

Appendix C4

Predicted Water Quantity and Quality (2012-2017)

MINING YEAR 3

Water Quantity Year 3^

Pits	Predicted (m ³)	Measured (m ³)	% Difference between predicted vs measured
Portage	931,800	1,026,000	10
Bay Goose	1,235,100	499,000	-60

^predicted volumes from Golder 2007 - Waste and Water Management Plan - Meadowbank Gold Project

Third Portage Open Pit Sumps Water Quality Year 3

Parameters	Units	Probable Scenario Year 3*	Possible Poor end Scenario Year 3*	Measured		% Difference between predicted vs measured- mean		% Difference between predicted vs measured- Lower 25th percentile *		CCME Guidelines**	MMER Schedule 4**	Water License Discharge to 3PL**
				Mean	Lower 25th centile	Probable	Possible Poor	Probable	Possible Poor			
pH		6.30	6.10	7.80	7.77	24	28	23	27	6.5 to 9.0	6.0 to 9.5	6.0 to 9.0
Alkalinity	mg CaCO3/L	39	42	92	56	136	119	44	33	--	--	--
Ammonia (unionized)	mg NH3/L	0.00057	0.0006	0.2081	0.1000	36,413	34,588	17,444	16,567	0.016	--	--
Ammonia nitrogen	mg N/L	2.3	4	3.9	0.2	69	0	-90	-94	1.83	--	16
Dissolved Arsenic	mg/L	0.0024	0.057	0.0031	0.0025	29	-95	4	-96	0.005	0.5	0.3
Chloride	mg/L	630	630	20	7	-97	-97	-99	-99	120	--	1000
Dissolved Copper	mg/L	0.0014	0.013	0.0046	0.0025	230	-64	79	-81	0.002	0.3	0.1
Fluoride	mg/L	0.19	0.23	0.62	0.34	228	171	80	49	0.12	--	--
Hardness	mg CaCO3/L	300	310	100	78	-87	-68	-74	-75	--	--	--
Dissolved Lead	mg/L	0.0016	0.0063	0.0036	0.0025	123	-43	56	-60	0.001	0.2	0.1
Dissolved Nickel	mg/L	0.003	0.073	0.0051	0.0025	75	-93	-14	-97	0.025	0.5	0.2
Dissolved Barium	mg/L	0.040	0.057	0.0651	0.0088	63	14	-78	-85	--	--	--
Dissolved Cadmium	mg/L	0.000074	0.00023	0.0025	0.0025	3,278	987	3,278	987	0.00004	--	0.002
Dissolved Iron	mg/L	0.36	3.7	0.0328	0.0250	-91	-99	-93	-99	0.3	--	--
Dissolved Mercury	mg/L	0.000057	0.000044	0.00025	0.0025	4,286	468	4,286	468	0.000026	--	0.0004
Dissolved Manganese	mg/L	0.19	0.55	0.0553	0.0336	-71	-90	-82	-94	--	--	--
Dissolved Molybdenum	mg/L	0.013	0.013	0.0238	0.0193	83	83	48	48	0.073	--	--
Dissolved Selenium	mg/L	0.0003	0.0011	0.0025	0.0025	762	127	762	127	0.001	--	--
Dissolved Thallium	mg/L	0.00003	0.0001	0.0044	0.0050	14,692	4,338	16,567	4,900	0.0008	--	--
Nitrate	mgN/L	2.60	4.4	7.74	2.96	198	76	14	-33	2.94	--	20
Sulphate	mgN/L	31	42	40	19	28	-6	-39	-55	--	--	--
Total dissolved solids	mg/L	960	990	240	168	-75	-76	-83	-83	--	--	--
Dissolved Zinc	mg/L	0.0074	0.068	0.0179	0.0025	142	-74	-66	-96	0.03	0.5	0.4

Goose Island Open Pit Sumps Water Quality Year 3

Parameters	Units	Probable Scenario Year 3*	Possible Poor end Scenario Year 3*	Measured		% Difference between predicted vs measured- mean		% Difference between predicted vs measured- Lower 25th percentile *		CCME Guidelines**	MMER Schedule 4**	Water License Discharge to 3PL**
				Mean	Lower 25th centile	Probable	Possible Poor	Probable	Possible Poor			
pH		6.10	6.10	7.75	7.56	27	27	24	24	6.5 to 9.0	6.0 to 9.5	6.0 to 9.0
Alkalinity	mg CaCO3/L	27	27	85	55	216	216	103	103	--	--	--
Ammonia (unionized)	mg NH3/L	0.00056	0.00056	0.2358	0.0250	42,013	42,013	4,364	4,364	0.016	--	--
Ammonia nitrogen	mg N/L	3.6	3.6	5.0	0.6	40	40	-83	-83	1.83	--	16
Dissolved Arsenic	mg/L	0.0016	0.0016	0.0158	0.0073	884	884	353	353	0.005	0.5	0.3
Chloride	mg/L	440	440	16	6	-96	-96	-99	-99	120	--	1000
Dissolved Copper	mg/L	0.00010	0.001	0.0150	0.0088	15,689	1,479	9,111	821	0.002	0.3	0.1
Fluoride	mg/L	0.13	0.13	0.43	0.24	231	231	83	83	0.12	--	--
Hardness	mg CaCO3/L	210	210	130	60	-38	-38	-72	-72	--	--	--
Dissolved Lead	mg/L	0.0011	0.0011	0.0144	0.0044	1,207	1,207	298	298	0.001	0.2	0.1
Dissolved Nickel	mg/L	0.002	0.002	0.0194	0.0194	869	869	869	869	0.025	0.5	0.2
Dissolved Barium	mg/L	0.027	0.0270	0.0618	0.0305	129	129	13	13	--	--	--
Dissolved Cadmium	mg/L	0.000051	0.000051	0.0250	0.0250	48,920	48,920	48,920	48,920	0.00004	--	0.002
Dissolved Iron	mg/L	0.25	0.25	0.0250	0.0250	-90	-90	-90	-90	0.3	--	--
Dissolved Mercury	mg/L	0.000039	0.000039	0.00644	0.00025	164,964	164,964	6,310	6,310	0.000026	--	0.0004
Dissolved Manganese	mg/L	0.13	0.13	0.1479	0.1109	14	14	-15	-15	--	--	--
Dissolved Molybdenum	mg/L	0.0086	0.0086	0.0240	0.0240	179	179	179	179	0.073	--	--
Dissolved Selenium	mg/L	0.0002	0.0002	0.0138	0.0025	6,775	6,775	1,150	1,150	0.001	--	--
Dissolved Thallium	mg/L	0.00002	0.00002	0.0050	0.0050	24,900	24,900	24,900	24,900	0.0008	--	--
Nitrate	mgN/L	4.00	4.00	6.28	0.92	57	57	-77	-77	2.94	--	20
Sulphate	mgN/L	21	21	27	17	30	30	-20	-20	--	--	--
Total dissolved solids	mg/L	670	670	258	167	-61	-61	-75	-75	--	--	--
Dissolved Zinc	mg/L	0.0051	0.0051	0.0170	0.0025	233	233	-51	-51	0.03	0.5	0.4

Footnotes:

Highlighted values represent exceedences of greater than 20% relative percent difference between predicted vs measured values.

* Used year 3 predictions for Portage and year 3 for Goose presented in Golder, 2007 - Water Quality Predictions Meadowbank Gold Project Doc No 516. Ver 0

** Discharge criteria and guidelines based on total metal concentrations.

Highlighted values in yellow indicate a mean measured value greater than the discharge criteria or guidelines.

Water Quantity Year 3[^]

Pits**	Predicted (m ³)	Measured (m ³)	% Difference between predicted vs measured
Portage	931,800	676,706	-27
Bay Goose	1,235,100	344,994	-72

[^]predicted volumes from Golder 2007 - Waste and Water Management Plan - Meadowbank Gold Project
^{**}There is no year 4 in the predicted model so take year 3 for Portage and Vault and year 3 for Goose.

Third Portage Open Pit Sumps Water Quality Year 4

Parameters	Units	Probable Scenario Year 4 [*]	Possible Poor end Scenario Year 4 [*]	Measured		% Difference between predicted vs measured- mean		% Difference between predicted vs measured- Lower 25th percentile [*]		CCME Guidelines**	MMER Schedule 4**	Water License Discharge to 3PL**
				Mean	Lower 25th centile +	Probable	Possible Poor	Probable	Possible Poor			
pH		6.30	6.10	7.49	7.17	19	23	14	18	6.5 to 9.0	6.0 to 9.5	6.0 to 9.0
Alkalinity	mg CaCO3/L	40	43	72	52	81	68	30	21	--	--	--
Ammonia (unionized)	mg N/L	0.00052	0.00055	0.2000	0.0250	38,362	36,264	4,708	4,445	0.016	--	--
Ammonia nitrogen	mg N/L	2.1	3.5	3.6	0.2	70	2	-91	-95	1.83	--	16
Dissolved Arsenic	mg/L	0.0024	0.068	0.0180	-	650	-74	-	-	0.005	0.5	0.3
Chloride	mg/L	620	630	2	-	-100	-100	-	-	120	--	1000
Dissolved Copper	mg/L	0.0014	0.016	0.0124	-	788	-22	-	-	0.002	0.3	0.1
Fluoride	mg/L	0.19	0.24	0.13	-	-32	-46	-	-	0.12	--	--
Hardness	mg CaCO3/L	300	310	48	-	-84	-85	-	-	--	--	--
Dissolved Lead	mg/L	0.0016	0.0076	0.0010	-	-36	-87	-	-	0.001	0.2	0.1
Dissolved Nickel	mg/L	0.003	0.093	0.0047	-	62	-95	-	-	0.025	0.5	0.2
Dissolved Barium	mg/L	0.041	0.063	0.0076	-	-82	-88	-	-	--	--	--
Dissolved Cadmium	mg/L	0.000076	0.00027	0.0000	-	-87	-96	-	-	0.00004	--	0.002
Dissolved Iron	mg/L	0.37	4.6	0.0125	-	-97	-100	-	-	0.3	--	--
Dissolved Mercury	mg/L	0.0000059	0.000054	0.00005	-	747	-7	-	-	0.000026	--	0.0004
Dissolved Manganese	mg/L	0.19	0.66	0.0123	-	-94	-98	-	-	--	--	--
Dissolved Molybdenum	mg/L	0.013	0.013	0.0016	-	-88	-88	-	-	0.073	--	--
Dissolved Selenium	mg/L	0.0003	0.0012	0.0005	-	72	-58	-	-	0.001	--	--
Dissolved Thallium	mg/L	0.00003	0.00012	0.0025	-	7,965	1,983	-	-	0.0008	--	--
Nitrate	mgN/L	2.30	4.0	1.35	-	-41	-66	-	-	2.94	--	20
Sulphate	mgN/L	31	46	83	-	167	80	-	-	--	--	--
Total dissolved solids	mg/L	960	990	127	57	-87	-87	-94	-94	--	--	--
Dissolved Zinc	mg/L	0.0076	0.085	0.0028	-	-64	-97	-	-	0.03	0.5	0.4

Goose Island Open Pit Sumps Water Quality Year 3

Parameters	Units	Probable Scenario Year 3 [*]	Possible Poor end Scenario Year 3 [*]	Measured		% Difference between predicted vs measured- mean		% Difference between predicted vs measured- Lower 25th percentile [*]		CCME Guidelines**	MMER Schedule 4**	Water License Discharge to 3PL**
				Mean	Lower 25th centile +	Probable	Possible Poor	Probable	Possible Poor			
pH		6.10	6.10	7.68	7.49	26	26	23	23	6.5 to 9.0	6.0 to 9.5	6.0 to 9.0
Alkalinity	mg CaCO3/L	27	27	130	109	380	380	304	304	--	--	--
Ammonia (unionized)	mg N/L	0.00056	0.00056	0.2961	0.1400	52,777	52,777	24,900	24,900	0.016	--	--
Ammonia nitrogen	mg N/L	5.4	5	7.9	4.0	46	46	-26	-26	1.83	--	16
Dissolved Arsenic	mg/L	0.0016	0.0016	0.0046	-	188	188	-	-	0.005	0.5	0.3
Chloride	mg/L	440	440	62	-	-86	-86	-	-	120	--	1000
Dissolved Copper	mg/L	0.001	0.001	0.0712	-	7,389	7,389	-	-	0.002	0.3	0.1
Fluoride	mg/L	0.13	0.13	0.72	-	454	454	-	-	0.12	--	--
Hardness	mg CaCO3/L	210	210	214	-	2	2	-	-	--	--	--
Dissolved Lead	mg/L	0.0011	0.0011	0.0002	-	-86	-86	-	-	0.001	0.2	0.1
Dissolved Nickel	mg/L	0.002	0.002	0.0599	-	2,893	2,893	-	-	0.025	0.5	0.2
Dissolved Barium	mg/L	0.027	0.0270	0.1328	-	392	392	-	-	--	--	--
Dissolved Cadmium	mg/L	0.000051	0.000051	0.0000	-	-12	-12	-	-	0.00004	--	0.002
Dissolved Iron	mg/L	0.25	0.25	0.1025	-	-59	-59	-	-	0.3	--	--
Dissolved Mercury	mg/L	0.0000039	0.0000039	0.00008	-	1,823	1,823	-	-	0.000026	--	0.0004
Dissolved Manganese	mg/L	0.13	0.13	0.2192	-	69	69	-	-	--	--	--
Dissolved Molybdenum	mg/L	0.0086	0.0086	0.0207	-	140	140	-	-	0.073	--	--
Dissolved Selenium	mg/L	0.0002	0.0002	0.0015	-	650	650	-	-	0.001	--	--
Dissolved Thallium	mg/L	0.00002	0.00002	0.0025	-	12,400	12,400	-	-	0.0008	--	--
Nitrate	mgN/L	4.00	4.00	20.80	-	420	420	-	-	2.94	--	20
Sulphate	mgN/L	21	21	66	-	216	216	-	-	--	--	--
Total dissolved solids	mg/L	670	670	314	218	-53	-53	-68	-68	--	--	--
Dissolved Zinc	mg/L	0.0051	0.0051	0.0075	-	47	47	-	-	0.03	0.5	0.4

Footnotes:
 Highlighted values represent exceedences of greater than 20% relative percent difference between predicted vs measured values.
^{*} Used year 4 predictions for Portage and year 3 for Goose presented in Golder, 2007 - Water Quality Predictions Meadowbank Gold Project Doc No 516. Ver 0
⁺ Some have no lower 25th percentile data as only 2 or 1 samples were monitored in 2013
^{**} Discharge criteria and guidelines based on total metal concentrations.
 Highlighted values in yellow indicate a mean measured value greater than the discharge criteria or guidelines.

Water Quantity Year 5^a

Pits**	Predicted (m ³)	Measured (m ³)	% Difference between predicted vs measured
Portage	715,200	165,877	-77
Bay Goose	1,235,100	307,769	-75
Vault Pit	46,100	101,617	120

^a Predicted volumes from Golder 2007 - Waste and Water Management Plan - Meadowbank Gold Project, Table 12.1 and Figures 12.7

** There is no year 5 in the predicted model for Bay Goose so take year 3 for Goose.

Vault Pit Sumps Water Quality Year 5

Parameters	Units	Probable Scenario Year 5 ^a	Possible Poor end Scenario Year 5 ^a	Measured		% Difference between predicted vs measured- mean		% Difference between predicted vs measured- Lower 25th percentile		CCME Guidelines**	MMER Schedule 4**	Water License Discharge to Wally Lake**
				Mean	Lower 25th centile*	Probable	Possible Poor	Probable	Possible Poor			
pH		8.00	8.00	7.13	-	-11	-11	-	-	6.5 to 9.0	6.0 to 9.5	6.0 to 9.0
Alkalinity	mg CaCO ₃ /L	0.091	9.7	89	-	97,153	812	-	-	--	--	--
Ammonia (unionized)	mg N/L	0.78	1.30	0.1800	-	-77	-86	-	-	0.016	--	--
Ammonia nitrogen	mg N/L	64	110	14.4	-	-78	-87	-	-	1.83	--	20
Dissolved Arsenic	mg/L	0.000063	0.052	0.0127	-	20,059	-76	-	-	0.005	0.5	0.1
Chloride	mg/L	0.0031	0.033	31	-	996,674	93,536	-	-	120	--	500
Dissolved Copper	mg/L	0.000063	0.00075	0.0116	-	184,027	1,447	-	-	0.002	0.3	0.1
Fluoride	mg/L	0.000063	0.013	0.26	-	4,126,884	1,900	-	-	0.12	--	--
Hardness	mg CaCO ₃ /L	0.11	19	378	-	343,536	1,889	-	-	--	--	--
Dissolved Lead	mg/L	0.0000081	0.00011	0.0002	-	18,419	1,284	-	-	0.001	0.2	0.1
Dissolved Nickel	mg/L	0.00012	0.0011	0.0254	-	211,567	22,991	-	-	0.025	0.5	0.2
Dissolved Barium	mg/L	0.000210	0.012	0.0588	-	27,900	390	-	-	--	--	--
Dissolved Cadmium	mg/L	0.0000081	0.00011	0.0003	-	370,270	2,627	-	-	0.00004	--	0.002
Dissolved Iron	mg/L	0.000063	0.002	0.2200	-	349,106	10,900	-	-	0.3	--	--
Dissolved Mercury	mg/L	0.0000081	0.00011	0.00010	-	123,357	809	-	-	0.000026	--	0.0004
Dissolved Manganese	mg/L	0.000018	0.00230	0.1328	-	737,678	5,674	-	-	--	--	--
Dissolved Molybdenum	mg/L	0.000160	0.03100	0.1089	-	67,963	251	-	-	0.073	--	--
Dissolved Selenium	mg/L	0.0000041	0.00055	0.0070	-	170,632	1,173	-	-	0.001	--	--
Dissolved Thallium	mg/L	0.0000021	0.000023	0.0025	-	118,948	10,770	-	-	0.0008	--	--
Nitrate	mgN/L	71	120	46.40	-	-35	-61	-	-	2.94	--	50
Sulphate	mgN/L	0.01	10	148	-	1,479,900	1,380	-	-	--	--	--
Total dissolved solids	mg/L	150	300	456	-	204	52	-	-	--	--	--
Dissolved Zinc	mg/L	0.000041	0.00052	0.0020	-	4,778	285	-	-	0.03	0.5	0.2

Goose Island Pit Sumps Water Quality Year 3

Parameters	Units	Probable Scenario Year 3 ^a	Possible Poor end Scenario Year 3 ^a	Measured		% Difference between predicted vs measured- mean		% Difference between predicted vs measured- Lower 25th percentile *		CCME Guidelines**	MMER Schedule 4**	Water License Discharge to 3PL**
				Mean	Lower 25th centile	Probable	Possible Poor	Probable	Possible Poor			
pH		6.10	6.10	7.97	7.52	31	31	23	23	6.5 to 9.0	6.0 to 9.5	6.0 to 9.0
Alkalinity	mg CaCO ₃ /L	27	27	90	86	233	233	217	217	--	--	--
Ammonia (unionized)	mg N/L	0.00056	0.00056	0.0600	0.0100	10,614	10,614	1,686	1,686	0.016	--	--
Ammonia nitrogen	mg N/L	5.4	5	1.8	0.2	-66	-66	-96	-96	1.83	--	16
Dissolved Arsenic	mg/L	0.0016	0.0016	0.0040	-	150	150	-	-	0.005	0.5	0.3
Chloride	mg/L	440	440	53	-	-88	-88	-	-	120	--	1000
Dissolved Copper	mg/L	0.001	0.001	0.0010	-	5	5	-	-	0.002	0.3	0.1
Fluoride	mg/L	0.13	0.13	0.94	-	623	623	-	-	0.12	--	--
Hardness	mg CaCO ₃ /L	210	210	131	-	-38	-38	-	-	--	--	--
Dissolved Lead	mg/L	0.0011	0.0011	0.0002	-	-82	-82	-	-	0.001	0.2	0.1
Dissolved Nickel	mg/L	0.002	0.002	0.0150	-	650	650	-	-	0.025	0.5	0.2
Dissolved Barium	mg/L	0.027	0.0270	0.0280	-	4	4	-	-	--	--	--
Dissolved Cadmium	mg/L	0.000051	0.000051	0.0000	-	-80	-80	-	-	0.00004	--	0.002
Dissolved Iron	mg/L	0.25	0.25	0.0050	-	-98	-98	-	-	0.3	--	--
Dissolved Mercury	mg/L	0.0000039	0.0000039	0.00010	-	2,464	2,464	-	-	0.000026	--	0.0004
Dissolved Manganese	mg/L	0.13	0.13	0.0590	-	-55	-55	-	-	--	--	--
Dissolved Molybdenum	mg/L	0.0086	0.0086	0.0180	-	109	109	-	-	0.073	--	--
Dissolved Selenium	mg/L	0.0002	0.0002	0.0010	-	400	400	-	-	0.001	--	--
Dissolved Thallium	mg/L	0.00002	0.00002	0.0030	-	14,900	14,900	-	-	0.0008	--	--
Nitrate	mgN/L	4.00	4.00	10.90	-	173	173	-	-	2.94	--	20
Sulphate	mgN/L	21	21	61	-	190	190	-	-	--	--	--
Total dissolved solids	mg/L	670	670	530	232	-21	-21	-65	-65	--	--	--
Dissolved Zinc	mg/L	0.0051	0.0051	0.0010	-	-80	-80	-	-	0.03	0.5	0.4

Footnotes:

Highlighted values represent exceedences of greater than 20% relative percent difference between predicted vs measured values.

^a Used year 5 predictions for Vault and year 3 for Goose presented in Golder, 2007 - Water Quality Predictions Meadowbank Gold Project Doc No 516. Ver 0

+ Some have no lower 25th percentile data as only 2 or 1 samples were monitored in 2014

** Discharge criteria and guidelines based on total metal concentrations.

Highlighted values in yellow indicate a mean measured value greater than the discharge criteria or guidelines.

Water Quantity - Year 5^

Pits**	Predicted (m³)	Measured (m³)	% Difference between predicted vs measured
Portage	715,200	136,627	-81
Bay Goose	1,086,400	383,800	-65
Vault Pit	46,100	111,336	142

*predicted volumes from Golder 2007 - Waste and Water Management Plan - Meadowbank Gold Project, Table 12.1 and Figures 12.7

**There is no year 6 in the predicted model so take year 5 for Portage and Vault. For Goose, pit reflooding started in 2015, use year 5 reflooding values minus evaporation for Goose.

Vault Pit Sumps Water Quality Year 6

Parameters	Units	Probable Scenario Year 6*	Possible Poor end Scenario Year 6*	Measured		% Difference between predicted vs measured- mean		% Difference between predicted vs measured- Lower 25th percentile		CCME Guidelines**	MMER Schedule 4**	Water License Discharge to Wally Lake**
				Mean	Lower 25th centile*	Probable	Possible Poor	Probable	Possible Poor			
pH		8.00	8.00	7.11	-	-11	-11	-	-	6.5 to 9.0	6.0 to 9.5	6.0 to 9.0
Alkalinity	mg CaCO3/L	0.160	17	126	-	78,650	641	-	-	--	--	--
Ammonia (unionized)	mg N/L	0.55	0.92	0.3200	-	-42	-65	-	-	0.016	--	--
Ammonia nitrogen	mg N/L	45	76	22.6	-	-50	-70	-	-	1.83	--	20
Dissolved Arsenic	mg/L	0.00011	0.089	0.0003	-	127	-100	-	-	0.005	0.5	0.1
Chloride	mg/L	0.0054	0.057	33	-	614,715	58,146	-	-	120	--	500
Dissolved Copper	mg/L	0.0000110	0.00130	0.0010	-	8,991	-23	-	-	0.002	0.3	0.1
Fluoride	mg/L	0.0000110	0.022	0.25	-	2,272,627	1,036	-	-	0.12	--	--
Hardness	mg CaCO3/L	0.20	32	340	-	169,900	963	-	-	--	--	--
Dissolved Lead	mg/L	0.00000140	0.000019	0.0002	-	10,614	689	-	-	0.001	0.2	0.1
Dissolved Nickel	mg/L	0.000021	0.00019	0.0218	-	103,710	11,374	-	-	0.025	0.5	0.2
Dissolved Barium	mg/L	0.000039	0.020	0.0703	-	180,156	252	-	-	--	--	--
Dissolved Cadmium	mg/L	0.0000014	0.000019	0.0000	-	614	-47	-	-	0.00004	--	0.002
Dissolved Iron	mg/L	0.0000110	0.004	0.5900	-	536,264	16,757	-	-	0.3	--	--
Dissolved Mercury	mg/L	0.000000140	0.000019	0.00001	-	3,471	-74	-	-	0.000026	--	0.0004
Dissolved Manganese	mg/L	0.000030	0.00390	0.0863	-	287,567	2,113	-	-	--	--	--
Dissolved Molybdenum	mg/L	0.000280	0.05300	0.1111	-	39,579	110	-	-	0.073	--	--
Dissolved Selenium	mg/L	0.0000069	0.00094	0.0040	-	57,871	326	-	-	0.001	--	--
Dissolved Thallium	mg/L	0.0000036	0.000039	0.0025	-	69,344	6,310	-	-	0.0008	--	--
Nitrate	mg/L	50	86	45.90	-	-8	-47	-	-	2.94	--	50
Sulphate	mg/L	0.02	17	124	-	729,312	629	-	-	--	--	--
Total dissolved solids	mg/L	100	240	568	-	468	137	-	-	--	--	--
Dissolved Zinc	mg/L	0.000069	0.00089	0.0055	-	625	-44	-	-	0.03	0.5	0.2

Goose Island Pit Sumps Water Quality Year 3

Parameters	Units	Probable Scenario Year 3*	Possible Poor end Scenario Year 3*	Measured		% Difference between predicted vs measured- mean		% Difference between predicted vs measured- Lower 25th percentile *		CCME Guidelines**	MMER Schedule 4**	Water License Discharge to 3PL**
				Mean	Lower 25th centile	Probable	Possible Poor	Probable	Possible Poor			
pH		6.10	6.10	7.37	7.06	21	21	16	16	6.5 to 9.0	6.0 to 9.5	6.0 to 9.0
Alkalinity	mg CaCO3/L	27	27	57	52	109	109	91	91	--	--	--
Ammonia (unionized)	mg N/L	0.00056	0.00056	0.0138	0.0088	2,355	2,355	1,463	1,463	0.016	--	--
Ammonia nitrogen	mg N/L	5.4	5	1.1	0.8	-79	-79	-84	-84	1.83	--	16
Dissolved Arsenic	mg/L	0.0016	0.0016	0.0003	0.0003	-84	-84	-84	-84	0.005	0.5	0.3
Chloride	mg/L	440	440	22	16	-95	-95	-96	-96	120	--	1000
Dissolved Copper	mg/L	0.001	0.001	0.0013	0.0006	35	35	-34	-34	0.002	0.3	0.1
Fluoride	mg/L	0.13	0.13	0.40	0.36	205	205	173	173	0.12	--	--
Hardness	mg CaCO3/L	210	210	134	116	-36	-36	-45	-45	--	--	--
Dissolved Lead	mg/L	0.0011	0.0011	0.0002	0.0002	-82	-82	-86	-86	0.001	0.2	0.1
Dissolved Nickel	mg/L	0.002	0.002	0.0326	0.0232	1,532	1,532	1,060	1,060	0.025	0.5	0.2
Dissolved Barium	mg/L	0.027	0.0270	0.0173	0.0151	-36	-36	-44	-44	--	--	--
Dissolved Cadmium	mg/L	0.000051	0.000051	0.0000	0.0000	-74	-74	-80	-80	0.00004	--	0.002
Dissolved Iron	mg/L	0.25	0.25	0.0050	0.0050	-98	-98	-98	-98	0.3	--	--
Dissolved Mercury	mg/L	0.0000039	0.0000039	0.00001	0.00001	156	156	28	28	0.000026	--	0.0004
Dissolved Manganese	mg/L	0.13	0.13	0.1776	0.1642	37	37	26	26	--	--	--
Dissolved Molybdenum	mg/L	0.0086	0.0086	0.0099	0.0089	16	16	3	3	0.073	--	--
Dissolved Selenium	mg/L	0.0002	0.0002	0.0015	0.0013	650	650	525	525	0.001	--	--
Dissolved Thallium	mg/L	0.00002	0.00002	0.0025	0.0025	12,400	12,400	12,400	12,400	0.0008	--	--
Nitrate	mg/L	4.00	4.00	2.96	2.50	-26	-26	-38	-38	2.94	--	20
Sulphate	mg/L	21	21	79	60	276	276	185	185	--	--	--
Total dissolved solids	mg/L	670	670	180	114	-73	-73	-83	-83	--	--	--
Dissolved Zinc	mg/L	0.0051	0.0051	0.0005	0.0005	-90	-90	-90	-90	0.03	0.5	0.4

Third Portage Pit Sumps Water Quality Year 4

Parameters	Units	Probable Scenario Year 4*	Possible Poor end Scenario Year 4*	Measured		% Difference between predicted vs measured- mean		% Difference between predicted vs measured- Lower 25th percentile *		CCME Guidelines**	MMER Schedule 4**	Water License Discharge to 3PL**
				Mean	Lower 25th centile	Probable	Possible Poor	Probable	Possible Poor			
pH		6.30	6.10	6.66	6.36	6	9	1	4	6.5 to 9.0	6.0 to 9.5	6.0 to 9.0
Alkalinity	mg CaCO3/L	40	43	64	60	59	48	49	38	--	--	--
Ammonia (unionized)	mg N/L	0.00052	0.00055	0.0467	0.0250	8,874	8,385	4,708	4,445	0.016	--	--
Ammonia nitrogen	mg N/L	2.1	4	2.8	2.2	31	-21	5	-37	1.83	--	16
Dissolved Arsenic	mg/L	0.0024	0.0680	0.0160	-	567	-76	-	-	0.005	0.5	0.3
Chloride	mg/L	620	630	15	-	-98	-98	-	-	120	--	1000
Dissolved Copper	mg/L	0.0014	0.016	0.0003	-	-82	-98	-	-	0.002	0.3	0.1
Fluoride	mg/L	0.19	0.24	0.27	-	39	10	-	-	0.12	--	--
Hardness	mg CaCO3/L	300	310	196	-	-35	-37	-	-	--	--	--
Dissolved Lead	mg/L	0.0016	0.0076	0.0002	-	-91	-98	-	-	0.001	0.2	0.1
Dissolved Nickel	mg/L	0.003	0.093	0.0323	-	1,012	-65	-	-	0.025	0.5	0.2
Dissolved Barium	mg/L	0.041	0.0630	0.0111	-	-73	-82	-	-	--	--	--
Dissolved Cadmium	mg/L	0.000076	0.00027	0.0000	-	-87	-96	-	-	0.00004	--	0.002
Dissolved Iron	mg/L	0.37	4.60	0.0050	-	-99	-100	-	-	0.3	--	--
Dissolved Mercury	mg/L	0.0000059	0.0000540	0.00001	-	112	-77	-	-	0.000026	--	0.0004
Dissolved Manganese	mg/L	0.19	0.66	0.0921	-	-52	-86	-	-	--	--	--
Dissolved Molybdenum	mg/L	0.013	0.013	0.0628	-	383	383	-	-	0.073	--	--
Dissolved Selenium	mg/L	0.0003	0.0012	0.0015	-	417	25	-	-	0.001	--	--
Dissolved Thallium	mg/L	0.00003	0.00012	0.0025	-	7,965	1,983	-	-	0.0008	--	--
Nitrate	mg/L	2.30	4.00	10.47	-	355	162	-	-	2.94	--	20
Sulphate	mg/L	31	46	136	-	337	195	-	-	--	--	--
Total dissolved solids	mg/L	960	990	498	363	-48	-50	-62	-63	--	--	--
Dissolved Zinc	mg/L	0.0076	0.0850	0.0005	-	-93	-99	-	-	0.03	0.5	0.4

North Portage Pit Sumps Water Quality Year 4

Parameters	Units	Probable Scenario Year 4*	Possible Poor end Scenario Year 4*	Measured		% Difference between predicted vs measured- mean		% Difference between predicted vs measured- Lower 25th percentile +		CCME Guidelines**	MMER Schedule 4**	Water License Discharge to 3PL**
				Mean	Lower 25th centile	Probable	Possible Poor	Probable	Possible Poor			
pH		6.30	6.10	7.87	7.45	25	29	18	22	6.5 to 9.0	6.0 to 9.5	6.0 to 9.0
Alkalinity	mg CaCO3/L	0.05	2.4	77	68	153,614	3,102	134,900	2,713	--	--	--
Ammonia (unionized)	mg N/L	0.003	0.0014	0.0557	0.0350	1,757	3,880	1,067	2,400	0.016	--	--
Ammonia nitrogen	mg N/L	12	8.9	2.9	1.8	-76	-67	-85	-80	1.83	--	16
Dissolved Arsenic	mg/L	0.00005	0.056	0.0205	-	45,344	-63	-	-	0.005	0.5	0.3
Chloride	mg/L	0.0010	0.25	17	12	1,757,553	6,790	1,247,349	4,790	120	--	1000
Dissolved Copper	mg/L	0.00001	0.007	0.0007	-	6,036	-90	-	-	0.002	0.3	0.1
Fluoride	mg/L	0.00008	0.031	0.31	0.29	3,812,400	884	3,656,150	844	0.12	--	--
Hardness	mg CaCO3/L	0.05	8	239	191	530,456	2,884	423,789	2,284	--	--	--
Dissolved Lead	mg/L	0.00002	0.0029	0.002	-	10,127	-92	-	-	0.001	0.2	0.1
Dissolved Nickel	mg/L	0.00003	0.043	0.0071	-	20,782	-83	-	-	0.025	0.5	0.2
Dissolved Barium	mg/L	0.00002	0.013	0.0092	-	48,058	-30	-	-	--	--	--
Dissolved Cadmium	mg/L	0.000006	0.000099	0.0000	-	1,567	-90	-	-	0.00004	--	0.002
Dissolved Iron	mg/L	0.000097	2.1	0.0075	-	7,632	-100	-	-	0.3	--	--
Dissolved Mercury	mg/L	0.00000056	0.000029	0.00001	-	8,829	-83	-	-	0.000026	--	0.0004
Dissolved Manganese	mg/L	0.0002	0.22	0.0706	-	46,967	-68	-	-	--	--	--
Dissolved Molybdenum	mg/L	0.000004	0.00081	0.0182	-	454,900	2,147	-	-	0.073	--	--
Dissolved Selenium	mg/L	0.000003	0.00058	0.0010	-	33,233	72	-	-	0.001	--	--
Dissolved Thallium	mg/L	0.0000014	0.000057	0.0038	-	267,757	6,479	-	-	0.0008	--	--
Nitrate	mgN/L	13	10.00	11.90	9.72	-8	19	-25	-3	2.94	--	20
Sulphate	mgN/L	0.011	8.8	179	135	1,630,809	1,939	1,226,264	1,433	--	--	--
Total dissolved solids	mg/L	28	41	399	309	1,326	874	1,004	654	--	--	--
Dissolved Zinc	mg/L	0.000032	0.037	0.0008	-	2,244	-98	-	-	0.03	0.5	0.4

Footnotes:

Highlighted values represent exceedences of greater than 20% relative percent difference between predicted vs measured values.

* Used year 6 predictions for Vault, year 3 for Goose and year 4 for Portage as presented in Golder, 2007 - Water Quality Predictions Meadowbank Gold Project Doc No 516. Ver 0

+ Some have no lower 25th percentile data as only 1 or 2 samples were taken in 2015.

** Discharge criteria and guidelines based on total metal concentrations.

Highlighted values in yellow indicate a mean measured value greater than the discharge criteria or guidelines.

MINING YEAR 7

Water Quantity - Year 7^

Pits**	Predicted (m ³)	Measured (m ³)	% Difference between predicted vs measured
Portage	715,200	132,359	-81
Bay Goose	800,100	375,300	-53
Vault Pit	55,600	54,964	-1

*predicted volumes from Golder 2007 - Waste and Water Management Plan - Meadowbank Gold Project, Table 12.1 and Figures 12.8

**For year 7, in the predicted model, there is no value for the volume of water transferred from Portage Pit to the Reclaim Pond, so take year 5 values for Portage. For Goose, use year 7 reflooding values minus evaporation for Goose.

Vault Pit Sumps Water Quality Year 7

Parameters	Units	Probable Scenario Year 7*	Possible Poor end Scenario Year 7*	Measured		% Difference between predicted vs measured- mean		% Difference between predicted vs measured- Lower 25th percentile		CCME Guidelines**	MMER Schedule 4**	Water License Discharge to Wally Lake**
				Mean	Lower 25th centile*	Probable	Possible Poor	Probable	Possible Poor			
pH		8.00	8.00	7.76	7.56	-3	-3	-6	-6	6.5 to 9.0	6.0 to 9.5	6.0 to 9.0
Alkalinity	mg CaCO ₃ /L	0.220	23	95	87	42,968	312	39,445	278	--	--	--
Ammonia (unionized)	mg N/L	0.40	0.67	0.113	0.110	-72	-83	-73	-84	0.016	--	--
Ammonia nitrogen	mg N/L	33	55	5.0	3.7	-85	-91	-89	-93	1.83	--	20
Dissolved Arsenic	mg/L	0.00015	0.120	0.0023	0.0003	1,400	-98	67	-100	0.005	0.5	0.1
Chloride	mg/L	0.0075	0.079	29	17	390,900	37,020	223,567	21,134	120	--	500
Dissolved Copper	mg/L	0.0000150	0.00180	0.0023	0.0005	15,483	30	3,317	-72	0.002	0.3	0.1
Fluoride	mg/L	0.0000150	0.031	0.19	0.19	1,266,567	513	1,233,233	497	0.12	--	--
Hardness	mg CaCO ₃ /L	0.27	45	332	258	122,956	638	95,270	472	--	--	--
Dissolved Lead	mg/L	0.00000190	0.000027	0.0002	0.0002	7,795	456	7,795	456	0.001	0.2	0.1
Dissolved Nickel	mg/L	0.000030	0.00027	0.0065	0.0024	21,692	2,321	7,858	784	0.025	0.5	0.2
Dissolved Barium	mg/L	0.000054	0.028	0.0306	0.0193	56,474	9	35,641	-31	--	--	--
Dissolved Cadmium	mg/L	0.0000019	0.000027	0.0001	0.0001	6,742	381	3,979	187	0.00004	--	0.002
Dissolved Iron	mg/L	0.0000150	0.005	0.0350	0.0250	23,233	629	16,567	421	0.3	--	--
Dissolved Mercury	mg/L	0.000000190	0.000027	0.000018	0.00001	9,111	-35	2,532	-81	0.000026	--	0.0004
Dissolved Manganese	mg/L	0.000042	0.00540	0.1398	0.0952	332,757	2,489	226,567	1,663	0.073	--	--
Dissolved Molybdenum	mg/L	0.0000390	0.07300	0.0659	0.0533	16,785	-10	13,560	-27	0.073	--	--
Dissolved Selenium	mg/L	0.0000097	0.00130	0.0039	0.0024	39,848	198	24,385	83	0.001	--	--
Dissolved Thallium	mg/L	0.0000050	0.000054	0.0006	0.0004	10,900	919	7,900	641	0.0008	--	--
Nitrate	mgN/L	36	62	19.85	9.83	59,796	-68	-73	-84	2.94	--	50
Sulphate	mgN/L	0.02	24	144	143	499,796	500	595,629	496	--	--	--
Total dissolved solids	mg/L	76	210	529	441	596	152	480	110	--	--	--
Dissolved Zinc	mg/L	0.000097	0.00120	0.0008	0.0005	673	-38	415	-58	0.03	0.5	0.2

Goose Island Pit Sumps Water Quality Year 3

Parameters	Units	Probable Scenario Year 3*	Possible Poor end Scenario Year 3*	Measured		% Difference between predicted vs measured- mean		% Difference between predicted vs measured- Lower 25th percentile *		CCME Guidelines**	MMER Schedule 4**	Water License Discharge to 3PL**
				Mean	Lower 25th centile	Probable	Possible Poor	Probable	Possible Poor			
pH		6.10	6.10	7.73	7.63	27	27	25	25	6.5 to 9.0	6.0 to 9.5	6.0 to 9.0
Alkalinity	mg CaCO ₃ /L	27	45	47	45	74	74	66	66	--	--	--
Ammonia (unionized)	mg N/L	0.00056	0.00056	0.0050	0.0050	793	793	793	793	0.016	--	--
Ammonia nitrogen	mg N/L	5.4	5	0.1	0.0	-98	-98	-99	-99	1.83	--	16
Dissolved Arsenic	mg/L	0.0016	0.0016	0.003	0.0003	-84	-84	-84	-84	0.005	0.5	0.3
Chloride	mg/L	440	440	13	12	-97	-97	-97	-97	120	--	1000
Dissolved Copper	mg/L	0.001	0.001	0.009	0.0004	-7	-7	-54	-54	0.002	0.3	0.1
Fluoride	mg/L	0.13	0.13	0.34	0.33	163	163	154	154	0.12	--	--
Hardness	mg CaCO ₃ /L	210	210	127	113	-40	-40	-46	-46	--	--	--
Dissolved Lead	mg/L	0.0011	0.0011	0.0002	0.0002	-86	-86	-86	-86	0.001	0.2	0.1
Dissolved Nickel	mg/L	0.002	0.002	0.0352	0.0260	1,660	1,660	1,201	1,201	0.025	0.5	0.2
Dissolved Barium	mg/L	0.027	0.027	0.0162	0.0142	-40	-40	-48	-48	--	--	--
Dissolved Cadmium	mg/L	0.000051	0.000051	0.0000	0.0000	-75	-75	-80	-80	0.00004	--	0.002
Dissolved Iron	mg/L	0.25	0.25	0.0050	0.0050	-98	-98	-98	-98	0.3	--	--
Dissolved Mercury	mg/L	0.0000039	0.0000039	0.00001	0.00001	60	60	28	28	0.000026	--	0.0004
Dissolved Manganese	mg/L	0.13	0.13	0.0480	0.0244	-63	-63	-81	-81	--	--	--
Dissolved Molybdenum	mg/L	0.0086	0.0086	0.0064	0.0060	-25	-25	-30	-30	0.073	--	--
Dissolved Selenium	mg/L	0.0002	0.0002	0.0008	0.0005	275	275	150	150	0.001	--	--
Dissolved Thallium	mg/L	0.00002	0.00002	0.0006	0.0004	2,650	2,650	1,900	1,900	0.0008	--	--
Nitrate	mgN/L	4.00	4.00	3.72	3.55	-7	-7	-11	-11	2.94	--	20
Sulphate	mgN/L	21	21	84	80	301	301	279	279	--	--	--
Total dissolved solids	mg/L	670	670	238	229	-64	-64	-66	-66	--	--	--
Dissolved Zinc	mg/L	0.0051	0.0051	0.0005	0.0005	-90	-90	-90	-90	0.03	0.5	0.4

Third Portage Pit Sumps Water Quality Year 4

Parameters	Units	Probable Scenario Year 4*	Possible Poor end Scenario Year 4*	Measured		% Difference between predicted vs measured- mean		% Difference between predicted vs measured- Lower 25th percentile *		CCME Guidelines**	MMER Schedule 4**	Water License Discharge to 3PL**
				Mean	Lower 25th centile	Probable	Possible Poor	Probable	Possible Poor			
pH		6.30	6.10	7.70	-	22	26	-	-	6.5 to 9.0	6.0 to 9.5	6.0 to 9.0
Alkalinity	mg CaCO ₃ /L	40	43	64	54	59	48	34	24	--	--	--
Ammonia (unionized)	mg N/L	0.00052	0.00055	0.0833	0.0300	15,926	15,052	5,669	5,355	0.016	--	--
Ammonia nitrogen	mg N/L	2.1	4	5.3	4.4	153	52	108	25	1.83	--	16
Dissolved Arsenic	mg/L	0.0024	0.0680	0.0003	-	-90	-100	-	-	0.005	0.5	0.3
Chloride	mg/L	620	630	31	29	-95	-95	-95	-95	120	--	1000
Dissolved Copper	mg/L	0.0014	0.016	0.0010	-	-29	-94	-	-	0.002	0.3	0.1
Fluoride	mg/L	0.19	0.24	0.51	0.42	167	111	118	73	0.12	--	--
Hardness	mg CaCO ₃ /L	300	310	273	199	-9	-12	-34	-36	--	--	--
Dissolved Lead	mg/L	0.0016	0.0076	0.0002	-	-91	-98	-	-	0.001	0.2	0.1
Dissolved Nickel	mg/L	0.003	0.093	0.0072	-	-148	-92	-	-	0.025	0.5	0.2
Dissolved Barium	mg/L	0.041	0.0630	0.0173	-	-58	-73	-	-	--	--	--
Dissolved Cadmium	mg/L	0.000076	0.00027	0.0002	-	216	-11	-	-	0.00004	--	0.002
Dissolved Iron	mg/L	0.37	4.60	0.0200	-	-95	-100	-	-	0.3	--	--
Dissolved Mercury	mg/L	0.0000059	0.0000540	0.00005	-	747	-7	-	-	0.000026	--	0.0004
Dissolved Manganese	mg/L	0.19	0.66	0.5854	-	208	-11	-	-	--	--	--
Dissolved Molybdenum	mg/L	0.013	0.013	0.0867	-	567	567	-	-	0.073	--	--
Dissolved Selenium	mg/L	0.0003	0.0012	0.0020	-	590	67	-	-	0.001	--	--
Dissolved Thallium	mg/L	0.00003	0.00012	0.0004	-	1,190	233	-	-	0.0008	--	--
Nitrate	mgN/L	2.30	4.00	4.34	1.62	89	9	-30	-60	2.94	--	20
Sulphate	mgN/L	31	46	245	153	691	433	394	233	--	--	--
Total dissolved solids	mg/L	960	990	562	470	-41	-43	-51	-53	--	--	--
Dissolved Zinc	mg/L	0.0076	0.0850	0.0040	-	-47	-95	-	-	0.03	0.5	0.4

North Portage Pit Sumps Water Quality Year 4

Parameters	Units	Probable Scenario Year 4*	Possible Poor end Scenario Year 4*	Measured		% Difference between predicted vs measured- mean		% Difference between predicted vs measured- Lower 25th percentile +		CCME Guidelines**	MMER Schedule 4**	Water License Discharge to 3PL**
				Mean	Lower 25th centile	Probable	Possible Poor	Probable	Possible Poor			
				Long Term, Based on 3PL quality								
pH		6.30	6.10	7.91	7.92	26	30	26	30	6.5 to 9.0	6.0 to 9.5	6.0 to 9.0
Alkalinity	mg CaCO3/L	0.05	2.4	97	79	194,186	3,948	157,900	3,192	--	--	--
Ammonia (unionized)	mg N/L	0.003	0.0014	0.0914	0.0600	2,948	6,431	1,900	4,186	0.016	--	--
Ammonia nitrogen	mg N/L	12	8.9	3.7	2.8	-69	-58	-77	-69	1.83	--	16
Dissolved Arsenic	mg/L	0.00005	0.056	0.0140	0.0061	30,928	-75	13,372	-89	0.005	0.5	0.3
Chloride	mg/L	0.0010	0.25	24	19	2,415,352	9,369	1,918,267	7,420	120	--	1000
Dissolved Copper	mg/L	0.00001	0.007	0.0013	0.0007	11,264	-82	6,036	-90	0.002	0.3	0.1
Fluoride	mg/L	0.00008	0.031	0.43	0.35	5,357,043	1,282	4,312,400	1,013	0.12	--	--
Hardness	mg CaCO3/L	0.05	8	306	236	679,583	3,723	524,344	2,850	--	--	--
Dissolved Lead	mg/L	0.000002	0.0029	0.0002	0.0002	6,718	-95	6,718	-95	0.001	0.2	0.1
Dissolved Nickel	mg/L	0.00003	0.043	0.0325	0.0253	95,488	-24	74,165	-41	0.025	0.5	0.2
Dissolved Barium	mg/L	0.00002	0.013	0.0207	0.0150	108,979	59	78,847	15	--	--	--
Dissolved Cadmium	mg/L	0.0000006	0.000099	0.0004	0.0002	61,150	271	32,400	97	0.00004	--	0.002
Dissolved Iron	mg/L	0.000097	2.1	0.0063	0.0050	6,343	-100	5,055	-100	0.3	--	--
Dissolved Mercury	mg/L	0.000000056	0.000029	0.00002	0.00001	33,382	-35	8,829	-83	0.000026	--	0.0004
Dissolved Manganese	mg/L	0.0002	0.22	0.1373	0.1225	91,433	-38	81,533	-44	--	--	--
Dissolved Molybdenum	mg/L	0.000004	0.00081	0.1319	0.1192	3,296,775	16,181	2,979,275	14,613	0.073	--	--
Dissolved Selenium	mg/L	0.000003	0.00058	0.0020	0.0010	66,567	245	33,233	72	0.001	--	--
Dissolved Thallium	mg/L	0.0000014	0.000057	0.0004	0.0004	28,471	602	28,471	602	0.0008	--	--
Nitrate	mgN/L	13	10.00	12.68	12.60	-2	27	-3	26	2.94	--	20
Sulphate	mgN/L	0.011	8.8	232	195	2,107,692	2,535	1,772,627	2,116	--	--	--
Total dissolved solids	mg/L	28	41	518	455	1,752	1,164	1,523	1,009	--	--	--
Dissolved Zinc	mg/L	0.000032	0.037	0.0021	0.0009	6,541	-94	2,634	-98	0.03	0.5	0.4

Footnotes:

Highlighted values represent exceedences of greater than 20% relative percent difference between predicted vs measured values.

* Used year 7 predictions for Vault, year 3 for Goose and year 4 for Portage as presented in Golder, 2007 - Water Quality Predictions Meadowbank Gold Project Doc No 516. Ver 0

+ Some have no lower 25th percentile data as only 1 or 2 samples were taken in 2016.

** Discharge criteria and guidelines based on total metal concentrations.

Highlighted values in yellow indicate a mean measured value greater than the discharge criteria or guidelines.

MINING YEAR 8

Water Quantity - Year 8^

Pits**	Predicted (m³)	Measured (m³)	% Difference between predicted vs measured
Portage	715,200	341,192	-52
Bay Goose	635,200	464,019	-27
Vault Pit	53,900	249,513	363

*predicted volumes from Golder 2007 - Waste and Water Management Plan - Meadowbank Gold Project, Table 12.1 and Figures 12.9

**For year 8, in the predicted model, there is no value for the volume of water transferred from Portage Pit to the Reclaim Pond, so take year 5 values for Portage. For Goose, use year 8 reflooding values minus evaporation for Goose.

Vault Pit Sumps Water Quality Year 7

Parameters	Units	Probable Scenario Year 7*	Possible Poor end Scenario Year 7*	Measured		% Difference between predicted vs measured- mean		% Difference between predicted vs measured- Lower 25th percentile		CCME Guidelines**	MMER Schedule 4**	Water License Discharge to Wally Lake**
				Mean	Lower 25th centile*	Probable	Possible Poor	Probable	Possible Poor			
pH		8.00	8.00	7.72	7.44	-4	-4	-7	-7	6.5 to 9.0	6.0 to 9.5	6.0 to 9.0
Alkalinity	mg CaCO3/L	0.220	23	120	110	54,218	420	50,014	379	--	--	--
Ammonia (unionized)	mg N/L	0.40	0.67	0.083	0.070	-79	-88	-83	-90	0.016	--	--
Ammonia nitrogen	mg N/L	33	55	3.8	3.5	-88	-93	-89	-94	1.83	--	20
Dissolved Arsenic	mg/L	0.00015	0.120	0.0046	0.0003	2,950	-96	67	-100	0.005	0.5	0.1
Chloride	mg/L	0.0075	0.079	36	26	474,344	44,942	344,900	32,653	120	--	500
Dissolved Copper	mg/L	0.0000150	0.00180	0.0013	0.0003	8,400	-29	1,567	-86	0.002	0.3	0.1
Fluoride	mg/L	0.0000150	0.031	0.19	0.17	1,244,344	502	1,099,900	432	0.12	--	--
Hardness	mg CaCO3/L	0.27	45	290	249	107,246	544	91,937	452	--	--	--
Dissolved Lead	mg/L	0.00000190	0.000027	0.0005	0.0002	24,900	1,659	7,795	456	0.001	0.2	0.1
Dissolved Nickel	mg/L	0.000030	0.00027	0.0077	0.0033	25,428	2,736	10,733	1,104	0.025	0.5	0.2
Dissolved Barium	mg/L	0.000054	0.028	0.0271	0.0213	50,162	-3	39,391	-24	--	--	--
Dissolved Cadmium	mg/L	0.0000019	0.000027	0.0000	0.0000	1,918	42	426	-63	0.00004	--	0.002
Dissolved Iron	mg/L	0.0000150	0.005	0.6200	0.0113	413,233	12,817	7,400	134	0.3	--	--
Dissolved Mercury	mg/L	0.00000190	0.000027	0.00002	0.00001	7,795	-44	2,532	-81	0.000026	--	0.0004
Dissolved Manganese	mg/L	0.000042	0.00540	0.2675	0.1847	636,805	4,854	439,662	3,320	--	--	--
Dissolved Molybdenum	mg/L	0.000390	0.07300	0.0283	0.0144	7,159	-61	3,579	-80	0.073	--	--
Dissolved Selenium	mg/L	0.0000097	0.00130	0.0016	0.0013	16,223	22	12,787	-4	0.001	--	--
Dissolved Thallium	mg/L	0.0000050	0.000054	0.0004	0.0004	7,900	641	7,900	641	0.0008	--	--
Nitrate	mg/NL	36	62	4.23	1.28	-93	-93	-96	-98	2.94	--	50
Sulphate	mg/NL	0.02	24	146	76	609,761	510	315,004	215	--	--	--
Total dissolved solids	mg/L	76	210	464	411	511	121	441	96	--	--	--
Dissolved Zinc	mg/L	0.000097	0.00120	0.0008	0.0005	759	-31	415	-58	0.03	0.5	0.2

Goose Island Pit Sumps Water Quality Year 3

Parameters	Units	Probable Scenario Year 3*	Possible Poor end Scenario Year 3*	Measured		% Difference between predicted vs measured- mean		% Difference between predicted vs measured- Lower 25th percentile *		CCME Guidelines**	MMER Schedule 4**	Water License Discharge to 3PL**
				Mean	Lower 25th centile	Probable	Possible Poor	Probable	Possible Poor			
pH		6.10	6.10	7.92	7.81	30	30	28	28	6.5 to 9.0	6.0 to 9.5	6.0 to 9.0
Alkalinity	mg CaCO3/L	27	27	86	83	217	217	207	207	--	--	--
Ammonia (unionized)	mg N/L	0.00056	0.00056	0.0183	0.0125	3,174	3,174	2,132	2,132	0.016	--	--
Ammonia nitrogen	mg N/L	5.4	5	1.2	1.0	-79	-79	-82	-82	1.83	--	16
Dissolved Arsenic	mg/L	0.0016	0.0016	0.0003	0.0003	-84	-84	-84	-84	0.005	0.5	0.3
Chloride	mg/L	440	440	13	12	-97	-97	-97	-97	120	--	1000
Dissolved Copper	mg/L	0.001	0.001	0.0009	0.0007	-9	-9	-26	-26	0.002	0.3	0.1
Fluoride	mg/L	0.13	0.13	0.18	0.17	41	41	27	27	0.12	--	--
Hardness	mg CaCO3/L	210	210	226	208	8	8	-1	-1	--	--	--
Dissolved Lead	mg/L	0.0011	0.0011	0.0002	0.0002	-86	-86	-86	-86	0.001	0.2	0.1
Dissolved Nickel	mg/L	0.002	0.002	0.0702	0.0638	3,410	3,410	3,088	3,088	0.025	0.5	0.2
Dissolved Barium	mg/L	0.027	0.0270	0.0378	0.0341	40	40	26	26	--	--	--
Dissolved Cadmium	mg/L	0.000051	0.000051	0.0000	0.0000	-80	-80	-80	-80	0.00004	--	0.002
Dissolved Iron	mg/L	0.25	0.25	0.0050	0.0050	-98	-98	-98	-98	0.3	--	--
Dissolved Mercury	mg/L	0.0000039	0.0000039	0.00002	0.00001	285	285	92	92	0.000026	--	0.0004
Dissolved Manganese	mg/L	0.13	0.13	0.0842	0.0788	-35	-35	-39	-39	--	--	--
Dissolved Molybdenum	mg/L	0.0086	0.0086	0.0070	0.0065	-19	-19	-24	-24	0.073	--	--
Dissolved Selenium	mg/L	0.0002	0.0002	0.0015	0.0013	650	650	525	525	0.001	--	--
Dissolved Thallium	mg/L	0.00002	0.00002	0.0004	0.0004	1,900	1,900	1,900	1,900	0.0008	--	--
Nitrate	mg/NL	4.00	4.00	13.22	9.68	230	230	142	142	2.94	--	20
Sulphate	mg/NL	21	21	147	134	602	602	538	538	--	--	--
Total dissolved solids	mg/L	670	670	423	406	-37	-37	-39	-39	--	--	--
Dissolved Zinc	mg/L	0.0051	0.0051	0.0018	0.0008	-64	-64	-85	-85	0.03	0.5	0.4

Third Portage Pit Sumps Water Quality Year 4

Parameters	Units	Probable Scenario Year 4*	Possible Poor end Scenario Year 4*	Measured		% Difference between predicted vs measured- mean		% Difference between predicted vs measured- Lower 25th percentile *		CCME Guidelines**	MMER Schedule 4**	Water License Discharge to 3PL**
				Mean	Lower 25th centile	Probable	Possible Poor	Probable	Possible Poor			
pH		6.30	6.10	8.14	8.05	29	33	28	32	6.5 to 9.0	6.0 to 9.5	6.0 to 9.0
Alkalinity	mg CaCO3/L	40	43	77	74	92	78	85	72	--	--	--
Ammonia (unionized)	mg N/L	0.00052	0.00055	0.0617	0.0425	11,759	11,112	8,073	7,627	0.016	--	--
Ammonia nitrogen	mg N/L	2.1	4	4.2	3.7	100	20	76	6	1.83	--	16
Dissolved Arsenic	mg/L	0.0024	0.0680	0.0003	0.0003	-90	-100	-90	-100	0.005	0.5	0.3
Chloride	mg/L	620	630	29	28	-95	-95	-95	-96	120	--	1000
Dissolved Copper	mg/L	0.0014	0.016	0.0004	0.0003	-74	-98	-82	-98	0.002	0.3	0.1
Fluoride	mg/L	0.19	0.24	0.39	0.38	104	61	97	56	0.12	--	--
Hardness	mg CaCO3/L	300	310	192	179	-36	-38	-40	-42	--	--	--
Dissolved Lead	mg/L	0.0016	0.0076	0.0002	0.0002	-91	-98	-91	-98	0.001	0.2	0.1
Dissolved Nickel	mg/L	0.003	0.093	0.0175	0.0137	503	-81	372	-85	0.025	0.5	0.2
Dissolved Barium	mg/L	0.041	0.0630	0.0101	0.0090	-75	-84	-78	-86	--	--	--
Dissolved Cadmium	mg/L	0.000076	0.00027	0.0000	0.0000	-61	-89	-87	-96	0.00004	--	0.002
Dissolved Iron	mg/L	0.37	4.60	0.0050	0.0050	-99	-100	-99	-100	0.3	--	--
Dissolved Mercury	mg/L	0.0000059	0.0000540	0.00004	0.00004	634	-20	493	-35	0.000026	--	0.0004
Dissolved Manganese	mg/L	0.19	0.66	0.0735	0.0577	-61	-89	-70	-91	--	--	--
Dissolved Molybdenum	mg/L	0.013	0.013	0.0279	0.0271	115	115	108	108	0.073	--	--
Dissolved Selenium	mg/L	0.0003	0.0012	0.0017	0.0010	475	39	245	-17	0.001	--	--
Dissolved Thallium	mg/L	0.00003	0.00012	0.0004	0.0004	1,190	233	1,190	233	0.0008	--	--
Nitrate	mg/NL	2.30	4.00	7.56	5.50	229	89	139	37	2.94	--	20
Sulphate	mg/NL	31	46	129	124	316	180	298	168	--	--	--
Total dissolved solids	mg/L	960	990	388	376	-60	-61	-61	-62	--	--	--
Dissolved Zinc	mg/L	0.0076	0.0850	0.0005	0.0005	-93	-99	-93	-99	0.03	0.5	0.4

North Portage Pit Sumps Water Quality Year 4

Parameters	Units	Probable Scenario Year 4*	Possible Poor end Scenario Year 4*	Measured		% Difference between predicted vs measured- mean		% Difference between predicted vs measured- Lower 25th percentile +		CCME Guidelines**	MMER Schedule 4**	Water License Discharge to 3PL**
				Mean	Lower 25th centile	Probable	Possible Poor	Probable	Possible Poor			
pH		6.30	6.10	7.85	7.61	25	29	21	25	6.5 to 9.0	6.0 to 9.5	6.0 to 9.0
Alkalinity	mg CaCO3/L	0.05	2.4	98	81	196,700	4,000	161,900	3,275	--	--	--
Ammonia (unionized)	mg N/L	0.003	0.0014	0.0717	0.0100	2,289	5,019	233	614	0.016	--	--
Ammonia nitrogen	mg N/L	12	8.9	2.6	0.7	-78	-71	-94	-92	1.83	--	16
Dissolved Arsenic	mg/L	0.00005	0.056	0.0203	0.0118	44,937	-64	26,011	-79	0.005	0.5	0.3
Chloride	mg/L	0.0010	0.25	25	16	2,553,641	9,911	1,601,941	6,180	120	--	1000
Dissolved Copper	mg/L	0.00001	0.007	0.0016	0.0003	14,021	-78	2,173	-96	0.002	0.3	0.1
Fluoride	mg/L	0.00008	0.031	0.42	0.38	5,250,733	1,255	4,749,900	1,126	0.12	--	--
Hardness	mg CaCO3/L	0.05	8	214	201	476,048	2,578	446,567	2,413	--	--	--
Dissolved Lead	mg/L	0.000002	0.0029	0.0009	0.0002	40,506	-69	6,718	-95	0.001	0.2	0.1
Dissolved Nickel	mg/L	0.00003	0.043	0.0290	0.0251	85,214	-33	73,724	-42	0.025	0.5	0.2
Dissolved Barium	mg/L	0.00002	0.013	0.0159	0.0130	83,689	22	68,058	0	--	--	--
Dissolved Cadmium	mg/L	0.0000006	0.000099	0.0001	0.0000	13,178	-20	1,567	-90	0.00004	--	0.002
Dissolved Iron	mg/L	0.000097	2.1	0.0200	0.0050	20,519	-99	5,055	-100	0.3	--	--
Dissolved Mercury	mg/L	0.000000056	0.000029	0.00002	0.00001	37,995	-26	8,829	-83	0.000026	--	0.0004
Dissolved Manganese	mg/L	0.0002	0.22	0.1255	0.1112	83,589	-43	74,000	-49	--	--	--
Dissolved Molybdenum	mg/L	0.000004	0.00081	0.0592	0.0405	1,479,567	7,207	1,011,150	4,894	0.073	--	--
Dissolved Selenium	mg/L	0.000003	0.00058	0.0009	0.0005	30,567	59	16,567	-14	0.001	--	--
Dissolved Thallium	mg/L	0.0000014	0.000057	0.0004	0.0004	28,471	602	28,471	602	0.0008	--	--
Nitrate	mgN/L	13	10.00	8.81	6.19	-32	-12	-52	-38	2.94	--	20
Sulphate	mgN/L	0.011	8.8	186	159	1,690,809	2,014	1,445,355	1,707	--	--	--
Total dissolved solids	mg/L	28	41	463	396	1,555	1,030	1,314	866	--	--	--
Dissolved Zinc	mg/L	0.000032	0.037	0.0006	0.0005	1,619	-99	1,463	-99	0.03	0.5	0.4

Footnotes:

Highlighted values represent exceedences of greater than 20% relative percent difference between predicted vs measured values.

* Used year 7 predictions for Vault, year 3 for Goose and year 4 for Portage as presented in Golder, 2007 - Water Quality Predictions Meadowbank Gold Project Doc No 516. Ver 0

+ Some have no lower 25th percentile data as only 1 or 2 samples were taken in 2016.

** Discharge criteria and guidelines based on total metal concentrations.

Highlighted values in yellow indicate a mean measured value greater than the discharge criteria or guidelines.