C}	Method Blanks	Matrix S _I Surrog Recovery	ate	Lab Cor Samples Ro (%)	ecovery	Lab Dupl RPD (Field Dup RPD (Instrument	
Parameter	Completeness/ Methodology	Reported	Goal	Reported	Goal	Reporting Limit	Reported	Goal	Reported	Goal	Reported	Goal ¹	Reported	Goal ¹	Calibration/ Performance	ACTION
TSS	SM2540D	NA	NA	3	≤7	< 0.50	NA	NA	94	±10	Batch	≤ 25	64	≤25	OK	"J" FLAG FB-IN AND QA-1
155	SW12540D	IVA	IVA	3	1	0.5 MG/L	IVA	IVA	74	±10	9.5	3 23	O T	323		DUE TO FIELD DUPLICATE
	FD 1 0 65 1				100	< 0.002	Batch		00		Batch	1.00			OK	None
TP	EPA 365.1	NA	NA	<1	≤28	0.002 MG/L	101	±25	98	±10	0.8	≤ 20	0	≤ 25		
						< 0.001	04.1				0.4.1				OK	"J" FLAG DUE TO
SRP	EPA 365.1	<12	≤12	3	≤2	0.001 MG/L	QA-1 99	±25	100	±10	QA-1 1.4	≤ 20	15	≤ 25		HOLDING TIME
HARDNESS	SM2340B	NA	NA	3	≤180	<2.00	Batch	±25	96	±10	Batch	≤ 20	1.2	≤25	OK	None
TIARDIVESS	51412540B	1421	1423	3	3100	2 MG/L	101		70	±10	NC	320	1.2	320		
TOT. CU AND	EPA 200.8	NA	NA	4	≤180	<1,5	QA-1	±25	105,106	±10	QA-1	≤ 20	<mark>26,86</mark>	≤ 25	OK	"J" FLAG FB-IN AND QA-1
ZN	LI A 200.0	IVA	IVA	7	3160	1-5 UG/L	97,88	-25	103,100	±10	0, 9.5	320	20,80	3 23		DUE TO FIELD DUPLICATE
DISS. CU AND	EPA 200.8	<12	≤12	3	≤180	<1,5	QA-1	±25	108,106	±10	QA-1	≤ 20	0,NC	≤ 25	OK	None
ZN	El A 200.6	\12	212	J	7100	1-5 UG/L	110,118	143	100,100	±10	16,NC	≥ 20°	0,110	223		
DCD	A CTM 4 2077	NT A	NA	NI A	-7	NA	N/A	NT A	NIA	NA	NA	NT A	NS	NA	OK	NOT ANALYZED
PSD	ASTM 3977	NA	NA	NA	≤7	1 MICRON	NA	NA	NA	NA	NA	NA	NS	NA		

¹ If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.



		By	G. Catarra				
Project Name/No./Client:	Filterra Bioretention System Phosphorus Treatment/ 10-04715-000/ Filterra	Date	08/27/13	Page	1	of	1
Laboratory/Parameters:	Aquatic Research / TSS, TP, SRP, hardness, Total and Dissolved copper and zinc, PSD (ARI)	Checked:	initials				
Sample Date/Sample ID:	03/06/2013 / FB-IN, FB-OUT, QA-2 (Field duplicate)		date				

		Pre-preser Holding 7 (hour	Γimes	Total Hold	-	Method Blanks	Matrix S _I Surrog Recovery	ate	Lab Cor Samples Ro (%)	ecovery	Lab Dupl RPD (Field Dup RPD (Instrument	
Parameter	Completeness/ Methodology	Reported	Goal	Reported	Goal	Reporting Limit	Reported	Goal	Reported	Goal	Reported	Goal ¹	Reported	Goal ¹	Calibration/ Performance	ACTION
TSS	SM2540D	NA	NA	5	≤7	<0.50 0.5 MG/L	NA	NA	97	±10 Batch 9.5 ≤ 25 29 ≤25 OK		OK	"J" FLAG FB-IN AND QA-2 DUE TO FIELD DUPLICATE			
TP	EPA 365.1	NA	NA	5	≤28	<0.002 0.002 MG/L	QA-2 100	±25	100	±10	QA-2 10	≤ 20	10	≤25	OK	None
SRP	EPA 365.1	<12	≤12	2	≤2	<0.001 0.001 MG/L	Batch 100	±25	100	±10	Batch 0	≤ 20	40	≤ 25	OK	"J" FLAG FB-IN AND QA-2 DUE TO FIELD DUPLICATE
HARDNESS	SM2340B	NA	NA	14	≤180	<2.00 2 MG/L	Batch 93	±25	98	±10	Batch 3.6	≤ 20	0	≤25	OK	None
TOT. CU AND ZN	EPA 200.8	NA	NA	5	≤180	<1,5 1-5 UG/L	QA-2 102,104	±25	110,106	±10	QA-2 5.7,0	≤ 20	DIFF=0.00 16, NC	≤ 25	OK	None
DISS. CU AND ZN	EPA 200.8	<12	≤12	5	≤180	<1,5 1-5 UG/L	Batch 92,100	±25	109,106	±10	Batch 0,NC	≤ 20	DIFF=0.00 15, NC	≤ 25	OK	None
PSD	ASTM 3977	NA	NA	6	≤7	NA 1 MICRON	NA	NA	NA	NA	NA	NA	43	NA	OK	"J" FLAG FB-IN AND QA-2 DUE TO FIELD DUPLICATE

¹ If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.



		Ву	G. Catarra			
Project Name/No./Client:	Filterra Bioretention System Phosphorus Treatment/ 10-04715-000/ Filterra	Date	08/27/13	Page 1	of	1
Laboratory/Parameters:	Aquatic Research / TSS, TP, SRP, hardness, Total and Dissolved copper and zinc, PSD (ARI)	Checked:	initials			
Sample Date/Sample ID:	03/13/2013 / FB-IN, FB-OUT		date			

		Pre-preser Holding 7 (hour	Γimes	Total Hold (day		Method Blanks	Matrix S _I Surrog Recovery	ate	Lab Cor Samples Ro (%)	ecovery	Lab Dupl RPD (Field Dup RPD (Instrument	
Parameter	Completeness/ Methodology	Reported	Goal	Reported	Goal	Reporting Limit	Reported	Goal	Reported	Goal	Reported	Goal ¹	Reported	Goal ¹	Calibration/ Performance	ACTION
TSS	SM2540D	NA	NA	6	≤7	< 0.50	NA	NA	95	±10	Batch	≤ 25	NS	≤25	OK	None
				,		0.5 MG/L					5.4					
TP	EDA 265 1	NA	NA		≤28	< 0.002	Batch	±25	106	.10	Batch	- 20	NS	- 25	OK	None
IP	EPA 365.1	NA	NA	6	≤28	0.002 MG/L	104	±25	106	±10	3.9	≤ 20	NS	≤ 25		
						< 0.001	5.1								OK	None
SRP	EPA 365.1	<12	≤12	<1	≤2	0.001 MG/L	Batch 100	±25	100	±10	Batch NC	≤ 20	NS	≤ 25		
HARDNESS	SM2340B	NA	NA	14	≤180	<2.00	Batch	±25	94	±10	Batch	≤ 20	NS	≤ 25	OK	None
TIARDINESS	51412540B	1471	1421	14	3100	2 MG/L	95	-23	74	±10	2.2	320	110	325		
TOT. CU AND	EPA 200.8	NA	NA	5	≤180	<1,5	Batch	±25	108,106	±10	Batch	≤ 20	NS	≤25	OK	None
ZN	EPA 200.8	INA	NA	3	≥100	1-5 UG/L	82,88	±23	108,100	±10	10,8.7	≥ 20	NS	≥ 25		
DISS. CU AND	EDA 200 0	.12	-10	-	<100	<1,5	Batch	.25	100 106	10	Batch	- 20	NG	- 25	OK	None
ZN	EPA 200.8	<12	≤12	5	≤180	1-5 UG/L	87,94	±25	108,106	±10	NC,NC	≤ 20	NS	≤25		
PSD	ASTM 3977	NA	NA	NA	≤7	NA 1 MICRON	NA	NA	NA	NA	NA	NA	NS	NA	OK	NOT ANALYZED

¹ If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.



		By	G. Catarra				
Project Name/No./Client:	Filterra Bioretention System Phosphorus Treatment/ 10-04715-000/ Filterra	Date	08/27/13	_ Page	1	of	2
Laboratory/Parameters:	Aquatic Research / TSS, TP, SRP, hardness, conductivity, pH, turbidity, Total and Dissolved copper and zinc	Checked:	initials				
Sample Date/Sample ID:	03/14/2013 / FB-IN, FB-OUT		date				

		Pre-preser Holding 7 (hours	Γimes	Total Hold (day	-	Method Blanks	Matrix S _I Surrog Recovery	ate	Samples Recovery Lab Duplicates Field Duplicate RPD (%) RPD (%)			Instrument				
Parameter	Completeness/ Methodology	Reported	Goal	Reported	Goal	Reporting Limit	Reported	Goal	Reported	Goal	Reported	Goal ¹	Reported	Goal ¹	Calibration/ Performance	ACTION
TSS	SM2540D	NA	NA	7	≤7	< 0.50	NA	NA	97	±10	Batch	≤ 25	NS	≤25	OK	None
155	3W12540D	IVA	IVA	,	3/	0.5 MG/L	IVA	IVA	71	±10	11	3 23	113	323		
TED.	ED 4 265 1	27.4	374	-	400	< 0.002	Batch	25	106	10	Batch	120	NG		OK	None
TP	EPA 365.1	NA	NA	5	≤28	0.002 MG/L	104	±25	106	±10	3.9	≤ 20	NS	≤ 25		
						< 0.001	Batch				D-4-1-				OK	"J" FLAG DUE TO
SRP	EPA 365.1	<12	≤12	4	≤2	0.001 MG/L	105	±25	91	±10	Batch 0	≤ 20	NS	≤ 25		HOLDING TIME
HARDNESS	SM2340B	NA	NA	13	≤180	<2.00	Batch 94	±25	94	±10	Batch 2.2	≤ 20	NS	≤ 25	OK	None
						1.5	94				2.2					
TOT. CU AND	EPA 200.8	NA	NA	6	≤180	<1,5	Batch	±25	106,94	±10	Batch	≤ 20	NS	≤25	OK	None
Zn						1-5 UG/L	82,94				7.1, NC					
DISS. CU AND	EPA 200.8	<12	≤12	6	≤180	<1,5	Batch	±25	106,106	±10	Batch	≤ 20	NS	≤25	OK	None
ZN						1-5 UG/L	97,94				13,4.0					
PSD	ASTM 3977	NA	NA	NA	≤7	NA	NA	NA	NA	NA	NA	NA	NS	NA	OK	NOT ANALYZED
TOD	1101111 3711	1 17 1	1171	1 1/2 1	_,	1 MICRON	1471	1421	1471	1421	1,71	1421	110	1411		

¹ If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.



		Ву	G. Catarra				
Project Name/No./Client:	Filterra Bioretention System Phosphorus Treatment/ 10-04715-000/ Filterra	Date	08/27/13	Page	2	of _	2
Laboratory/Parameters:	Aquatic Research / TSS, TP, SRP, hardness, conductivity, pH, turbidity, Total and Dissolved copper and zinc	Checked:	initials				
Sample Date/Sample ID:	03/14/2013 / FB-IN, FB-OUT		date				

		Pre-preser Holding 7 (hour	Γimes	Total Hold (da	C	Method Blanks	Matrix S _I Surrog Recovery	ate	Lab Cor Samples Ro (%)	ecovery	Lab Dupl RPD (Field Duplicates RPD (%)		Instrument	
Parameter	Completeness/ Methodology	Reported	Goal	Reported	Goal	Reporting Limit	Reported	Goal	Reported	Goal	Reported	Goal ¹	Reported	Goal ¹	Calibration/ Performance	ACTION
COND	EPA 120.1	NA	NA	11	≤28	NA 0.1 UMHOS/CM	NA	NA	100	±10	Batch 0.5	≤ 20	NS	≤25	OK	None
РΗ	EPA 150.1	NA	NA	2	≤1	NA 0.1 STD UNITS	NA	NA	NA	NA	NA	NA	NS	≤25	OK	"J" FLAG DUE TO HOLDING TIME
TURBIDITY	EPA 180.1	NA	NA	<mark>3</mark>	≤2	NA 0.1 NTU	NA	NA	96	±10	Batch 3.9	≤ 20	NS	≤25	OK	"J" FLAG DUE TO HOLDING TIME

¹ If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.



		By	G. Catarra				
Project Name/No./Client:	Filterra Bioretention System Phosphorus Treatment/ 10-04715-000/ Filterra	Date	08/27/13	Page	1	of	2
Laboratory/Parameters:	Aquatic Research / TSS, TP, SRP, hardness, conductivity, pH, turbidity, Total and Dissolved copper and zinc	Checked:	initials				
Sample Date/Sample ID:	03/16/2013 / FB-IN, FB-OUT		date				

		Pre-preser Holding 7 (hour	Γimes	Total Hold (day		Method Blanks	Matrix S _I Surrog Recovery	ate	Lab Cor Samples Re (%)	ecovery	Lab Dupl RPD (Field Dup RPD (Instrument	
Parameter	Completeness/ Methodology	Reported	Goal	Reported	Goal	Reporting Limit	Reported	Goal	Reported	Goal	Reported	Goal ¹	Reported	Goal ¹	Calibration/ Performance	ACTION
TSS	SM2540D	NA	NA	5	≤7	<0.50 0.5 MG/L	NA	NA	97	±10	Batch 11	≤ 25	NS	≤25	OK	None
TP	EPA 365.1	NA	NA	3	≤28	<0.002 0.002 MG/L	FB-OUT	±25	106	±10	FB-OUT 3.9	≤ 20	NS	≤ 25	OK	None
SRP	EPA 365.1	<12	≤12	2	≤2	<0.001 0.001 MG/L	FB-OUT 105	±25	91	±10	FB-OUT	≤ 20	NS	≤ 25	OK	None
HARDNESS	SM2340B	NA	NA	11	≤180	<2.00	FB-OUT 94	±25	94	±10	FB-OUT 2.2	≤ 20	NS	≤ 25	OK	None
TOT. CU AND ZN	EPA 200.8	NA	NA	4	≤180	<1,5 1-5 UG/L	Batch 82,94	±25	106,106	±10	Batch 7.1, NC	≤ 20	NS	≤ 25	OK	None
DISS. CU AND ZN	EPA 200.8	<12	≤12	4	≤180	<1,5 1-5 UG/L	Batch 97,94	±25	106,106	±10	Batch 13,4.0	≤ 20	NS	≤ 25	OK	None
PSD	ASTM 3977	NA	NA	NA	≤7	NA 1 MICRON	NA	NA	NA	NA	NA	NA	NS	NA	OK	NOT ANALYZED

¹ If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.



		Ву	G. Catarra				
Project Name/No./Client:	Filterra Bioretention System Phosphorus Treatment/ 10-04715-000/ Filterra	Date	08/27/13	Page	2	of _	2
Laboratory/Parameters:	Aquatic Research / TSS, TP, SRP, hardness, conductivity, pH, turbidity, Total and Dissolved copper and zinc	Checked:	initials				
Sample Date/Sample ID:	03/16/2013 / FB-IN, FB-OUT		date				

		Pre-preser Holding 7 (hour	Γimes	Total Hold (da	C	Method Blanks	Matrix S _I Surrog Recovery	ate	Lab Cor Samples Ro (%)	ecovery	Lab Dupl RPD (Field Dup RPD (Instrument	
Parameter	Completeness/ Methodology	Reported	Goal	Reported	Goal	Reporting Limit	Reported	Goal	Reported	Goal	Reported	Goal ¹	Reported	Goal ¹	Calibration/ Performance	ACTION
COND	EPA 120.1	NA	NA	9	≤28	NA 0.1 UMHOS/CM	NA	NA	100	±10	Batch 0.5	≤ 20	NS	≤25	OK	None
РΗ	EPA 150.1	NA	NA	1	≤1	NA 0.1 STD UNITS	NA	NA	NA	NA	NA	NA	NS	≤25	OK	None
TURBIDITY	EPA 180.1	NA	NA	1	≤2	NA 0.1 NTU	NA	NA	96	±10	FB-OUT 3.9	≤20	NS	≤25	OK	None

¹ If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.



		By	G. Catarra				
Project Name/No./Client:	Filterra Bioretention System Phosphorus Treatment/ 10-04715-000/ Filterra	Date	08/27/13	Page	1	of	2
Laboratory/Parameters:	Aquatic Research / TSS, TP, SRP, hardness, conductivity, pH, turbidity, Total and Dissolved copper and zinc	Checked:	initials				
Sample Date/Sample ID:	03/20/2013 / FB-IN, FB-OUT		date				

		Pre-preser Holding 7 (hour	Γimes	Total Hold (day	-	Method Blanks	Matrix S _I Surrog Recovery	ate	Lab Cor Samples Ro (%)	ecovery	Lab Dupl RPD (Field Dup RPD (Instrument	
Parameter	Completeness/ Methodology	Reported	Goal	Reported	Goal	Reporting Limit	Reported	Goal	Reported	Goal	Reported	Goal ¹	Reported	Goal ¹	Calibration/ Performance	ACTION
TSS	SM2540D	NA	NA	6	≤7	< 0.50	NA	NA	95	±10	FB-OUT	≤ 25	NS	≤25	OK	None
155	5141254015	1471	1421	0		0.5 MG/L	1471	1421	,,,	210	9.9		145			
TD	EDA 265 1	NA	374	2	<00	< 0.002	D-4-1-00	. 25	103	. 10	Batch	- 20	NS	125	OK	None
TP	EPA 365.1	NA	NA	2	≤28	0.002 MG/L	Batch 98	±25	103	±10	6.2	≤ 20	NS	≤ 25		
						< 0.001	FB-OUT				FB-OUT				OK	None
SRP	EPA 365.1	<12	≤12	2	≤2	0.001 MG/L	105	±25	100	±10	13	≤ 20	NS	≤ 25		
HARDNESS	SM2340B	NA	NA	9	≤180	<2.00	Batch 96	±25	99	±10	Batch 0.8	≤ 20	NS	≤25	OK	None
TOT. CU AND						<1,5	Batch				Batch				OK	None
ZN	EPA 200.8	NA	NA	6	≤180	1-5 UG/L	89,88	±25	105,98	±10	4.1,0	≤ 20	NS	≤ 25	on on	TIONE
DISS. CU AND	EPA 200.8	<12	≤12	2	≤180	<1,5	FB-OUT	±25	105,104	±10	FB-OUT	≤ 20	NS	≤25	OK	None
ZN	EFA 200.8	<12	≥12	2	≥180	1-5 UG/L	97,108	±23	103,104	±10	0,NC	≥ 20	1/1/2	≥ 25		
PSD	ASTM 3977	NA	NA	NA	≤7	NA	NA	NA	NA	NA	NA	NA	NS	NA	OK	NOT ANALYZED
ראט	AS 1M 39//	NA	NA	NA	≤/	1 MICRON	NA	NA	NA	NA	NA	NA	NS	NA		

¹ If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.



		Ву	G. Catarra				
Project Name/No./Client:	Filterra Bioretention System Phosphorus Treatment/ 10-04715-000/ Filterra	Date	08/27/13	Page	2	of _	2
Laboratory/Parameters:	Aquatic Research / TSS, TP, SRP, hardness, conductivity, pH, turbidity, Total and Dissolved copper and zinc	Checked:	initials				
Sample Date/Sample ID:	03/20/2013 / FB-IN, FB-OUT		date				

		Pre-preser Holding 7 (hour	Γimes	Total Hold (da	_	Method Blanks	Matrix S _I Surrog Recovery	ate	Lab Cor Samples Ro (%)	ecovery	Lab Dupl RPD (Field Dup RPD (Instrument	
Parameter	Completeness/ Methodology	Reported	Goal	Reported	Goal	Reporting Limit	Reported	Goal	Reported	Goal	Reported	Goal ¹	Reported	Goal ¹	Calibration/ Performance	ACTION
COND	EPA 120.1	NA	NA	5	≤28	NA 0.1 UMHOS/CM	NA	NA	100	±10	FB-OUT 0.5	≤ 20	NS	≤25	OK	None
РΗ	EPA 150.1	NA	NA	1	≤1	NA 0.1 STD UNITS	NA	NA	NA	NA	NA	NA	NS	≤25	OK	None
TURBIDITY	EPA 180.1	NA	NA	2	≤2	NA 0.1 NTU	NA	NA	98	±10	Batch 2.4	≤ 20	NS	≤25	OK	None

¹ If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.



		By	G. Catarra				
Project Name/No./Client:	Filterra Bioretention System Phosphorus Treatment/ 10-04715-000/ Filterra	Date	08/27/13	Page	1	of	1
Laboratory/Parameters:	Aquatic Research / TSS, TP, SRP, hardness, Total and Dissolved copper and zinc	Checked:	initials				
Sample Date/Sample ID:	04/05/2013 / FB-IN, FB-OUT		date				

		Pre-preser Holding 7 (hour	Γimes	Total Hold (day	U	Method Blanks	Matrix S _I Surrog Recovery	ate	Lab Cor Samples Ro (%)	ecovery	Lab Dupl RPD (Field Dup RPD (Instrument	
Parameter	Completeness/ Methodology	Reported	Goal	Reported	Goal	Reporting Limit	Reported	Goal	Reported	Goal	Reported	Goal ¹	Reported	Goal ¹	Calibration/ Performance	ACTION
TSS	SM2540D	NA	NA	7	≤7	< 0.50	NA	NA	96	±10	Batch	≤ 25	NS	≤25	OK	None
133	SW12340D	INA	NA	,	7	0.5 MG/L	IVA	NA	90	±10	11	\$ 23	NS	223		
	TD 1 0 65 1				100	< 0.002	Batch	25	100	4.0	Batch	100			OK	None
TP	EPA 365.1	NA	NA	6	≤28	0.002 MG/L	104	±25	100	±10	5.4	≤ 20	NS	≤ 25		
						< 0.001	Batch				Batch				OK	"J" FLAG RESULTS DUE TO
SRP	EPA 365.1	<12	≤12	3	≤2	0.001 MG/L	105	±25	97	±10	0	≤ 20	NS	≤ 25		HOLDING TIME.
HARDNESS	SM2340B	NA	NA	12	≤180	<2.00	Batch	±25	94	±10	Batch	≤ 20	NS	≤ 25	OK	None
HARDNESS	SW12340B	IVA	NA	12	2100	2 MG/L	92	±23	94	±10	2.1	S 20	NS	\$ 23		
TOT. CU AND	EPA 200.8	NA	NA	5	≤180	<1,5	Batch	±25	107,104	±10	Batch	≤ 20	NS	≤ 25	OK	None
ZN	LI A 200.0	IVA	INA	3	2160	1-5 UG/L	85,86	-23	107,104	±10	2.9,1.3	220	145	223		
DISS. CU AND	EPA 200.8	<12	≤12	5	≤180	<1,5	Batch	±25	107,104	±10	Batch	≤ 20	NS	≤ 25	OK	None
ZN	EI A 200.0	\1Z	212	J	7100	1-5 UG/L	97,104		107,104	±10	2.2,0	≥ 20°	140	223		
PSD	ASTM 3977	NA	NA	NA	≤7	NA 1 MICRON	NA	NA	NA	NA	NA	NA	NS	NA	OK	NOT ANALYZED

¹ If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.



		Ву	G. Catarra				
Project Name/No./Client:	Filterra Bioretention System Phosphorus Treatment/ 10-04715-000/ Filterra	Date	08/27/13	Page	1	of	1
Laboratory/Parameters:	Aquatic Research / TSS, TP, SRP, hardness, Total and Dissolved copper and zinc	Checked:	initials				
Sample Date/Sample ID:	04/06/2013 / FB-IN, FB-OUT		date				

		Pre-preser Holding 7 (hours	Γimes	Total Hold (day		Method Blanks	Matrix S _I Surrog Recovery	ate	Lab Cor Samples Re (%)	ecovery	Lab Dupl RPD (Field Dup RPD (Instrument	
Parameter	Completeness/ Methodology	Reported	Goal	Reported	Goal	Reporting Limit	Reported	Goal	Reported	Goal	Reported	Goal ¹	Reported	Goal ¹	Calibration/ Performance	ACTION
TSS	SM2540D	NA	NA	6	≤7	< 0.50	NA	NA	96	±10	Batch	≤ 25	NS	≤25	OK	None
155	3W12540D	IVA	IVA	Ü	1/	0.5 MG/L	IVA	NA	90	±ΙΟ	11	<u> </u>	143	223		
TED	ED 4 265 1	27.4	374	-	400	< 0.002	Batch	. 25	100	10	Batch	120	NG		OK	None
TP	EPA 365.1	NA	NA	5	≤28	0.002 MG/L	104	±25	100	±10	5.4	≤ 20	NS	≤25		
						< 0.001	FB-OUT				FB-OUT				OK	None
SRP	EPA 365.1	<12	≤12	2	≤2	0.001 MG/L	105	±25	97	±10	0	≤ 20	NS	≤25		
HARDNESS	SM2340B	NA	NA	11	≤180	<2.00	Batch	±25	94	±10	Batch	≤ 20	NS	≤25	OK	None
TIARDNESS	51V12540B	IVA	IVA	11	3100	2 MG/L	92	± 2 3	74	±10	2.1	320	145	3 23		
TOT. CU AND	EPA 200.8	NA	NA	4	≤180	<1,5	Batch	±25	107,104	±10	Batch	≤ 20	NS	≤25	OK	None
ZN	Li A 200.0	IVA	IVA	7	2160	1-5 UG/L	85,86	± 2 5	107,104	±1 0	2.9,1.3	220	145	323		
DISS. CU AND ZN	EPA 200.8	<12	≤12	4	≤180	<1,5 1-5 UG/L	Batch 97,104	±25	107,104	±10	Batch 2.2,0	≤ 20	NS	≤ 25	OK	None
PSD	ASTM 3977	NA	NA	NA	≤7	NA 1 MICRON	NA	NA	NA	NA	NA	NA	NS	NA	OK	NOT ANALYZED

¹ If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.



		By	G. Catarra				
Project Name/No./Client:	Filterra Bioretention System Phosphorus Treatment/ 10-04715-000/ Filterra	Date	08/27/13	Page	1	of	1
Laboratory/Parameters:	Aquatic Research / TSS, TP, SRP, hardness, Total and Dissolved copper and zinc	Checked:	initials				
Sample Date/Sample ID:	04/10/2013 / FB-IN, FB-OUT		date				

		Pre-preser Holding T	Γimes	Total Hold (day	_	Method Blanks	Matrix S _I Surrog Recovery	ate	Lab Cor Samples Ro (%)	ecovery	Lab Dupl RPD (Field Dup RPD (Instrument	
Parameter	Completeness/ Methodology	Reported	Goal	Reported	Goal	Reporting Limit	Reported	Goal	Reported	Goal	Reported	Goal ¹	Reported	Goal ¹	Calibration/ Performance	ACTION
TSS	SM2540D	NA	NA	7	≤7	< 0.50	NA	NA	94	±10	Batch	≤ 25	NS	≤25	OK	None
155	SW12340D	NA	NA	,	2/	0.5 MG/L	IVA	NA	94	±10	0	\$ 23	NS	243		
	TD 1 0 65 1		374		100	< 0.002	Batch	25	100	4.0	Batch	100		105	OK	None
TP	EPA 365.1	NA	NA	1	≤28	0.002 MG/L	104	±25	100	±10	5.4	≤ 20	NS	≤25		
						< 0.001	Batch				Batch				OK	None
SRP	EPA 365.1	<12	≤12	2	≤2	0.001 MG/L	95	±25	98	±10	0	≤ 20	NS	≤25		
HARDNESS	SM2340B	NA	NA	7	≤180	<2.00	FB-OUT	±25	94	±10	FB-OUT	≤ 20	NS	≤25	OK	None
HARDNESS	5W12540B	IVA	IVA	,	3100	2 MG/L	92	± 2 3	74	±10	2.2	320	145	3 23		
TOT. CU AND	EPA 200.8	NA	NA	5	≤180	<1,5	FB-IN	±25	107,106	±10	FB-IN	≤ 20	NS	≤25	OK	None
ZN	El A 200.8	IVA	NA	3	2100	1-5 UG/L	103,120	143	107,100	±10	13,NC	<u> </u>	113	423		
DISS. CU AND	EPA 200.8	<12	≤12	5	≤180	<1,5	FB-OUT	±25	107,106	±10	FB-OUT	≤ 20	NS	≤25	OK	None
ZN	EFA 200.8	<12	212	<i>J</i>	2100	1-5 UG/L	108,116	140	107,100	±10	8.3,NC	<u> </u>	INO	<u> </u>		
PSD	ASTM 3977	NA	NA	NA	≤7	NA 1 MICRON	NA	NA	NA	NA	NA	NA	NS	NA	OK	NOT ANALYZED

¹ If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.



		By	G. Catarra				
Project Name/No./Client:	Filterra Bioretention System Phosphorus Treatment/ 10-04715-000/ Filterra	Date	08/27/13	Page	1	of	1
Laboratory/Parameters:	Aquatic Research / TSS, TP	Checked:	initials				
Sample Date/Sample ID:	05/12/2013 / FB-IN, FB-OUT		date				

		Pre-preser Holding 7 (hour	Γimes	Total Hold (day	U	Method Blanks	Matrix S _I Surrog Recovery	ate	Lab Cor Samples Ro (%)	ecovery	Lab Dupl RPD (Field Dup RPD (Instrument	
Parameter	Completeness/ Methodology	Reported	Goal	Reported	Goal	Reporting Limit	Reported	Goal	Reported	Goal	Reported	Goal ¹	Reported	Goal ¹	Calibration/ Performance	ACTION
TSS	SM2540D	NA	NA	5	≤7	< 0.50	NA	NA	97	±10	Batch	≤ 25	NS	≤25	OK	None
155	SW12540D	IVA	NA	3	2/	0.5 MG/L	IVA	NA	91	±10	2.2	\$ 23	143	523		
9	TD 1 0 6 5 1		27.4		100	< 0.002	Batch	25	101	4.0	Batch	100	N.G		OK	None
TP	EPA 365.1	NA	NA	3	≤28	0.002 MG/L	102	±25	101	±10	5.4	≤ 20	NS	≤ 25		
						< 0.001									OK	NOT ANALYZED
SRP	EPA 365.1	NA	≤12	NA	≤2	0.001 MG/L	NA	±25	NA	±10	NA	≤ 20	NS	≤ 25		
HARDNESS	SM2340B	NA	NA	NA	≤180	<2.00	NA	±25	NA	±10	NA	≤ 20	NS	≤ 25	OK	NOT ANALYZED
						2 MG/L										
TOT. CU AND	EPA 200.8	NA	NA	NA	≤180	<1,5	NA	±25	NA	±10	NA	≤ 20	NS	≤ 25	OK	NOT ANALYZED
ZN						1-5 UG/L										
DISS. CU AND	EPA 200.8	NA	≤12	NA	≤180	<1,5	NA	±25	NA	±10	NA	≤ 20	NS	≤ 25	OK	NOT ANALYZED
ZN	27772000	1,12		1,11		1-5 UG/L			1 11 1				1,5			
PSD	ASTM 3977	NA	NA	NA	≤7	NA 1 MICRON	NA	NA	NA	NA	NA	NA	NS	NA	OK	NOT ANALYZED

¹ If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.



		By	G. Catarra				
Project Name/No./Client:	Filterra Bioretention System Phosphorus Treatment/ 10-04715-000/ Filterra	Date	08/27/13	Page _	1	of	1
_aboratory/Parameters:	Aquatic Research / TSS, TP, SRP	Checked:	initials				
Sample Date/Sample ID:	05/22/2013 / FB-IN, FB-OUT		date				

		Pre-preser Holding (hour	Γimes	Total Hold (da	-	Method Blanks	Matrix S _I Surrog Recovery	ate	Lab Cor Samples Ro (%)	ecovery	Lab Dupl RPD (Field Dup RPD (Instrument	
Parameter	Completeness/ Methodology	Reported	Goal	Reported	Goal	Reporting Limit	Reported	Goal	Reported	Goal	Reported	Goal ¹	Reported	Goal ¹	Calibration/ Performance	ACTION
TSS	SM2540D	NA	NA	6	≤7	< 0.50	NA	NA	96	±10	Batch	≤ 25	NS	≤25	OK	None
155	SW12540D	IVA	IVA	O	3/	$0.5~\mathrm{MG/L}$	IVA	IVA	70	±10	4.0	123	145	323		
TED	ED 4 265 1	27.4	37.4	2	400	< 0.002	Batch	±25	101	10	Batch	420	NG		OK	None
TP	EPA 365.1	NA	NA	2	≤28	0.002 MG/L	100	±25	101	±10	0	≤ 20	NS	≤ 25		
						< 0.001	Batch				Batch				OK	None
SRP	EPA 365.1	<12	≤12	2	≤2	0.001 MG/L	100	±25	103	±10	7.4	≤20	NS	≤ 25		
HARDNESS	SM2340B	NA	NA	NA	≤180	<2.00	NA	±25	NA	±10	NA	≤ 20	NS	≤ 25	OK	NOT ANALYZED
						2 MG/L										
TOT. CU AND	EPA 200.8	NA	NA	NA	≤180	<1,5	NA	±25	NA	±10	NA	≤ 20	NS	≤25	OK	NOT ANALYZED
ZN						1-5 UG/L										
DISS. CU AND ZN	EPA 200.8	NA	≤12	NA	≤180	<1,5 1-5 UG/L	NA	±25	NA	±10	NA	≤ 20	NS	≤ 25	OK	NOT ANALYZED
PSD	ASTM 3977	NA	NA	NA	≤7	NA 1 MICRON	NA	NA	NA	NA	NA	NA	NS	NA	OK	NOT ANALYZED

¹ If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.



		By	G. Catarra				
Project Name/No./Client:	Filterra Bioretention System Phosphorus Treatment/ 10-04715-000/ Filterra	Date	08/27/13	Page	1	of _	1
Laboratory/Parameters:	Aquatic Research / TSS, TP, SRP	Checked:	initials				
Sample Date/Sample ID:	05/22/2013 / FB-IN, FB-OUT		date				

		Pre-preser Holding T	Γimes	Total Hold (day	U	Method Blanks	Matrix S _I Surrog Recovery	ate	Lab Cor Samples Re (%)	ecovery	Lab Dupl RPD (Field Dup RPD (Instrument	
Parameter	Completeness/ Methodology	Reported	Goal	Reported	Goal	Reporting Limit	Reported	Goal	Reported	Goal	Reported	Goal ¹	Reported	Goal ¹	Calibration/ Performance	ACTION
TSS	SM2540D	NA	NA	6	≤7	< 0.50	NA	NA	96	±10	Batch	≤ 25	NS	≤25	OK	None
155	SW12540D	IVA	IVA	Ü	21	$0.5~\mathrm{MG/L}$	IVA	NA	90	±10	4.0	223	145	223		
	FD 4 0 6 5 4		27.4	10	100	< 0.002	Batch	25	102	4.0	Batch	100			OK	None
TP	EPA 365.1	NA	NA	12	≤28	0.002 MG/L	98	±25	102	±10	0	≤ 20	NS	≤ 25		
						< 0.001	FB-OUT				FB-OUT				OK	None
SRP	EPA 365.1	<12	≤12	2	≤2	0.001 MG/L	100	±25	103	±10	7.4	≤ 20	NS	≤ 25		
HARDNESS	SM2340B	NA	NA	NA	≤180	<2.00	NA	±25	NA	±10	NA	≤ 20	NS	≤ 25	OK	NOT ANALYZED
THREFTESS	51123 102	1171	1421	1171		2 MG/L	1,1.1		1171	_10	- 1,12	110	110			
TOT. CU AND	EPA 200.8	NA	NA	NA	≤180	<1,5	NA	±25	NA	±10	NA	≤ 20	NS	≤ 25	OK	NOT ANALYZED
Zn	L171 200.0	1421	1421	1421	3100	1-5 UG/L	1471	-20	1471	±10	1471	1	145	325		
DISS. CU AND	EPA 200.8	NA	≤12	NA	≤180	<1,5	NA	±25	NA	±10	NA	≤ 20	NS	≤ 25	OK	NOT ANALYZED
ZN	LI A 200.8	11/7	212	IVA	7100	1-5 UG/L	14/4	-20	IVA	±1 0	11/1	<u> </u>	140	323		
PSD	ASTM 3977	NA	NA	NA	≤7	NA	NA	NA	NA	NA	NA	NA	NS	NA	OK	NOT ANALYZED
	11011110777	1,71	1,11	1,71	_,	1 MICRON	1.71	1,21	1,11	1121	1.71	1,71	1.0			

¹ If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.



Бу	G. Catarra	
Date	08/27/13	Page <u>1</u> of <u>1</u>
Checked:	initials	
	date	
	Date	Date 08/27/13 Checked: initials

		Pre-preser Holding (hour	Γimes	Total Hold (day	-	Method Blanks	Matrix Spil Surrogate Rec (%)		Lab Cor Samples Ro (%)	ecovery	Lab Duplio RPD (%		Field Dup RPD (Instrument	
Parameter	Completeness/ Methodology	Reported	Goal	Reported	Goal	Reporting Limit	Reported	Goal	Reported	Goal	Reported	Goal ¹	Reported	Goal ¹	Calibration/ Performance	ACTION
TSS	SM2540D	NA	NA	7	≤7	<0.50 0.5 MG/L	NA	NA	98	±10	FB-QA-3 3.4	≤ 25	3.4	≤25	OK	None
TP	EPA 365.1	NA	NA	12	≤28	<0.002 0.002 MG/L	FB-OUT-B 102	±25	100	±10	FB-OUT-B NC	≤ 20	2.4	≤25	OK	None
SRP	EPA 365.1	<12	≤12	2	≤2	<0.001 0.001 MG/L	FB-OUT-B 105	±25	100	±10	FB-OUT-B NC	≤ 20	DIFF = 0.001	≤25	OK	None
HARDNESS	SM2340B	NA	NA	NA	≤180	<2.00 2 MG/L	NA	±25	NA	±10	NA	≤ 20	NS	≤25	OK	NOT ANALYZED
TOT. CU AND ZN	EPA 200.8	NA	NA	NA	≤180	<1,5 1-5 UG/L	NA	±25	NA	±10	NA	≤ 20	NS	≤25	OK	NOT ANALYZED
DISS. CU AND ZN	EPA 200.8	<12	≤12	8	≤180	<1,5 1-5 UG/L	Batch 100,108	±25	97,94	±10	Batch 4.2,NC	≤ 20	NS	≤25	OK	None
PSD	ASTM 3977	NA	NA	NA	≤7	NA 1 MICRON	NA	NA	NA	NA	NA	NA	NS	NA	OK	NOT ANALYZED

¹ If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available NC – not calculable due to one or more values below the detection limit NS – field duplicate not sampled.

 α



		By	G. Catarra				
Project Name/No./Client: _	Filterra Bioretention System Phosphorus Treatment/ 10-04715-000/ Filterra	Date	08/27/13	Page	1	of	1
_aboratory/Parameters:	Aquatic Research / TSS, TP, SRP	Checked:	initials				
Sample Date/Sample ID:	06/20/2013 / FB-IN, FB-OUT		date				

		Pre-preser Holding (hour	Γimes	Total Hold	_	Method Blanks	Matrix S _I Surrog Recovery	ate	Lab Cor Samples Ro (%)		Lab Dupl RPD (Field Duplicates RPD (%)		Instrument	
Parameter	Completeness/ Methodology	Reported	Goal	Reported	Goal	Reporting Limit	Reported	Goal	Reported	Goal	Reported	Goal ¹	Reported	Goal ¹	Calibration/ Performance	ACTION
TSS	SM2540D	NA	NA	5	≤7	< 0.50	NA	NA	95	±10	Batch	≤ 25	NS	≤25	ОК	None
155	514125-4015	1471	1421	3	27	$0.5~\mathrm{MG/L}$	1471	1171	75	±10	11	1	115	323		
	TD 4 0 6 5 4				100	< 0.002	Batch	25	100	4.0	Batch	100	270		ОК	None
TP	EPA 365.1	NA	NA	2	≤28	0.002 MG/L	106	±25	100	±10	0	≤ 20	NS	≤ 25		
						< 0.001	FB-OUT				FB-OUT				OK	None
SRP	EPA 365.1	<12	≤12	1	≤2	0.001 MG/L	100	±25	100	±10	0	≤ 20	NS	≤ 25		
HARDNESS	SM2340B	NA	NA	NA	≤180	<2.00	NA	±25	NA	±10	NA	≤ 20	NS	≤ 25	OK	NOT ANALYZED
TIARDINESS	5141254015	1471	1421	1421	3100	2 MG/L	1111		1471	-10	1171	320	115	325		
TOT. CU AND	EPA 200.8	NA	NA	NA	≤180	<1,5	NA	±25	NA	±10	NA	≤ 20	NS	≤ 25	ОК	NOT ANALYZED
ZN	Li A 200.0	IVA	IVA	IVA	2100	1-5 UG/L	IVA	1	IVA	±10	IVA	1	113	323		
DISS. CU AND	EPA 200.8	NA	≤12	NA	≤180	<1,5	NA	±25	NA	±10	NA	≤ 20	NS	≤ 25	OK	NOT ANALYZED
ZN	EFA 200.8	INA	212	INA	2100	1-5 UG/L	11//1	143	INA	±10	11/7	520	NO	≥ <u>2</u> 3		
PSD	ASTM 3977	NA	NA	NA	≤7	NA	NA	NA	NA	NA	NA	NA	NS	NA	OK	NOT ANALYZED
150	1101111 3711	IVA	I IIA	14/7	۱ د	1 MICRON	11/1	IIA	11/1	IVA	14/1	IVA	140	117		

¹ If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.