MEMORANDUM

DATE: 17 February 2020
TO: Chris Prucha, Bill McDonough and Jim Forney, Waste Management (WM)
CC:
FROM: Madeleine Corriveau & François Richard, BluMetric Environmental Inc.
PROJECT NO: 200172-03
SUBJECT: Report to Satisfy Item No. 4 of Provincial Officer's Order 3623-BL33DW, Waste Management Richmond Landfill, Town of Greater Napanee

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This report has been prepared as required by Item No. 4 of Provincial Officer's Order (POO) 3623-BL33DW issued on January 23, 2020 and amended on January 27, 2020. It provides a summary and interpretation of results from the sampling conducted in accordance with Item No. 3 of the POO, as well as conclusions and recommendations for further assessment. Note that additional sampling requested by MECP Provincial Officer David Arnott (email dated January 30, 2020) was completed on January 31, 2020. Results from this sampling event are expected by February 18, 2020 and will be reported as soon as possible thereafter.

Item No. 3 of the POO required the following sampling and analyses, associated with the South Chamber leachate sump:

- Surface water grab sample from the Southern Stormwater Management Pond (SW Pond) for analysis of Table 2 from ECA 1688-8HZNJG; 1,4-dioxane; and, acute lethality testing for Rainbow Trout and *Daphnia magna*.
- Groundwater samples from monitoring wells M9-2, M9-3, M41, M109-1 and M109-2 for analysis of Tables 3 and 4 from the latest Environmental Monitoring Program for the Site[1].

All sampling was completed on January 27, 2020.

[1] *Environmental Monitoring Plan, WM Richmond Landfill, Town of Greater Napanee, Ontario, rev. No.05*, prepared by BluMetric Environmental Inc., dated April 2016

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RESULTS & INTERPRETATION

Surface Water

Surface water quality results for the SW Pond are summarized in Table 1. The concentration of total phosphorous was slightly above PWQO. All other parameters were within PWQO. 1,4-dioxane was less than the reportable detection limit of 0.001 mg/L. Based on historical monitoring results, total phosphorus has been shown to exceed PWQO limits sporadically, in the SW Pond and at surface water monitoring station S5 (Attachment 1) located upstream of the SW Pond. The slight exceedance in the SW pond is consistent with historical observations and is likely not attributed to landfill leachate impacts which would otherwise be indicated by the presence of elevated concentrations of other leachate constituents.

Acute Lethality Testing results for the SW Pond indicated 0% mortality for both Rainbow Trout and *Daphnia magna* (see Attachment 2).

Groundwater

Groundwater quality results for monitoring wells M9-2, M9-3, M41, M109-1 and M109-2 (see Figure 1) are summarized in Table 2 and time-series graphs presenting historical data for select parameters are provided in Attachment 1. Results for this sampling event are consistent with historical groundwater monitoring results.

Table 1: Surface Water Quality Results

Parameter	Units	PWQO	SW Pond 2020-01-27
Inorganic/General Parameters			
Alkalinity	mg/L		180
Ammonia	mg/L		< 0.15
Ammonia (unionized)	mg/L	0.02	< 0.00061
Carbonaceous BOD	mg/L		< 2
Chemical Oxygen Demand	mg/L		8.9
Chloride	mg/L		17
Dissolved Oxygen	mg/L		6.41
Naphthalene	mg/L	0.007	< 0.00005
Nitrate	mg/L		< 0.1
pH (Lab)	unitless	6.5-8.5	7.64
Phenols	mg/L	0.001	< 0.004
Phosphorus (total)	mg/L	0.03	0.039
Total Dissolved Solids	mg/L		225
Total Kjeldahl Nitrogen	mg/L		< 0.7
Total Organic Carbon	mg/L		4.8
Total Suspended Solids	mg/L		< 10
Volatile Organic Compounds (VOCs)			
1,4-Dioxane	mg/L	0.02	<0.001
Benzene	mg/L		< 0.0002
Ethylbenzene	mg/L		< 0.0002
m+p-Xylene	mg/L		< 0.0002
o-Xylene	mg/L		< 0.0002
Toluene	mg/L		< 0.0002
Total Xylenes	mg/L		< 0.0002

Parameter	Units	PWQO	SW Pond 2020-01-27
Metals			
Aluminum	mg/L		0.063
Arsenic	mg/L		< 0.001
Barium	mg/L		0.037
Beryllium	mg/L		< 0.0006
Boron	mg/L	0.2	< 0.02
Cadmium	mg/L		< 0.0001
Chromium (III)	mg/L	0.0089	< 0.005
Chromium (Total)	mg/L		< 0.005
Chromium (VI)	mg/L	0.001	< 0.0005
Cobalt	mg/L	0.0009	< 0.0005
Copper	mg/L	0.005	< 0.002
Iron	mg/L	0.3	0.14
Mercury	mg/L		< 0.0002
Nickel	mg/L	0.025	< 0.001
Potassium	mg/L		2.8
Selenium	mg/L		< 0.005
Silver	mg/L		< 0.0004
Sodium	mg/L		16
Zinc	mg/L	0.02	< 0.01
Field Parameters			
pH (Field)	unitless		6.31
Field Conductivity	µS/cm		310
Field Temperature	Celsius		1.2
Toxicity			
Rainbow Trout Mortality*	%		0
Daphnia magna Mortality**	%		0

Exceeds PWQO

*96-hour 100% Effluent Concentration Acute Lethality Test

**48-hour 100% Effluent Concentration Acute Lethality Test

Table 2: Groundwater Quality Results

Parameter	Units	M109-1 2020-01-27	M109-2 2020-01-27	M41 2020-01-27	M9-2 2020-01-27	M9-3 2020-01-27
General/Inorganic Parameters						
Alkalinity	mg/L	560	260	440	500	350
Ammonia	mg/L	1.33	1.57	< 0.15	0.85	0.96
Boron	mg/L	0.33	0.99	0.057	0.23	0.38
Calcium	mg/L	140	35	150	120	66
Chloride	mg/L	150	110	160	110	94
Conductivity	µS/cm	1400	880	1500	1300	970
Dissolved Organic Carbon	mg/L	7.6	1.5	3.1	6.2	2.9
Iron	mg/L	14	< 0.1	0.33	10	2
Magnesium	mg/L	42	25	78	31	29
Manganese	mg/L	0.33	0.002	0.042	0.38	0.094
Nitrate	mg/L	< 0.1	< 0.1	2.02	< 0.1	< 0.1
Nitrite	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Potassium	mg/L	6.9	14	14	5.4	15
Sodium	mg/L	100	95	46	77	68
Sulphate	mg/L	1.4	9	98	3.6	2.9
Total Dissolved Solids	mg/L	820	460	885	700	490
Volatile Organic Compounds (VOCs)						
1,1,1,2-Tetrachloroethane	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
1,1,1-Trichloroethane	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
1,1,2,2-Tetrachloroethane	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
1,1,2-Trichloroethane	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
1,1-Dichloroethane	mg/L	< 0.0001	< 0.0001	0.00014	0.00038	0.0002
1,1-Dichloroethylene	mg/L	< 0.0001	< 0.0001	< 0.0001	0.00011	< 0.0001
1,2-Dichlorobenzene (o)	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
1,2-Dichloroethane	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
1,3,5-Trimethylbenzene	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
1,3-Dichlorobenzene (m)	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
1,4-Dichlorobenzene (p)	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
1,4-Dioxane		0.021	<0.001	<0.001	0.015	0.005
Benzene	mg/L	0.00014	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Chlorobenzene	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Chloroethane	mg/L	0.0088	< 0.0002	< 0.0002	0.021	0.0074
Chloromethane	mg/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Cis-1,2-Dichloroethylene	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Dichloromethane	mg/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Ethylbenzene	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
m+p-Xylene	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
o-Xylene	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Styrene	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Tetrachloroethylene	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Toluene	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Total Xylenes	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Trans-1,2-dichloroethylene	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Trichloroethylene	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Vinyl Chloride	mg/L	< 0.0002	< 0.0002	< 0.0002	0.00025	< 0.0002

CONCLUSIONS & RECOMMENDATIONS

Results from this sampling program indicate no adverse impact to surface water or groundwater as a result of leachate overflow from the South Chamber.

Weekly surface water sampling at location S8R has been initiated by WM. Sampling location S8R is located along Beechwood Ditch near the downstream property boundary. Samples are being analyzed for the list of surface water parameters from the Environmental Monitoring Plan (EMP Table 8)[1]. Results from this sampling location represent surface water quality leaving the site. It is recommended that weekly sampling continue for a period of six weeks at which point the need to continue weekly sampling will be re-evaluated and discussed with MECP.

It is recommended that each of the five monitoring wells sampled as part of this investigation be sampled for the same suite of parameters during the next routine monitoring event (typically scheduled for April) to ensure no significant concentration increases resulting from the leachate overflow are identified. Intermediate groundwater monitoring wells M9-2, M9-3 and M109-1 are part of the routine semi-annual EMP monitoring program; shallow groundwater monitoring well M41 and intermediate groundwater monitoring well M109-2 will be added to this monitoring event.

CLOSING

We trust the above is satisfactory at this time. If you have any questions or need further information please do not hesitate to contact the undersigned.

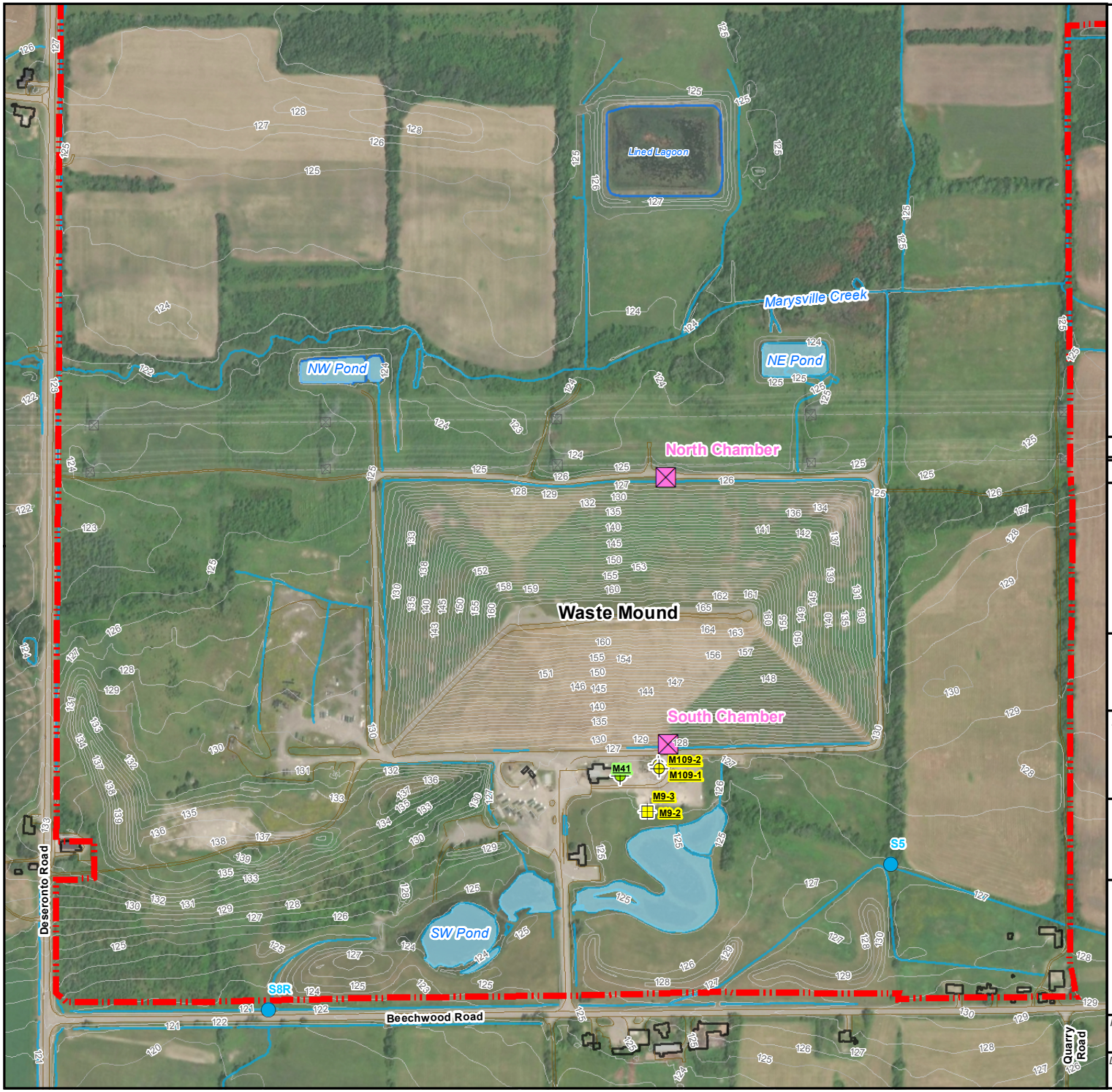
Respectfully submitted,
BluMetric Environmental Inc.

Francois Richard, Ph.D. P.Geo.
Senior Hydrogeologist

Madeleine Corriveau, M.Sc., P.Geo
Senior Geoscientist

Encl.
Figure 1: Site Plan and Sampling Locations
Attachment 1: Historical Water Quality Results
Attachment 2: Acute Lethality Bioassay Report

FIGURE



LEGEND

- Surface Water Sample
- **Multi-Level Wells**
- Active Intermediate Monitoring Well
- **Single Wells**
- Active Shallow Monitoring Well
- Active Intermediate Monitoring Well
- Leachate Monitoring Locations
- Property Boundary
- Waterbody
- Building
- Hydro Tower
- Road
- Watercourse
- Overhead Power Line
- Waterbody
- **Topographic Contours (1 masl)**
- Major Contour
- Minor Contour

REV.	DESCRIPTION	YY/MM/DD	BY	CHK
1				

REFERENCES

0 50 100 200 Meters

1:6,300

CLIENT

WASTE MANAGEMENT

PROJECT

WASTE MANAGEMENT RICHMOND LANDFILL LEACHATE RELEASE INVESTIGATION

TITLE

SITE PLAN AND MONITORING LOCATIONS

BluMetric™ Environmental
The Tower - The Woolen Mill,
4 Cataraqui St.,
Kingston, Ontario, K7K 1Z7
Tel: 613-531-2725
Fax: 613-531-1852
Email: info@blumetric.ca
Web: http://www.blumetric.ca

PROJECT #	DATE
200172-03	February 11, 2020

DRAWN	CHECKED	FIG NO.	REV
AL	FR	01	0

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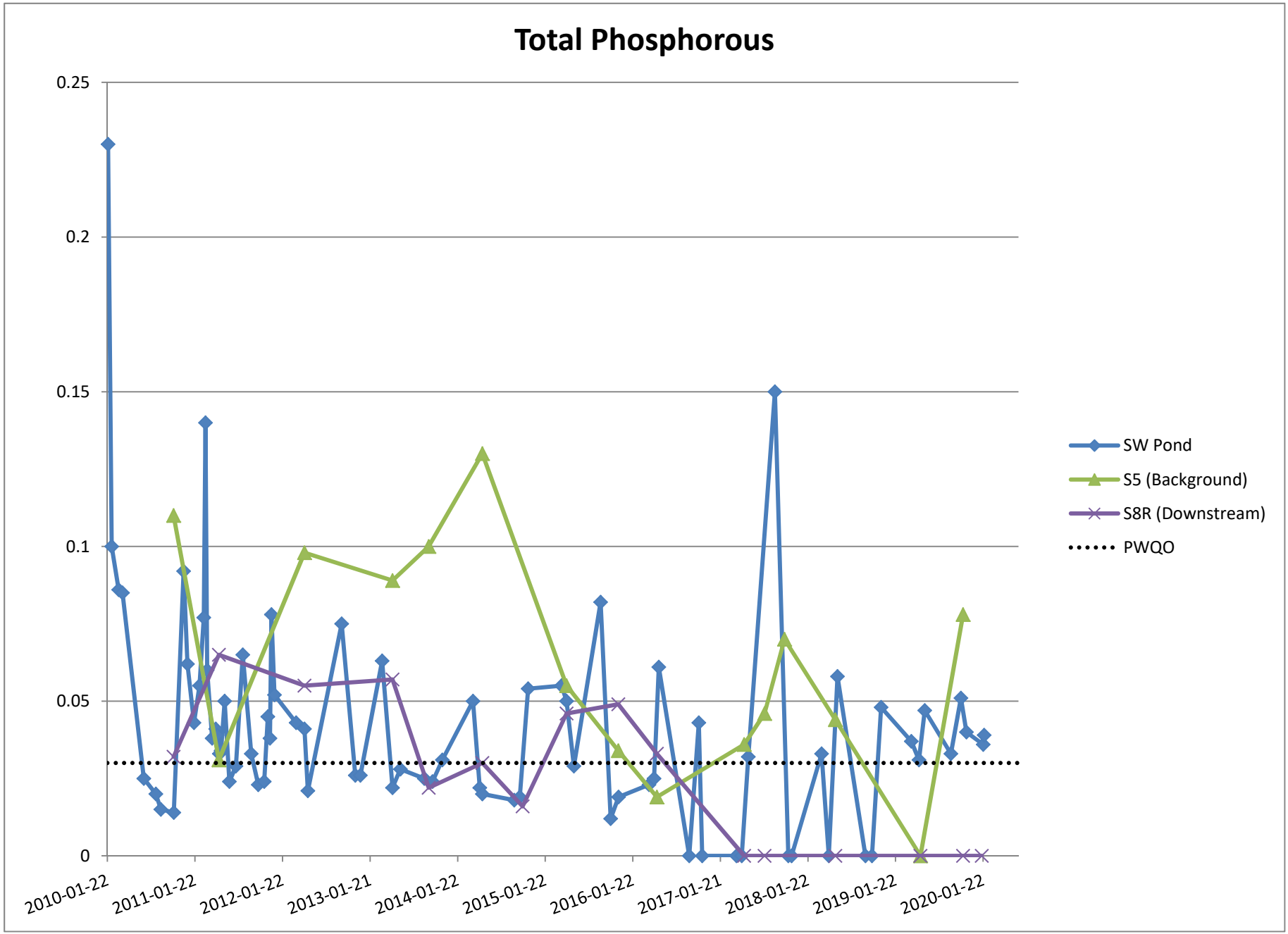
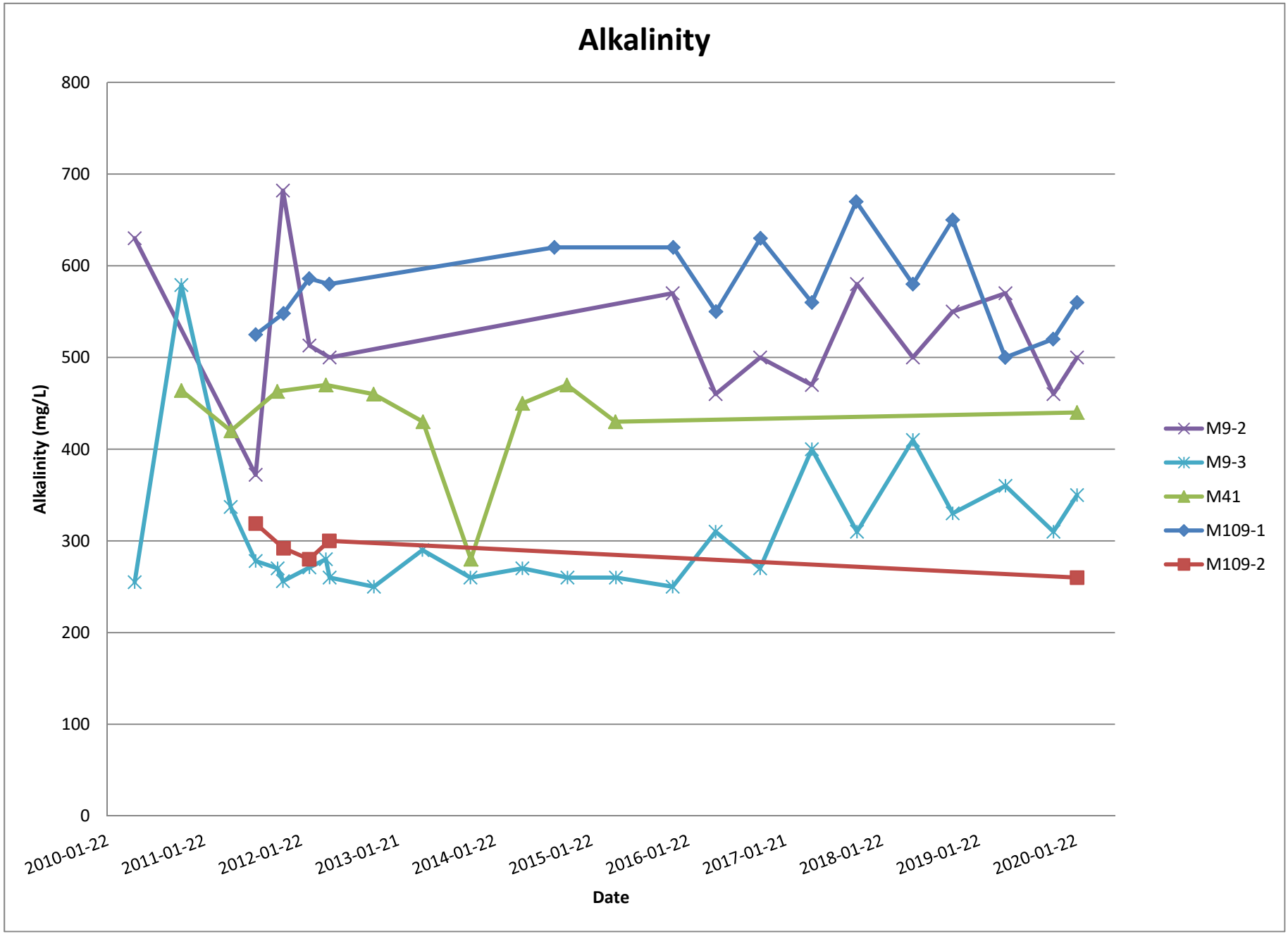
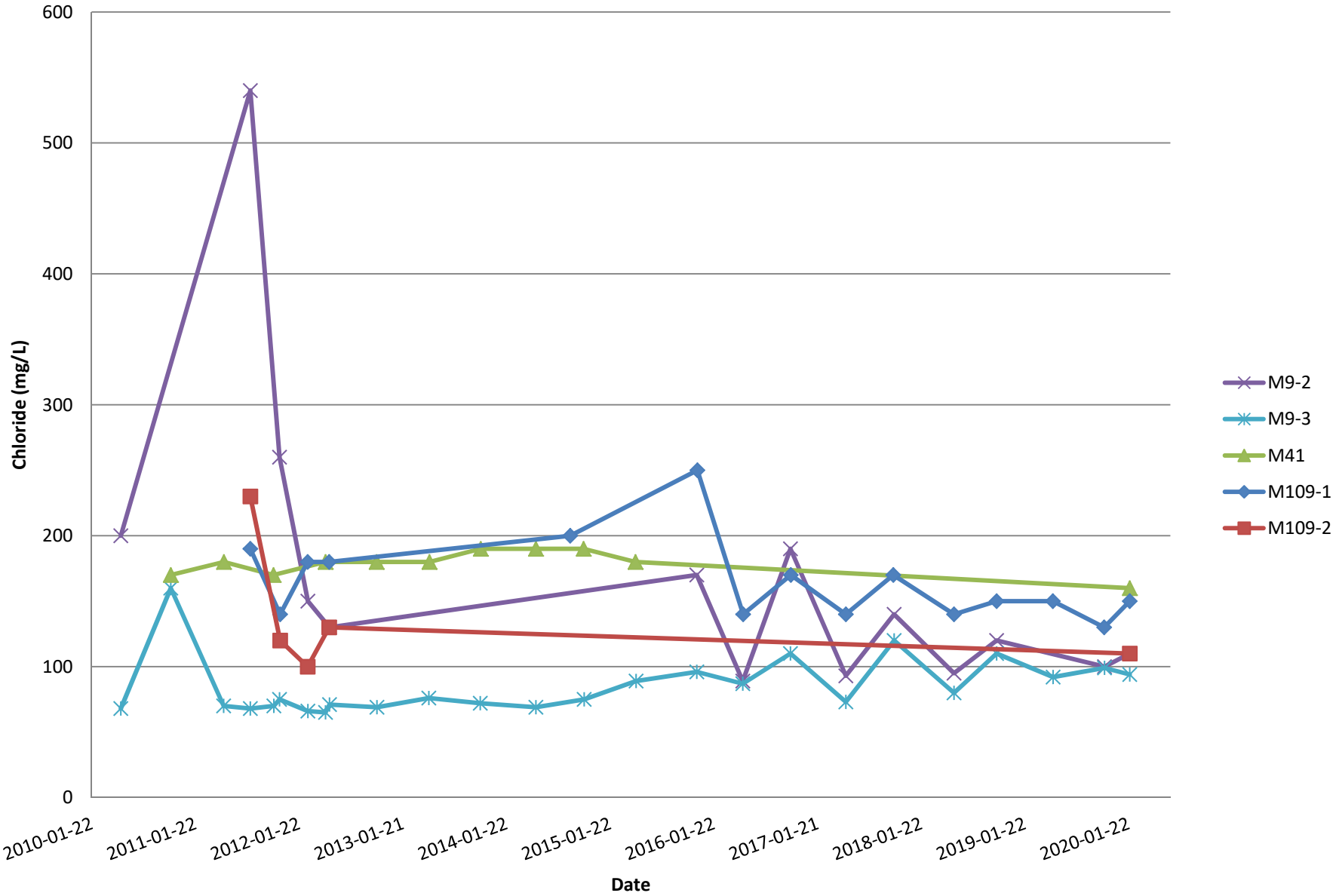
ATTACHMENT 1

Historical Water Quality Results

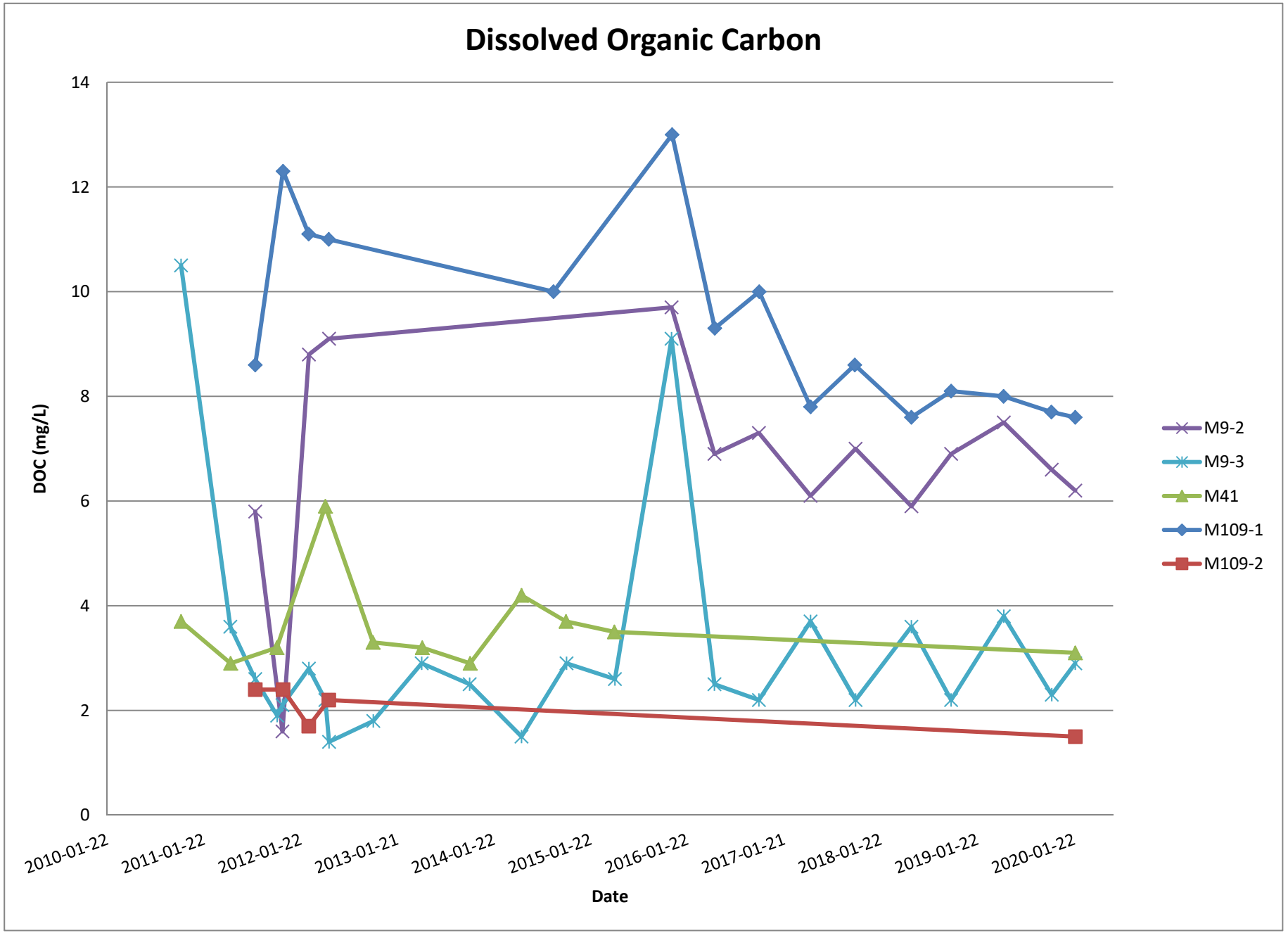

Total Phosphorous
0.25
0.2
0.15
0.1
0.05
0
2010-01-22
2011-01-22
2012-01-22
2013-01-21
2014-01-22
2015-01-22
2016-01-22
2017-01-21
2018-01-22
2019-01-22
2020-01-22
SW Pond
S5 (Background)
S8R (Downstream)
PWQO

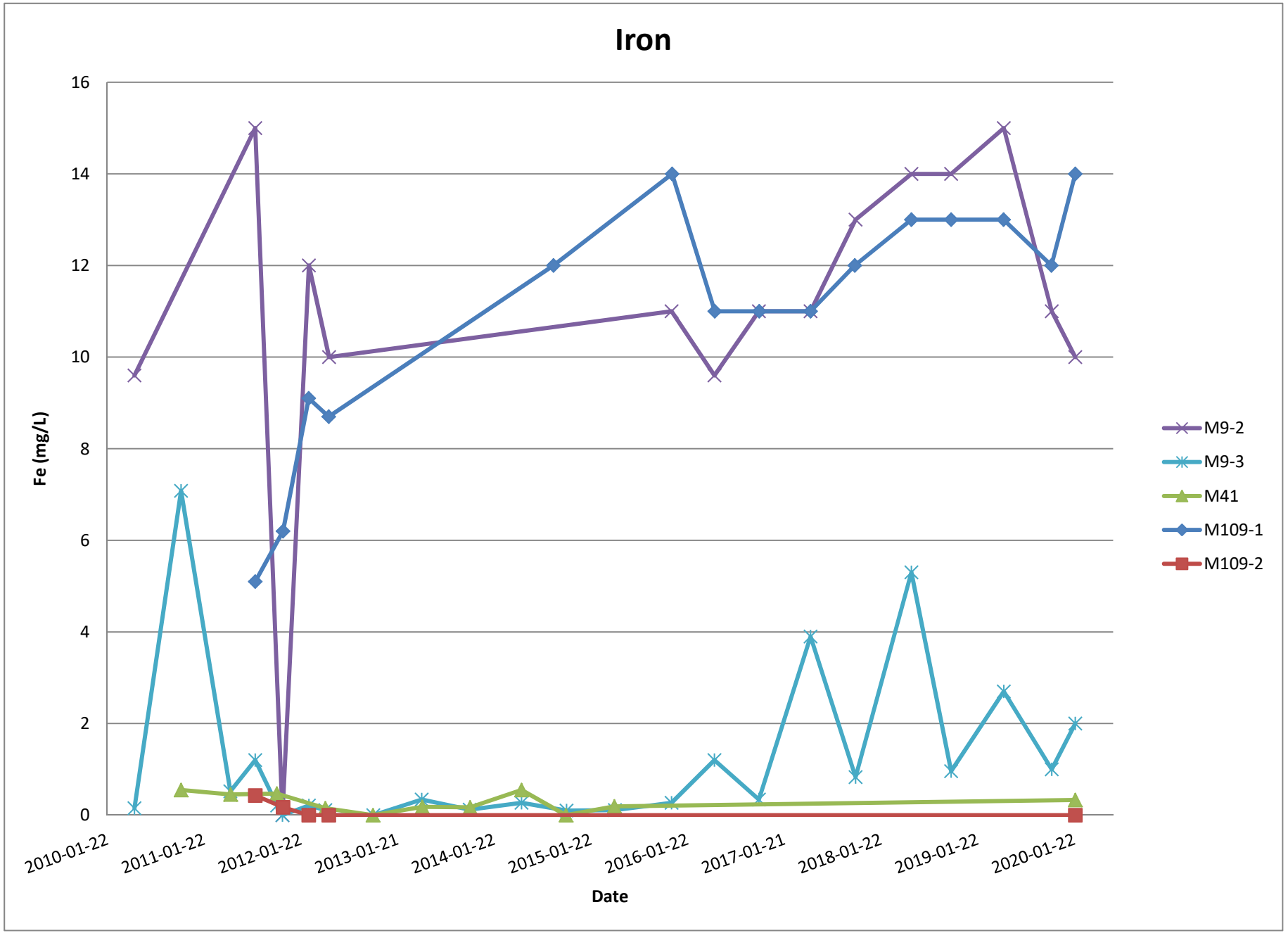

Alkalinity
800
700
600
500
400
300
200
100
0
Alkalinity (mg/L)
2010-01-22
2011-01-22
2012-01-22
2013-01-21
2014-01-22
2015-01-22
2016-01-22
2017-01-21
2018-01-22
2019-01-22
2020-01-22
Date
M9-2
M9-3
M41
M109-1
M109-2

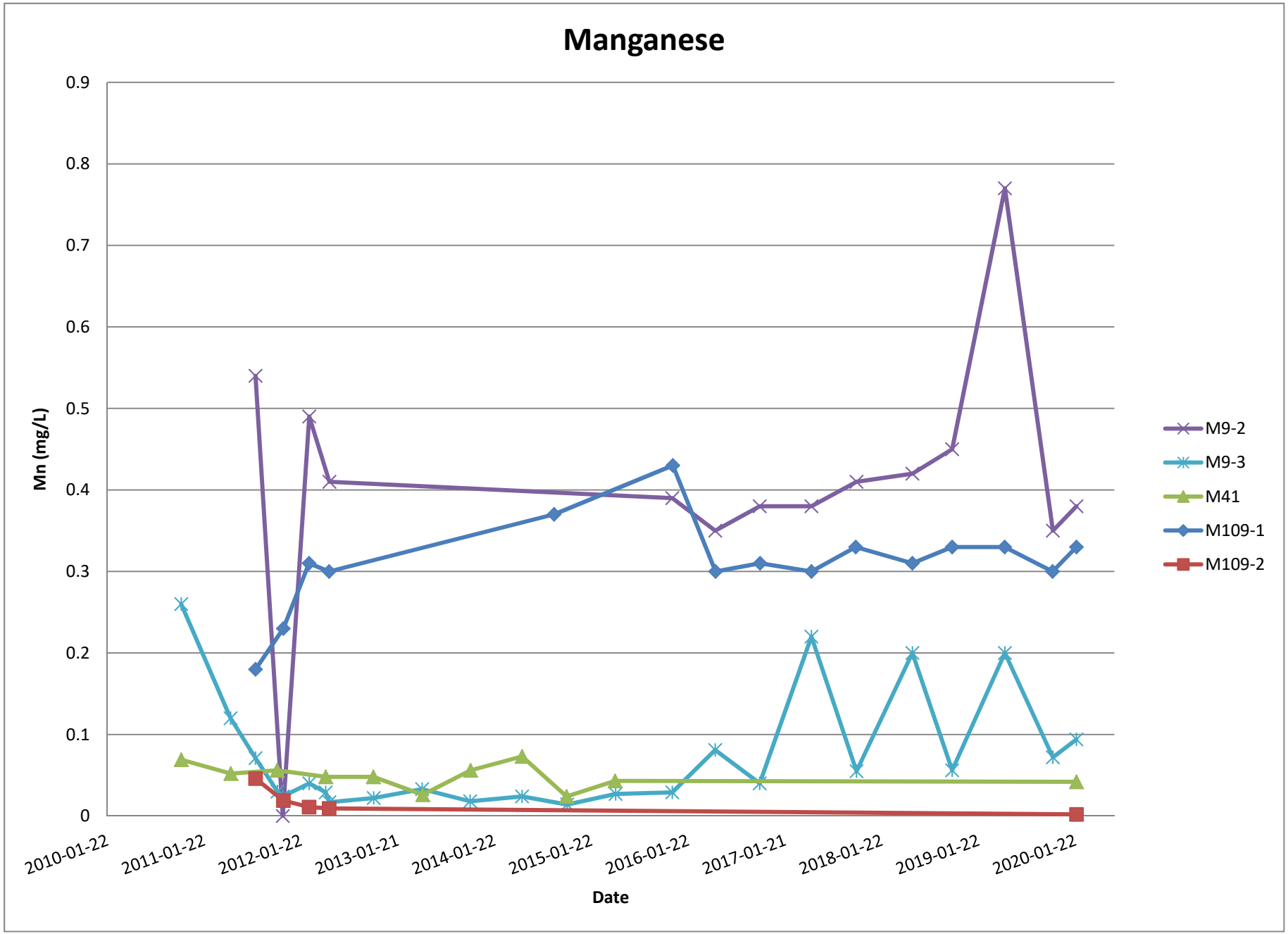
Chloride

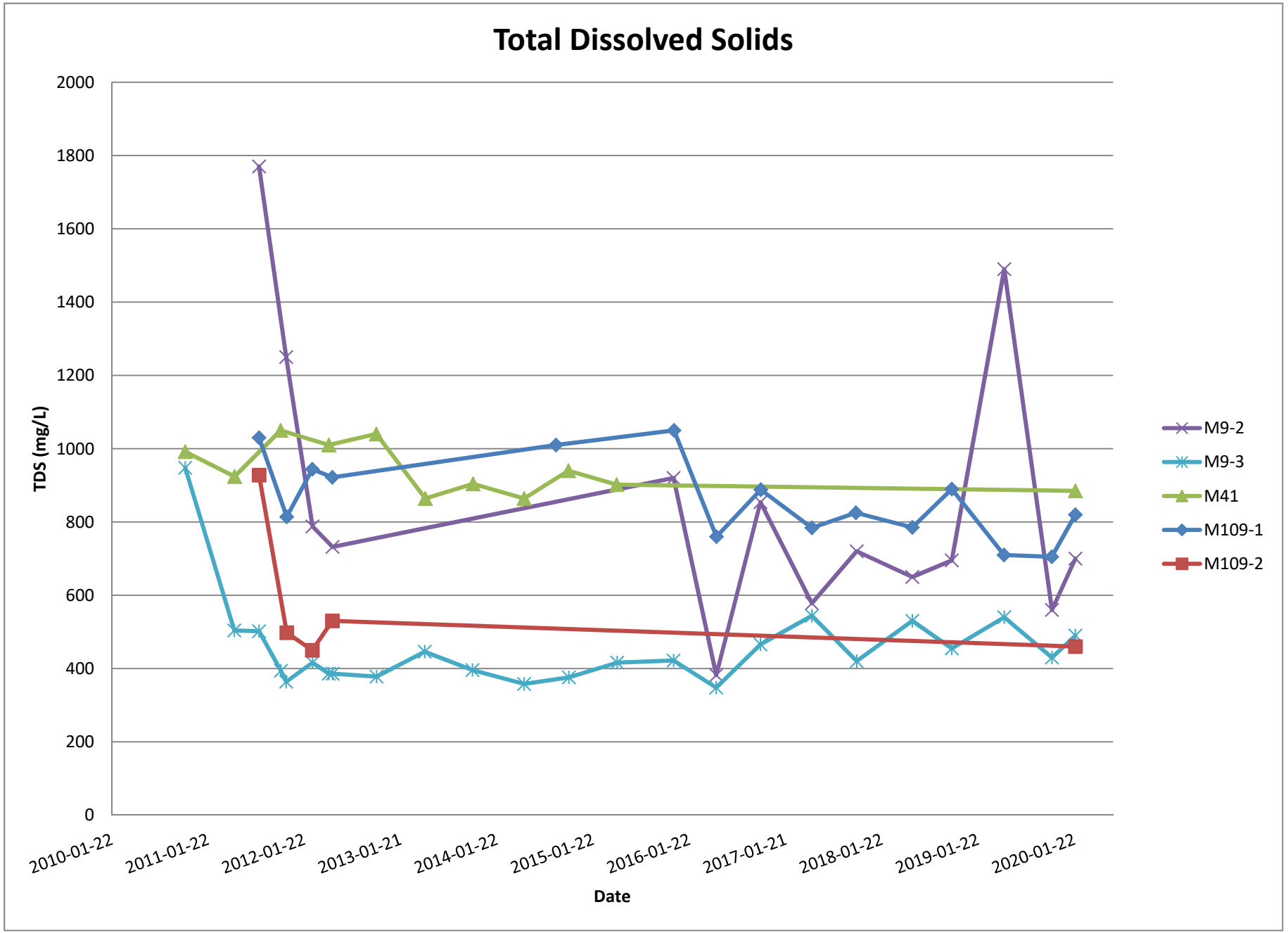


*Note: An outlier data point of 2,700 mg/L reported on May 2, 2019 was omitted from the chart.


Dissolved Organic Carbon
DOC (mg/L)
14
12
10
8
6
4
2
0
2010-01-22
2011-01-22
2012-01-22
2013-01-21
2014-01-22
2015-01-22
2016-01-22
2017-01-21
2018-01-22
2019-01-22
2020-01-22
Date
M9-2
M9-3
M41
M109-1
M109-2


Iron
16
14
12
10
8
6
4
2
0
Fe (mg/L)
2010-01-22
2011-01-22
2012-01-22
2013-01-21
2014-01-22
2015-01-22
2016-01-22
2017-01-21
2018-01-22
2019-01-22
2020-01-22
Date
M9-2
M9-3
M41
M109-1
M109-2


Manganese
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
Mn (mg/L)
2010-01-22
2011-01-22
2012-01-22
2013-01-21
2014-01-22
2015-01-22
2016-01-22
2017-01-21
2018-01-22
2019-01-22
2020-01-22
Date
M9-2
M9-3
M41
M109-1
M109-2


Total Dissolved Solids
2000
1800
1600
1400
1200
1000
800
600
400
200
0
TDS (mg/L)
2010-01-22
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2012-01-22
2013-01-21
2014-01-22
2015-01-22
2016-01-22
2017-01-21
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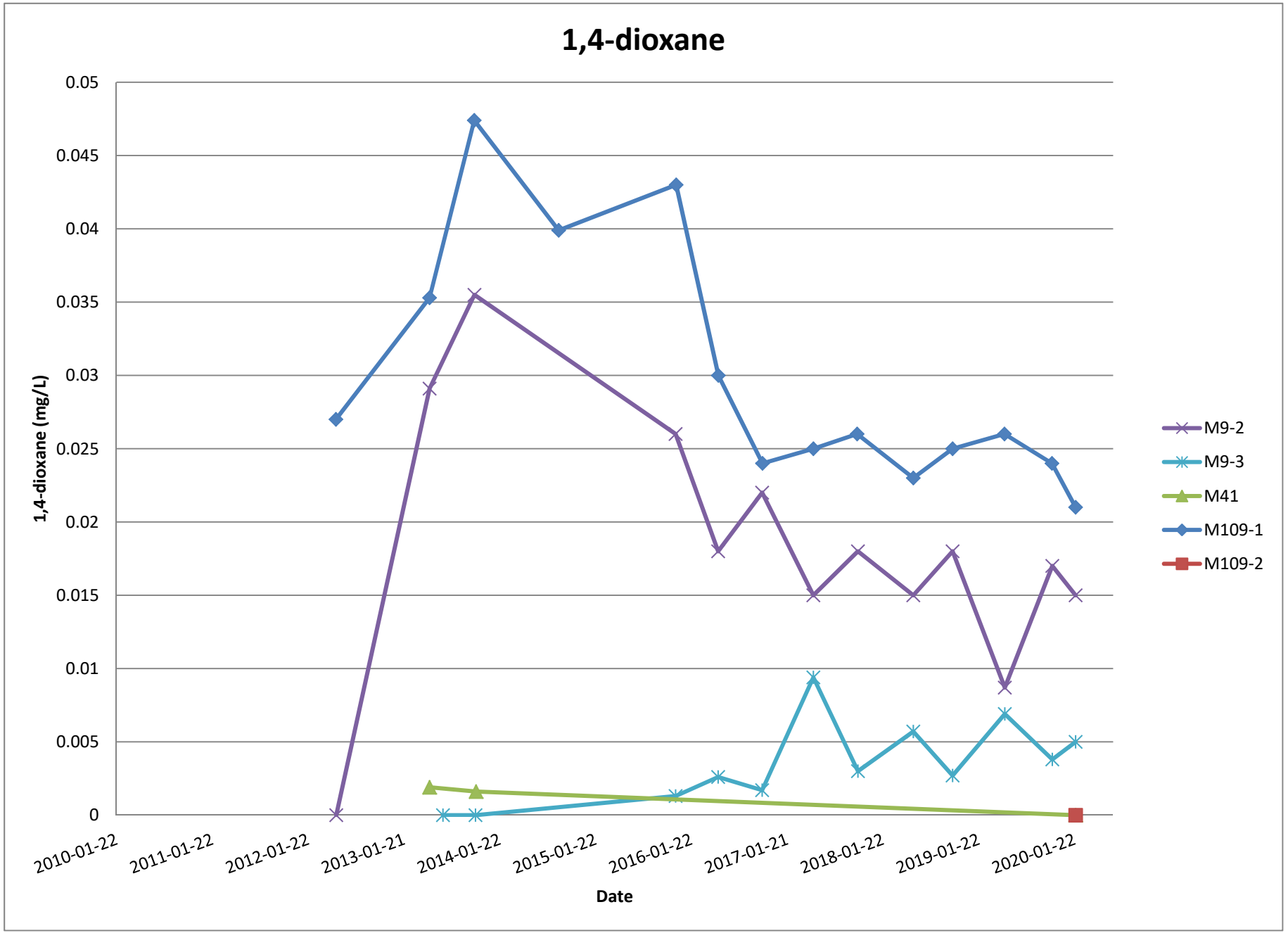
Date
M9-2
M9-3
M41
M109-1
M109-2


1,4-dioxane
0.05
0.045
0.04
0.035
0.03
0.025
0.02
0.015
0.01
0.005
0
1,4-dioxane (mg/L)
2010-01-22
2011-01-22
2012-01-22
2013-01-21
2014-01-22
2015-01-22
2016-01-22
2017-01-21
2018-01-22
2019-01-22
2020-01-22
Date
M9-2
M9-3
M41
M109-1
M109-2

ATTACHMENT 2

Acute Lethality Bioassay Report

pollutech
enviroquatics limited

Certificate of Analysis

ACUTE LETHALITY BIOASSAY REPORT
(Single-Concentration Test)

CLIENT:
Francois Richard, BluMetric Environmental Inc, 4 Cataraqui St, Kingston, ON K7K 1Z7

TEST RESULTS:

Sample Name[1]	Sample Number	Date Collected (M/D/Y)	Date Received (M/D/Y)	Date Tested (M/D/Y)	Test Species[2]	Percent Mortality[3]	Method Deviations
SW Pond	8602-0022001	01/27/20	01/28/20	01/30/20 01/28/20	RBT DM	0% 0%	None None

1 - Results relate only to the sample tested. Tested as received from client.
2 - Test Type and Species RBT = Rainbow Trout 96-hour 100% Effluent Concentration Acute Lethality Test
DM = *Daphnia magna* 48-hour 100% Effluent Concentration Acute Lethality Test
3 - Most regulations regard ≤50% mortality to be a "pass". Check your applicable regulatory requirements.

TEST PROTOCOLS:

Environment Canada, "Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout", Environmental Technology Centre, Ottawa, Ontario, Report EPS 1/RM/13 Second Edition - December 2000, including May 2007 and February 2016 Amendments. (Pollutech Test Method RT-SC-R1.5)

Environment Canada, "Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*", Environmental Technology Centre, Ottawa, Ontario, Report EPS 1/RM/14 Second Edition - December 2000, including February 2016 Amendments. (Pollutech Test Method DM-SC-R1.6)

TESTING PERFORMED BY:

Rainbow Trout Bioassay: B. Steven / K. Kramer / K. Ferguson
Daphnia magna Bioassay: K. Kramer / K. Ferguson

TESTING FACILITY:

Pollutech EnviroQuatics Limited, 704 Mara St., Suite 122, Point Edward, Ontario, N7V 1X4
This laboratory is accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA).
All of the tests included in this report are within the scope of this laboratory.

CALA Testing Accreditation No. A 1225

REFERENCE/HEALTH DATA:

Trout
Date Reference Test Initiated: 12/19/19 **Reference Chemical:** Phenol **Fish Lot #:** RS120219
96-Hour LC50: 9.33 mg/L **95% Confidence Limits:** 7.53 mg/L; 11.57 mg/L
Historic Geometric Mean LC50: 9.63 mg/L **Historic Warning Limits (± 2 Standard Deviations):** 5.99 mg/L; 15.48 mg/L

Daphnia magna
Date Reference Test Initiated: 01/21/2020 **Reference Chemical:** Phenol
48-Hour LC50: 23.60 mg/L **95% Confidence Limits:** 19.37 mg/L; 28.74 mg/L
Historic Geometric Mean LC50: 13.30 mg/L **Historic Warning Limits (± 2 Standard Deviations):** 5.75 mg/L; 29.53 mg/L

TEST RESULTS APPROVED BY:

Date: 02/03/20
(M/D/Y)

Y:\bioassays\2020\8000\8602-002\8602-002ja1 TD

R. Clay Ferguson, B.Sc. (Hon.)
Laboratory Manager

POLLUTECH ENVIROQUATICS RAINBOW TROUT TOXICITY TEST BENCH SHEET

Sample Information	Sample Method: Composite (Grab) Other	**Test Information**	Type: (Single Concentration) LC50 TIE Screen
Account 8602-002	Sample Number 8602-002001	Date/Time Started 01.30.20 / 12:00	Analyst Starting Test K. Kramer
Client BluMetric	Sample Name Sw Pond	Date/Time Ended 02.03.20 / 1145	Fish Lot # RS 120219-1
Person Collecting Sample ML	Temperature Upon Receipt 9.5 °C	Test Volume 30 L Per Vessel	Number of Fish Per Vessel 10 — Number of Vessels Per Conc. (1) 2
Date/Time Collected 01.27.20 / 1030		Pre-Aeration No (Yes)	Pre-Aeration Duration min — Pre-Aeration Rate 65 ±0.26 ml/min·L^{-1}
Date/Time Received in Lab 01.28.20 / 1320		Rate of Aeration During Test 65 ±0.26 ml/min·L^{-1}	Dilution Water deehlor — Sample pH Adjustment (No) Yes
Sample Description clear green	Sample Type Description ~~eff~~ n/a	Sample Point Description: MISA (Other)	Storage Temperature 4±2 °C

Initial Sample Measurements Before Aeration - Cond.: 337 µmhos D.O: 9.0 mg/L 91.2% Temp: 15.5 °C pH: 7.7 Air Flow Meter Reading: 0.225 L/min.
Instrument Identification- M/P #: 6/7 M/P #: 6/4 M/P #: 12/82 Meter #: 7

TOXICANT	CONC %	TOTAL NUMBER DEAD # OF HOURS FROM START OF TEST: ___	24	48	72	96	Initial Measurements After Pre-Aeration: Time	Cond (umhos)	D.O. (mg/L)/%		°C	pH (units)	Meter/Probe: Cond	D.O./Temp	pH	Initials	Final Measurements: Date	Time	°C	D.O. (mg/L)/%		pH (units)	Meter/Probe: D.O./Temp	pH	Initials
Control			0	0	0	0	11:45	214	10.4	101.7	14.0	8.2	6/7	6/4	12/82	KK	02.03.20	1145	14.7	8.9	89.8	8.4	6/4	12/82	✓
(1)	100%		0	0	0	0	↓	384	9.3	95.2	15.4	7.7	↓	↓	↓	KK	"	"	15.0	8.5	86.4	8.5	"	"	✓
Time Initials			835 KK	0815 RS	1020 AJ	1145 ✓	**Number of Control Fish Showing Atypical Behaviour: <24h:** 0	**24h:** 0	**48h:** 0	**72h:** 0	**96h:** 0														

Percent Mortality	0 %	**LENGTH (mm)**	**WEIGHT (g)** Initials: RS	**Holding Mortalities 7-days Preceding Test**	Number of Fish in Batch at Day (-)7 253
LC50 (Lower; Upper Limit)	—	Mean (SD) 42.5 (2.9)	Mean (SD) 0.90 (0.17)	Number Dead (recorded daily for 7 days)	Total Number Dead for 7 days Preceding Test
Method	—	Min/Max 37 / 47	Min/Max 0.65 / 1.26	0 + 0 + 0 + 0 + 0 + 0 + 0	= 0
Verified By (initials)	RJ	Sample Size 10	Loading Density 0.30 g/L	7-Day Holding Mortality ([total number dead/number of fish in batch] x 100)	0

Observations and notes:

Pollutech EnviroQuatics *Daphnia magna* Toxicity Test Bench Sheet

Sample Information		Test Information		
Sample Method: Composite Grab Other		Test Type: (Single Concentration) LC50 TIE Screen		
Account Number 8602-002	Sample # 8602-0022001	Date Started/Time 01.28.20	/14:10	Analyst Starting Test KK
Client BlueMetric	Sample Name SW Pond	Date Ended/Time 01.30.20	/1355	#Neonates/Vessel 10
Person Collecting Sample M. Lloyd	Temperature Upon Receipt 9.5 °C	Test Volume 250 mL/Vessel		mL Solution/Daphnid 25 mL
Date/Time Sampled ~~01.28.20~~ KK 01.27.20	/ 10:30	Pre-aeration (no) yes		Pre-aeration Duration — min
Date/Time Received 01.28.20	/ 13:20	Pre-aeration Rate — ±2 mL/min L⁻¹		Sample Hardness Adjustment (no) yes
Sample Description Clear green		Dilution H_2O # DW2007		Sample pH Adjustment (no) yes
Sample Type Description water		Sample Point Description: MISA (other)		Storage Temperature N/A °C
LC50 Randomization Template:		Test Row(s): 5		

Initial Sample Measurements: pH 7.5 Dissolved O_2 8.2 mg/L 93.6 % Conductivity 430 µmhos Temperature 20.9 °C
Instrument Identification: Meter/Probe # 12/82 Meter/Probe # 614 Meter/Probe # 619 Meter/Probe # 614

Concentration (% Volume)	pH			Dissolved Oxygen					Cond. (µmhos)	Hard. (mg/L)	Temperature (°C)		
	Initial	Final	Final M/P	Initial (mg/L)	Initial (%)	Final (mg/L)	Final (%)	Final M/P	Initial	Initial	Initial	Final	Final M/P
Control	8.0	7.9	10/10	8.5	96.3	7.6	85.4	5/5	625	200	21.1	~~21.5~~ 20.5 KK	5/5
100%	7.5	8.4	"	8.2	93.6	7.8	86.3	"	430	204	20.9	20.4	"
Initials	KK	✓		KK		✓			KK	KK	KK	✓	

BROOD CULTURE HEALTH INFORMATION

Brood Culture #	63 R B					
Culture age (days)	22					
Days to 1st Brood (≤12)	8					
Average # of Neonates/Brood (≥15)	33					
Previous 7 Days Mortality in Culture (≤25%)	0					

NEONATE SOURCE AND OBSERVATIONS OF NUMBER IMMOBILE AND DEAD

	Control				100%												Init
	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	
Brood culture #	63 R B	→	→		63 R B	→	→										KK
24-Hr. # Immobile	0	0	0		0	0	0										KK
48-Hr. # Immobile	0	0	0		0	0	0										
48-Hr. # Dead	0	0	0		0	0	0										5
Total # Immobile			0				0										
Total # Dead			0				0										

Percent Mortality 0 % Standard Deviation of Control Survival — Standard Deviation of Test Survival — Verified By (Initials) KK Notes