

# **APPENDIX B**

## **Landrie Lake Water Quality Data**

Table 1 - Inorganics and Metals for Raw Water and Estimated for Reject Process Water

Parameter	Unit	RDL	CCME Water Quality Guidelines for the Protection of Aquatic Life - Marine	Raw Water	Raw	Water Plant - Raw	WTP Raw	Raw	Raw	Raw	Raw Water Average* (2017-2022)	Assumed Reject Process Water Concentration** (Based on 3x Average Raw Water)
				19-Oct-17	26-Sep-18	11-Dec-18	08-Oct-19	21-Oct-20	6-Nov-22	21-Dec-22		
<b>Inorganics</b>												
pH			7.0-8.7 <sup>B</sup>	6.8	6.94	6.68	6.87	6.73	6.85	6.73	6.80	7.0-8.7***
Reactive Silica as SiO <sub>2</sub>	mg/L	0.5		0.6	-	1.4	0.6	0.8	0.94	1.70	1.01	3.03
Chloride	mg/L	1		10	9	8	11	15	9.4	11.0	10.5	31.5
Fluoride	mg/L	0.1		ND	ND	ND	ND	ND	ND	ND	ND	ND
Sulphate	mg/L	2		5	4	5	4	5	4.1	7.1	4.9	14.7
Alkalinity	mg/L	2		6	-	ND	ND	ND	5	4.1	3.8	11.4
True Color	TCU	5	Narrative <sup>B</sup> - The mean absorbance of filtered water samples at 456 nm shall not be significantly higher than the seasonally adjusted expected value for the system under consideration.	ND	24	37	18	10.2	27	30	21	63
Turbidity	NTU	0.1	Narrative <sup>B</sup> - Clear flow: Maximum increase of 8 NTUs from background levels for a short-term exposure (e.g., 24-h period). Maximum average increase of 2 NTUs from background levels for a longer term exposure (e.g., 30-d period).  High flow or turbid waters: Maximum increase of 8 NTUs from background levels at any one time when background levels are between 8 and 80 NTUs. Should not increase more than 10% of background levels when background is > 80 NTUs.	1.8	1.9	1.7	1.9	1	0.89	1.00	1.46	4.38
Electrical Conductivity	uS/cm	1		61	-	62	69	73	58	58	64	192
Nitrate + Nitrite as N	mg/L	0.05		ND	-	ND	ND	ND	ND	ND	ND	ND
Nitrate as N	mg/L	0.05	1,500 <sup>A</sup> , 200 <sup>B</sup>	ND	ND	ND	ND	ND	ND	ND	ND	ND
Nitrite as N	mg/L	0.05		ND	-	ND	ND	ND	ND	ND	ND	ND
Ammonia as N	mg/L	0.05		ND	-	0.04	0.04	0.05	ND	0.58	0.13	0.39
Total Organic Carbon	mg/L	0.5		4.3	-	6.2	3.4	3.4	6.2	5.8	4.9	14.7
Ortho-Phosphate as P	mg/L	0.01		ND	-	0.01	ND	0.02	ND	ND	0.01	0.03
Total Sodium	mg/L	0.1			7.6				6.7	7.0	7.1	21.3
Total Potassium	mg/L	0.1		0.3	-	0.3	0.4	0.4	0.29	0.29	0.33	0.99
Total Calcium	mg/L	0.1		3.1	-	3	3.8	2.5	2.8	2.8	3.0	9.0
Total Magnesium	mg/L	0.1		0.8	-	0.8	1	0.8	0.74	0.78	0.82	2.46
Bicarb. Alkalinity (as CaCO <sub>3</sub> )	mg/L	1		6	-	ND	ND	ND	5.0	4.1	3.8	11.4
Carb. Alkalinity (as CaCO <sub>3</sub> )	mg/L	1		ND	-	ND	ND	ND	ND	ND	ND	ND
Hydroxide	mg/L	5		ND	-	ND	ND	ND			ND	ND
Calculated TDS	mg/L	1		31	20	24	30	32	29	34	29	87
Hardness	mg/L	1		11	-	10.8	13.6	9.5	11	9.9	11.0	33
Langelier Index (@20C)	NA			-3.47	-	-3.67	-3.39	-3.72	-3.26	-3.52	-3.51	-10.52
Langelier Index (@ 4C)	NA			-3.79	-	-3.99	-3.71	-4.04	-3.51	-3.77	-3.80	-11.41
Saturation pH (@ 20C)	NA			10.3	-	10.4	10.3	10.4	10.1	10.2	10.3	-
Saturation pH (@ 4C)	NA			10.6	-	10.7	10.6	10.8	10.4	10.5	10.6	-
Anion Sum	me/L			0.51	-	0.33	0.39	0.53	0.45	0.54	0.46	1.38
Cation sum	me/L			0.57	-	0.53	0.72	0.58	0.56	0.54	0.58	1.74
Total Suspended Solids	mg/L	1	Narrative <sup>B</sup> - Clear flow: Maximum increase of 25 mg/L from background levels for a short-term exposure (e.g., 24-h period). Maximum average increase of 5 mg/L from background levels for a longer term exposure (e.g., 30-d period).  High flow or turbid waters: Maximum increase of 25 mg/L from background levels at any one time when background levels are between 25 and 250 mg/L. Should not increase more than 10% of background levels when background is ≥ 250 mg/L.						<1.0	<1.0	<1.0	<1.0
Total UV Transmittance	%T								63	62	62.5	187.5
% Difference/ Ion Balance (NS)	%			6.2	-	23.5	29.3	4.7	10.9	0	12.43	37.3

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				19-Oct-17	26-Sep-18	11-Dec-18	08-Oct-19	21-Oct-20	6-Nov-22	21-Dec-22		
<b>Metals</b>												
Total Aluminum	ug/L	5		46	31	101	41	25	46	83	53	159
Total Antimony	ug/L	2		ND	ND	ND	ND	ND	ND	ND	ND	ND
Total Arsenic	ug/L	2	12.5 <sup>B</sup>	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total Barium	ug/L	1		5	ND	8	ND	ND	5.7	7.0	6.43	19.275
Total Beryllium	ug/L	0.1		ND	-	ND	ND	ND	ND	ND	ND	ND
Total Bismuth	ug/L	2		ND	-	ND	ND	ND	ND	ND	ND	ND
Total Boron	ug/L	50		7	9	8	8	6	ND	ND	20	60
Total Cadmium	ug/L	0.01	0.12 <sup>B</sup>	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total Chromium (CrIII)	ug/L	1		ND	ND	ND	ND	ND	ND	ND	ND	ND
Total Cobalt	ug/L	0.4		ND	-	ND	ND	ND	ND	ND	ND	ND
Total Copper	ug/L	1		66	56	39	26	54	0.55	ND	34.54	103.62
Total Iron	ug/L	50		321	184	264	223	229	170	220	230	690
Total Lead	ug/L	0.5		0.6	ND	ND	ND	ND	ND	ND	0.50	1.5
Total Lithium	ug/L	2							ND	ND	ND	ND
Total Manganese	ug/L	2		98	145	29	89	23	47	40	67	201
Mercury	ug/L	0.013	0.016		ND				ND	ND	ND	ND
Total Molybdenum	ug/L	2		ND	-	ND	ND	ND	ND	ND	ND	ND
Total Nickel	ug/L	2		ND	-	ND	ND	ND	ND	ND	ND	ND
Total Phosphorous	ug/L	100	Guidance Framework <sup>B</sup>	30	-	ND	40	ND	ND	ND	65	195
Total Rubidium	ug/L	2							ND	ND	ND	ND
Total Selenium	ug/L	0.5		1	-	ND	ND	ND	ND	ND	ND	ND
Total Silicon	ug/L	500							ND	660	580	1740
Total Silver	ug/L	0.1	7.5 <sup>A</sup>	ND	-	ND	ND	ND	ND	ND	ND	ND
Total Strontium	ug/L	2		15	-	14	18	15	12	12	14	42
Total Tellurium	ug/L	2							ND	ND	ND	ND
Total Thallium	ug/L	0.1		ND	-	ND	ND	ND	ND	ND	ND	ND
Total Tin	ug/L	2		ND	-	ND	ND	ND	ND	ND	ND	ND
Total Titanium	ug/L	2		ND	ND	ND	ND	ND	ND	ND	ND	ND
Total Uranium	ug/L	0.1		ND	-	ND	ND	ND	ND	ND	ND	ND
Total Vanadium	ug/L	2		ND	11	ND	ND	ND	ND	ND	2.4	7.2
Total Zinc	ug/L	5		9	-	8	7	5	ND	ND	7.0	21

Notes:  
RDL = Reported Detection Limit (for more recent 2022 samples provided in RDL column)  
ND = not detected  
**bold** = parameter concentration exceeds CCME Water Quality Guidelines for the Protection of Aquatic Life - Marine  
<sup>A</sup> = Canadian Environmental Quality Guidelines, Canadian Water Quality Guidelines for the Protection of Aquatic Life - Short Term  
<sup>B</sup> = Canadian Environmental Quality Guidelines, Canadian Water Quality Guidelines for the Protection of Aquatic Life - Long Term  
\*Average calculated only for analytically detected parameters and includes in the average the value equal to the RDL of that sample if undetected and to be conservative  
\*\*Assumes 3x concentration of the average for parameters analytically detected  
\*\*\*pH will be process adjusted to meet CCME guideline before discharge if required