AMENDED EIS/EA REPORT
CHAPTER 3: EXISTING CONDITIONS
VERSION 3

TABLES

Table 3-1: Waste Rock and Tailings Sample List

Rock Type	Samples Collected	
	Number	Percentage
Waste Rock	**123**	**100%**
Chloritic Granite	31	25%
Tonalite	30	24%
Fine Grained Granite	16	14%
Pegmatite	11	9%
Mafic Dyke	9	7%
Altered Granitoid	8	6%
Chloritic Granite Porphyry	5	4%
Minor Units[a]	13	11%
Tailings (Zone and Metallurgical Composites)[b]	**20**	**100%**

Note:

a) Includes aplite, diorite, gneiss, sheared mafic unit, sheared granitoid, tectonized-sheared vein zone, quartz vein zone and intermediate dyke.

b) Sampling, rock type and testing details are provided in the Geochemistry, Geology and Soil TSD.

Table 3-2: Geochemical Testing Program Sample List

Material Type	Number of Samples Collected	Static Testing						Kinetic Testing	
		Elemental	ABA	NAG	Leach		Tailings Water Ageing Test	Mineralogy	Humidity Cells
					SFE	NAG			
Waste Rock	123	123	123	123	41	41	—	9	9
Tailings	20	10[a]	25[a]	15[a]	2[a]	15[a]	2[a]	1[a]	2[a]

Note:

a) Tests included individual and composite testing, SFE, water age testing and humidity cell tests were completed on representative composite samples based on individual test results from elemental, ABA and NAG tests. Mineralogy conducted on composite tailings sample.

— = Test not conducted.

Table 3-3: Acid Generation Potential Criteria

Acid Generation Potential	Criteria	Comments
Potentially Acid-Generating	NPR less than 1	Potentially acid-generating unless sulphide minerals are non-reactive.
Uncertain	NPR less than 2	Possibly acid-generating if NP is insufficiently reactive or is depleted at a rate faster than sulphides.
Non-Acid-Generating	NPR greater than 2	Not expected to generate acidity.

Table 3-4: Summary of Shake Flask Extraction (SFE) Leach Test Results for Waste Rock

Rock Type	pH (units)	SO_4 (mg/L)	Ag (mg/L)	Al (mg/L)	As (mg/L)	B (mg/L)	Cd (mg/L)	Cr (mg/L)	Cu (mg/L)	Se (mg/L)	V (mg/L)	Zn (mg/L)
PWQO	6.5 to 8.5	—	0.0001	0.075[(a)]	0.005	0.2	0.0001	0.001[(b)]	0.001	0.1	0.006	0.02
CCME Aquatic Life	6.5 to 9	—	0.0001	0.1[(a)]	0.005	—	0.000017	0.001[(b)]	0.002	0.001	—	0.03
MISA	6 to 9.5	—	—	—	1	—	—	—	0.6	—	—	1.0
Fine Grained Granite												
Minimum	**9.62**	<0.2	<0.00001	**0.60**	0.0006	0.0027	<0.000003	<0.0005	<0.0005	<0.001	0.0020	<0.001
Maximum	**10.1**	2.0	<0.00001	**0.51**	0.0003	0.0017	<0.000003	<0.0005	0.0007	<0.001	**0.0097**	<0.001
Average	**9.8**	0.73	<0.00001	**0.90**	0.002	0.005	<0.000003	<0.0005	0.0005	<0.001	0.005	<0.001
Chloritic Granite												
Minimum	**9.76**	0.30	<0.00001	**0.51**	0.0003	0.0017	<0.000003	<0.0005	<0.0005	<0.001	0.0017	<0.001
Maximum	**10.0**	1.3	<0.00001	**1.2**	0.003	0.0082	0.000003	<0.0005	0.0006	0.003	0.004	<0.001
Average	**9.9**	0.45	<0.00001	**0.91**	0.001	0.005	0.000003	<0.0005	0.0005	0.001	0.003	<0.001
Tonalite												
Minimum	**9.48**	0.3	<0.00001	**0.10**	0.0004	0.0023	<0.000003	<0.0005	<0.0005	<0.001	0.0009	<0.001
Maximum	**10.0**	0.3	0.00001	**1.2**	**0.019**	0.032	0.000004	<0.0005	**0.0014**	<0.001	**0.007**	0.001
Average	**9.8**	0.3	0.0001	**0.86**	0.003	0.007	0.000003	<0.0005	0.0006	<0.001	0.004	0.001
Altered Granitoid												
2010-HR-086	**9.92**	0.3	<0.00001	**0.93**	0.0011	0.0036	<0.000003	<0.0005	<0.0005	<0.001	0.0028	<0.001
2010-HR-093	**9.66**	0.3	<0.00001	**0.30**	0.0004	0.005	<0.000003	<0.0005	<0.0005	<0.001	0.00081	<0.001
Pegmatite												
Minimum	**9.85**	0.3	<0.00001	**0.66**	0.001	0.0036	<0.000003	<0.0005	<0.0005	<0.001	0.00081	<0.001
Maximum	**10.12**	0.3	<0.00001	**1.28**	0.0038	0.008	0.000003	<0.0005	0.0006	<0.001	0.0034	<0.001
Average	**10**	0.3	<0.00001	**1.0**	0.002	0.005	0.000003	<0.0005	0.0005	<0.001	0.002	<0.001
Mafic Dyke												
Minimum	**9.74**	0.3	<0.00001	**0.46**	0.0002	0.0042	<0.000003	<0.0005	<0.0005	<0.001	0.00093	<0.001
Maximum	**9.95**	0.3	<0.00001	**1.13**	0.0005	0.0048	0.000003	<0.0005	<0.0005	<0.001	0.0045	<0.001
Average	**9.8**	0.3	<0.00001	**0.75**	0.0004	0.005	0.000003	<0.0005	<0.0005	<0.001	0.003	<0.001

Table 3-4: Summary of Shake Flask Extraction (SFE) Leach Test Results for Waste Rock

Rock Type	pH (units)	SO_4 (mg/L)	Ag (mg/L)	Al (mg/L)	As (mg/L)	B (mg/L)	Cd (mg/L)	Cr (mg/L)	Cu (mg/L)	Se (mg/L)	V (mg/L)	Zn (mg/L)
Chloritic Granite Porphyry												
2010-HR-067	**9.68**	0.3	<0.00001	**0.95**	0.0017	0.008	<0.000003	<0.0005	<0.0005	<0.001	0.0029	<0.001
Minor Units												
Minimum	**9.53**	0.3	<0.00001	**0.09**	0.0004	0.0023	<0.000003	<0.0005	<0.0005	<0.001	0.00089	<0.001
Maximum	**10.06**	0.3	**0.00012**	**1.2**	0.012	0.0068	**0.000021**	<0.0005	<0.0005	**0.016**	0.0035	<0.001
Average	**9.82**	0.3	0.00003	**0.66**	0.0033	0.005	0.000008	<0.0005	<0.0005	**0.004**	0.003	<0.001

Note:

Bolded values do not meet one or more of the criteria considered. The formatting applies to this summary table only. For a complete comparison of all results and parameters tested to the criteria, refer to Appendix 2.III of the Geochemistry, Geology and Soil TSD. For criteria where a range exists, the lowest criterion was used, except in the case of aluminum.

a) Criteria for aluminum based on observed pH values greater than 6.5.

b) Criteria for hexavalent chromium used.

— = Guideline not applicable for this parameter.

Table 3-5: Summary of Net Acid Generation (NAG) Leach Test Results for Waste Rock

Rock Type	pH (units)	SO_4 (mg/L)	Ag (mg/L)	Al (mg/L)	As (mg/L)	B (mg/L)	Cd (mg/L)	Cr (mg/L)	Cu (mg/L)	Se (mg/L)	V (mg/L)	Zn (mg/L)
PWQO	6.5 to 8.5	—	0.0001	0.075[a]	0.005	0.2	0.0001	0.001[b]	0.001	0.1	0.006	0.02
CCME Aquatic Life	6.5 to 9	—	0.0001	0.1[a]	0.005	—	0.000017	0.001[b]	0.002	0.001	—	0.03
MISA	6 to 9.5	—	—	—	1	—	—	—	0.6	—	—	1.0
Fine Grained Granite												
Minimum	**8.91**	<2	<0.00001	<0.01	<0.0002	**0.37**	<0.000003	<0.0005	<0.0005	<0.001	0.0018	<0.001
Maximum	**10.8**	8.6	<0.00001	**5.54**	0.0007	**3.5**	0.000003	**0.022**	<0.0005	<0.001	**0.025**	0.003
Average	**9.5**	4.5	<0.00001	**3.33**	0.0003	**0.96**	0.000003	**0.02**	<0.0005	<0.001	**0.009**	0.002
Chloritic Granite												
Minimum	**9.31**	<2	<0.00001	**2.81**	<0.0002	0.15	<0.000003	**0.0053**	<0.0005	<0.001	0.0016	<0.001
Maximum	**11.2**	24	<0.00001	**13.8**	0.0003	**0.77**	0.000003	**0.035**	0.0009	<0.001	0.0055	0.004
Average	**10.1**	6.2	<0.00001	**6.7**	0.0002	**0.55**	0.000003	**0.02**	0.0005	<0.001	0.003	0.001
Tonalite												
Minimum	7.46	<2	<0.00001	**0.26**	<0.0002	0.036	<0.000003	**0.013**	<0.0005	<0.001	0.0017	<0.001
Maximum	**11.0**	43	0.00003	**8.19**	**0.0061**	**0.656**	0.00001	**0.047**	**0.0036**	<0.001	**0.0084**	0.004
Average	8.1	9.3	0.00001	**3.6**	0.002	**0.26**	0.000004	**0.03**	0.0009	<0.001	**0.006**	0.002
Altered Granitoid												
2010-HR-086	**10.3**	7.5	<0.00001	**7.73**	<0.0002	0.152	<0.000003	**0.0143**	<0.0005	<0.001	0.00348	<0.001
2010-HR-093	**10.2**	4.2	<0.00001	**1.14**	0.0005	**0.889**	<0.000003	**0.0244**	<0.0005	<0.001	0.00461	<0.001
Pegmatite												
Minimum	7.22	<2	<0.00001	**0.16**	0.0002	0.047	<0.000003	**0.029**	<0.0005	<0.001	0.0005	<0.001
Maximum	**11.1**	11	0.00005	**1.3**	0.0022	**1.18**	0.000003	**0.043**	**0.0021**	<0.001	**0.0086**	0.002
Average	7.6	5.7	0.00002	**0.73**	0.001	**0.435**	0.000003	**0.04**	**0.001**	<0.001	0.003	0.001
Mafic Dyke												
Minimum	**10.3**	<2	<0.00001	**0.16**	<0.0002	0.07	<0.000003	**0.022**	<0.0005	<0.001	0.0045	<0.001
Maximum	**11.4**	78	<0.00001	**1.3**	0.0002	**1.18**	<0.000003	**0.066**	0.0007	<0.001	**0.0075**	0.003
Average	**11**	29	<0.00001	**0.73**	0.0002	**0.60**	<0.000003	**0.05**	0.0006	<0.001	**0.006**	0.002

Table 3-5: Summary of Net Acid Generation (NAG) Leach Test Results for Waste Rock

Rock Type	pH (units)	SO_4 (mg/L)	Ag (mg/L)	Al (mg/L)	As (mg/L)	B (mg/L)	Cd (mg/L)	Cr (mg/L)	Cu (mg/L)	Se (mg/L)	V (mg/L)	Zn (mg/L)
Chloritic Granite Porphyry												
2010-HR-067	**10.6**	3.2	<0.00001	**4.39**	0.0003	0.171	<0.000003	**0.0275**	<0.0005	<0.001	**0.00712**	0.001
Minor Units												
Minimum	7.67	<2	<0.00001	**0.55**	<0.0002	0.043	<0.000003	**0.011**	<0.0005	<0.001	0.00047	<0.001
Maximum	**10.6**	150	<0.00001	**8.38**	0.0046	**0.784**	0.000009	**0.189**	<0.0005	**0.006**	0.0055	0.001
Average	**9.61**	38	<0.00001	**3.2**	0.0012	**0.22**	0.000004	**0.09**	<0.0005	**0.0022**	0.004	0.001

Note:

NAG test results are not analogous and should not be used for estimates of field conditions but are provided only for general information purposes only. **Bolded** values do not meet one or more of the criteria considered. The formatting applies to this summary table only. For a complete comparison of all results and parameters tested to the criteria, refer to Appendix 2.III of the Geochemistry, Geology and Soil TSD. For criteria where a range exists, the lowest criterion was used, except in the case of aluminum.

a) Criteria for aluminum based on observed pH values greater than 6.5.

b) Criteria for hexavalent chromium used.

— = Guideline not applicable for this parameter.

Table 3-6: 2012 Existing Conditions Soil Metal Analyses

Parameter	Soil Samples
pH	✓
% moisture	✓
Nitrate and nitrite N	✓
Total P	✓
Total organic C	✓
CCME metals (Ag, As, hot water-soluble B, Ba, Be, Cd, Co, Cr (total) and Cr (6+), Cu, Hg, Mo, Ni, Pb, Sb, Se, Tl, U, V, Zn); Al and Mn	✓

Table 3-7: Area of Terrain Map Units in the Terrain and Soil Local Study Area

Terrain Map Unit	Total Terrain and Soil Local Study Area	
	Area (ha)[a]	%
Bedrock	5,633	66
Glaciolacustrine	1,277	15
Glaciofluvial ice contact deposits	187	2
Fluvial	70	1
Water	902	4
Total	**8,494**	**100**

Note:

a) Numbers are rounded for presentation purposes; therefore, it may appear that the totals do not equal the sum of the individual values.

Table 3-8: Distribution of Soil Map Units in the Terrain and Soil Local Study Area

Soil Map Unit	Distribution in Terrain and Soil Local Study Area	
	Area (ha)[a]	%[a]
Dystric Brunisol-fine	382	4
Dystric Brunisol-Gleysol –coarse	142	2
Dystric Brunisol-Gleysol –fine	1,097	13
Dystric Brunisol-Regosol	205	2
Gleysol-Regosol	120	1
Gleysol-Terric Organic	125	1
Terric Organic-Gleysol	693	8
Regosol-bedrock	4,816	57
Water	915	11
Total	**8,495**	**100**

Note:

a) Numbers are rounded for presentation purposes; therefore, it may appear that the totals do not equal the sum of the individual values.

Table 3-9: Erosion Sensitivity in the Terrain and Soil Local Study Area

Soil Map Unit	Soil Wind Erosion Sensitivity	Soil Water Erosion Sensitivity
Dystric Brunisol-fine	Low-moderate	Low <5% slope Moderate 5 to 9% slope High >10% slope
Dystric Brunisol-Gleysol -coarse	High	Low 0 to 9% slope Moderate >10% slope
Dystric Brunisol-Gleysol -fine	Low-moderate	Low <5% slope Moderate 5 to 9% slope High >10% slope
Dystric Brunisol-Regosol	Low	Low <5% slope Moderate 5 to 9% slope High >10% slope
Gleysol-Regosol	Low	Low <5% slope
Gleysol-Terric Organic	Low	Low <5% slope
Terric Organic-Gleysol	Low	Low <5% slope
Regosol-bedrock	Low	Low <5% slope Moderate 5 to 9% slope High >10% slope
Water	N/A	N/A

Note:
N/A = Not applicable.

Table 3-10: Soil Chemistry Results 2012

Sample ID	MOE Table 1	DUP-1	DUP-2	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	S13	S14	S15	S16	S17	S18	S19	S20	S21	S22
Nitrate-N	—	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Nitrite-N	—	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Phosphorus, Total	—	330	377	232	318	216	357	276	475	192	429	420	562	312	426	237	310	126	425	348	307	330	398	175	851
Total Organic Carbon	—	3.27	3.04	0.90	2.62	1.17	3.10	2.95	6.57	1.49	3.50	3.74	4.46	3.19	2.40	0.77	0.55	0.74	1.08	1.80	2.31	3.40	1.84	2.35	1.15
Metals																									
Aluminum (Al)	—	24100	22800	7230	15200	9570	8780	21900	14200	16000	14400	22600	17700	22200	17600	13900	18100	13900	17200	21700	13900	17500	19600	18400	8340
Antimony (Sb)	—	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Arsenic (As)	18	3.68	3.48	1.00	2.40	0.95	2.12	2.36	1.80	1.80	2.10	3.44	4.52	3.14	3.91	1.27	1.40	1.12	1.57	2.27	2.14	2.71	1.94	1.56	1.13
Barium (Ba)	220	53.9	33.0	15.9	39.8	19.8	20.8	42.4	59.1	22.2	72.3	33.7	76.4	50.1	37.4	22.3	27.4	41.5	40.4	101	33.8	52.5	37.2	72.8	26.0
Beryllium (Be)	2.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Bismuth (Bi)	—	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Boron (B)	36	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Cadmium (Cd)	1.2	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Calcium (Ca)	—	2960	1810	1230	2220	1620	1110	1760	2190	1430	2470	1690	2250	1690	2050	1970	1890	1640	2080	2690	1580	1520	1670	4440	1170
Chromium (Cr)	70	24.6	26.6	11.1	25.8	16.3	16.8	23.0	16.3	20.5	27.3	26.4	33.0	22.8	24.8	23.7	26.5	20.2	22.0	27.0	18.1	29.4	26.4	36.6	12.3
Cobalt (Co)	21	7.6	5.9	2.5	6.5	4.1	2.9	5.2	3.4	3.9	5.5	5.8	6.0	6.8	5.9	5.7	5.7	4.6	5.7	7.5	3.7	6.2	5.1	10.1	2.8
Copper (Cu)	92	58.9	13.5	3.0	11.2	5.3	5.2	7.8	12.0	6.0	5.3	8.5	7.0	11.5	7.6	7.1	8.7	9.7	8.7	16.3	5.2	18.9	6.7	26.5	2.8
Iron (Fe)		21300	18500	10400	21400	11500	16400	18500	14700	14100	17400	18600	19900	18400	25500	15400	16700	11900	15800	18300	14300	21800	20600	19200	10200
Lead (Pb)	120	17.0	8.4	3.5	6.3	3.3	6.6	6.5	9.9	5.3	10.3	7.8	10.6	9.5	7.4	4.2	4.2	4.3	4.6	6.8	8.0	8.7	6.2	6.2	4.1
Lithium (Li)	—	10.9	7.8	4.1	9.7	5.5	6.0	9.0	8.5	7.2	7.9	8.6	10.9	11.1	9.8	7.7	8.0	7.5	8.2	9.0	7.2	13.0	12.6	11.6	6.8
Magnesium (Mg)	—	2420	2500	957	2900	1990	1480	1950	2070	1530	2000	2550	3090	2120	2530	2370	2670	2060	2380	3090	1740	2250	2070	4490	1260
Manganese (Mn)	—	106	101	62.6	129	83.7	63.7	80.5	101	76.2	553	104	364	100	176	122	126	84.1	139	293	90.6	89.4	101	511	124
Mercury (Hg)	0.27	0.077	0.060	0.012	0.027	0.014	0.024	0.045	0.044	0.031	0.034	0.050	0.060	0.072	0.070	0.021	0.032	0.023	0.038	0.039	0.036	0.042	0.026	0.036	0.017
Molybdenum (Mo)	2	6.8	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.4	6.2	1.4	<1.0	<1.0	<1.0	<1.0	2.1	<1.0	1.6	<1.0	<1.0	<1.0
Nickel (Ni)	82	17.2	13.9	6.5	16.4	9.5	7.1	13.4	8.9	9.2	15.4	13.6	16.4	15.0	12.5	13.8	13.1	11.2	13.2	17.7	8.6	16.0	16.8	38.3	5.9
Potassium (K)	—	450	370	200	440	250	320	350	590	260	430	370	710	400	410	320	390	230	330	420	350	390	330	500	290
Selenium (Se)	1.5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Silver (Ag)	0.5	0.49	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.39	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Sodium (Na)	—	230	220	130	180	150	100	150	150	130	150	200	130	170	200	210	310	150	210	270	160	140	140	260	<100
Strontium (Sr)	—	10.7	9.9	7.1	13.1	8.8	7.7	10.3	14.9	9.7	16.8	10.0	16.0	10.0	11.3	11.0	10.3	13.8	11.6	16.9	10.8	10.3	10.5	15.8	9.2
Thallium (Tl)	1	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Tin (Sn)	—	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Titanium (Ti)	—	880	977	671	1040	734	779	936	651	858	764	973	973	878	1050	1050	1140	849	956	1000	793	1050	1010	921	519
Uranium (U)	2.5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.4	<1.0	<1.0	<1.0	<1.0	<1.0
Vanadium (V)	86	57.0	61.9	32.0	60.9	32.5	44.7	58.0	40.7	45.5	52.5	61.2	55.5	53.6	66.0	50.4	58.2	39.0	49.4	57.6	47.5	63.7	60.8	54.6	25.3
Zinc (Zn)	290	88.4	30.8	14.1	30.7	13.8	21.1	24.5	29.8	22.4	37.0	27.7	47.4	27.0	27.5	21.5	22.9	16.8	36.9	32.3	24.0	22.7	24.6	40.0	25.2

Note:
— = No guideline value.

Table 3-11: Monthly Temperature Normals for Atikokan Marmion Meteorological Station

Parameter	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Daily Average (°C)	-18.1	-13.8	-6.5	2.8	10.4	14.7	17.7	16.1	10.4	4.5	-4.8	-14.2	1.6
Standard Deviation (°C)	3.6	3.8	3.0	2.0	2.3	1.5	1.3	1.6	1.4	1.9	2.5	4.0	1.2
Daily Maximum (°C)	-11.2	-6.5	0.4	10.0	18.0	21.7	24.7	22.8	16.5	9.6	0.0	-8.4	8.1
Daily Minimum (°C)	-24.9	-20.9	-13.4	-4.4	2.7	7.7	10.8	9.3	4.3	-0.6	-9.5	-20.1	-4.9
Extreme Maximum (°C)	7.8	11.7	17.2	28.3	34.4	32.6	35.6	35.0	37.2	26.1	20.2	9.2	37.2
Extreme Minimum (°C)	-45.2	-45.6	-38.3	-28.9	-10.0	-3.4	-0.6	-2.8	-7.8	-17.7	-37.4	-42.0	-45.6
Days with Temperatures Above 30°C	0	0	0	0	1	1	2	1	0	0	0	0	5
Days with Temperatures Below -10°C	28	23	18	4	0	0	0	0	0	1	12	25	110

Table 3-12: Seasonal Temperature Normals for Atikokan Marmion Meteorological Station

Parameter	Spring	Summer	Fall	Winter	Year
Daily Average (°C)	2.2	16.2	3.4	-15.4	1.6
Daily Maximum (°C)	9.5	23.1	8.7	-8.7	8.1
Daily Minimum (°C)	-5.0	9.3	-1.9	-22.0	-4.9
Extreme Maximum (°C)	34.4	35.6	37.2	11.7	37.2
Extreme Minimum (°C)	-38.3	-3.4	-37.4	-45.6	-45.6
Days with Maximum Temperatures Above 30°C	1	4	0	0	5
Days with Minimum Temperatures Below -10°C	22	0	12	76	110

Table 3-13: Monthly Precipitation Normals for Atikokan Marmion Meteorological Station

Parameter	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Rainfall (mm)	0.3	1.0	11.6	27.1	66.6	103.3	97.9	97.8	89.4	58.4	12.2	2.9	568
Snowfall (cm)	40.7	33.8	32.8	16.2	4.2	0.0	0.0	0.0	2.7	11.6	42.8	35.3	220
Precipitation (mm)	28.8	24.7	37.4	42.9	70.8	103.3	97.9	97.8	91.6	68.4	48.2	27.9	740
Extreme Daily Precipitation (mm)	24.6	16.5	22.1	40.1	43.4	55.4	53.6	74.2	96.6	73.9	45.8	33.4	—
Days with Measurable Precipitation	13	11.6	11.2	9.5	11.8	15	16	15.8	17.7	15.8	15.9	15.5	168.9

Note:
— = Not applicable.

Table 3-14: Seasonal Precipitation Normals for Atikokan Marmion Meteorological Station

Parameter	Spring	Summer	Fall	Winter	Year
Rainfall (mm)	152.7	245.0	225.6	33.3	656.5
Snowfall (cm)	58.7	0.0	37.8	178.0	274.4
Precipitation (mm)	208.3	244.9	259.9	186.3	899.3
Extreme Daily Precipitation (mm)	62.8	91.8	112.0	51.6	—
Days with Measurable Precipitation	33	47	49	40	169

Note:
— = Not applicable.

Table 3-15: Monitoring Station Information

Station ID	Location	Type of Area	Distance to Project Site
Fort Liard	Northwest Territories	Rural	2,343 km
La Loche	Saskatchewan	Rural	1,451 km
Thunder Bay	Ontario	Urban	171 km
Fraserdale	Ontario	Rural	723 km
Pickle Lake	Ontario	Rural	351 km
Senneterre	Quebec	Rural – forest	1,050 km
Brandon	Manitoba	Urban	621 km
Fort Chipewyan	Alberta	Rural	1,656 km

Table 3-16: Availability of Ambient Air Quality Data

Location	Electronic Data Availability					Periodic Data
	NO_2	SO_2	CO	O_3	$PM_{2.5}$	PM_{10}
Fort Liard	2006-2010	2006-2010	N/A	2007-2010	2006-2010	2008-2011
La Loche	2008-2010	2008-2010	2008-2010	2008-2010	2008-2010	2008-2010
Thunder Bay	2006-2010	N/A	N/A	2006-2010	2005-2010	N/A
Senneterre	N/A	N/A	N/A	N/A	2006-2010	N/A
Fraserdale	N/A	N/A	N/A	2005-2007	N/A	N/A
Pickle Lake	N/A	N/A	N/A	2006-2009	N/A	N/A
Brandon	2008-2010	2006-2010	N/A	2008-2010	N/A	2008-2010
Fort Chipewyan	2006-2010	2006-2010	N/A	2006-2010	2006-2010	N/A

Note:
N/A = Data not available.

Table 3-17: Existing Air Quality for the Air Quality Regional Study Area

Compound	Ave. Period	Background (µg/m³)	90th Percentile of Monitored Data (µg/m³)							
			Fort Liard	La Loche	Thunder Bay	Fraserdale	Pickle Lake	Senneterre	Brandon	Fort Chipewyan
PM_{10}	24-hour	17.81	17.81	102.09	—	—	—	—	47.44	—
$PM_{2.5}$	24-hour	4.93	6.77	8.86	8.50	—	—	8.21	—	4.93
SO_2	1-hour	2.62	3.19	2.62	—	—	—	—	2.62	2.62
	24-hour	1.77	3.21	1.77	—	—	—	—	2.73	2.73
NO_2	1-hour	2.32	2.32	11.29	33.86	—	—	—	22.57	5.64
	24-hour	2.32	2.32	9.48	28.29	—	—	—	18.73	5.32
CO	1-hour	1.15	—	1.15	—	—	—	—	—	—
	8-hour	1.16	—	1.16	—	—	—	—	—	—
O_3	1-hour	74.57	76.79	74.57	78.50	80.46	84.39	—	78.50	76.54
	8-hour	74.57	75.75	74.57	75.55	78.99	83.65	—	74.57	75.80
	24-hour	69.18	73.22	72.68	69.18	75.51	82.01	—	70.20	74.66

Note:
— = Not available.

Table 3-18: Long-Term Average and Range of Annual Mean Flows

Watercourse ID	Drainage Area (km^2)	Average Annual Mean Flow (m^3/s)	Range in Annual Mean Flows (m^3/s)
Mine Study Area Watercourses			
B (SW-11)	4.62	0.037	0.061
I	0.852	0.007	0.011
J	0.256	0.002	0.003
K	0.890	0.007	0.012
L	0.705	0.006	0.009
Q	2.73	0.022	0.036
R (SW-12)	6.21	0.050	0.081
AB	0.520	0.004	0.007
AD	0.293	0.002	0.004
AF	0.775	0.006	0.010
AH	0.600	0.005	0.008
AI	0.103	0.001	0.001
Local Study Area Watercourses			
Sawbill Creek (SW-01)	106	0.859	1.389
Lumby Creek upstream of Lizard Lake (SW-02A)	36.0	0.292	0.472
Lumby Creek downstream of Lizard Lake (SW-03)	62.8	0.509	0.823
Upper Marmion Reservoir inflows	458,145	32.1	--

Table 3-19: Long-Term Average Seasonal Mean Flows

Watercourse ID	Drainage Area (km²)	Average Seasonal Mean Flows (m³/s)			
		Fall (Oct-Dec)	Winter (Jan-Mar)	Spring (Apr-Jun)	Summer (Jul-Sep)
Mine Study Area Watercourses					
B (SW-11)	4.62	0.028	0.018	0.061	0.042
I	0.852	0.005	0.003	0.011	0.008
J	0.256	0.002	0.001	0.003	0.002
K	0.890	0.005	0.004	0.012	0.008
L	0.705	0.004	0.003	0.009	0.006
Q	2.73	0.016	0.011	0.036	0.025
R (SW-12)	6.21	0.037	0.025	0.081	0.056
AB	0.520	0.003	0.002	0.007	0.005
AD	0.293	0.002	0.001	0.004	0.003
AF	0.775	0.005	0.003	0.010	0.007
AH	0.600	0.004	0.002	0.008	0.005
AI	0.103	0.001	0.000	0.001	0.001
Local Study Area Watercourses					
SW-01	106	0.636	0.424	1.389	0.954
SW-02A	36.0	0.216	0.144	0.472	0.324
SW-03	62.8	0.377	0.251	0.823	0.565
Upper Marmion Reservoir inflows	458,145	29.9	17.4	55.8	24.7

Table 3-20: Long-Term Average Monthly Mean Flows (m³/s)

Watercourse ID	Drainage Area (km²)	Long-Term Average Monthly Mean Flows (m³/s)											
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mine Study Area Watercourses													
B (SW-11)	4.62	0.021	0.018	0.016	0.028	0.077	0.075	0.057	0.038	0.030	0.029	0.029	0.025
I	0.852	0.004	0.003	0.003	0.005	0.014	0.014	0.010	0.007	0.006	0.005	0.005	0.005
J	0.256	0.001	0.001	0.001	0.002	0.004	0.004	0.003	0.002	0.002	0.002	0.002	0.001
K	0.890	0.004	0.003	0.003	0.005	0.015	0.015	0.011	0.007	0.006	0.006	0.006	0.005
L	0.705	0.003	0.003	0.002	0.004	0.012	0.011	0.009	0.006	0.005	0.004	0.004	0.004
Q	2.73	0.012	0.011	0.010	0.017	0.046	0.044	0.034	0.022	0.018	0.017	0.017	0.015
R (SW-12)	6.21	0.028	0.024	0.022	0.038	0.104	0.101	0.076	0.051	0.040	0.039	0.039	0.034
AB	0.520	0.002	0.002	0.002	0.003	0.009	0.008	0.006	0.004	0.003	0.003	0.003	0.003
AD	0.293	0.001	0.001	0.001	0.002	0.005	0.005	0.004	0.002	0.002	0.002	0.002	0.002
AF	0.775	0.003	0.003	0.003	0.005	0.013	0.013	0.010	0.006	0.005	0.005	0.005	0.004
AH	0.600	0.003	0.002	0.002	0.004	0.010	0.010	0.007	0.005	0.004	0.004	0.004	0.003
AI	0.103	0.000	0.000	0.000	0.001	0.002	0.002	0.001	0.001	0.001	0.001	0.001	0.001
Local Study Area Watercourses													
SW-01	106	0.477	0.413	0.371	0.647	1.770	1.728	1.304	0.869	0.689	0.657	0.657	0.572
SW-02A	36.0	0.162	0.140	0.126	0.220	0.601	0.587	0.443	0.295	0.234	0.223	0.223	0.194
SW-03	62.8	0.283	0.245	0.220	0.383	1.049	1.024	0.772	0.515	0.408	0.389	0.389	0.339
Upper Marmion Reservoir inflows	458,145	18.6	19.2	13.1	26.7	75.0	65.2	36.9	22.2	17.4	32.7	34.5	22.5

Table 3-21: Long-Term Average and Range of Annual Mean Water Levels

Water Body	Average Annual Mean Water Levels (masl)	Range in Annual Mean Water Levels (masl)
Mitta Lake (API[a] #12)	431.299	1.547[b]
Unnamed Lake 1 (API[a] #13)	441.076	1.547[b]
Unnamed Lake 3 (API[a] #11)	431.726	1.547[b]
Unnamed Lake 4 (API[a] #2)	433.636	1.547[b]
Unnamed Lake 5 (API[a] #8)	428.946	1.547[b]
Lizard Lake	426.605	1.547[b]
Upper Marmion Reservoir	414.73	0.81[c]
Lower Marmion Reservoir	415.12	0.23[c]

Note:

a) Area of Potential Impact identified by the Aquatic Environment team.

b) Based on the long-term range in annual mean water levels recorded at French Lake for the period September 1960 to August 1998.

c) The range in annual mean water levels observed in the reservoirs between September 2004 and August 2012.

Table 3-22: Long-Term Average Seasonal Mean Water Levels

Water Body	Seasonal Mean Water Levels (masl)			
	Fall| (Oct-Dec)	Winter (Jan-Mar)	Spring (Apr-Jun)	Summer (Jul-Aug)
Mitta Lake	431.221	431.125	431.730	431.623
Unnamed Lake 1 (API[a] #13)	440.998	440.902	441.507	441.400
Unnamed Lake 3 (API[a] #11)	431.648	431.552	432.157	432.050
Unnamed Lake 4	433.558	433.462	434.067	433.960
Unnamed Lake 5 (API[a] #8)	428.868	428.772	429.377	429.270
Lizard Lake	426.563	426.467	427.071	426.965
Upper Marmion Reservoir	415.10	414.20	414.53	415.14
Lower Marmion Reservoir	415.18	414.97	415.16	415.21

Note:

a) Area of Potential Impact identified by the Aquatic Environment team.

Table 3-23: Long-Term Average Monthly Mean Water Levels

Water Body	Monthly Mean Water Levels (masl)											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mitta Lake	431.148	431.121	431.243	431.546	431.840	431.789	431.713	431.605	431.555	431.593	431.586	431.170
Unnamed Lake 1 (API #13)	440.925	440.898	441.020	441.323	441.617	441.566	441.490	441.382	441.332	441.370	441.363	440.947
Unnamed Lake 3 (API #11)	431.575	431.548	431.670	431.973	432.267	432.216	432.140	432.032	431.982	432.020	432.013	431.597
Unnamed Lake 4	433.485	433.458	433.580	433.883	434.177	434.126	434.050	433.942	433.892	433.930	433.923	433.507
Unnamed Lake 5 (API #8)	428.795	428.768	428.890	429.193	429.487	429.436	429.360	429.252	429.202	429.240	429.233	428.817
Lizard Lake	426.489	426.462	426.585	426.887	427.181	427.131	427.054	426.947	426.897	426.934	426.928	426.512
Upper Marmion Reservoir	414.71	414.28	413.60	413.66	414.80	415.15	415.19	415.16	415.08	415.12	415.17	415.01
Lower Marmion Reservoir	415.07	414.94	414.88	414.96	415.17	415.33	415.29	415.19	415.13	415.14	415.23	415.18

Table 3-24: Summary of Watercourses and Water Bodies in Field and Desktop Assessments

Project Component	Assessment Type	Watercourse Type	Total No. of Sites	Minor Navigable Water	Subject to Permit Process	Not Assessed
Mine Site/Upper Marmion Reservoir	Field	Site Scale Watercourses (Lower Reaches)	34	23	11	0
	Field	Site Scale Watercourses (Mine Site Road)	5	4	1	0
	Field	Local Scale Watercourses	2	0	2	0
	Desktop	Site Scale Watercourses (Lower Reaches)	10	n/a	n/a	10
	Desktop	Lakes and Reservoirs	6	0	6	0
Access Road	Desktop	Watercourses	15	3	-	12
Power Transmission and Optics Line	Desktop	Watercourses/Lakes/Wetlands	19	-	-	19
		Total	**91**	**30**	**20**	**41**

Table 3-25: Summary of Hydraulic Conductivity Estimates for Overburden and Bedrock in Mine Area

Material	Number of Tests	Hydraulic Conductivity (m/s)	
		Range	Geometric Mean
Overburden (Coarse Grained[a])	3	9.8×10^{-6} to 5.0×10^{-5}	1.8×10^{-5}
Bedrock (Upper 30 m)	40	7.1×10^{-10} to 6.7×10^{-5}	1.7×10^{-7}
Bedrock (Below 30 m)	87	7.2×10^{-10} to 1.5×10^{-5}	3.6×10^{-8}
Shear Zones	19	1.0×10^{-9} to 1.0×10^{-5}	1.9×10^{-7}

Note:

a) Coarse Grained refers to soil material with less than 50% material less than 75 micrometres in diameter.

Table 3-26: Summary of Hydraulic Conductivity Estimates for Overburden and Shallow Bedrock in Tailings Management Facility Area

Material	Number of Tests	Hydraulic Conductivity (m/s)	
		Range	Geometric Mean
Overburden (Fine Grained[a])	3	3.3×10^{-7} to 6.6×10^{-7}	4.4×10^{-7}
Overburden (Coarse Grained[b])	8	2.0×10^{-7} to 5.0×10^{-5}	6.3×10^{-6}
Bedrock (Upper 30 m)	5	3.4×10^{-7} to 8.3×10^{-5}	2.2×10^{-6}

Note:

a) Fine Grained refers to soil material with more than 50% material less than 75 micrometres in diameter.

b) Coarse Grained refers to soil material with less than 50% material less than 75 micrometres in diameter.

Table 3-27: Summary of CCME and PWQO Screening of Results for Surface Water Grab Sample

Parameters	Criteria		Total Number	Values not meeting criteria				Locations	
				CCME		PWQO			
	CCME	PWQO		Number	Percent	Number	Percent	CCME	PWQO
pH	6.5-9	6.5-8.5	172	32	19%	32	19%	HRWQ-1, 2, 6, 7[b], 8[b], 9[b], 10, 11[b], 13, 14[b], 16, 17[b], 18[b], 19, 20, 23, 26, 27[b], 28, 30, 35[b]	HRWQ-1, 2, 6, 7[b], 8[b], 9[b], 10, 11[b], 13, 14[b], 16, 17[b], 18[b], 19, 20, 23, 26, 27[b], 28, 35[b]
Dissolved Oxygen	5.5-9.5	4-8	138	9	7%	5	4%	HRWQ-6, 7, 8,11[b], 17, 27, 36, 35	HRWQ-7, 11[b], 27, 35
Phosphorus	—	0.02	173	—	—	15	9%	—	HRWQ-3, 7, 11[b], 15[b], 17[b], 18, 19, 20[b], 25, 27
Phenols	0.004	0.005	173	24	14%	17	10%	HRWQ-3, 4, 5, 8, 9, 11, 12, 13, 15, 17, 18, 19, 20, 21, 22[b], 25, 26, 27, 28, 29[b], 30	HRWQ-4, 8, 11, 12, 13, 15, 18, 19, 21, 22[b], 26, 27, 28, 29[b]
Aluminum (total)	0.005-0.1	0.015-0.075	172	48	28%	58	34%	HRWQ-1,2[b], 3, 4, 6[b], 7[b], 8[b], 9[b], 10, 11[b], 13, 14[b], 16, 17[b], 18[b], 19[b], 20[b], 23, 25[b], 26, 27[b], 28, 35[b]	HRWQ-1, 2[b], 3, 4[b], 6[b], 7[b], 8[b], 9[b], 10, 11[b], 13, 14[b], 16, 17[b], 18[b], 19[b], 20[b], 23, 25[b], 26[b], 27[b], 28, 35[b], 38
Arsenic (total)	0.005	0.1	172	1	1%	0	0%	HRWQ-31	—
Cadmium (total)	0.0000041-0.000042	0.0001-0.0005	172	18	10%	1	1%	HRWQ-1	HRWQ-3
Chromium (total)	0.001	0.001	172	2	1%	2	1%	HRWQ-3, 33	HRWQ-3, 33
Cobalt (total)	—	0.0009	172	—	—	5	3%	—	HRWQ-3[b],7, 11[b]
Copper (total)	0.002-0.004	0.001-0.005	172	5	3%	11	6%	HRWQ-3, 22, 27, 31[b]	HRWQ-3, 11, 13, 22[b], 23, 27[b], 31, 33
Iron (total)	0.3	0.3	171	62	36%	62	36%	HRWQ-3[b], 4[b], 6, 7[b], 8[b], 9[b], 11[b], 13[b], 15[b], 16[b], 17[b], 18[b], 19, 20, 21[b], 22[b], 24, 25[b], 27[b], 31, 33[b], 34[b]	HRWQ-3[b], 4[b], 6, 7[b], 8[b], 9[b], 11[b], 13[b], 15[b], 16[b], 17[b], 18[b], 19, 20, 21[b], 22[b], 24, 25[b], 27[b], 31, 33[b], 34[b]
Lead (total)	0.001-0.007	0.001-0.005	172	1	1%	0	0%	HRWQ-3	—
Mercury (total)	0.000026	0.0002	173	1	1%	0	0%	HRWQ-1	—

Note:

a) Refer to Appendix 2.II of the Water and Sediment Quality TSD for the time period details.

b) Surface water quality locations that had concentrations greater than the guideline in at least two occurrences during the baseline investigation.

c) Parameters were greater than the criteria for all seasons of the baseline investigation.

— = Guideline not applicable for this parameter.

Table 3-28: Summary of CCME and PWQO Screening of Results for Water Samples Collected from Profile Stations

Parameters	Criteria		Total Number	Values Not Meeting Criteria				Location[A]	
				CCME		PWQO			
	CCME	PWQO		Number	Percent	Number	Percent	CCME	PWQO
pH	6.5-9	6.5-8.5	84	20	24%	20	24%	HRWQP-1A, 1B[b], 2A, 2B[b], 3A[b], 4B, 5B[b], 6A, 6B, 7A[b], 7B[b],8B	HRWQP-1A, 1B[b], 2A, 2B[b], 3A[b], 4B, 5B[b], 6A, 6B, 7A[b], 7B[b], 8B
Dissolved Oxygen	5.5-9.5	4-8	72	9	13%	7	10%	HRWQP-1B[b], 2B, 5B[b], 7B	HRWQP-1B[b], 5B[b]
Phosphorus	—	0.02	84	—	—	12	14%	—	HRWQP-1B[b], 4B, 5B[b], 6A, 7B, 8A
Phenols	0.004	0.005	84	12	14%	6	7%	HRWQP-1A[b], 1B, 4A, 4B, 6B, 7A, 7B[b], 8A, 8B	HRWQP-1B, 4B, 7A, 7B, 8A, 8B
Aluminum (total)	0.005-0.1	0.015-0.075	84	30	36%	29	35%	HRWQP-1A[b], 1B[b], 2A[b], 2B[b], 3A[b], 4B[b], 5B[b], 6A[b], 6B, 7A[b], 7B[b], 8B	HRWQP-1A[b], 1B[b], 2A[b], 2B[b], 3A[b], 4B[b], 5B[b], 6A[b], 6B, 7A, 7B[b], 8B
Cadmium (total)	0.0000041-0.000042	0.0001-0.0005	84	4	5%	0	0%	HRWQP-5B, 6A, 7B, 8B	—
Chromium (total)	0.001	0.001	84	3	4%	3	4%	HRWQP-1B, 6A, 7B	HRWQP-1B, 6A, 7B
Cobalt (total)	—	0.0009	84	—	—	1	1%	—	HRWQP-7B
Copper (total)	0.002-0.004	0.001-0.005	84	1	1%	3	4%	HRWQP-1B	HRWQP-5B, 7A, 7B
Iron (total)	0.3	0.3	84	32	38%	32	38%	HRWQP-1B[b], 2B[b], 4A, 4B[b], 5A[b], 5B[b], 6A, 7A[b], 7B[b]	HRWQP-1B[b], 2B[b], 4A, 4B[b], 5A[b], 5B[b], 6A, 7A[b], 7B[b]
Mercury (total)	0.000026	0.0002	84	3	4%	2	2%	HRWQP-1A, 5A, 6A	HRWQP-5A, 6A
Zinc (total)	0.03	0.02	84	0	0%	1	1%	—	HRWQP-1A

Note:

a) Refer to Appendix 3.I of the Water and Sediment Quality TSD for the time period details.

b) Indicates concentrations greater than the guideline in at least 2 occurrences during the baseline investigation.

— = Guideline not applicable for this parameter.

Table 3-29: Summary of CSQG and PSQG Screening of Sediment Quality Results (Grab and Lake Bottom Samples)

Parameters	Lowest Receiving Criteria[a]	Total Number	Values Not Meeting Criteria		Location
			Number	Percent	
Arsenic	5.9	134	34	25%	HRWQP-1,2,4,5,7,8 and HRWQ-2,25,31,38,39[b]
Cadmium	0.6	134	36	27%	HRWQP-1,2-5,7,8 and HRWQ-2,25,29,38,39[b]
Chromium (total)	26	134	35	26%	HRWQP-2-8 and HRWQ-3,6,17,20,38[b]
Cobalt	50	134	2	1%	HRWQP-7 (Sep 2010)
Copper	16	134	38	28%	HRWQP-1-8 and HRWQ-2,3,5,6,8,9,17,18,20,25,26,29,31,32,37-39[b]
Iron (total)	20000	134	33	25%	HRWQP-1-5,7,8 and HRWQ-17,20,25,38,39[b]
Lead	31	134	15	11%	HRWQP-1,2,5,7 and HRWQ-25,29,38[b]
Manganese	460	134	44	33%	HRWQP-1-5,7,8 and HRWQ-2,3,5,6,11,20,25,26,34,38,39[b]
Mercury	0.17	134	11	8%	HRWQ-3,6,9,27,31,32[b]
Nickel	16	134	47	35%	HRWQP-1-8 and HRWQ-2,3,5,6,8,17,20,38,39[b]
Silver	0.5	134	6	4%	HRWQP-1 (Nov. 2010), HRWQP-7 (Nov. 2010), HRWQ-2 (Aug. 2012), HRWQ-27 (Nov. 2010)
Zinc	120	134	7	5%	HRWQP-3,5,7 and HRWQP-8,38[b]
1-Methylnaphthalene	0.00671	84	1	1%	HRWQ-27 (Nov. 2010)
2-Methylnaphthalene	0.00587	84	2	2%	HRWQ-11 (Nov. 2010), HRWQ-27 (Nov. 2010)
Benzo(k)fluor-anthene	0.00034	84	4	5%	HRWQP-2 (Nov. 2010), HRWQ-4 (Nov. 2010), HRWQ-5 (Nov. 2010), HRWQ-11 (Nov. 2010)
Benzo(b&j)fluoranthene	0.00037	84	1	1%	HRWQP-5 (Nov. 2010)
Benzo(a)pyrene	0.00006	84	3	4%	HRWQP-2 (June 2011), HRWQP-4 (Nov. 2010), HRWQP-5 (Nov. 2010)
Fluoranthene	0.0002	84	1	1%	HRWQP-5 (Nov. 2010)
Indeno(1,2,3-cd)pyrene	0.0202	84	1	1%	HRWQP-5 (Nov. 2010)
Pyrene	0.00049	84	1	1%	HRWQP-5 (Nov. 2010)

Note:

a) The most conservative value was taken from four criteria: CCME PEL, CCME ISQG, PSQG LEL and PSQG SEL.

b) Refer to Appendix 2.III of the Water and Sediment Quality TSD for the time period details.

Table 3-30: Summary of Field Program Dates

Field Data Collected	2010	2011	2012
Fish and Aquatic Habitat	May 8 -15, August 1-6, 18-29, September 23-30, October 14-20	May 3-10, May 27 – June 5, August 26-30, September 23-29	August 22-31, September 13-22
Fish Tissue	August 18-29	September 23-29	
Benthic Invertebrates	October 14-20		
Aquatic Sediments	October 14-20		

Table 3-31: Fish Species Captured During Baseline Studies

Family/Subfamily	Species Common Name	Species Scientific Name
Coregoninae	■ Lake Whitefish ■ Cisco	■ *Coregonus clupeaformis* ■ *Coregonus artedi*
Umbridae	■ Central Mudminnow	■ *Umbra limi*
Esocidae	■ Northern Pike	■ *Esox lucius*
Cyprinidae	■ Longnose Dace ■ Blacknose Dace ■ Northern Redbelly Dace ■ Finescale Dace ■ Pearl Dace ■ Fathead Minnow ■ Spottail Shiner ■ Blacknose Shiner ■ Brassy Minnow ■ Golder Shiner	■ *Rhinichthys cataractae* ■ *Rhinichthys atratulus* ■ *Chrosomus eos* ■ *Chrosomus neogaeus* ■ *Semotilus margarita* ■ *Pimephales promelas* ■ *Notropis hudsonius* ■ *Notropis heterolepis* ■ *Hybognathus hankinsoni* ■ *Notemigonus crysoleucas*
Catostomidae	■ Common White Sucker	■ *Catostomus commersoni*
Gadidae	■ Burbot	■ *Lota lota*
Gasterosteidae	■ Ninespine Stickleback ■ Brook Stickleback	■ *Pungitius pungitius* ■ *Culaea inconstans*
Centrarchidae	■ Smallmouth Bass ■ Pumpkinseed	■ *Micropterus dolomieu* ■ *Lepomis gibbosus*
Percidae	■ Walleye ■ Yellow Perch ■ Iowa Darter	■ *Sander vitreus* ■ *Perca flavescens* ■ *Etheostoma exile*
Cottidae	■ Mottled Sculpin	■ *Cottus bairdi*

Table 3-32: Selected Fish Tissue Trace Metal Results Summary (mg/kg wwt)

Parameter	MDL	Blacknose Shiner (n=2)			Lake Whitefish (n=22)			White Sucker (n=22)			Cisco (n=8)			Walleye (n=34)		
		Avg.	Max.	Min.	Avg.	Max.	Min.	Avg.	Max.	Min.	Avg.	Max.	Min.	Avg.	Max.	Min.
Aluminum (Al)	*5.0*	24.2	33.7	14.7	10.2	40.2	2.5	14.9	49.1	2.5	21.1	32.9	6.1	15.6	55.6	2.5
Antimony (Sb)	*1.0*	<1.0	<1.0	<1.0	0.53	1.10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Arsenic (As)	*1.0*	<1.0	<1.0	<1.0	0.54	1.30	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Barium (Ba)	*1.0*	0.90	1.30	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Beryllium (Be)	*0.20*	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.2	<0.2	<0.2
Bismuth (Bi)	*1.0*	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.73	2.30	<1.0	0.5	1.9	<1.0
Boron (B)	*5.0*	<5.0	<5.0	<5.0	2.65	5.9	<5.0	2.8	8.3	2.5	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Cadmium (Cd)	*0.20*	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.2	<0.2	<0.2
Chromium (Cr)	*1.0*	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Cobalt (Co)	*1.0*	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Copper (Cu)	*1.0*	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.53	1.20	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Lead (Pb)	*1.0*	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.56	1.80	<1.0	<1.0	<1.0	<1.0	0.5	2.0	<1.0
Magnesium (Mg)	*20*	278.0	285.0	271.0	252.2	330.0	183.0	255.2	319.0	187.0	289.5	338.0	227.0	346.9	2270.0	206.0
Silver (Ag)	*0.20*	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.2	<0.2	<0.2
Tin (Sn)	*1.0*	1.50	1.70	1.30	1.16	2.30	<1.0	1.33	2.00	<1.0	1.05	1.80	<1.0	1.30	12.20	<1.0
Titanium (Ti)	*5.0*	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Uranium (U)	*5.0*	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Vanadium (V)	*1.0*	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Zinc (Zn)	*10*	46.50	53.00	40.00	<10	<10	<10	<10	<10	<10	<10	<10	<10	6.1	37.0	<10

Table 3-33: Total Mercury Levels in Fish Tissue Samples

Water Body	Species	Average	Maximum	Minimum
		(µg/g, Detection Limit 0.050 µg/g)		
Turtle Bay	Blacknose Shiner (n=1)	0.083	0.083	0.083
	Lake Whitefish (n=8)	0.241	0.329	0.135
	Walleye (n=8)	0.461	0.935	0.267
	White Sucker (n= 5)	0.185	0.301	0.072
Sawbill Bay	Blacknose Shiner (n=1)	0.066	0.066	0.066
	Lake Whitefish (n=14)	0.214	0.335	0.102
	Walleye (n=18)	0.523	1.660	0.232
	White Sucker (n=11)	0.244	0.374	0.124
Lizard Lake	Cisco (n=8)	0.155	0.178	0.140
	Walleye (n=8)	1.210	1.730	0.796
	White Sucker (n= 6)	0.239	0.408	0.140

Table 3-34: Ontario Land Cover Data in the Hammond Reef Regional Study Area

Land Cover Type[(a)]	Area in Terrestrial Ecology RSA (ha)	% Coverage in Terrestrial Ecology RSA
Water – deep clear	127,663.84	19.33%
Water – shallow / sedimented	84.94	0.01%
Settlement / Infrastructure	763.27	0.12%
Sand / Gravel / Mine Tailing	199.06	0.03%
Forest Depletion – cuts	38,826.09	5.88%
Forest Depletion – burns	79.56	0.01%
Forest – sparse	94,130.24	14.25%
Forest – dense deciduous	72,974.41	11.05%
Forest – dense mixed	220,707.91	33.41%
Forest – dense coniferous	74,297.37	11.25%
Fen – open	1,132.75	0.17%
Fen – treed	6,921.55	1.05%
Bog – open	2,786.07	0.42%
Bog – treed	19,939.06	3.02%
Other – unknown	94.77	0.01%

Note:

a) Based on Land Information Ontario (LIO) mapping supplied by the OMNR.

Table 3-35: Upland Ecosite Classification and Area Summaries for the Mine Study Area and Local Study Area

Ecosite Code	Name	Ecosite Components	MSA		Terrestrial Ecology LSA	
			Area (ha)	%	Area (ha)	%
ES-A	Red Pine-White Pine-Jack Pine: Very Shallow Soil	ES11: Red Pine-White Pine-Jack Pine: Very Shallow Soil	8.99	0.44	211.9	2.85
ES-B	Black Spruce-Jack Pine: Very Shallow Soil	ES12: Black Spruce-Jack Pine: Very Shallow Soil	334.08	16.38	761.76	10.23
ES-C	Jack Pine-Conifer: Dry-Moderately Fresh	ES13: Jack Pine-Conifer: Dry-Moderately Fresh, Sandy Soil	39.87	1.95	166.74	2.24
ES-D	Red Pine-White Pine	ES15: Red Pine-White Pine: Sandy Soil	0.33	0.02	87.44	1.17
		ES24: Red Pine-White Pine: Fresh, Fine Loamy Soil				
ES-E	Hardwood-Fir-Spruce Mixedwood	ES16: Hardwood-Fir-Spruce Mixedwood: Sandy Soil	381.14	18.68	1,296.02	17.40
		ES19: Hardwood-Fir-Spruce Mixedwood: Fresh, Sandy-Course Loamy Soil				
		ES23: Hardwood-Fir-Spruce Mixedwood: Moist, Sandy-Coarse Loamy Soil				
		ES28: Hardwood-Fir-Spruce Mixedwood: Fresh, Silty Soil				
		ES29: Hardwood-Fir-Spruce Mixedwood: Fresh, Fine Loamy-Clayey Soil				
		ES33: Hardwood-Fir-Spruce Mixedwood: Moist, Silty-Clayey Soil				
ES-F	Fir-Spruce-Mixedwood	ES21: Fir-Spruce Mixedwood: Fresh, Coarse Loamy Soil	246.34	12.08	1,478.88	19.86
		ES27: Fir-Spruce Mixedwood: Fresh, Silty-Fine Loamy Soil				
ES-G	Pine-Spruce Mixedwood	ES14: Pine-Spruce Mixedwood: Sandy Soil	70.1	3.44	566.44	7.61

Table 3-35: Upland Ecosite Classification and Area Summaries for the Mine Study Area and Local Study Area

Ecosite Code	Name	Ecosite Components	MSA		Terrestrial Ecology LSA	
			Area (ha)	%	Area (ha)	%
ES-H	Spruce-Pine/ Feathermoss	ES20: Spruce-Pine/Feathermoss: Fresh, Sandy-Course Loamy Soil	347.77	17.05	817.81	10.98
		ES22: Spruce-Pine/*Ledum*/Feathermoss: Moist, Sandy-Coarse Loamy Soil				
		ES25: Pine-Spruce/Feathermoss: Fresh, Silty Soil				
		ES26: Spruce-Pine/Feathermoss: Fresh, Fine Loamy-Clayey Soil				
ES-I	White Cedar: Fresh-Moist, Coarse-Fine Loamy Soil	ES17: White Cedar: Fresh-Moist, Coarse-Fine Loamy Soil	67.81	3.32	207.71	2.79
ES-J	Rock Barren	ES7: Rock Barren	0.81	0.04	0.81	0.01
		Total	**1,497.24**	**73.39%**	**5,595.51**	**75.14%**

Table 3-36: Wetland Ecosite Classification and Area Summaries for the Mine Study Area and Local Study Area

Ecosite Code	Name	MSA		Terrestrial Ecology LSA	
		Area (ha)	%	Area (ha)	%
W1	Open Water Marsh: Mixed: Mineral Substrate	0.59	0.03	7.12	0.10
W2	Open Water Marsh: Pipewort-Water Lobelia: Mineral Substrate	1.71	0.08	5.91	0.08
W3	Open Water Marsh: Mixed: Organic Substrate	3.77	0.18	14.92	0.20
W4	Open Water Marsh: Floating-leaved Plants	4.19	0.21	28.69	0.39
W5	Marsh: Mixed: Mineral Substrate	6.34	0.31	18.92	0.25
W10	Marsh: Mixed: Organic Substrate	1.78	0.09	10.90	0.15
W11	Marsh: Cattail	0.42	0.02	4.50	0.06
W12	Meadow Marsh: Tall Sedge	7.17	0.35	58.04	0.78
W13	Meadow Marsh: Blue-joint Grass	10.77	0.53	38.68	0.52
W14	Open Graminoid Shore Fen: Wire Sedge	9.99	0.49	86.77	1.17
W15	Low Shrub Shore Fen: Leatherleaf-Sweet Gale/Graminoid	3.66	0.18	21.98	0.30
W16	Tall Shrub Shore Fen: Speckled Alder-Willow/Dwarf Birch/Ericaceous Shrub	14.42	0.71	57.29	0.77
W18	Moderately Rich Fen: Tamarack-Black Spruce/Ericaceous Shrub	62.39	3.06	203.12	2.73
W19	Moderately Rich Fen: Graminoid	27.08	1.33	27.08	0.36
W20	Poor Fen: Ericaceous Shrub/Wire Sedge/peatmoss	12.08	0.59	26.04	0.35
W21	Poor Fen: Ericaceous Shrub/peatmoss	4.74	0.23	15.24	0.20
W22	Poor Fen: Black Spruce-Tamarack/Ericaceous Shrub/peatmoss	26.63	1.31	124.12	1.67
W24	Open Low Shrub Bog: Ericaceous Shrub/ peatmoss	N/A	N/A	1.29	0.02
W25	Semi-treed bog: Black Spruce/Ericaceous Shrub/peatmoss	16.76	0.82	36.11	0.48
W26	Treed Bog: Black Spruce/ Ericaceous Shrub/peatmoss	0.34	0.02	29.74	0.40
W27	Poor Conifer Swamp: Black Spruce/Labrador Tea./ peatmoss	31.65	1.55	228.55	3.07

Table 3-36: Wetland Ecosite Classification and Area Summaries for the Mine Study Area and Local Study Area

Ecosite Code	Name	MSA		Terrestrial Ecology LSA	
		Area (ha)	%	Area (ha)	%
W28	Poor Conifer Swamp: Black Spruce/ Labrador Tea/peatmoss	31.18	1.53	57.47	0.77
W29	Intermediate Conifer Swamp: Black Spruce/ Tall Shrub/ Labrador Tea	58.37	2.86	146.89	1.97
W30	Intermediate Conifer Swamp: Conifer/Tall Shrub/Herb-rich	3.23	0.16	152.02	2.04
W31	Rich Conifer Swamp: Cedar-Tamarack (Black Spruce)	139.41	6.83	225.26	3.02
W32	Rick Conifer Swamp: Cedar-Tamarack	48.49	2.38	158.78	2.13
W33	Hardwood Swamp: Black Ash (Other Hardwood): Upland Transition	2.89	0.14	4.96	0.07
W34	Hardwood Swamp: Black Ash (Other Hardwood): Riparian	N/A	N/A	5.63	0.08
W35	Thicket Swamp: Speckled Alder/Blue-joint Grass	5.17	0.25	42.07	0.56
W36	Thicket Swamp: Tall Willow	7.60	0.37	13.63	0.18
	Total	**542.82**	**26.61%**	**1,851.72**	**24.86%**

Note:
"N/A"= Not applicable.

Table 3-37: Locally Rare Plant Species Observed in the Terrestrial Ecology Local Study Area

Common Name	Scientific Name	G-Rank	S-Rank	Preferred Habitat	Observed Location
Kalm's Lobelia	*Lobelia kalmia*	G5	S5	Rich peatlands, wet meadows, sandy shores, cedar and tamarack swamps, calcareous rock crevices	On hummocks in meadow marsh and along ATV trail in ecosite 155 (W13) (Figure 12 of Appendix 2.III of the Terrestrial Ecology TSD)
Indian Tobacco	*Lobelia inflata*	G5	S5	Path edges, cleared portions in woodlands, shaded seeps, abandoned fields, prefers disturbed areas	In northeast portion of ecosite 214 (ES-H) in disturbed (ATV trail, cleared trees and topsoil) (Figure 18 of Appendix 2.III of the Terrestrial Ecology TSD) Under conifers in ecosite 175 (ES-G) not far from 167 (W31) (Figure 11 of Appendix 2.III of the Terrestrial Ecology TSD)
Northern Comandra	*Geocaulon lividum*	G5	S5	Moist woods, poor swamps, treed bogs, poor fens, associated with sphagnum and feather moss	In treed fen raised slightly above surrounding graminoid fen on northwest portion of Terrestrial Ecology LSA in polygon 122 (W22: Black Spruce-Tamarack/Ericaceous Shrub/Sphagnum Poor Fen) (Figure 11 of Appendix 2.III of the Terrestrial Ecology TSD)
Marsh Grass of Parnassus	*Parnassia palustris*	G5	S5	prefers calcareous wetlands, rich fens, wet meadows, shorelines and marshes	Observed in meadow marsh ecosite 189 (W12) at edge of beaver pond and ATV trail (Figure 13 of Appendix 2.III of the Terrestrial Ecology TSD)
Arrowhead Sweet-Colts Foot	*Petasites sagittatus*	G5	S5	Fens, marshes, wet meadows, swamps, bogs, areas with standing water, disturbed areas, moist woods, woodland edges, recent clearcuts	In ecosite 131 (W31-Rich Conifer Swamp: Cedar-Tamarack (Black Spruce) between the edge of a graminoid fen and steep bedrock of upland conifer forest (Figure 11 of Appendix 2.III of the Terrestrial Ecology TSD)

Note:
Figures are located in the Terrestrial Ecology TSD.

Table 3-38: Potential for Ecosite Types to Support Traditional Use Plants

Ecosite Classification	Name	Traditional Plant Potential	Number of Traditional Use Plants with Potential to Occur in Ecosite Type
ES-A	Red Pine -White Pine -Jack Pine: Very Shallow Soil	High	7 (white cedar, white birch, white spruce, red pine, white pine, jack pine, blueberry spp.)
ES-B	Black Spruce -Jack Pine: Very Shallow Soil	Moderate	5 (black spruce, jack pine, white pine, white birch, velvetleaf blueberry)
ES-C	Jack Pie -Conifer: Dry - Moderately Fresh	Moderate	5 (jack pine, white pine, black spruce, white birch, blueberry spp.)
ES-D	Red Pine -White Pine	High	7 (red pine, white pine, white birch, black spruce, white spruce, white cedar, blueberry spp.)
ES-E	Hardwood -Fir -Spruce Mixedwood	High	7 (white birch, white spruce, black spruce, jack pine, speckled alder, wild ginger, ostrich fern)
ES-F	Fir -Spruce -Mixedwood	Moderate	5 (white spruce, black spruce, white birch, wild ginger, red raspberry)
ES-G	Pine -Spruce Mixedwood	High	8 (jack pine, white pine, black spruce, white birch, white spruce, wild ginger, red raspberry, blueberry spp.)
ES-H	Spruce -Pine / Feather moss	High	9 (black spruce, jack pine, white pine, white birch, speckled alder, Labrador tea, sphagnum moss, blueberry spp., fiddlehead fern spp.)
ES-I	White Cedar: Fresh -Moist, Coarse -Fine Loamy Soil	Moderate	4 (white cedar, white spruce, red raspberry, fiddlehead fern spp.)
ES-J	Rock Barren	Moderate	4 (jack pine, white pine, black spruce, blueberry spp.)
W1	Open Water Marsh: Mixed : Mineral Substrate	Low	2 (sweet flag, white water lily)
W2	Open Water Marsh: Pipewort-Water Lobelia: Mineral Substrate	Low	1 (sweet flag)
W3	Open Water Marsh: Mixed: Organic Substrate	Low	2 (sweet flag, white water lily)
W4	Open Water Marsh: Floating-leaved Plants	Low	2 (sweet flag, white water lily)
W5	Marsh: Mixed: Mineral Substrate	Low	1 (sweet flag)
W10	Marsh: Mixed: Organic Substrate	Low	—

Table 3-38: Potential for Ecosite Types to Support Traditional Use Plants

Ecosite Classification	Name	Traditional Plant Potential	Number of Traditional Use Plants with Potential to Occur in Ecosite Type
W11	Marsh: Cattail	Low	2 (cattail, speckled alder)
W12	Meadow Marsh: Tall Sedge	Low	3 (sweet flag, cattail, speckled alder)
W13	Meadow Marsh: Blue-joint Grass	Low	2 (speckled alder, cattail)
W14	Open Graminoid Shore Fen: Wire Sedge	Low	3 (sphagnum, Labrador tea, sweet flag)
W15	Low Shrub Shore Fen: Leatherleaf-Sweet Gale/Graminoid	Low	3 (sphagnum, Labrador tea, bog willow)
W16	Tall Shrub Shore Fen: Speckled Alder-Willow/Dwarf Birch/Ericaceous Shrub	Moderate	6 (speckled alder, willow spp., sphagnum, Labrador tea, black spruce, fiddlehead fern spp.)
W18	Moderately Rich Fen: Tamarack-Black Spruce/Ericaceous Shrub	Moderate	6 (white cedar, Labrador tea, sphagnum, black spruce, bog willow, speckled alder)
W19	Moderately Rich Fen: Graminoid	Low	3 (black spruce, Labrador tea, sphagnum, bog willow)
W20	Poor Fen: Ericaceous Shrub/Wire Sedge/Sphagnum	Moderate	4 (Labrador tea, black spruce, sphagnum, willow spp.)
W21	Poor Fen: Ericaceous Shrub/Sphagnum	Low	3 (Labrador tea, sphagnum, black spruce)
W22	Poor Fen: Black Spruce - Tamarack/ Ericaceous Shrub/Sphagnum	Low	3 (black spruce, Labrador tea, sphagnum)
W24	Open Low Shrub Bog: Ericaceous Shrub/Sphagnum	Low	3 (black spruce, Labrador tea, sphagnum)
W25	Semi-treed bog: Black Spruce/ Ericaceous Shrub/Sphagnum	Low	3 (black spruce, Labrador tea, sphagnum)
W26	Treed Bog: Black Spruce/Ericaceous Shrub/Sphagnum	Low	3 (black spruce, Labrador tea, sphagnum)
W27	Poor Conifer Swamp: Black Spruce/Labrador Tea/Sphagnum	Moderate	5 (black spruce, Labrador tea, sphagnum, blueberry spp., fiddlehead fern spp.)
W28	Poor Conifer Swamp: Black Spruce/Labrador Tea/Sphagnum	Moderate	6 (black spruce, Labrador tea, sphagnum, speckled alder, blueberry spp., fiddlehead fern spp.)

Table 3-38: Potential for Ecosite Types to Support Traditional Use Plants

Ecosite Classification	Name	Traditional Plant Potential	Number of Traditional Use Plants with Potential to Occur in Ecosite Type
W29	Intermediate Conifer Swamp: Black Spruce/Tall Shrub/Labrador Tea	Moderate	6 (black spruce, speckled alder, sphagnum, Labrador tea, blueberry spp., fiddlehead fern spp.)
W30	Intermediate Conifer Swamp: Conifer/Tall Shrub/Herb-rich	Moderate	5 (black spruce, white cedar, speckled alder, sphagnum, Labrador tea, blueberry spp., fiddlehead fern spp.)
W31	Rich Conifer Swamp: Cedar-Tamarack (Black Spruce)	Moderate	5 (white cedar, black spruce, sphagnum, speckled alder, Labrador tea)
W32	Rich Conifer Swamp: Cedar-Tamarack	High	7 (white cedar, white spruce, black spruce, white birch, speckled alder, sphagnum, fiddlehead fern spp.)
W33	Hardwood Swamp: Black Ash (Other Hardwood): Upland Transition	Moderate	6 (white spruce, speckled alder, white birch, sphagnum, red raspberry, fiddlehead fern spp.)
W34	Hardwood Swamp: Black Ash (Other Hardwood): Riparian	Moderate	6 (white spruce, speckled alder, white birch, sphagnum, red raspberry, fiddlehead fern spp.)
W35	Thicket Swamp: Speckled Alder/Blue-joint Grass	Moderate	4 (speckled alder, sphagnum, willow spp., red raspberry)
W36	Thicket Swamp: Tall Willow	Moderate	4 (willow spp., speckled alder, sphagnum, red raspberry)

Table 3-39: Most Frequently Detected Bird Species and Status during the 2010-2012 Upland Breeding Bird Surveys in the Mine Study Area and Local Study Area

Species	Number of Observations during surveys	Global Rarity Status[a]	Ontario Rarity Status[a]	SARA[b]	ESA[c]
White-throated sparrow	273	G5	S5B	—	—
Nashville warbler	173	G5	S5B	—	—
Red-eyed vireo	124	G5	S5B	—	—
Swainson's thrush	76	G5	S5B	—	—
Magnolia warbler	72	G5	S5B	—	—
Winter wren	63	G5	S5B	—	—
Yellow-bellied flycatcher	60	G5	S5B	—	—
Ruby-crowned kinglet	57	G5	S4B	—	—

Note:
a) Ranks based upon determinations made by the Natural Heritage Information Centre (2010).
b) SARA = Canada Species at Risk Act.
c) ESA = Ontario Endangered Species Act.
— = Not designated under SARA/ESA.

Table 3-40: Relative Abundance of Priority Species in the Various Habitat Types in the Project Local Study Area

Habitat Type	Species	Relative Abundance
Dense coniferous forest	white-throated sparrow	14.12%
	Nashville warbler	9.41%
	bay-breasted warbler	2.94%
Conifer swamp	Nashville warbler	16.46%
	white-throated sparrow	11.59%
	common yellowthroat	0.61%
Dense deciduous forest	Least flycatcher	12.86%
	Veery	7.14%
	white-throated sparrow	4.29%
Dense mixed forest	white-throated sparrow	13.86%
	Nashville warbler	12.38%
	mourning warbler	3.96%
Edge	white-throated sparrow	10.64%
	Nashville warbler	8.51%
	swamp sparrow	5.32%
Marsh	white-throated sparrow	11.76%
	mourning warbler	11.76%
	northern flicker	5.88%
	common yellowthroat	5.88%
	swamp sparrow	5.88%
Open fen	swamp sparrow	17.78%
	Nashville warbler	8.89%
	white-throated sparrow	6.67%
Thicket swamp	white-throated sparrow	16.67%
	Nashville warbler	16.67%
	Veery	3.33%
Treed bog	Nashville warbler	15.38%
	white-throated sparrow	15.38%
	Connecticut warbler	7.69%
Treed fen	white-throated sparrow	15.94%
	Nashville warbler	14.49%
	purple finch	1.45%

Table 3-41: Species Detected during the 2010-2012 Marsh Bird Surveys in the Mine Study Area and Local Study Area

Species Common Name	Species Scientific Name	Global Rarity Status	Ontario Rarity Status	SARA	ESA
Belted kingfisher	*Ceryle alcyon*	G5	S4B	—	—
Common merganser	*Mergus merganser*	G5	S5B, S5N	—	—
Eastern kingbird	*Tyrannus tyrannus*	G5	S4B	—	—
Great blue heron	*Ardea herodias*	G5	S4	—	—
Green-winged teal	*Anas crecca*	G5	S4	—	—
Hooded merganser	*Lophodytes cucullatus*	G5	S5B, S5N	—	—
Mallard	*Anas platyrhynchos*	G5	S5	—	—
Ring-necked duck	*Aythya collaris*	G5	S5	—	—
Red-winged blackbird	*Agelaius phoeniceus*	G5	S4	—	—
Swamp sparrow	*Melospiza*	G5	S5B	—	—
Tree swallow	*Tachycineta bicolour*	G5	S4B	—	—
Wilson's snipe	*Gallinago delicate*	G5	S5B	—	—

Note:

— = Not designated under SARA/ESA.

Table 3-42: Species Observed during 2010-2012 Lake Watch Surveys in the Mine Study Area and Local Study Area

Species Common Name	Species Scientific Name	Global Rarity Status	Ontario Rarity Status	SARA	ESA
American black duck	*Anas rubripes*	G5	S4	—	—
Bald eagle	*Haliaeetus leucocephalus*	G5	S2N, S4B	—	—
Canada goose	*Branta canadensis*	G5	S5	—	—
Common goldeneye	*Bucephala clangula*	G5	S5	—	—
Common loon	*Gavia immer*	G5	S5B, S5N	—	—
Common merganser	*Mergus merganser*	G5	S5B, S5N	—	—
Common raven	*Corvus corax*	G5	S5	—	—
Herring gull	*Larus argentatus*	G5	S5B, S5N	—	—
Hooded merganser	*Lophodytes cucullatus*	G5	S5B, S5N	—	—
Pileated woodpecker	*Dryocopus pileatus*	G5	S5	—	—
Purple finch	*Carpodacus purpureus*	G5	S4B	—	—
Spotted sandpiper	*Actitis macularia*	G5	S5	—	—

Note:

— = Not designated under SARA/ESA.

Table 3-43: Raptors, Owls and Vultures Observed or Potentially Occurring in the Mine Study Area and Local Study Area

Species Common Name	Species Scientific Name	Global Rarity Status	Ontario Rarity Status	SARA[(a)]	ESA[(b)]
American kestrel[(c)(d)]	*Falco sparverius*	G5	S4	—	—
Bald eagle[(c)(d)]	*Haliaeetus leucocephalus*	G5	S2N, S4B	—	—
Barred owl[(d)]	*Strix varia*	G5	S5	—	—
Boreal owl[(d)]	*Aegolius funereus*	G5	S4	—	—
Broad-winged hawk[(c)(d)]	*Buteo platypterus*	G5	S5B	—	—
Great gray owl[(d)]	*Strix nebulosa*	G5	S4	—	—
Great horned owl[(c)(d)]	*Bubo virginianus*	G5	S4	—	—
Long-eared owl[(c)(d)]	*Asio otus*	G5	S4	—	—
Merlin[(d)]	*Falco columbarium*	G5	S5B	—	—
Northern Harrier[(d)]	*Circus cyaneus*	G5	S4B	—	—
Northern saw-whet owl[(c)(d)]	*Aegolius acadicus*	G5	S4	—	—
Red-tailed hawk[(d)(d)]	*Buteo jamaicensis*	G5	S5	—	—
Sharp-shinned hawk[(c)(d)]	*Accipiter striatus*	G5	S5	—	—
Short-eared owl[(d)]	*Asio flammeus*	G5	S2N, S4B	—	SC
Turkey vulture[(c)(d)]	*Cathartes aura*	G5	S5B	—	—

Note:
a) Canada Species at Risk Act (Schedule 1; checked February 20, 2012).
b) Ontario Endangered Species Act (O. Reg. 4/12 amending O.Reg.230/08; checked February 20, 2012).
c) Confirmed on the study area during 2010-2012 field work.
d) Potentially present in study area based upon broad distribution and suitable habitat.
— = Not designated under SARA/ESA.

Table 3-44: Mammal Species Occurring or Potentially Occurring in the Mine Study Area and Local Study Area

Order	Family	Common Name	Scientific Name	Origin[a]	Global Rarity Status[b]	Ontario Rarity Status[b]	SARA[c]	ESA[d]
Artiodactyla	Cervidae	Moose[f]	Alces alces	N	G5	S5	—	—
Artiodactyla	Cervidae	White-tailed deer[f]	*Odocoileus virginianus*	N	G5	S5	—	—
Carnivora	Canidae	Coyote[f]	*Canis latrans*	N	G5	S5	—	—
Carnivora	Canidae	Gray fox[f]	*Urocyon cinereoargenteus*[h]	N	G5	S1	THR	THR
Carnivora	Canidae	Gray wolf[e][f]	*Canis lupus*	N	G5	S4	Not at Risk	—
Carnivora	Canidae	Red fox[e][f]	*Vulpes vulpes*	N	G5	S5	—	—
Carnivora	Felidae	Canada lynx[e][f]	*Lynx canadensis*	N	G5	S5	Not at Risk	
Carnivora	Mephitidae	Striped skunk[f]	*Mephitis mephitis*	N	G5	S5	—	—
Carnivora	Mustelidae	American mink[e][f]	*Neovison vison*[g]	N	G5	S4	—	—
Carnivora	Mustelidae	Fisher[e][f]	*Martes pennanti*	N	G5	S5	—	—
Carnivora	Mustelidae	Marten[f]	*Martes americana*	N	G5	S5	—	—
Carnivora	Mustelidae	River otter[f]	*Lontra canadensis*	N	G5	S5	—	—
Carnivora	Mustelidae	Short-tailed weasel[f] (ermine)	*Mustela erminea*	N	G5	S5	—	—
Carnivora	Mustelidae	Weasel[f]	*Mustela sp.*	N			—	—
Carnivora	Procyonidae	Raccoon[f]	*Procyon lotor*	N	G5	S5	—	—
Carnivora	Ursidae	Black bear[e][f]	*Ursus americanus*	N	G5	S5	Not at Risk	
Chiroptera	Vespertilionidae	Big brown bat[f]	*Eptesicus fuscus*	N	G5	S5	—	—
Chiroptera	Vespertilionidae	Eastern Red bat	*Lasiurus borealis*	N				
Chiroptera	Vespertilionidae	Hoary bat[f]	*Lasiurus cinereus*	N	G5	S4	—	—
Chiroptera	Vespertilionidae	Little brown myotis[f]	*Myotis lucifugus*	N		S4	No schedule, no status**	END
Chiroptera	Vespertilionidae	Northern myotis	*Myotis septentrionalis*				No schedule, no status**	END
Chiroptera	Vespertilionidae	small-footed myotis	*Myotis leibii*	N				

Table 3-44: Mammal Species Occurring or Potentially Occurring in the Mine Study Area and Local Study Area

Order	Family	Common Name	Scientific Name	Origin[a]	Global Rarity Status[b]	Ontario Rarity Status[b]	SARA[c]	ESA[d]
Lagomorpha	Leporidae	Snowshoe hare[f]	*Lepus americanus*	N	G5	S5	—	—
Rodentia	-	Mouse sp.[e]					—	—
Rodentia	Castoridae	Beaver[e][f]	*Castor canadensis*	N	G5	S5	—	—
Rodentia	Cricetidae	Deer mouse[f]	*Peromyscus maniculatus*	N	G5	S5	—	—
Rodentia	Cricetidae	Heather vole[f]	*Phenacomys ungava*	N	G5	S4	—	—
Rodentia	Cricetidae	Meadow vole[f]	*Microtus pennsylvanicus*	N	G5	S5	—	—
Rodentia	Cricetidae	Muskrat[f]	*Ondatra zibethicus*	N	G5	S5	—	—
Rodentia	Cricetidae	Rock vole[f]	*Microtus chrotorrhinus*	N	G4	S4	—	—
Rodentia	Cricetidae	Southern bog lemming[f]	*Synaptomys cooperi*	N	G5	S4	—	—
Rodentia	Cricetidae	Southern red-backed vole[f]	*Myodes gapperi*	N	G5	S5	—	—
Rodentia	Dipodidae	Meadow jumping mouse[f]	*Zapus hudsonius*	N	G5	S5	—	—
Rodentia	Dipodidae	Woodland jumping mouse[f]	*Napaeozapus insignis*	N	G5	S5	—	—
Rodentia	Erethizontidae	Porcupine[f]	*Erethizon dorsatum*	N	G5	S5	—	—
Rodentia	Muridae	House mouse[f]	*Mus musculus*	I	G5	SNA	—	—
Rodentia	Muridae	Norway rat[f]	*Rattus norvegicus*	I	G5	SNA	—	—
Rodentia	Scuiridae	Eastern chipmunk[e][f]	*Tamias striatus*	N	G5	S5	—	—
Rodentia	Sciuridae	Least chipmunk[f]	*Neotamias minimus*	N	G5	S5	—	—
Rodentia	Sciuridae	Northern flying squirrel[f]	*Glaucomys sabrinus*	N	G5	S5	—	—
Rodentia	Scuiridae	Red squirrel[e][f]	*Tamiasciurus hudsonicus*	N	G5	S5	—	—
Rodentia	Sciuridae	Woodchuck[e][f]	*Marmota monax*	N	G5	S5	—	—

Table 3-44: Mammal Species Occurring or Potentially Occurring in the Mine Study Area and Local Study Area

Order	Family	Common Name	Scientific Name	Origin[a]	Global Rarity Status[b]	Ontario Rarity Status[b]	SARA[c]	ESA[d]
Soricomorpha	Soricidae	Black-backed shrew[f]	*Sorex arcticus*	N	G5	S5	—	—
Soricomorpha	Soricidae	Common shrew[f]	*Sorex cinereus*	N	G5	S5	—	—
Soricomorpha	Soricidae	Northern short-tailed shrew[f]	Blarina brevicauda	N	G5	S5	—	—
Soricomorpha	Soricidae	Pygmy shrew[f]	*Sorex hoyi*	N	G5	S4	—	—
Soricomorpha	Soricidae	Water shrew[f]	*Sorex palustris*	N	G5	S5	—	—
Soricomorpha	Talpidae	Star-nosed mole[f]	*Condylura cristata*	N	G5	S5	—	—

Note:
G = Global.
S = Provincial.
Ranks 1-3 are considered imperiled or rare; Ranks 4 and 5 are considered secure.
SNA = Not applicable for Ontario Ranking (e.g. Exotic species).
— = Not designated under SARA/ESA.
a) Origin: N = Native; (N) = Native but not in study area region; I = Introduced.
b) Ranks based upon determinations made by the Natural Heritage Information Centre (2010).
c) Canada Species at Risk Act (Schedule 1; checked February 20, 2012).
d) Ontario Endangered Species Act (O. Reg. 4/12 amending O.Reg.230/08; checked February 20, 2012).
e) Confirmed on the study area during 2010 -2012 field work.
f) Potentially present in study area based upon broad distribution and suitable habitat.
g) Formerly classified as *Mustela vison*. Updated via ITIS website (http://www.itis.gov/).
h) COSEWIC report on Gray fox indicates the population west of Lake Superior may not be a distinct breeding population but individuals dispersing from the population in the United States.

Table 3-45: Amphibian and Reptile Species Occurring and Potentially Occurring in the Mine Study Area and Local Study Area

Common Name	Scientific Name	Origin[a]	Global Rarity Status[b]	Ontario Rarity Status[b]	SARA[c]	ESA[d]
Amphibians						
Gray treefrog[e][f]	*Hyla versicolor*	N	G5	S5	—	—
Spring peeper[e][f]	*Pseudacris crucifer*	N	G5	S5	—	—
Northern green frog[e][f]	*Rana clamitans*	N	G5	S5	—	—
Wood frog[e][f]	*Rana sylvatica*	N	G5	S5	—	—
American toad[e][f]	*Bufo americanus*	N	G5	S5	—	—
Mink frog[e]	*Rana septentrionalis*	N	G5	S5	—	—
Boreal chorus frog[e][f]	*Pseudacris maculata*	N	G5	S5	—	—
Northern leopard frog[f]	*Rana pipiens*	N	G5	S5	—	—
Reptiles						
Western painted turtle[e][f]	*Chrysemys picta bellii*	N	G5T5	S4	—	—
Common snapping turtle[e]	*Chelydra serpentina*	N	G5	S3	SC	SC
Eastern garter snake [f]	*Thamnophis sirtalis sirtalis*	N	G5T5	S5	—	—

Note:
G = Global.
S = Provincial.
Ranks 1-3 are considered imperiled or rare; Ranks 4 and 5 are considered secure.
— = Not designated under SARA/ESA.
SNA = Not applicable for Ontario Ranking (e.g. Exotic species).
a) Origin: N = Native; (N) = Native but not in study area region; I = Introduced.
b) Ranks based upon determinations made by the Natural Heritage Information Centre (2010).
c) Canada Species at Risk Act (Schedule 1; checked February 20, 2012) END=endangered; THR=threatened; SC=special concern.
d) Ontario Endangered Species Act (O. Reg. 4/12 amending O.Reg.230/08; checked February 20, 2012) END=endangered; THR=threatened; SC=special concern.
e) Confirmed on the study area during 2010 -2012 field work.
f) Potentially present in study area based upon broad distribution and suitable habitat.

Table 3-46: Dragonfly and Butterfly Species Recorded during 2010-2012 Field Surveys in the Mine Study Area and Local Study Area

Common Name	Scientific Name	Origin[a]	Global Rarity Status[b]	Ontario Rarity Status[b]	SARA[c]	ESA[d]
Milbert's tortoiseshell	*Aglais milberti*	N	G5	S5	—	—
Atlantis fritillary	*Speyeria atlantis*	N	G5	S5	—	—
Baskettail species	*Epitheca* sp.	N	G5	S5	—	—
Belted whiteface	*Leucorrhinia proxima*	N	G5	S5	—	—
Bluet species	*Enallagma* sp.	N	G4/G5[e]	S1 - S5[f]	—	—
Boreal snaketail	*Ophiogomphus colubrinus*	N	G5	S4	—	—
Canada darner	*Aeshna canadensis*	N	G5	S5	—	—
Canadian tiger swallowtail	*Papilio canadensis*	N	G5	S5	—	—
Chalk-fronted corporal	*Ladona julia*	N	G5	S5	—	—
Common green darner	*Anax junius*	N	G5	S5	—	—
Common spreadwing	*Lestes disjunctus*	N	G5	S5	—	—
Common whitetail	*Plathemis lydia*	N	G5	S5	—	—
Compton tortoiseshell	*Nymphalis vaualbum*	N	G5	S5	—	—
Crimson-winged whiteface	*Leucorrhinia glacialis*	N	G5	S4	—	—
Dragon hunter	*Hagenius brevistylus*	N	G5	S5	—	—
Eastern comma	*Polygonia comma*	N	G5	S5	—	—
Hudsonian whiteface	*Leucorrhinia hudsonica*	N	G5	S5	—	—
Jutta arctic	*Oeneis jutta*	N	G5	S4	—	—
Mourning cloak	*Nymphalis antiopa*	N	G5	S5	—	—
Northern crescent	*Phyciodes cocyta*	N	G5	S5	—	—
Question mark	*Polygonia interrogationis*	N	G5	S5	—	—
River jewelwing	*Calopteryx aequabilis*	N	G5	S5	—	—
Silver-bordered fritillary	*Boloria selene*	N	G5	S5	—	—
Spring azure	*Celastrina ladon*	N	G5	S5	—	—

Table 3-46: Dragonfly and Butterfly Species Recorded during 2010-2012 Field Surveys in the Mine Study Area and Local Study Area

Common Name	Scientific Name	Origin[a]	Global Rarity Status[b]	Ontario Rarity Status[b]	SARA[c]	ESA[d]
Viceroy	*Limenitis archippus*	N	G5	S5	—	—
Western-tailed blue	*Cupido amyntula*	N	G5	S5	—	—
White admiral	*Limenitis arthemis*	N	G5	S5	—	—
White-faced meadowhawk	*Sympetrum obtrusum*	N	G5	S5	—	—

Note:
Ranks 1-3 are considered imperiled or rare; Ranks 4 and 5 are considered secure.
G = Global.
S = Provincial.
SNA = Not applicable for Ontario Ranking (e.g. Exotic species).
— = Not designated under SARA/ESA.
a) Origin: N = Native; (N) = Native but not in study area region; I = Introduced.
b) Ranks based upon determinations made by the Natural Heritage Information Centre (2010).
c) Canada Species at Risk Act (Schedule 1; checked February 20, 2012).
d) Ontario Endangered Species Act (O. Reg. 4/12 amending O.Reg.230/08; checked February 20, 2012).
e) Ranked as a 4 or 5 depending on the species.
f) Ranked from 1 to 5 depending on the species.

Table 3-47: Study Area Populations (1996 – 2011)

	Regional Study Area				Local Study Area	Province of Ontario
	Kenora District	Rainy River District	Thunder Bay District	Total RSA	Town of Atikokan	
2011	57,607	20,370	146,057	224,034	2,787	12,851,821
2006	64,419	21,564	149,063	235,046	3,293	12,160,282
2001	61,802	22,109	150,860	234,771	3,632	11,410,046
1996	63,335	23,163	157,619	244,117	4,043	10,753,573
2006-2011 Change (%)	-10.6	-5.5	-2.0	-4.7	-15.4	5.7
2001-2006 Change (%)	4.2	-2.5	-1.2	0.1	-9.3	6.6
1996-2001 Change (%)	-2.4	-4.6	-4.3	-3.8	-10.2	6.1
1996-2011 Change (%)	-9.0	-12.1	-7.3	-8.2	-31.1	19.5
Population Density 2011 (per km^2)	0.1	1.3	1.4	0.4	8.7	14.1

Source: StatsCan 1997, StatsCan 2002, StatsCan 2007; StatsCan 2012.

Table 3-48: Dependency Ratios (2006)

	Socio-economic Environment RSA	Atikokan	Ontario
Child (0-14 years)	23.0	26.1	26.6
Elderly (65 years and older)	17.0	27.0	19.9
Combined Total	41.0	53.0	46.5

Source: StatsCan 2007.

Table 3-49: Regional and Local Study Area Labour Force indicators (2006)

	Regional Study Area				Local Study Area	Province of Ontario
	Kenora District	Rainy River District	Thunder Bay District	Total RSA	Atikokan	
Total population 15 years and over in the labour force	31,340	10,935	77,775	120,050	1,670	6,587,580
Participation rate (%)	64.1	64.2	63.7	63.9	62.4	67.1
Employment rate (%)	58.5	59.1	58.5	58.6	56.8	62.8
Unemployment rate (%)	8.8	7.9	8.1	8.3	9.0	6.4
Medium income – persons 15 years and over ($)	23,667	25,470	27,638	26,410	25,718	27,258

Source: StatsCan 2007.

Table 3-50: Municipal Government Revenues for Town of Atikokan 2009

Taxation	Fees and User Charges	Provincial and Federal Government Capital Grants	Total Other Revenue	Total Revenue
7,087,284	1,428,783	5,469,130	1,073,581	15,058,778

Source: Town of Atikokan 2009.

Table 3-51: Municipal Government Expenditures for Town of Atikokan 2009

General Government ($)	Protective Services ($)	Health, Social Services and Housing ($)	Planning and Development ($)	Transportation and Utilities ($)	Parks, Recreation and Culture ($)	Total Capital Expenditures ($)	Total ($)
1,713,366	1,622,312	1,323,521	997,458	3,271,812	1,107,181	4,295,448	14,331,098

Source: Town of Atikokan 2009.

Table 3-52: Status, Remaining Capacity and Plans for Municipal Infrastructure

Infrastructure	Status	Remaining Capacity	Municipal Plans
Water Treatment Plant	Underused	50%	Planning improvements to infrastructure
Wastewater Treatment Plant	Underused	30%	Planning improvements to infrastructure
Landfill	Approaching capacity	Full by 2016	New facility planned

Table 3-53: Identified First Nations Communities

Community	Approximate Distance from Proposed Mine Site (km)	On Reserve Population[a]	Off Reserve Population[a]
Lac Des Milles Lacs	41	4	568
	70		
Lac La Croix	77	301	140
Seine River	77	329	405
	103		
Wabigoon Lake Ojibway Nation	108	190	469
Nigigoonsiminikaaning	111	153	198
Mitaanjigamiing	144	98	46
Couchiching First Nation	148	654	1,652
Naicatchewenin	157	279	145
Rainy River	184	N/A	N/A

Note:
N/A = not available.
a) Registered population with Indian Northern Affairs Canada (AANDC, 2012).

Table 3-54: Identified Métis Communities

Community Council Name	Location	Approximate Distance from Proposed Mine Site (km)
Atikokan Métis Council	Atikokan	35
Northwest Métis Council	Dryden	142
Sunset Country Métis Council	Fort Frances	155
Kenora Métis Council	Kenora	245

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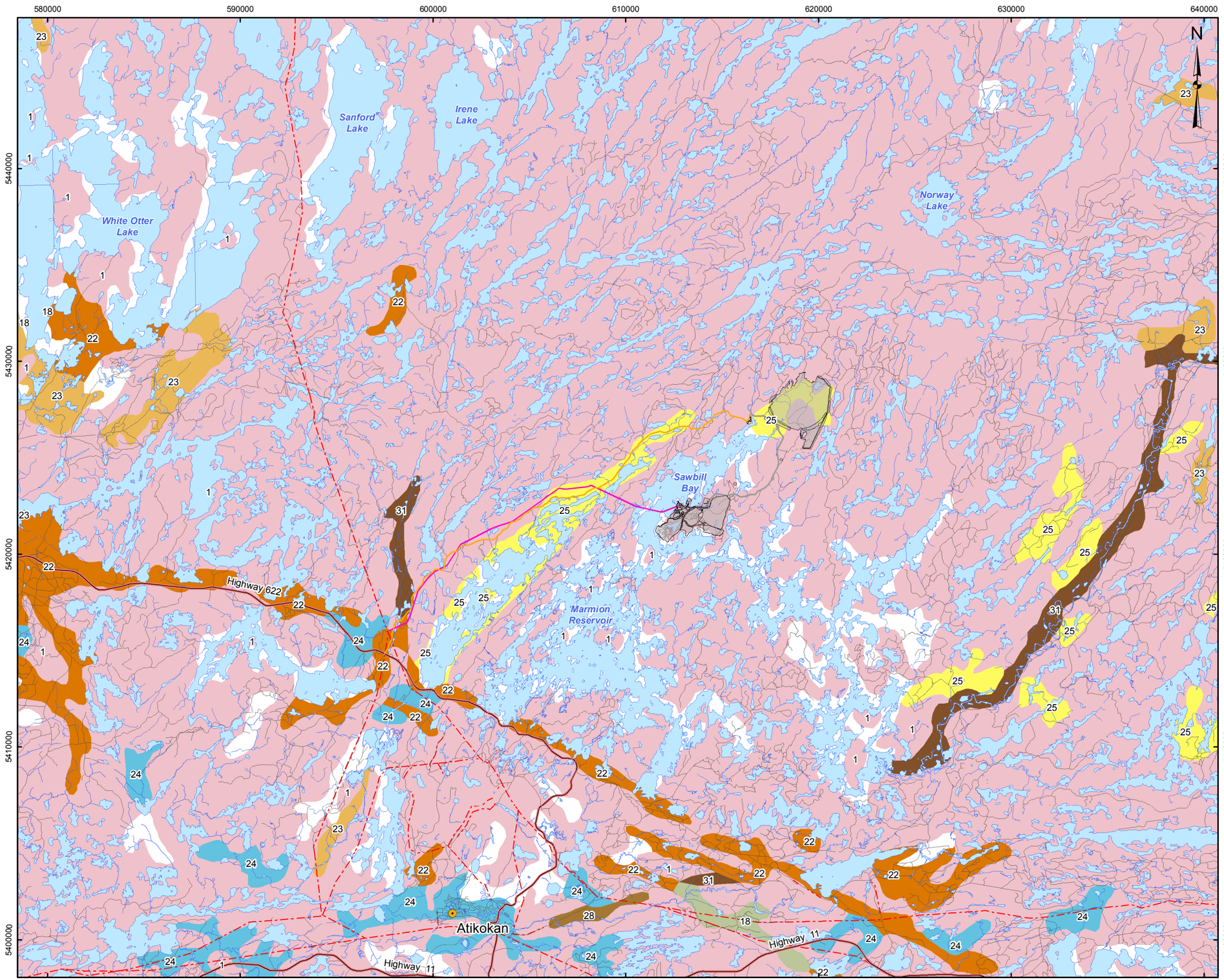
CHAPTER 3: EXISTING CONDITIONS
VERSION 3

FIGURES



LEGEND

- City/Town
- Provincial Highway
- Road
- Trail
- Power Transmission Line
- River/Stream
- Lake

Surficial Geology

- 1 Bedrock
- 18 Till
- 22 Glaciofluvial Ice
- 23 Glaciofluvial Outwash deposits
- 24 Glaciolacustrine deposits
- 25 Glaciolacustrine deposits
- 28 Fluvial deposits
- 31 Fluvial deposits
- Mine Site Road
- Access Road (Hardtack / Sawbill)
- Project Transmission Line
- Project Facilities

REFERENCE

Base Data - Provided by OSISKO Hammond Reef Gold Project Ltd.
Base Data - MNR NRVIS, obtained 2004
Surficial Geology - Ontario Geological Survey, 1997. Quaternary geology, seamless coverage of the province of Ontario: Ontario Geological Survey, Data Set 14.
Produced by Golder Associates Ltd under licence from
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Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 15N

2,500 0 2,500 5,000 7,500
SCALE 1:200,000 METRES

PROJECT
HAMMOND REEF GOLD PROJECT
ATIKOKAN, ONTARIO, CANADA

TITLE
QUATERNARY GEOLOGY AND GEOLOGY REGIONAL STUDY AREA

Golder Associates
Mississauga, Ontario

PROJECT NO. 13-1118-0010			SCALE AS SHOWN	VERSION 2
DESIGN	CGE	14 Nov. 2008		
GIS	JO	2 Dec. 2013		
CHECK	SP	2 Dec. 2013		
REVIEW	SP	2 Dec. 2013		

FIGURE: 3-1

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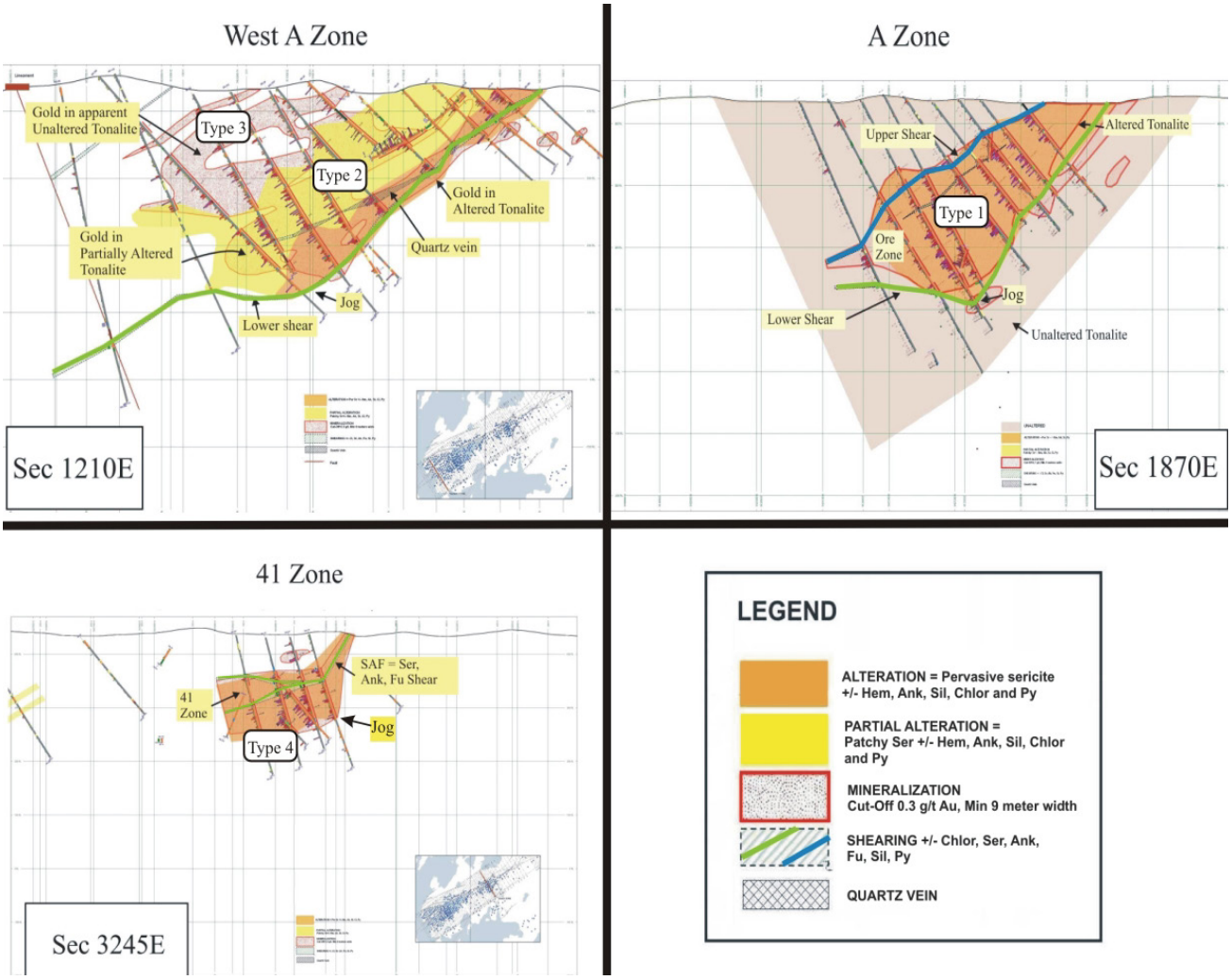

Source: Villeneuve 2011.

Figure 3-2: Detailed Ore Deposit Cross-Sections with Ore Types

600000 610000 620000

5430000 5420000 5410000

Cornell Lake
Sawbill Bay
Mitta Lake
Lynxhead Bay
Marmion Reservoir
Hawk Bay
Highway 622

N

LEGEND

- Provincial Highway
- Road
- Trail
- Power Transmission Line
- River/Stream
- Lake
- Wetland
- Mine Site Road
- Access Road (Hardtack / Sawbill)
- Project Transmission Line
- Fibre Optic Line and Auxiliary Power Line
- Project Facilities
- Geochemistry Local Study Area

REFERENCE

Base Data - Provided by OSISKO Hammond Reef Gold Project Ltd.
Base Data - MNR NRVIS, obtained 2004
Produced by Golder Associates Ltd under licence from
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Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 15N

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SCALE 1:85,000 METERS

PROJECT
HAMMOND REEF GOLD PROJECT
ATIKOKAN, ONTARIO, CANADA

TITLE
GEOCHEMISTRY LOCAL STUDY AREA

Golder Associates
Mississauga, Ontario

PROJECT NO. 13-1118-0010			SCALE AS SHOWN	VERSION 2
DESIGN	CGE	14 Nov. 2008		
GIS	JO	2 Dec. 2013		
CHECK	SP	2 Dec. 2013		
REVIEW	SP	2 Dec. 2013		

FIGURE: 3-3

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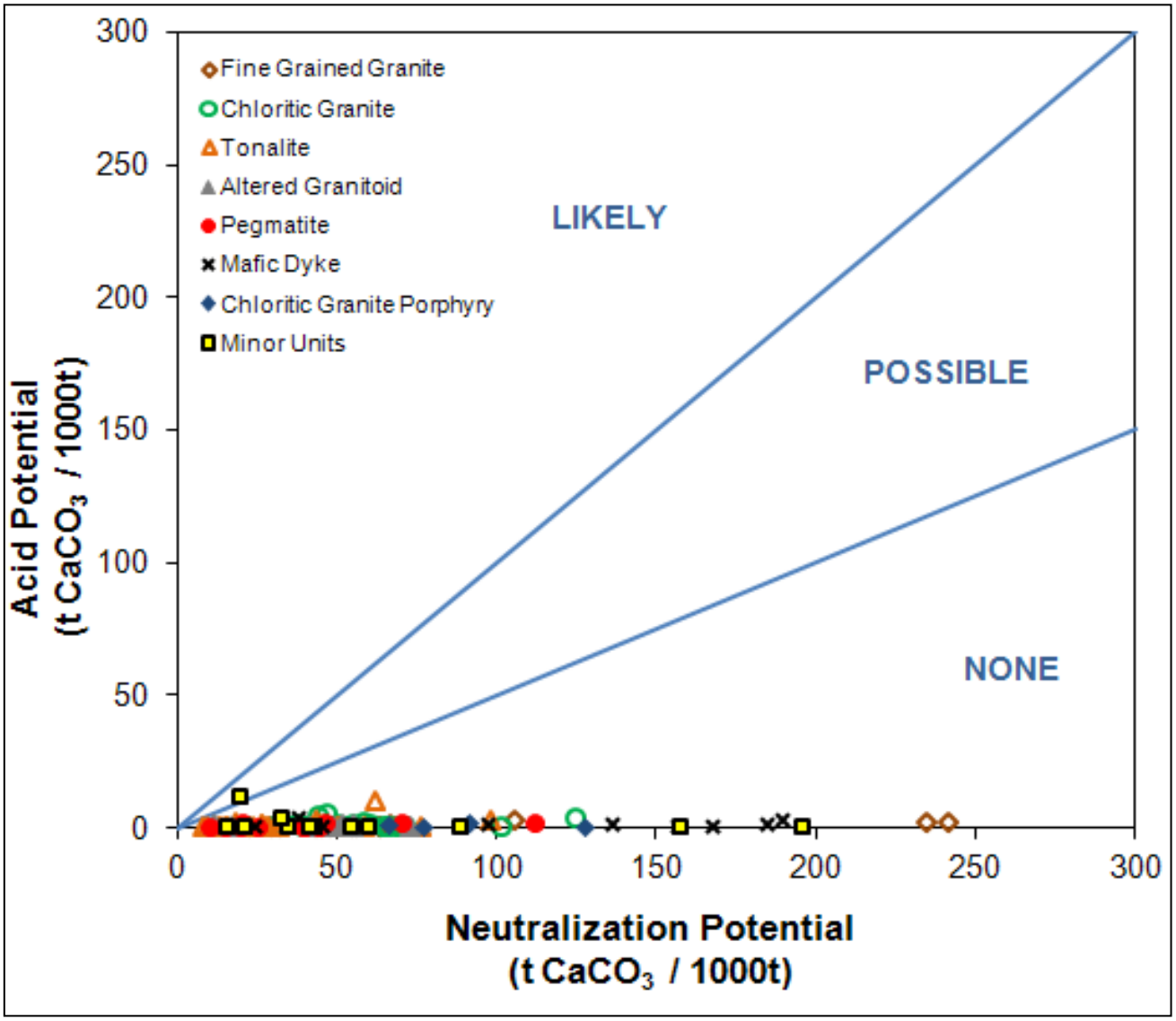

Figure 3-4: Neutralization Potential (NP) versus Acid Potential (AP) for Waste Rock

600000 610000 620000

5430000

5420000

Serpent Lake
Cornell Lake
Sawbill Bay
Mitta Lake
Lynxhead Bay
Marmion Reservoir
Hawk Bay
Highway 622

N

LEGEND

- Soil Sampling Location
- Provincial Highway
- Road
- Trail
- Power Transmission Line
- River/Stream
- Lake
- Wetland
- Mine Site Road
- Access Road (Hardtack / Sawbill)
- Project Transmission Line
- Project Facilities
- Terrain and Soil Local Study Area

REFERENCE

Base Data - Provided by OSISKO Hammond Reef Gold Project Ltd.
Base Data - MNR NRVIS, obtained 2004
Produced by Golder Associates Ltd under licence from
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Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 15N

1,000 0 1,000 2,000 3,000 4,000
SCALE 1:90,000 METRES

PROJECT
HAMMOND REEF GOLD PROJECT
ATIKOKAN, ONTARIO, CANADA

TITLE
2012 FIELD PROGRAM
SOIL SAMPLE LOCATIONS

Golder Associates
Mississauga, Ontario

PROJECT NO. 13-1118-0010			SCALE AS SHOWN	VERSION 2
DESIGN	CGE	14 Nov. 2008		
GIS	JO	2 Dec. 2013		
CHECK	SP	2 Dec. 2013		
REVIEW	SP	2 Dec. 2013		

FIGURE: 3-5

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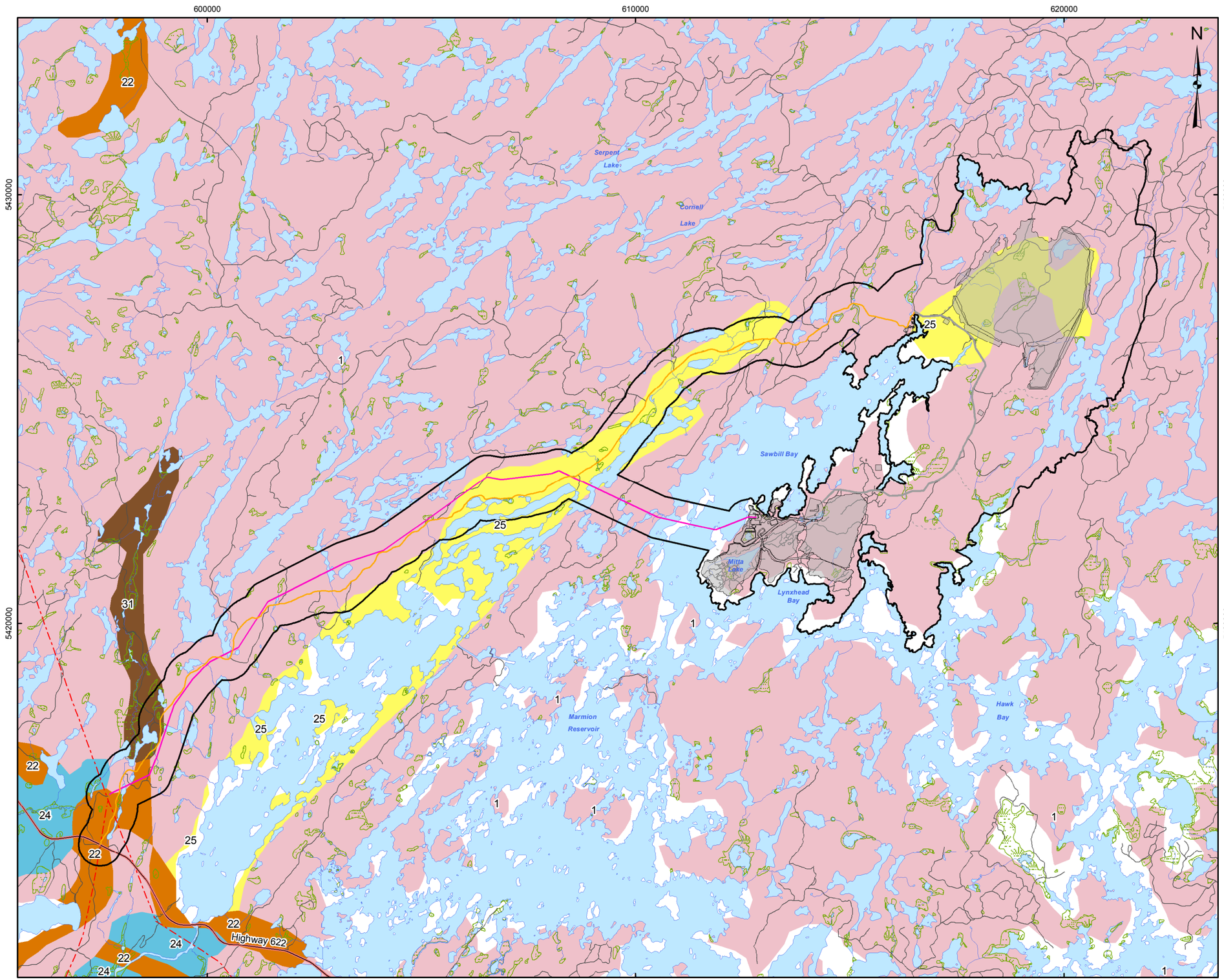

LEGEND

- Provincial Highway
- Trail
- Road
- Power Transmission Line
- River/Stream
- Lake
- Wetland

Surficial Geology

- 1 Bedrock
- 22 Glaciofluvial Ice
- 24 Glaciolacustrine deposits
- 25 Glaciolacustrine deposits
- 31 Fluvial deposits
- Mine Site Road
- Access Road (Hardtack / Sawbill)
- Project Transmission Line
- Project Facilities
- Terrain and Soil Local Study Area

REFERENCE

Base Data - Provided by OSISKO Hammond Reef Gold Project Ltd.
Base Data - MNR NRVIS, obtained 2004
Surficial Geology - Ontario Geological Survey, 1997. Quaternary geology, seamless coverage of the province of Ontario: Ontario Geological Survey, Data Set 14.
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Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 15N

1,000 0 1,000 2,000 3,000 4,000
SCALE 1:90,000 METRES

PROJECT
HAMMOND REEF GOLD PROJECT
ATIKOKAN, ONTARIO, CANADA

TITLE
TERRAIN MAP UNITS IN THE TERRAIN AND SOIL LOCAL STUDY AREA

Golder Associates
Mississauga, Ontario

PROJECT NO. 13-1118-0010			SCALE AS SHOWN	VERSION 2
DESIGN	CGE	14 Nov. 2008	**FIGURE: 3-6**	
GIS	JO	2 Dec. 2013		
CHECK	SP	2 Dec. 2013		
REVIEW	SP	2 Dec. 2013		

G:\Projects\2013\13-1118-0010_Osisko_Hammond_ReefGIS\MXDs\ReportingEIS\Chapter 3\Terrain_LSA.mxd

600000 610000 620000

5430000

5420000

N

Serpent Lake
Cornell Lake
Sawbill Bay
Lynxhead Bay
Marmion Reservoir
Hawk Bay
Highway 622

LEGEND

- Provincial Highway
- Trail
- Road
- Power Transmission Line
- River/Stream
- Mine Site Road
- Access Road (Hardtack / Sawbill)
- Project Transmission Line
- Terrain and Soil Local Study Area

Soil Type	Vegetation Code
Dystric Brunisol-Gleysol-course	ES-C, ES-G
Dystric Brunisol-Gleysol-fine	ES-E, ES-H, ES-I
Dystric Brunisol-Regosol	ES-A, ES-B
Dystric Brunisol-fine	ES-F
Gleysol-Regosol	ES-B
Gleysol-Terric Organic	W5, W12, W13, W13/W14, W27, W35, W36
Terric Organic-Gleysol	W14, W15, W16, W18, W19, W22, W24, W25, W26/W27, W29, W30-W34
Regosol-Bedrock	ES1/ES11/Other
Water	

REFERENCE

Base Data - Provided by OSISKO Hammond Reef Gold Project Ltd.
Base Data - MNR NRVIS, obtained 2004
Surficial Geology - Ontario Geological Survey, 1997. Quaternary geology, seamless coverage of the province of Ontario: Ontario Geological Survey, Data Set 14.
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Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 15N

1,000 0 1,000 2,000 3,000 4,000
SCALE 1:90,000 METRES

PROJECT
HAMMOND REEF GOLD PROJECT
ATIKOKAN, ONTARIO, CANADA

TITLE
SOIL MAP UNITS IN THE TERRAIN AND SOIL LOCAL STUDY AREA

Golder Associates
Mississauga, Ontario

PROJECT NO. 13-1118-0010			SCALE AS SHOWN	VERSION 2
DESIGN	CGE	14 Nov. 2008		
GIS	JO	2 Dec. 2013		
CHECK	SP	2 Dec. 2013		
REVIEW	SP	2 Dec. 2013		

FIGURE: 3-7

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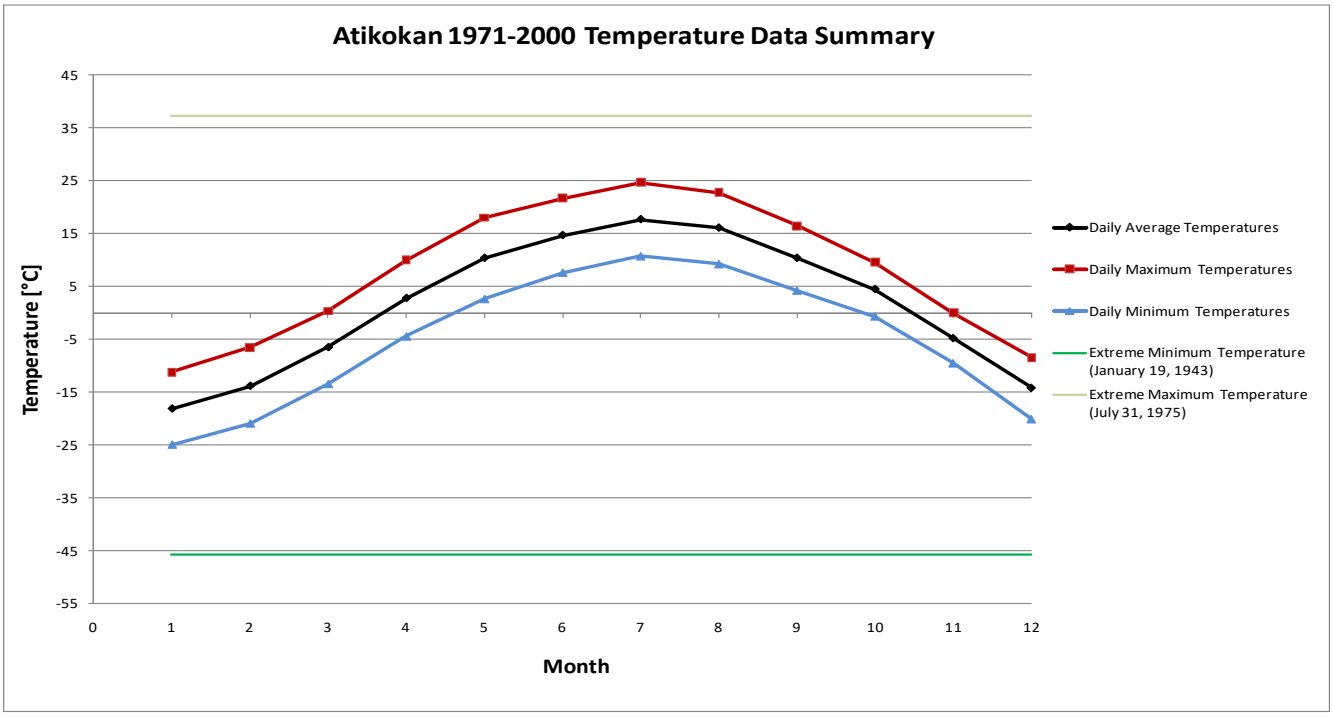

Figure 3-8: Monthly Temperatures

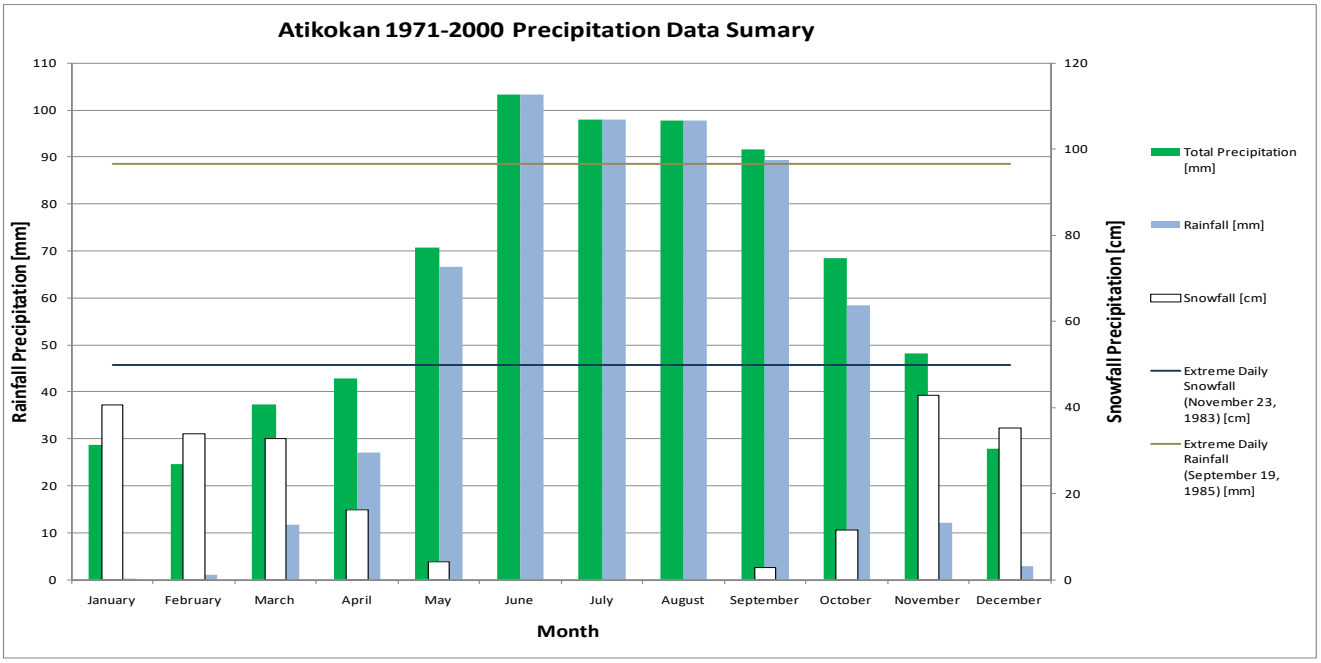

Figure 3-9: Atikokan Precipitation Data Summary

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CHAPTER 3: EXISTING CONDITIONS
VERSION 3

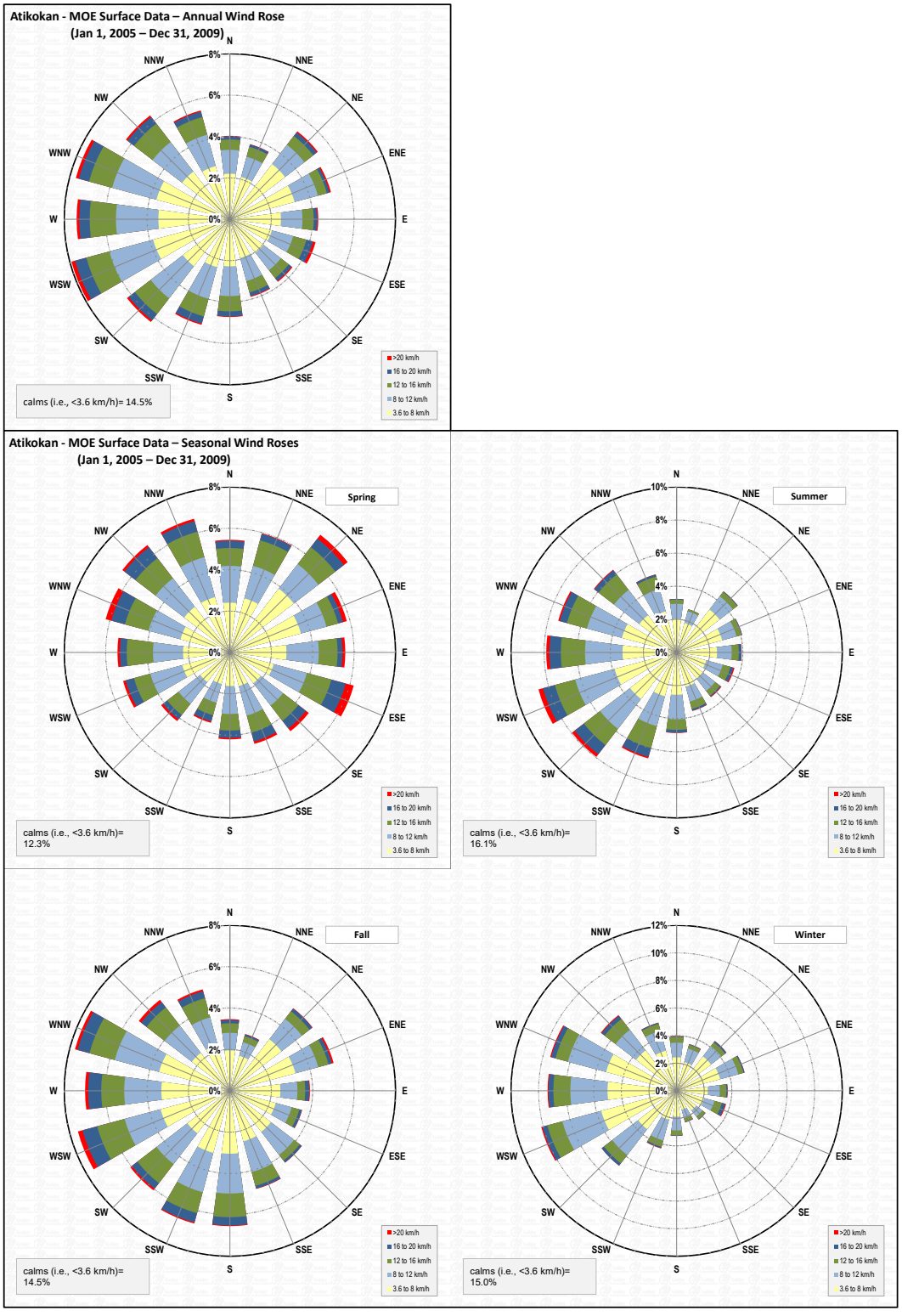

Figure 3-10: Mean Monthly Wind Speeds

LEGEND

- Air Quality Monitoring Stations
- Project Location

REFERENCE

Base Data - ESRI Street Maps V.10
Produced by Golder Associates Ltd under licence from
Ontario Ministry of Natural Resources, © Queens Printer 2008
Projection: Transverse Mercator Datum: LCC

100 0 100 200 300 400
SCALE 1:10,000,000 KILOMETERS

PROJECT
HAMMOND REEF GOLD PROJECT
ATIKOKAN, ONTARIO, CANADA

TITLE
AIR QUALITY MONITORING STATIONS MINE SITE

Golder Associates
Mississauga, Ontario

PROJECT NO. 13-1118-0010			SCALE AS SHOWN	VERSION 2
DESIGN	CGE	14 Nov. 2008	**FIGURE: 3-11**	
GIS	JO	2 Dec. 2013		
CHECK	SP	2 Dec. 2013		
REVIEW	SP	2 Dec. 2013		

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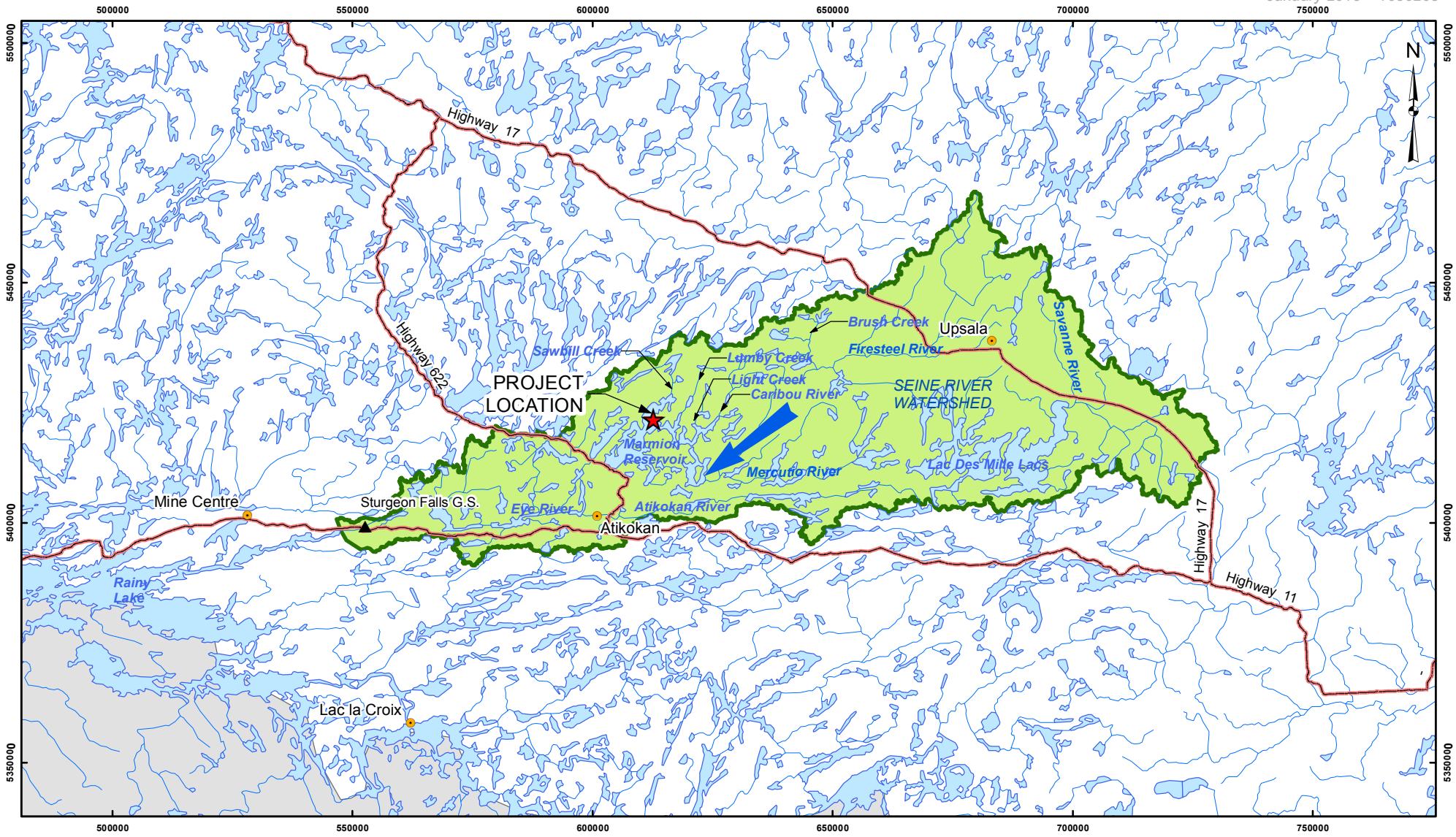

LEGEND

- Project Location
- City/Town
- Flow Direction
- Waterpower Facility
- Provincial Highway
- Lake
- Watershed Boundary

REFERENCE

Base Data - Global Dataset, LAND INFO Worldwide Mapping, LLC, CANVEC
Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 15N

20 10 0 20 40 60
SCALE 1:1,150,000 Kilometres

PROJECT
HAMMOND REEF GOLD PROJECT
ATIKOKAN, ONTARIO, CANADA

TITLE
SEINE RIVER WATERSHED

Golder Associates
Mississauga, Ontario

PROJECT NO. 13-1118-0010			SCALE AS SHOWN	VERSION 2
DESIGN	CGE	16 Mar. 2012		
GIS	JO	2 Dec. 2013		
CHECK	SP	2 Dec. 2013		
REVIEW	SP	2 Dec. 2013		

FIGURE: 3-12

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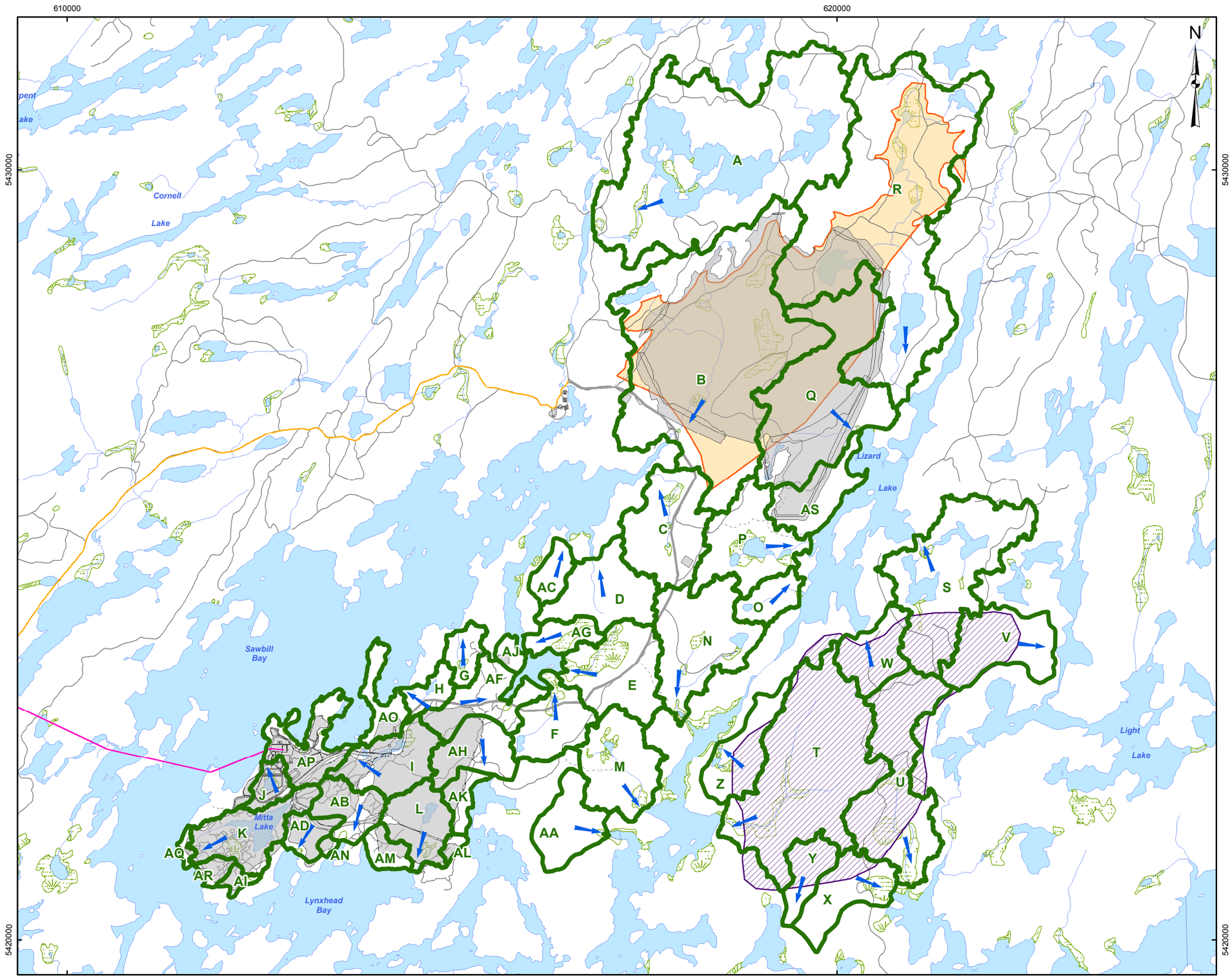

LEGEND

- Flow Direction
- Trail
- Road
- River/Stream
- Lake
- Wetland
- Mine Site Road
- Access Road (Hardtack / Sawbill)
- Project Transmission Line
- Project Facilities
- Tailings Management Facility Alternative 1
- Tailings Management Facility Alternative 2
- Local Watershed Boundary

WATERSHED AREAS

SITE WATERSHEDS

Watershed ID	*Watershed Area (ha)*
A	590.00
AA	73.34
AB	51.99
AC	29.24
AD	29.91
AF	77.52
AG	34.18
AH	68.19
AI	10.17
AJ	12.64
AK	25.92
AL	7.19
AM	24.29
AN	4.64
AO	37.88
AP	72.03
AQ	6.86
AR	12.87
AS	71.97
B	609.82
C	134.96
D	104.31
E	122.80
F	78.00
G	30.53
H	27.27
I	85.24
J	25.56
K	89.03
L	70.53
M	111.72
N	158.55
O	38.76
P	124.90
Q	272.96
R	623.45
S	230.85
T	336.68
U	200.68
V	106.27
W	66.90
X	82.32
Y	45.66
Z	74.75

REFERENCE

Base Data - Provided by OSISKO Hammond Reef Gold Project Ltd.
Base Data - MNR NRVIS, obtained 2004
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Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 15N

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SCALE 1:50,000 METRES

PROJECT
HAMMOND REEF GOLD PROJECT
ATIKOKAN, ONTARIO, CANADA

TITLE
SITE WATERSHEDS

Golder Associates
Mississauga, Ontario

PROJECT NO. 13-1118-0010			SCALE AS SHOWN	VERSION 2
DESIGN	CGE	14 Nov. 2008		
GIS	JO	2 Dec. 2013		
CHECK	SP	2 Dec. 2013		
REVIEW	SP	2 Dec. 2013		

FIGURE: 3-13

G:\Projects\2013\13-1118-0010_Osisko_Hammond_Reef\GIS\MXDs\Reporting\EIS\Chapter 3\SiteWatershedMap.mxd

610000 620000 630000 640000

5440000 5430000 5420000

N

SAWBILL BAY WATERSHED
LYNXHEAD-TRAP-TURTLE BAY WATERSHED
LIGHT BAY WATERSHED
UPPER SEINE BAY WATERSHED

Seahorse Lake
Red Paint Lake
Serpent Creek
Serpent Lake
Cornell Lake
Long Hike Lake
Sawbill Creek
Sawbill Bay
Mitta Lake
Lynxhead Bay
Marmion Reservoir
Solon Lake
Lumby Lake
Herontrack Lake
Lumby Creek
Turtle Bay
Lizard Lake
Hawk Bay
Premier Lake
Vista Lake
Light Creek
Light Lake
St. Patrick Creek
Upper Seine Bay
Viking Lake
Spool Lake
Spoon Lake
Lee Lake
Jefferson Lake
Wilson Lake
Bar Creek
Caribou River
Durie Lake

LEGEND

- Flow Direction
- Trail
- Road
- River/Stream
- Lake
- Wetland
- Mine Site Road
- Access Road (Hardtack / Sawbill)
- Project Transmission Line
- Project Facilities

REFERENCE

Base Data - Provided by OSISKO Hammond Reef Gold Project Ltd.
Base Data - MNR NRVIS, obtained 2004
Produced by Golder Associates Ltd under licence from
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Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 15N

2,000 0 2,000 4,000 6,000
SCALE 1:135,000 METRES

PROJECT
HAMMOND REEF GOLD PROJECT
ATIKOKAN, ONTARIO, CANADA

TITLE
LOCAL WATERSHEDS

Golder Associates
Mississauga, Ontario

PROJECT NO. 13-1118-0010			SCALE AS SHOWN	VERSION 2
DESIGN	CGE	14 Nov. 2008		
GIS	JO	2 Dec. 2013		
CHECK	SP	2 Dec. 2013		
REVIEW	SP	2 Dec. 2013		

FIGURE: 3-14

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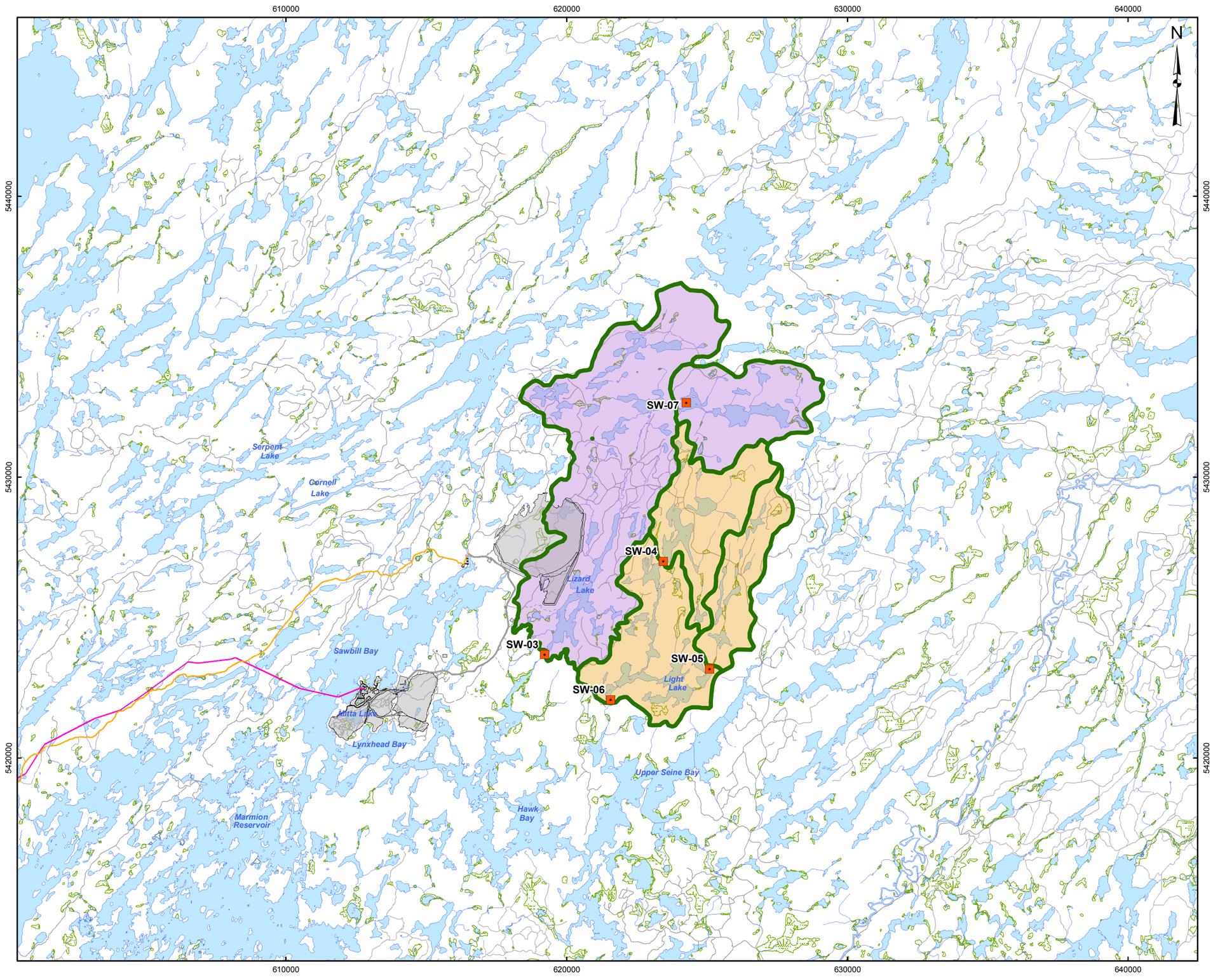

LEGEND

- Lake Water Level Station
- Surface Water Drainage Areas
  - Contributing to SW-03
  - Contributing to SW-06
- Road
- Trail
- River/Stream
- Lake
- Wetland
- Watershed Boundary
- Mine Site Road
- Access Road (Hardtack / Sawbill)
- Project Transmission Line
- Project Facilities

NOTES:

1. Lake Water Level Stations and Associated Drainage Areas:

Station ID	Station Name	Drainage Area (ha)
SW-03	LUMBY CREEK AT TURTLE BAY	4,841.91
SW-04	PREMIER LAKE-VISTA LAKE	1,409.88
SW-05	ST. PATRICK CREEK AT LIGHT LAKE	981.55
SW-06	LIGHT CREEK AT LIGHT LAKE	1,744.54
SW-07	LUMBY CREEK AT HERONTRACK LAKE	1,440.58

REFERENCE

Base Data - Provided by OSISKO Hammond Reef Gold Project Ltd.
Base Data - MNR NRVIS, obtained 2004
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Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 15N

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SCALE 1:135,000 METRES

PROJECT
HAMMOND REEF GOLD PROJECT
ATIKOKAN, ONTARIO, CANADA

TITLE
LOCAL SCALE LAKE WATER LEVEL MONITORING STATIONS

Golder Associates
Mississauga, Ontario

PROJECT NO. 13-1118-0010			SCALE AS SHOWN	VERSION 2
DESIGN	CGE	14 Nov. 2008		
GIS	JO	2 Dec. 2013		
CHECK	SP	2 Dec. 2013		
REVIEW	SP	2 Dec. 2013		

FIGURE: 3-15

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610000
620000
5430000
5420000
N

Cornell Lake
Sawbill Creek
Sawbill Creek
Lumby Creek
Lizard Lake
Sawbill Bay
Mitta Lake
Trap Bay
Lynxhead Bay
Turtle Bay
Light Lake

B
Q
R
AS
AF
AH
I
J
AB
L
K
AD
AI

LEGEND

- Trail
- Road
- River/Stream
- Lake
- Wetland
- Local Watershed Boundary
- Mine Site Road
- Access Road (Hardtack / Sawbill)
- Project Transmission Line
- Project Facilities

REFERENCE

Base Data - Provided by OSISKO Hammond Reef Gold Project Ltd.
Base Data - MNR NRVIS, obtained 2004
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Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 15N

1,000 0 1,000 2,000
SCALE 1:50,000 METRES

PROJECT
HAMMOND REEF GOLD PROJECT
ATIKOKAN, ONTARIO, CANADA

TITLE
WATERCOURSES OF INTEREST

Golder Associates
Mississauga, Ontario

PROJECT NO. 13-1118-0010			SCALE AS SHOWN	VERSION 2
DESIGN	CGE	14 Nov. 2008		
GIS	JO	2 Dec. 2013		
CHECK	SP	2 Dec. 2013		
REVIEW	SP	2 Dec. 2013		

FIGURE: 3-16

G:\Projects\2013\13-1118-0010_Osisko_Hammond_Reef\GIS\MXDs\Reporting\EIS\Chapter 3\Watercourse_of_interest.mxd

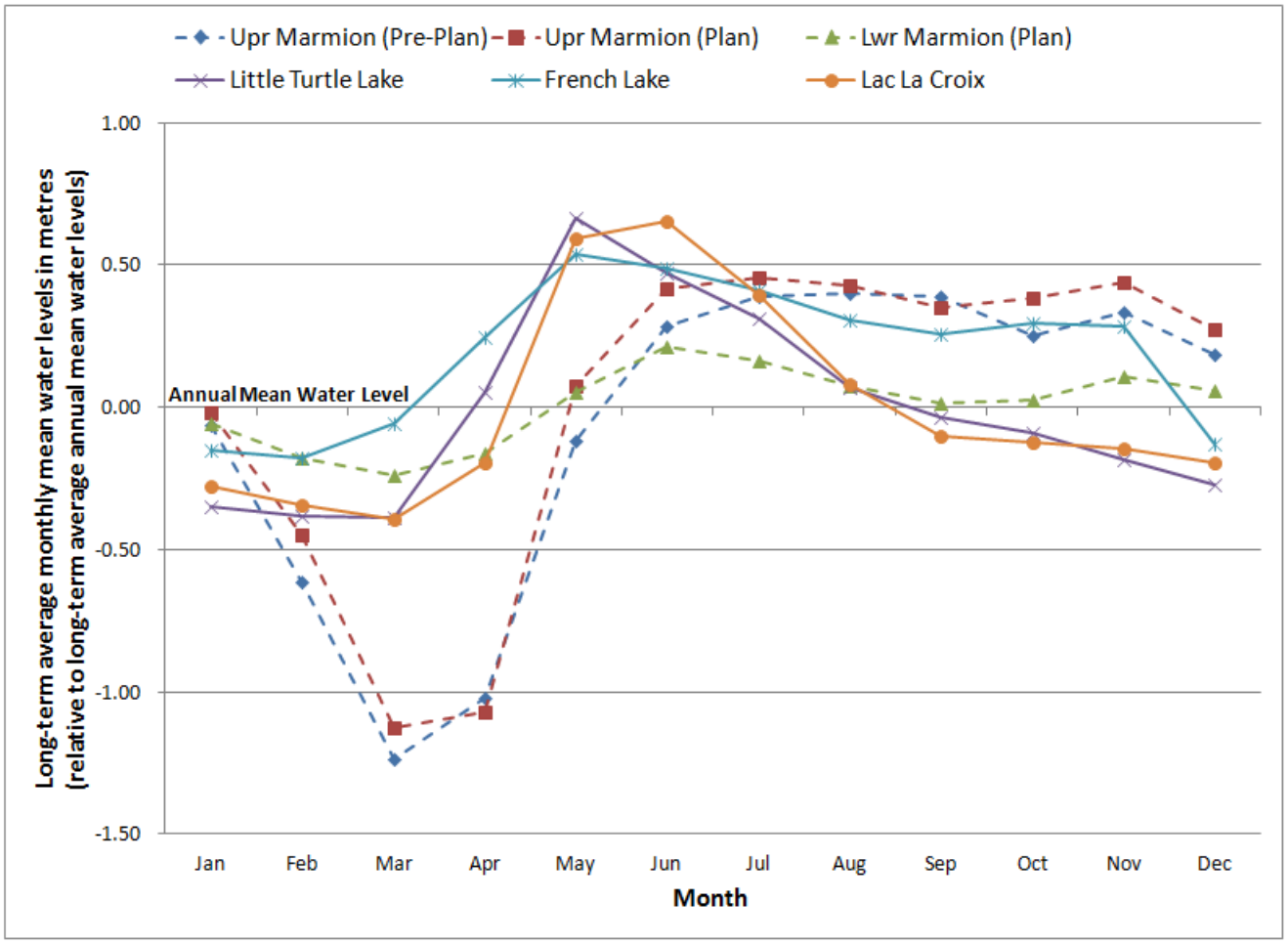


Figure 3-17: Long-term Average Monthly Mean Water Levels in Regional Scale Lakes

612000 613000 614000 615000 616000 617000 618000

5426000 5425000 5424000 5423000 5422000 5421000

N

BRH-0016A/B
BH12-10
BRH-0010
BRH-0015A/B
BH12-9
BRH-0013
Sawbill Bay
BRH-0006
BRH-0012A/B
BRH-0014A/B
BRH-0011
BRH-0005A/B
BRH-0001A/B
GT-06
BRH-0004
GT-05
BR-0366
GT-01
Mitta Lake
BR-0371
BRH-0009
BR-0220
GT-02
BR-0231
GT-04
BRH-0003
GT-03
BRH-0008A/B
BR-0433
BRH-0007A/B
Lynxhead Bay
BRH-0002A/B

LEGEND

- Monitoring Well
- Exploration Borehole
- Geotechnical Borehole - Deep Bedrock
- Road
- Trail
- River/Stream
- Lake
- Mine Site Road
- Access Road (Hardtack / Sawbill)
- Project Transmission Line
- Project Facilities

REFERENCE

Base Data - Provided by OSISKO Hammond Reef Gold Project Ltd
Base Data - MNR NRVIS, obtained 2004
Produced by Golder Associates Ltd under licence from
Ontario Ministry of Natural Resources, © Queens Printer 2008
Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 15N

250 0 250 500 750 1,000 1,250
SCALE 1:25,000 METERS

PROJECT
HAMMOND REEF GOLD PROJECT
ATIKOKAN, ONTARIO, CANADA

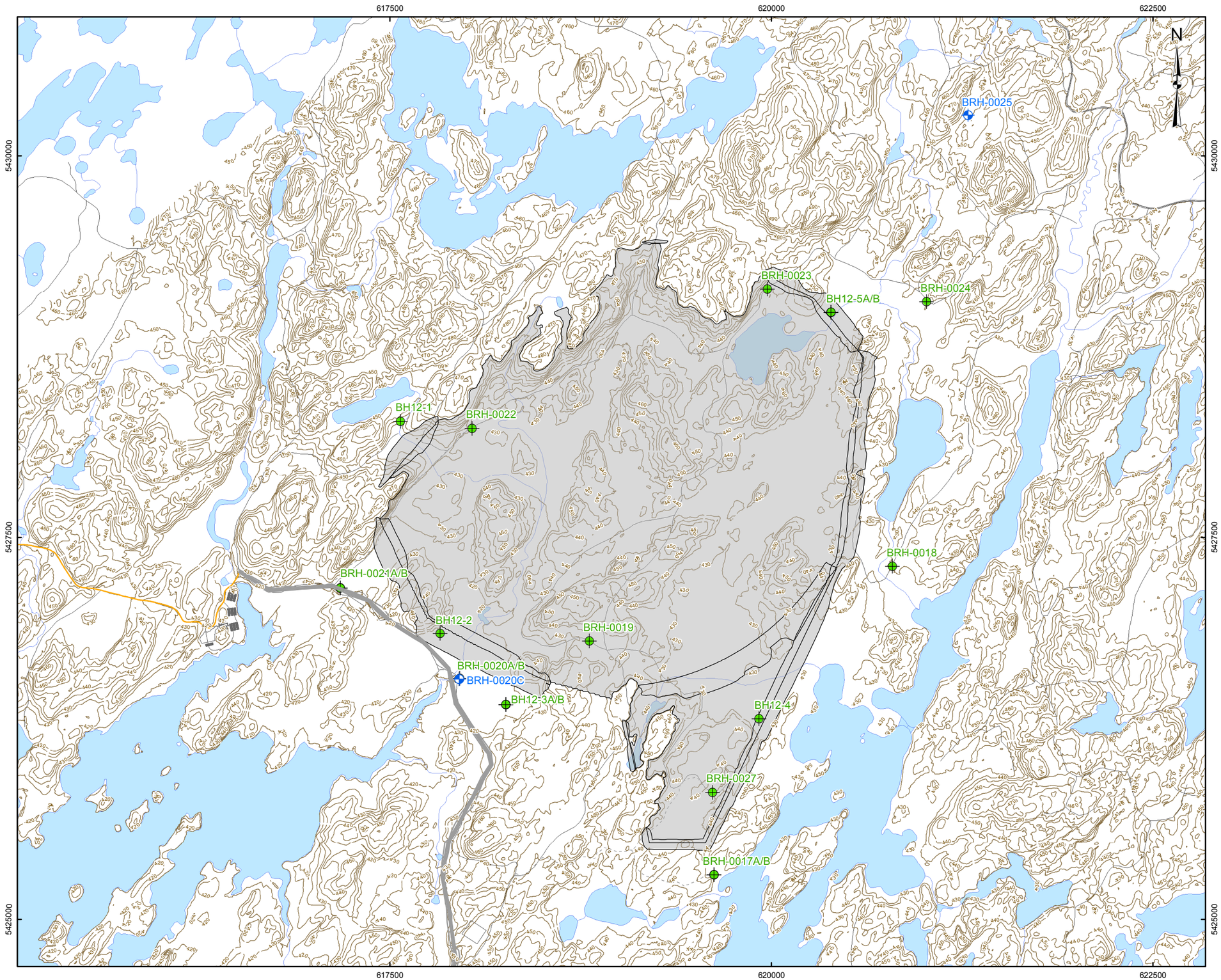
TITLE
BOREHOLE AND MONITORING WELL LOCATIONS - MINE AREA

Golder Associates
Mississauga, Ontario

PROJECT NO. 13-1118-0010			SCALE AS SHOWN	VERSION 2
DESIGN	CGE	14 Nov. 2008		
GIS	JO	2 Dec. 2013		
CHECK	SP	2 Dec. 2013		
REVIEW	SP	2 Dec. 2013		

FIGURE: 3-18

G:\Projects\2013\13-1118-0010_Osisko_Hammond_Reef\GIS\MXDs\Reporting\EIS\Chapter 3\ProposedMineArea_Borehole_MW_Locations.mxd



LEGEND

- Monitoring Well
- Geotechnical Borehole - Overburden
- Road
- Trail
- Index Contour (5m interval)
- River/Stream
- Lake
- Mine Site Road
- Access Road (Hardtack / Sawbill)
- Project Facilities

REFERENCE

Base Data - Provided by OSISKO Hammond Reef Gold Project Ltd
Base Data - MNR NRVIS, obtained 2004
Produced by Golder Associates Ltd under licence from
Ontario Ministry of Natural Resources, © Queens Printer 2008
Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 15N

250 0 250 500 750 1,000 1,250
SCALE 1:25,000 METERS

PROJECT
HAMMOND REEF GOLD PROJECT
ATIKOKAN, ONTARIO, CANADA

TITLE
BOREHOLE AND MONITORING WELL LOCATIONS - TAILINGS MANAGEMENT FACILITY AREA

Golder Associates
Mississauga, Ontario

PROJECT NO. 13-1118-0010			SCALE AS SHOWN	VERSION 2
DESIGN	CGE	14 Nov. 2008		
GIS	JO	2 Dec. 2013		
CHECK	SP	2 Dec. 2013		
REVIEW	SP	2 Dec. 2013		

FIGURE: 3-19

G:\Projects\2013\13-1118-0010_Osisko_Hammond_ReefGIS\MXDs\Reporting\EIS\Chapter 3\ProposedTMF_Borehole_MW_Locations.mxd

612000 613000 614000 615000 616000 617000 618000

5426000 5425000 5424000 5423000 5422000 5421000

REFER TO FIGURE 3-21

Sawbill Bay
Mitta Lake
Lynxhead Bay

BRH-0001A 425.738
BRH-0001B 428.247
BRH-0005A 425.425
BRH-0005B 439.605
BRH-0006 416.751
BRH-0008A
BRH-0008B 419.534
BRH-0002A 423.393
BRH-0002B 422.339
BRH-0003 416.500
BRH-0004 429.507
BRH-0007A 418.511
BRH-0007B 422.758
BRH-0009 415.319
BRH-0010 435.262
BRH-0011 430.747
BRH-0012A 415.940
BRH-0012B 415.960
BRH-0013 416.878
BRH-0014A 416.944
BRH-0014B 416.952
BRH-0015A 416.856
BRH-0015B 416.793
BRH-0016A 443.433
BRH-0016B 443.653
BH12-9
BH12-10
GT-01
GT-02
GT-03
GT-04
GT-05
GT-06
BR-0220
BR-0231
BR-0366
BR-0371
BR-0433

N

LEGEND

- 415.940 Groundwater Elevation (October 2011)
- Monitoring Well
- Exploration Borehole
- Geotechnical Borehole - Deep Bedrock
- Inferred Direction of Shallow Groundwater Flow
- Road
- Trail
- Index Contour (5m interval)
- River/Stream
- Lake
- Mine Site Road
- Access Road (Hardtack / Sawbill)
- Project Transmission Line
- Project Facilities

REFERENCE

Base Data - Provided by OSISKO Hammond Reef Gold Project Ltd
Base Data - MNR NRVIS, obtained 2004
Produced by Golder Associates Ltd under licence from
Ontario Ministry of Natural Resources, © Queens Printer 2008
Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 15N

250 0 250 500 750 1,000 1,250
SCALE 1:25,000 METERS

PROJECT
HAMMOND REEF GOLD PROJECT
ATIKOKAN, ONTARIO, CANADA

TITLE
GROUNDWATER ELEVATIONS AND INFERRED FLOW DIRECTIONS - MINE AREA

Golder Associates
Mississauga, Ontario

PROJECT NO. 13-1118-0010			SCALE AS SHOWN	VERSION 2
DESIGN	CGE	14 Nov. 2008		
GIS	JO	2 Dec. 2013		
CHECK	SP	2 Dec. 2013		
REVIEW	SP	2 Dec. 2013		

FIGURE: 3-20

G:\Projects\2013\13-1118-0010_Osisko_Hammond_Reef\GIS\MXDs\Reporting\EIS\Chapter 3\MineArea_GW_Elevations_InferredGW_Flow.mxd

611500 612000 612500 613000

5422000 5421500 5421000 5420500

N

Marmion Lake
415

Mitta Lake
431.013

BRH-0001B 428.247
BRH-0005B 439.605
BR-6241 439.1
BR-6030 439.1
BR-6203 432.322
BR-6210 431.829
BR-6051 434.56
BR-6144 431.63
BR-0325 434.6
BR-6224 431.5
BR-6037 433.62
BR-6267 437.85
BR-6270 435.87
BR-6221 437.45
BR-6021 434.53
BR-6192 438.141
BR-0442 440.23
BR-0390 434.73
BR-1012 433.78
BR-1290 445.59
BR-1162 436.09
BR-1249 428.55
BR-6103A 436.25
BR-6223 433.72
BR-1278 430
BR-1283 432.34
BR-1112 428.82
BR-1102 429.13
BR-1095 435.68
BR-1093 435.02
BR-1280 435.06
BR-1214 435.32
BR-1207 428.11
BR-0115 434
BR-6004 433.8
BR-6213 433.649
BR-6190 433.97
BR-1237 438.17
BR-0388 428.37
BR-1229 436.71
BR-1197A 428.36
BR-1116 428.6
BR-1190 430.05
BR-1128A 432.837
BR-1174 426.72
BR-1216 427.65
BR-1069 433.93
BR-0097 434.557
BR-0092 432.86
BR-6057 433.62
BR-6191 433.297
BR-6072 432.91
BR-6126A 433.63
BR-1061 435.03
BR-1129 428.87
BR-1228 428.81
BR-1176 426.217
BR-6217 432.593
BR-1199 431.33
BR-1187 428.01
BR-1146 425.05
BR-1056 434.13
BR-0231 433.75
BR-0090 434.29
BR-6129 435.67
BR-6106 432.46
BR-0401 418.6
BR-1198 423.46
BR-1188 416.638
BR-0073 419.991
BR-1248 426.763
BR-1227 426.61
BR-1050 447.673
BR-1042 432.88
BR-0058 436.12
BR-6113 433.56
BRH-0003 416.5
BR-1048 434.06
BR-1159 431.79
BR-0246 434.05
BR-0408 416.53
BR-0413 415.96
BR-1272 418.923
BR-022E 432.82
BR-0216 434.61
BR-1003 434.75
BRH-0008B 419.534
BR-0061 422.51
BR-0220 432.63
BR-1060 430.59
BR-1193 434.19
BR-1051 426.44
BR-0046 418.63
BR-1263 424.094
BR-1168A 433.71
BR-1151 425.42
BR-0433 421.556
BR-1223 426.45
BR-0081 433.77
BR-1154 433.58
BR-0437 426.13
BR-1135 422.55
BR-1161 432.2
BR-1144 421.14
BR-1267 420.95
BR-1153A 432.66
BR-1150 432.47
BR-1063 423.92
BR-1261 419.63
BR-1225 421.279
BR-1238 432.05
BR-1177 418.51
BR-1246 433.09
BR-1109 431.35
BR-1011 420.72
BR-1077 418.666
BR-1064 427
BR-0377 419.19
BR-1094 421.25
BR-1194A 433.74
BR-1157 429.46
BR-1073 431.25
BR-1251A 422.574
BR-1078 426.08
BRH-0002B 422.339
BR-1070 430.22
BR-1080 420.796
BR-1083 418.12

LEGEND

- 434.61 Groundwater Elevation
- Monitoring Well
- Inferred Direction of Shallow Groundwater Flow
- Inferred Groundwater Divide
- Mapped Faults
- Road
- Trail
- Index Contour (5m interval)
- River/Stream
- Lake
- Project Facilities

REFERENCE

Base Data - Provided by OSISKO Hammond Reef Gold Project Ltd
Base Data - MNR NRVIS, obtained 2004
Produced by Golder Associates Ltd under licence from
Ontario Ministry of Natural Resources, © Queens Printer 2008
Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 15N

100 0 100 200 300 400
SCALE 1:7,000 METERS

PROJECT
HAMMOND REEF GOLD PROJECT
ATIKOKAN, ONTARIO, CANADA

TITLE
GROUNDWATER ELEVATIONS AND INFERRED FLOW DIRECTIONS - WEST PIT AREA

Golder Associates
Mississauga, Ontario

PROJECT NO. 13-1118-0010			SCALE AS SHOWN	VERSION 2
DESIGN	CGE	14 Nov. 2008		
GIS	JO	2 Dec. 2013		
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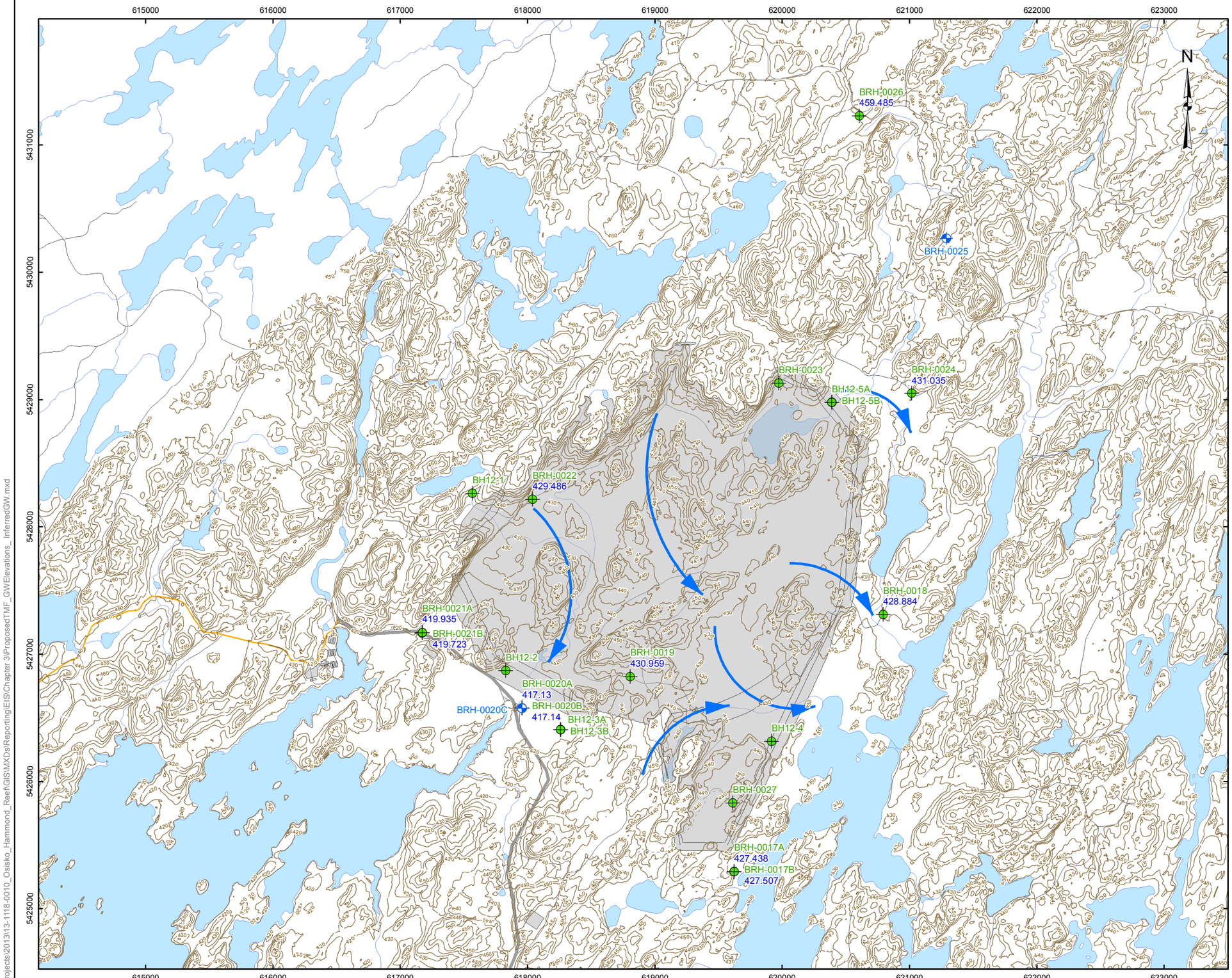
REVIEW	SP	2 Dec. 2013		

FIGURE: 3-21

G:\Projects\2013\13-1118-0010_Osisko_Hammond_Reef\GIS\MXDs\Reporting\EIS\Chapter 3\ProposedWestpit_GW_Elevations_InferredGW_Flow.mxd



LEGEND

- 417.14 Groundwater Elevation (October 2011)
- Monitoring Well
- Geotechnical Borehole - Overburden
- Inferred Direction of Shallow Groundwater Flow
- Road
- Trail
- Index Contour (5m interval)
- River/Stream
- Lake
- Mine Site Road
- Access Road (Hardtack / Sawbill)
- Project Facilities

REFERENCE

Base Data - Provided by OSISKO Hammond Reef Gold Project Ltd
Base Data - MNR NRVIS, obtained 2004
Produced by Golder Associates Ltd under licence from
Ontario Ministry of Natural Resources, © Queens Printer 2008
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500 0 500 1,000 1,500
SCALE 1:30,000 METERS

PROJECT
HAMMOND REEF GOLD PROJECT
ATIKOKAN, ONTARIO, CANADA

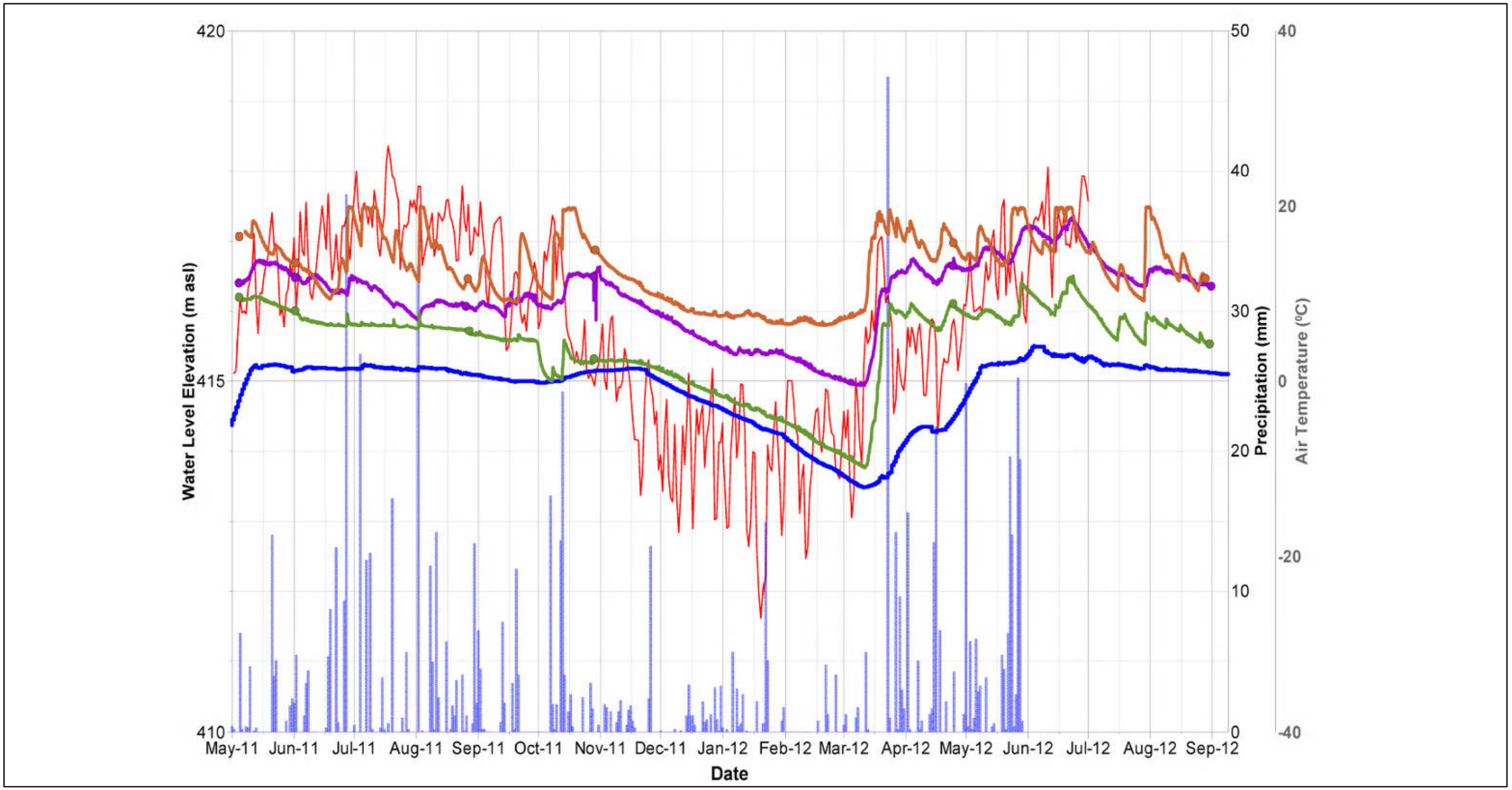
TITLE
GROUNDWATER ELEVATIONS AND INFERRED FLOW DIRECTIONS - TAILINGS MANAGEMENT FACILITY AREA

Golder Associates
Mississauga, Ontario

PROJECT NO. 13-1118-0010			SCALE AS SHOWN	VERSION 2
DESIGN	CGE	14 Nov. 2008		
GIS	JO	2 Dec. 2013		
CHECK	SP	2 Dec. 2013		
REVIEW	SP	2 Dec. 2013		

FIGURE: 3-22

G:\Projects\2013\13-1118-0010_Osisko_Hammond_Reef\GIS\MXDs\Reporting\EIS\Chapter 3\ProposedTMF_GWElevations_InferredGW.mxd



LEGEND

- BRH-0003B
- BRH-0009
- BHR-00013
- Upper Marmion Reservoir
- Average Daily Air Temperature
- Total Daily Precipitation

NOTES:

Colored circles represent manual water level measurements.

PROJECT
HAMMOND REEF GOLD PROJECT
ATIKOKAN, ONTARIO, CANADA

TITLE
MARMION RESERVOIR AND NEARBY GROUNDWATER LEVELS

Golder Associates
Mississauga, Ontario

PROJECT NO. 13-1118-0010			VERSION 2
DESIGN	CGE	14 Nov. 2008	
GIS	JO	2 Dec. 2013	
CHECK	SP	2 Dec. 2013	
REVIEW	SP	2 Dec. 2013	

FIGURE: 3-23

G:\Projects\2013\13-1118-0010_Osisko_Hammond_Reef\GIS\MXDs\Reporting\EIS\Chapter 3\Marmion_Reservoir_and_nearby_gw_levels.mxd

611000 612000 613000 614000 615000

5423000 5422000 5421000 5420000

Sawbill Bay
Mitta Lake
Lynxhead Bay

BRH-0006
BRH-0005A/B
BRH-0001A/B
GT-05
BR-0366
GT-06
BRH-0004
BRH-0011
GT-01
BR-0371
BR-0220
GT-02
BR-0231
GT-04
GT-03
BRH-0003
BRH-0009
BRH-0008A/B
BR-0433
BRH-0007A/B
BRH-0002A/B

N

LEGEND

- BR-0433 Areas of Observed Groundwater Seepage
- Monitoring Well
- Exploration Borehole
- Geotechnical Borehole - Deep Bedrock
- Road
- Trail
- Index Contour (5m interval)
- River/Stream
- Lake
- Areas of Inferred Groundwater Discharge
- Mine Site Road
- Project Transmission Line
- Project Facilities

REFERENCE

Base Data - Provided by OSISKO Hammond Reef Gold Project Ltd
Base Data - MNR NRVIS, obtained 2004
Produced by Golder Associates Ltd under licence from
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Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 15N

200 0 200 400 600 800
SCALE 1:15,000 METERS

PROJECT
HAMMOND REEF GOLD PROJECT
ATIKOKAN, ONTARIO, CANADA

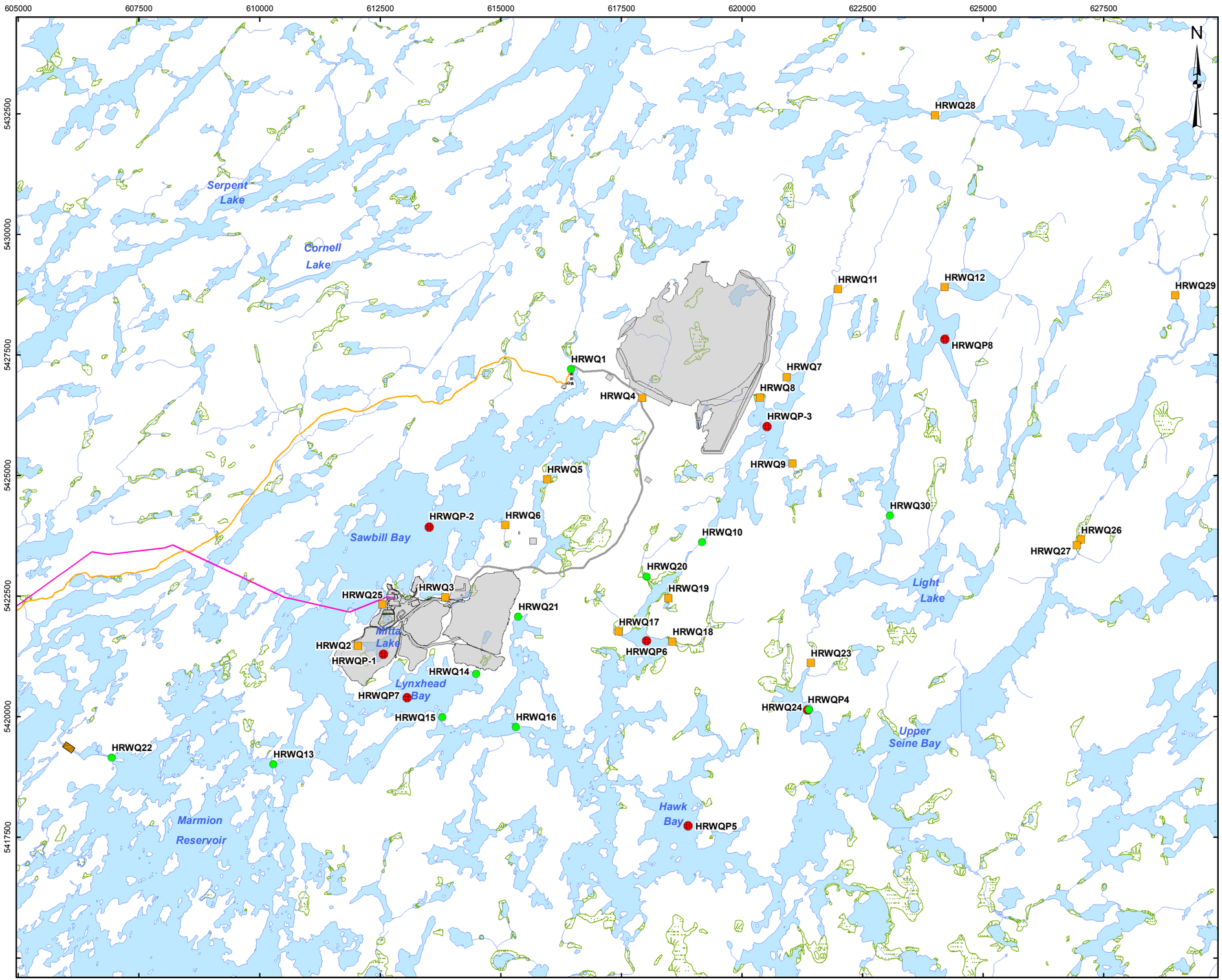
TITLE
AREAS OF OBSERVED GROUNDWATER SEEPAGE AND INFERRED GROUNDWATER DISCHARGE

Golder Associates
Mississauga, Ontario

PROJECT NO. 13-1118-0010			SCALE AS SHOWN	VERSION 2
DESIGN	CGE	14 Nov. 2008		
GIS	JO	2 Dec. 2013		
CHECK	SP	2 Dec. 2013		
REVIEW	SP	2 Dec. 2013		

FIGURE: 3-24

G:\Projects\2013\13-1118-0010_Osisko_Hammond_Reef\GIS\MXD\sr\Reporting\EIS\Chapter 3\ObservedGWSeepageandInferredGWDischarge.mxd



LEGEND

- Surface Water Sample Location
- Surface Water and Sediment Sample Location
- Profile Sample Location (surface water and sediment)
- Raft Lake Cut Location
- River/Stream
- Lake
- Wetland
- Mine Site Road
- Access Road (Hardtack / Sawbill)
- Project Transmission Line
- Project Facilities

REFERENCE

Base Data - Provided by OSISKO Hammond Reef Gold Project Ltd.
Base Data - MNR NRVIS, obtained 2004
Produced by Golder Associates Ltd under licence from
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Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 15N

1,000 0 1,000 2,000 3,000 4,000
SCALE 1:80,000 METERS

PROJECT
HAMMOND REEF GOLD PROJECT
ATIKOKAN, ONTARIO, CANADA

TITLE
WATER QUALITY, SEDIMENT AND PROFILE SAMPLE LOCATIONS

Golder Associates
Mississauga, Ontario

PROJECT NO. 13-1118-0010			SCALE AS SHOWN	VERSION 2
DESIGN	CGE	14 Nov. 2008	FIGURE: 3-25	
GIS	JO	2 Dec. 2013		
CHECK	SP	2 Dec. 2013		
REVIEW	SP	2 Dec. 2013		

G:\Projects\2013\13-1118-0010_Osisko_Hammond_Reef\GIS\MXDs\Reporting\EIS\Chapter 3\WaterQuality.mxd

611750 612000 612250 612500 612750 613000 613250

5422000 5421750 5421500 5421250 5421000

N

LEGEND

- Lake Bottom Contours - 2 m interval
- Lake Bottom Contours - 1 m interval
- Dirt Road - Double
- Dirt Road - Single
- Trail
- River/Stream
- Lake
- Wetland/Swamp

Depth of Lake Bottom (metres)

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

NOTES:

1. Water level/Shoreline elevation used for Mitta Lake was 431.01m.
2. The contours were derived from a 20 metre cell size for the grid files. Minor contour errors exist at the shorelines where departures are at the scale of the grid dimension.

REFERENCE

Base Data - Provided by OSISKO Hammond Reef Gold Project Ltd
Base Data - MNR NRVIS, obtained 2004
Produced by Golder Associates Ltd under licence from
Ontario Ministry of Natural Resources, © Queens Printer 2008
Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 15N

200 0 200
SCALE 1:5,000 METRES

PROJECT
HAMMOND REEF GOLD PROJECT
ATIKOKAN, ONTARIO, CANADA

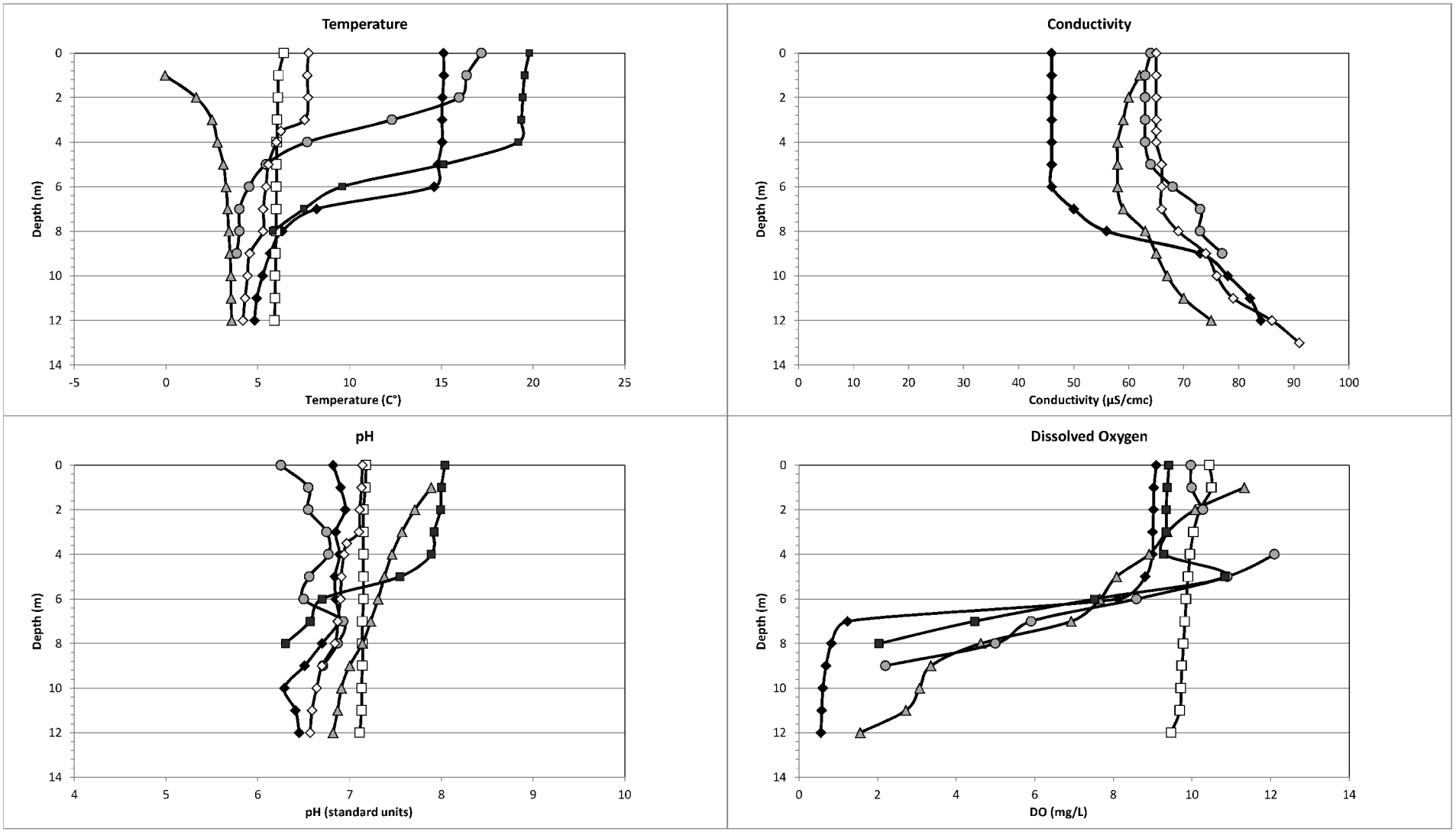
TITLE
CONTOURED DEPTH OF LAKE BOTTOM MITTA LAKE

Golder Associates
Mississauga, Ontario

PROJECT NO. 13-1118-0010			SCALE AS SHOWN	VERSION 2
DESIGN	CGE	14 Nov. 2008		
GIS	JO	2 Dec. 2013		
CHECK	SP	2 Dec. 2013		
REVIEW	SP	2 Dec. 2013		

FIGURE: 3-26

G:\Projects\201313-1118-0010_Osisko_Hammond_Reef\GIS\MXDs\Reporting\EIS\Chapter 3\Mitta_LakeBathymetry.mxd



PROJECT
HAMMOND REEF GOLD PROJECT
ATIKOKAN, ONTARIO, CANADA

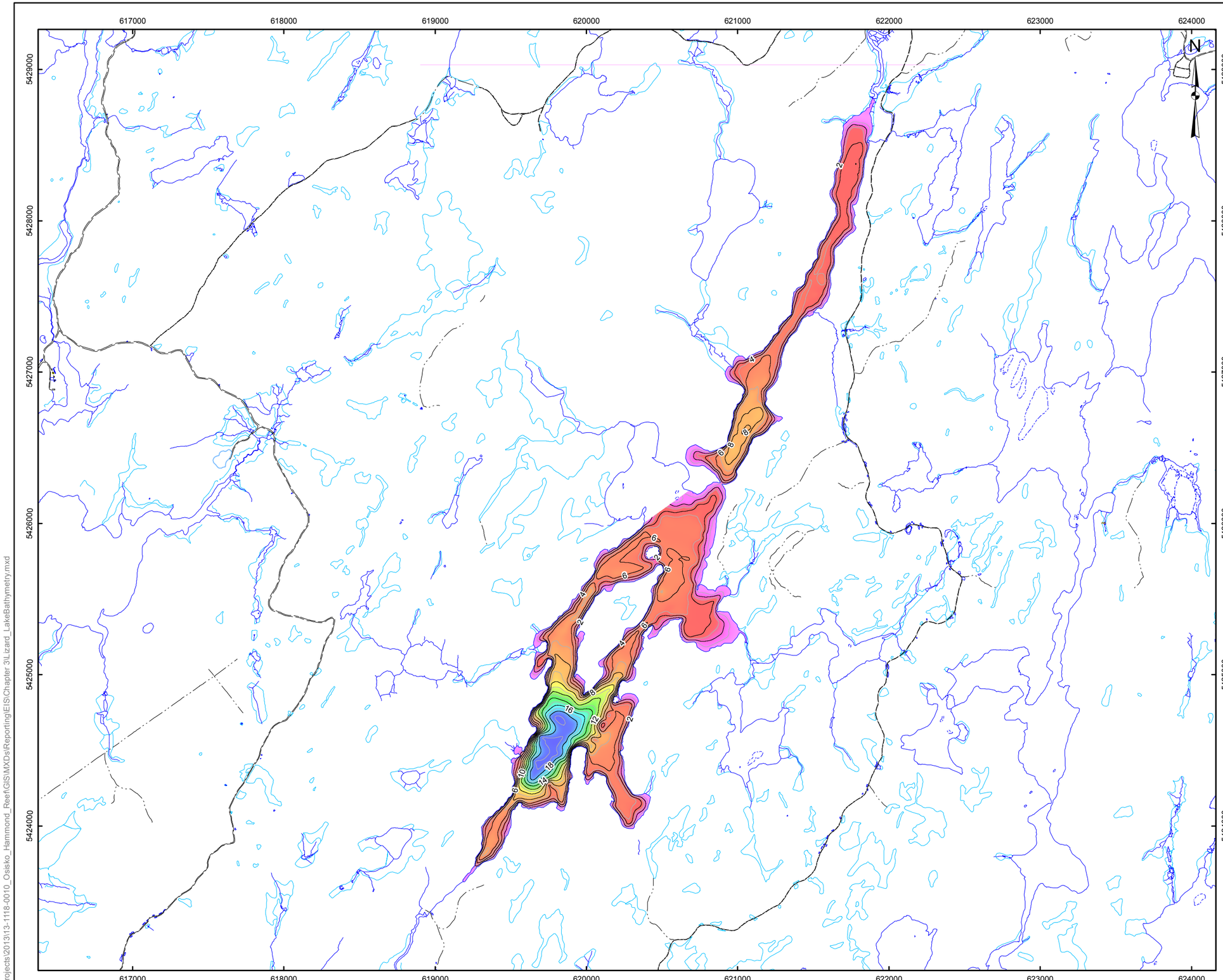
TITLE
FIELD PARAMETER RESULTS FOR MITTA LAKE WATER COLUMN PROFILE

Golder Associates
Mississauga, Ontario

PROJECT NO. 13-1118-0010			VERSION 2
DESIGN	CGE	16 Mar. 2012	
GIS	JO	2 Dec. 2013	
CHECK	SP	2 Dec. 2013	
REVIEW	SP	2 Dec. 2013	

FIGURE: 3-27

G:\Projects\2013\13-1118-0010_Osisko_Hammond_Reef\GIS\MXDs\Reporting\EIS\Chapter 3\Mitta_Lake_Field_Parameters.mxd



LEGEND

- Lake Bottom Contours - 2 m interval
- Lake Bottom Contours - 1 m interval
- Dirt Road - Double
- Dirt Road - Single
- Trail
- River/Stream
- Lake
- Wetland/Swamp

Depth of Lake Bottom (metres)

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19

NOTES:

1. Water level/Shoreline elevation used for Lizard Lake was 426.55 m.
2. The contours were derived from a 20 metre cell size for the grid files. Minor contour errors exist at the shorelines where departures are at the scale of the grid dimension.

REFERENCE

Base Data - Provided by OSISKO Hammond Reef Gold Project Ltd
Base Data - MNR NRVIS, obtained 2004
Produced by Golder Associates Ltd under licence from
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Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 15N

500 0 500 1,000
SCALE 1:25,000 METRES

PROJECT
HAMMOND REEF GOLD PROJECT
ATIKOKAN, ONTARIO, CANADA

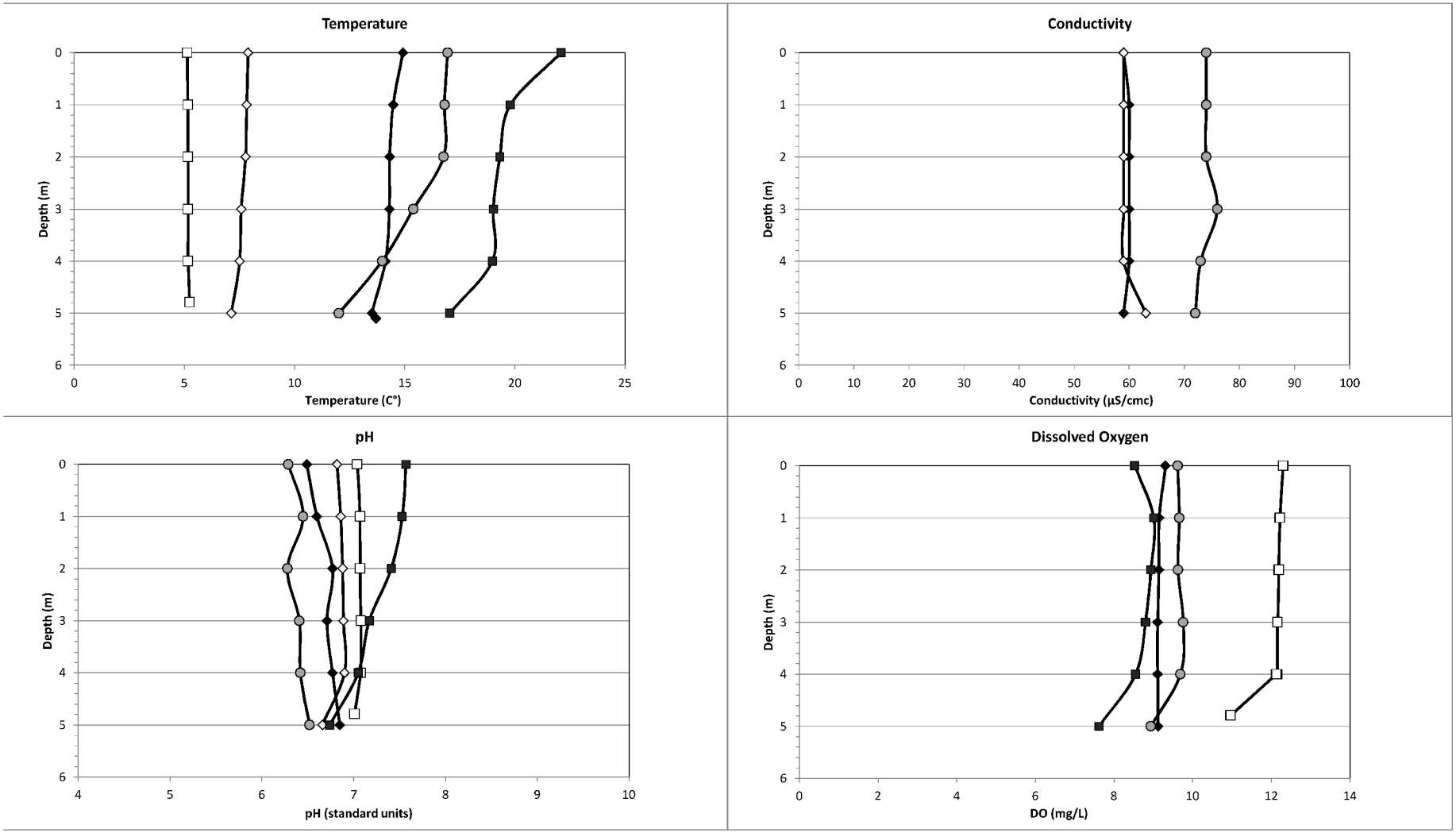
TITLE
CONTOURED DEPTH OF LAKE BOTTOM LIZARD LAKE

Golder Associates
Mississauga, Ontario

PROJECT NO. 13-1118-0010			SCALE AS SHOWN	VERSION 2
DESIGN	CGE	14 Nov. 2008		
GIS	JO	2 Dec. 2013		
CHECK	SP	2 Dec. 2013		
REVIEW	SP	2 Dec. 2013		

FIGURE: 3-28

G:\Projects\2013\13-1118-0010_Osisko_Hammond_Reef\GIS\MXDs\Reporting\EIS\Chapter 3\Lizard_LakeBathymetry.mxd



PROJECT
HAMMOND REEF GOLD PROJECT
ATIKOKAN, ONTARIO, CANADA

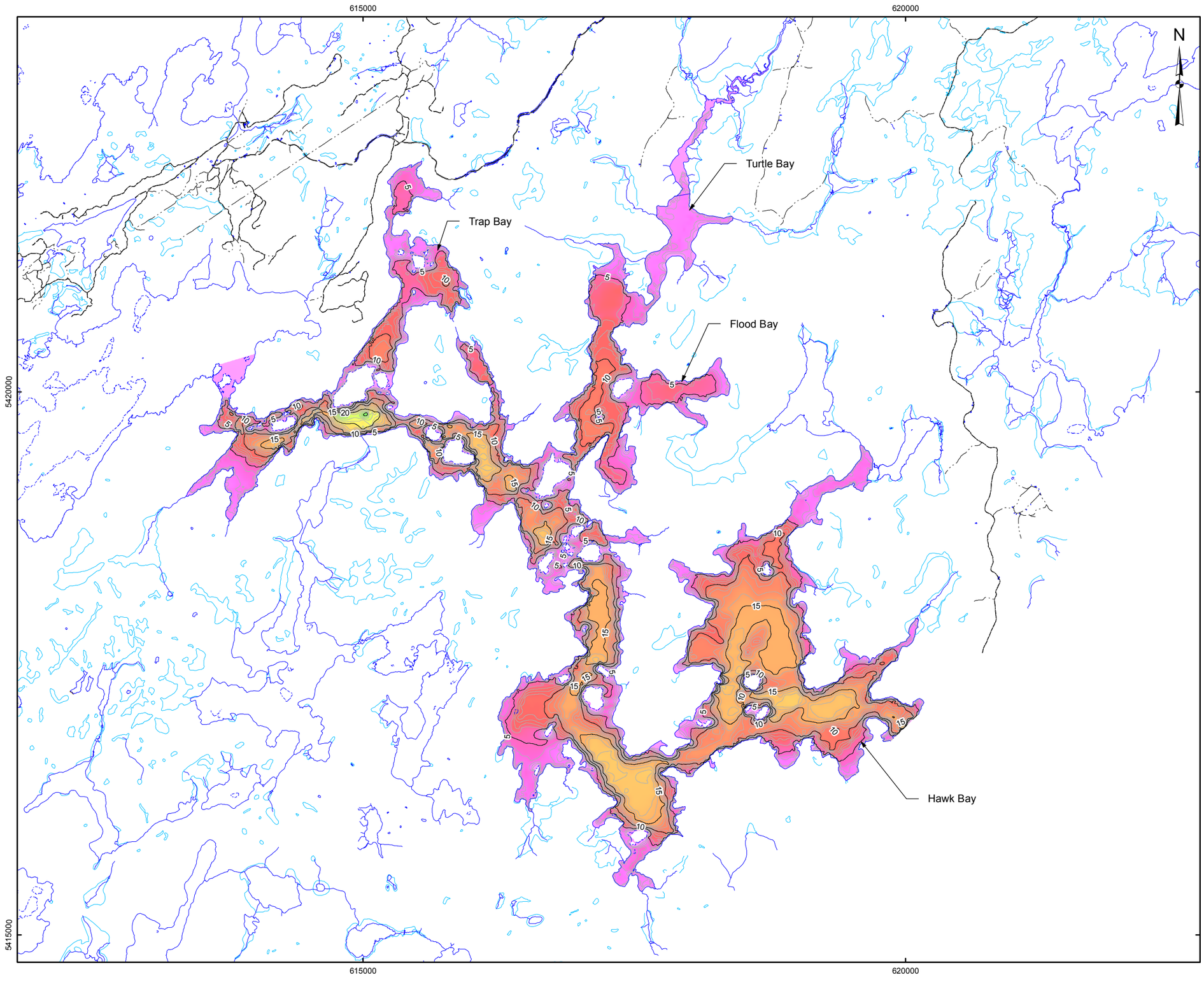
TITLE
FIELD PARAMETER RESULTS FOR LIZARD LAKE WATER COLUMN PROFILE

Golder Associates
Mississauga, Ontario

PROJECT NO. 13-1118-0010			VERSION 2
DESIGN	CGE	16 Mar. 2012	
GIS	JO	2 Dec. 2013	
CHECK	SP	2 Dec. 2013	
REVIEW	SP	2 Dec. 2013	

FIGURE: 3-29

G:\Projects\2013\13-1118-0010_Osisko_Hammond_Reef\GIS\MXDs\Reporting\EIS\Chapter 3\Lizard_Lake_Field_Parameters.mxd



LEGEND

- Lake Bottom Contours - 5 m interval
- Lake Bottom Contours - 1 m interval
- Dirt Road - Double
- Dirt Road - Single
- Trail
- River/Stream
- Lake
- Wetland/Swamp

Depth of Lake Bottom (metres)

0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38

NOTES:

1. Water level/Shoreline elevation used for Trap Bay was 413.13 m.
2. Water level/Shoreline elevation used for Turtle Bay was 413.13 m.
3. Water level/Shoreline elevation used for Flood Bay was 413.13 m.
4. Water level/Shoreline elevation used for Hawk Bay was 413.13 m.
5. The contours were derived from a 20 metre cell size for the grid files. Minor contour errors exist at the shorelines where departures are at the scale of the grid dimension.

REFERENCE

Base Data - Provided by OSISKO Hammond Reef Gold Project Ltd
Base Data - MNR NRVIS, obtained 2004
Produced by Golder Associates Ltd under licence from
Ontario Ministry of Natural Resources, © Queens Printer 2008
Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 15N

1,000 0 1,000
SCALE 1:35,000 METRES

PROJECT
HAMMOND REEF GOLD PROJECT
ATIKOKAN, ONTARIO, CANADA

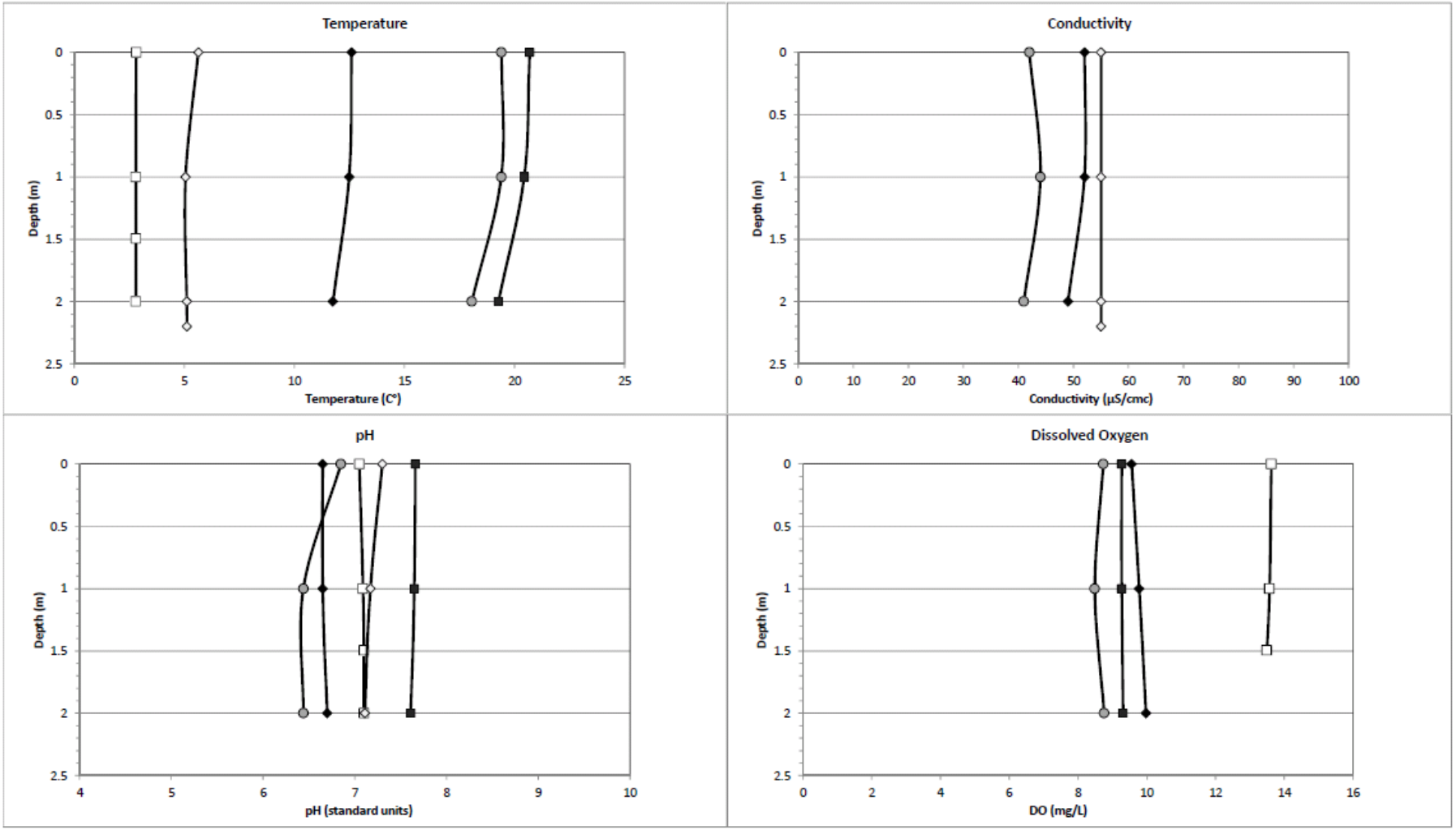
TITLE
CONTOURED DEPTH OF LAKE BOTTOM
TRAP BAY TO HAWK BAY
(TRAP, TURTLE, FLOOD AND HAWK BAYS)

Golder Associates
Mississauga, Ontario

PROJECT NO. 13-1118-0010			SCALE AS SHOWN	VERSION 2
DESIGN	CGE	14 Nov. 2008		
GIS	JO	2 Dec. 2013		
CHECK	SP	2 Dec. 2013		
REVIEW	SP	2 Dec. 2013		

FIGURE: 3-30

G:\Projects\201313-1118-0010_Osisko_Hammond_Reef\GIS\MXDs\Reporting\EIS\Chapter 3\TrapBay_HawkBayBathymetry.mxd



PROJECT
HAMMOND REEF GOLD PROJECT
ATIKOKAN, ONTARIO, CANADA

TITLE
FIELD PARAMETER RESULTS FOR TURTLE BAY WATER COLUMN PROFILE

Golder Associates
Mississauga, Ontario

PROJECT NO. 13-1118-00`0			VERSION 2
DESIGN	BA	12 Feb. 2013	**FIGURE: 3-31**
GIS	JO	Dec 2013	
CHECK	SP	Dec 2013	
REVIEW	SP	Dec 2013	

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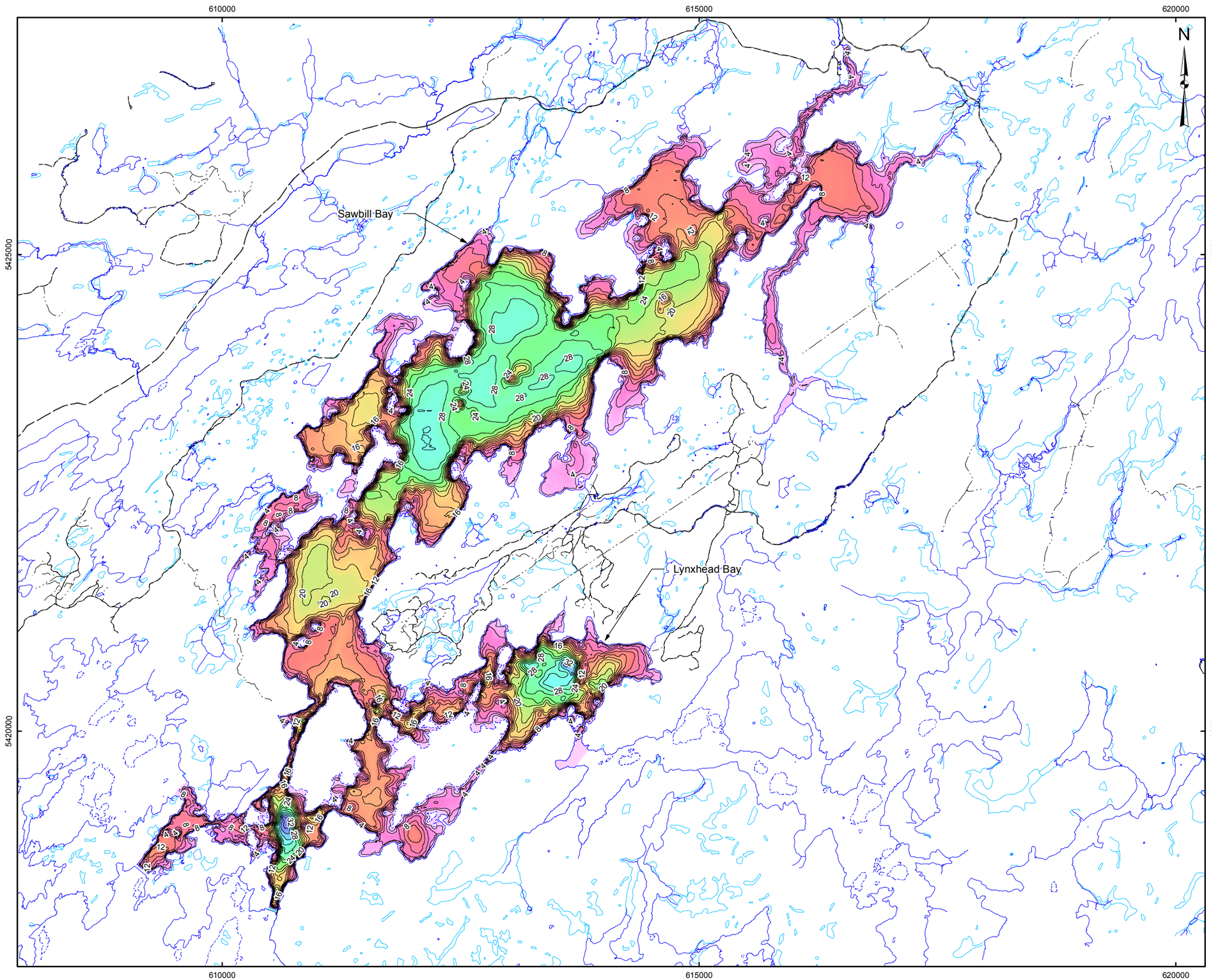

LEGEND

- Lake Bottom Contours - 2 m interval
- Dirt Road - Double
- Dirt Road - Single
- Trail
- River/Stream
- Lake
- Wetland/Swamp

Depth of Lake Bottom (metres)

0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38

NOTES:

1. Water level/Shoreline elevation used for Marmion Lake was 415.18 m.
2. The contours were derived from a 20 metre cell size for the grid files. Minor contour errors exist at the shorelines where departures are at the scale of the grid dimension.

REFERENCE

Base Data - Provided by OSISKO Hammond Reef Gold Project Ltd
Base Data - MNR NRVIS, obtained 2004
Produced by Golder Associates Ltd under licence from
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Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 15N

1,000 0 1,000
SCALE 1:40,000 METRES

PROJECT
HAMMOND REEF GOLD PROJECT
ATIKOKAN, ONTARIO, CANADA

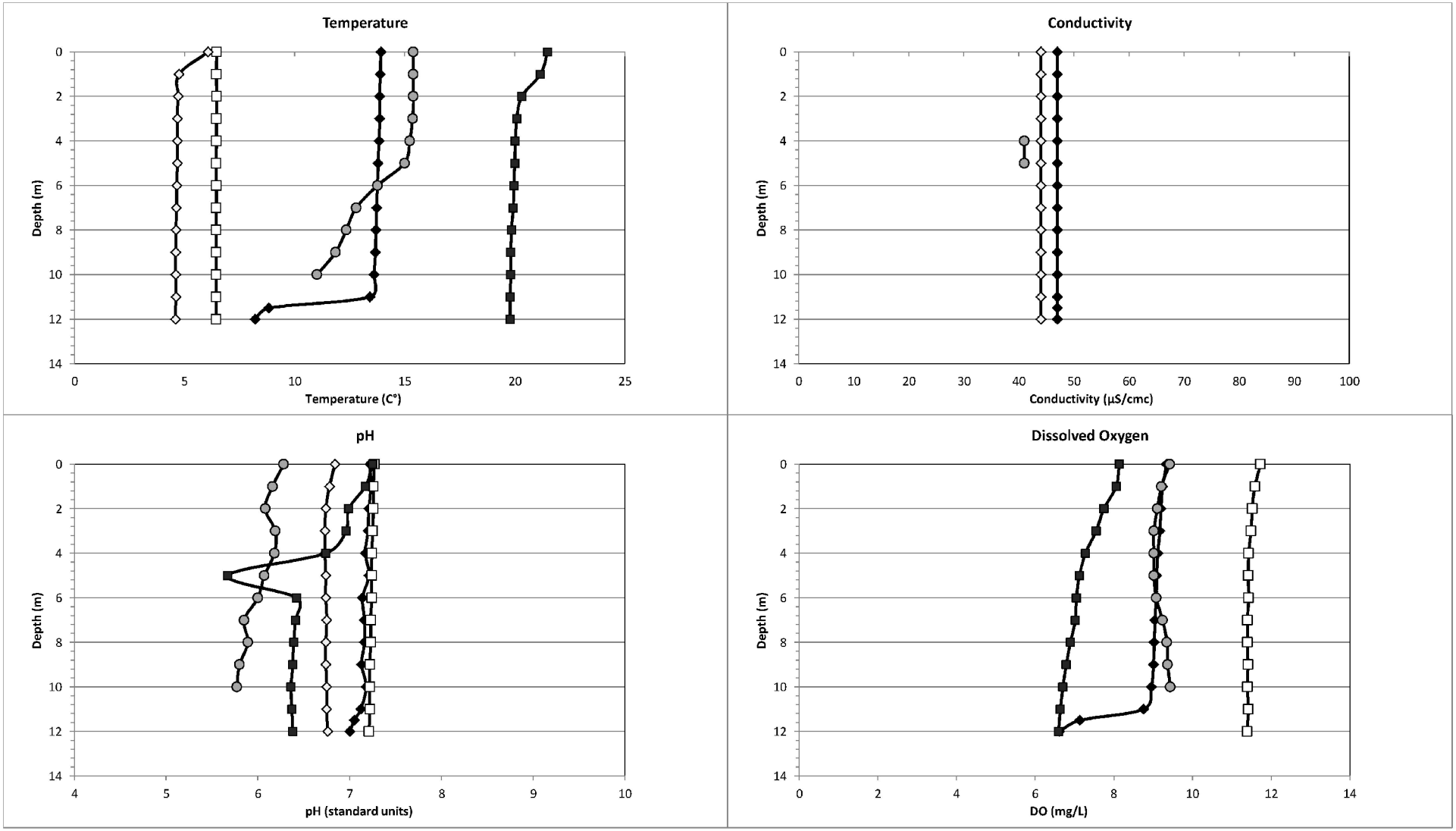
TITLE
CONTOURED DEPTH OF LAKE BOTTOM SAWBILL BAY AND LYNXHEAD BAY

Golder Associates
Mississauga, Ontario

PROJECT NO. 13-1118-0010			SCALE AS SHOWN	VERSION 2
DESIGN	CGE	14 Nov. 2008		
GIS	JO	2 Dec. 2013		
CHECK	SP	2 Dec. 2013		
REVIEW	SP	2 Dec. 2013		

FIGURE: 3-32

G:\Projects\201313-1118-0010_Osisko_Hammond_Reef\GIS\MXDs\Reporting\EIS\Chapter 3\Sawbill_LynxheadLakeBathymetry.mxd



PROJECT
HAMMOND REEF GOLD PROJECT
ATIKOKAN, ONTARIO, CANADA

TITLE
FIELD PARAMETER RESULTS FOR LYNXHEAD BAY WATER COLUMN PROFILE

Golder Associates
Mississauga, Ontario

PROJECT NO. 13-1118-0010			VERSION 2
DESIGN	CGE	16 Mar. 2012	FIGURE: 3-33
GIS	JO	2 Dec. 2013	
CHECK	SP	2 Dec. 2013	
REVIEW	SP	2 Dec. 2013	

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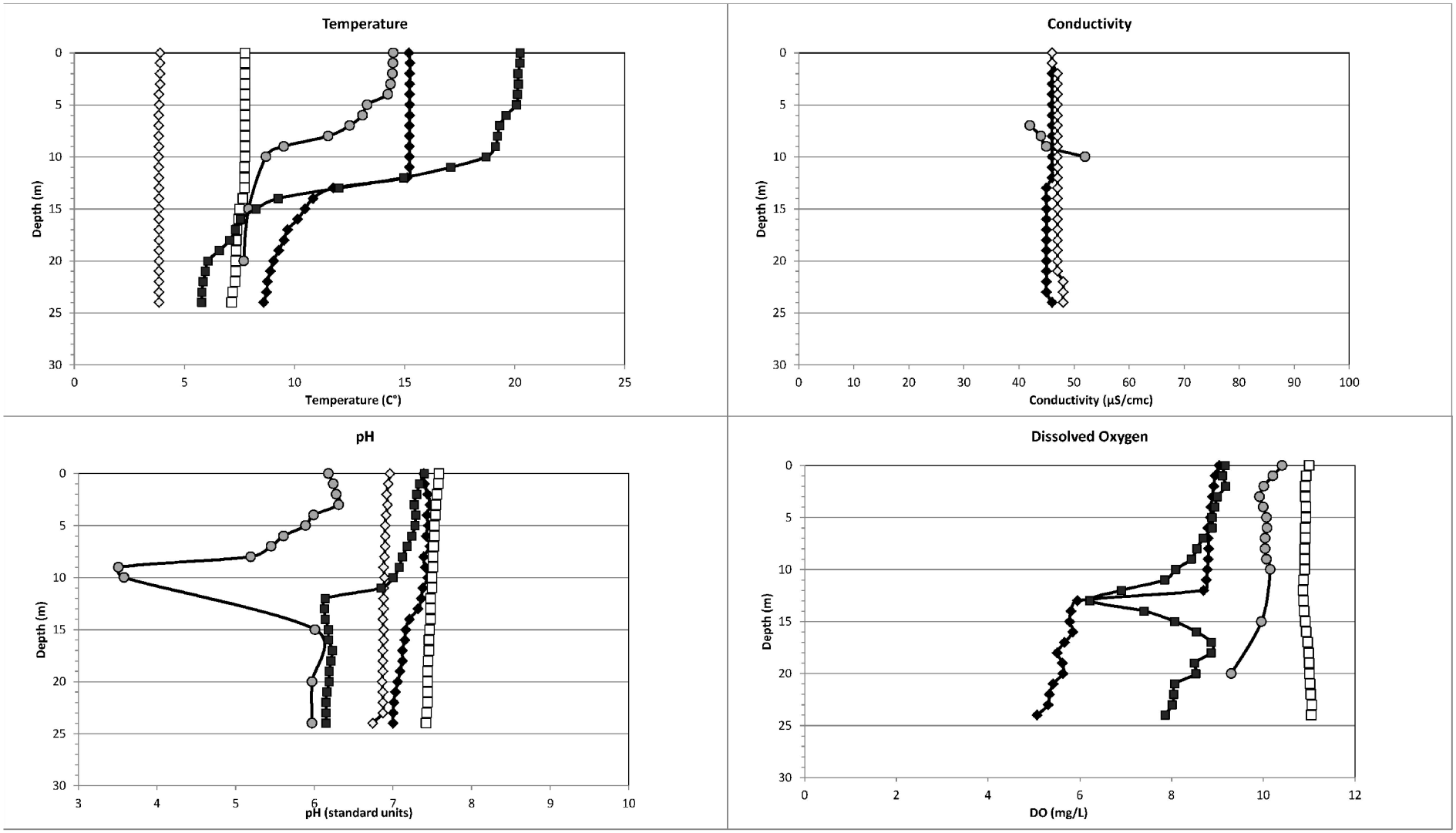

PROJECT
HAMMOND REEF GOLD PROJECT
ATIKOKAN, ONTARIO, CANADA

TITLE
FIELD PARAMETER RESULTS FOR SAWBILL BAY WATER COLUMN PROFILE

Golder Associates
Mississauga, Ontario

PROJECT NO. 13-1118-0010			VERSION 2
DESIGN	CGE	16 Mar. 2012	
GIS	JO	2 Dec. 2013	
CHECK	SP	2 Dec. 2013	
REVIEW	SP	2 Dec. 2013	

FIGURE: 3-34

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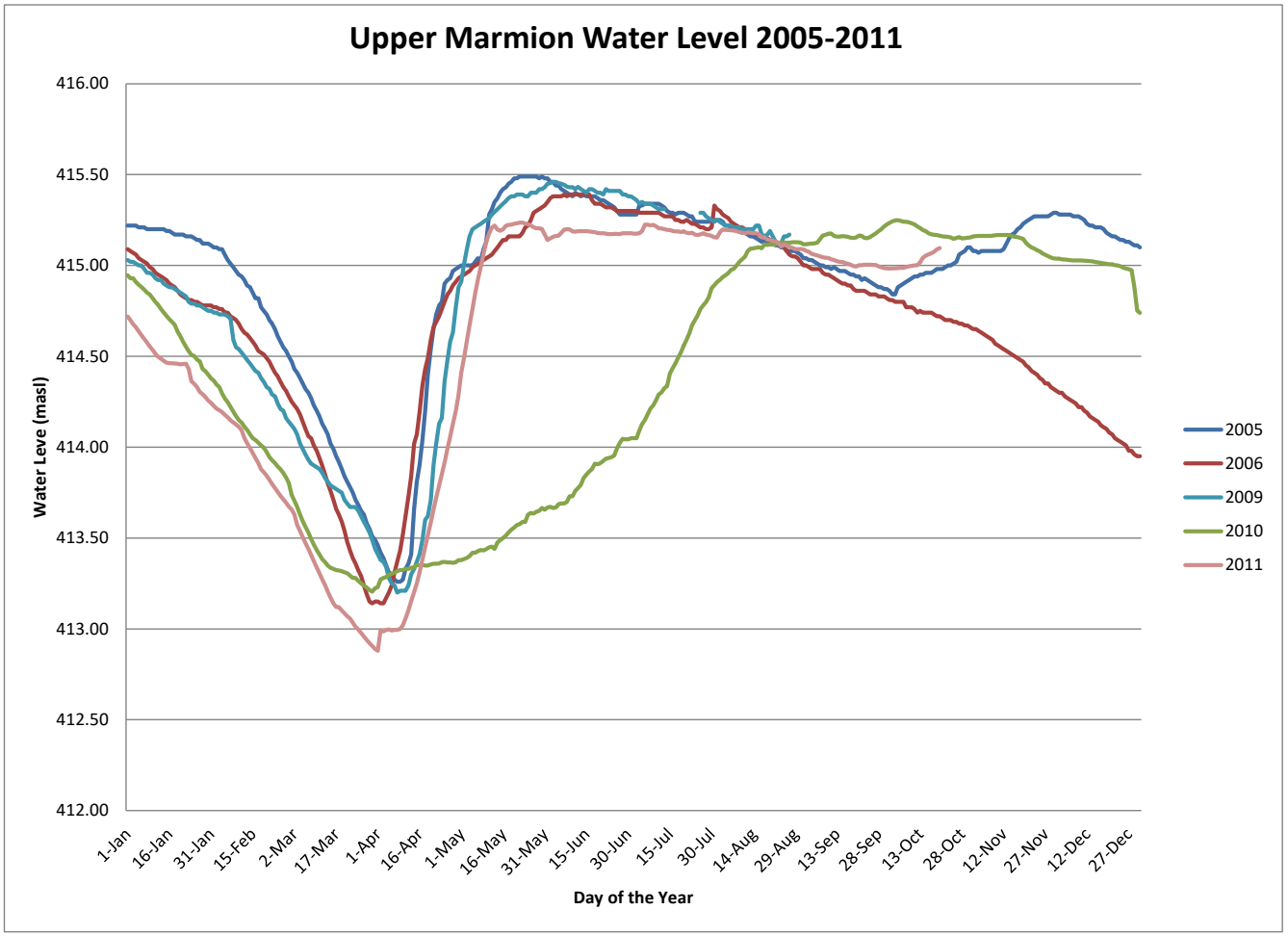
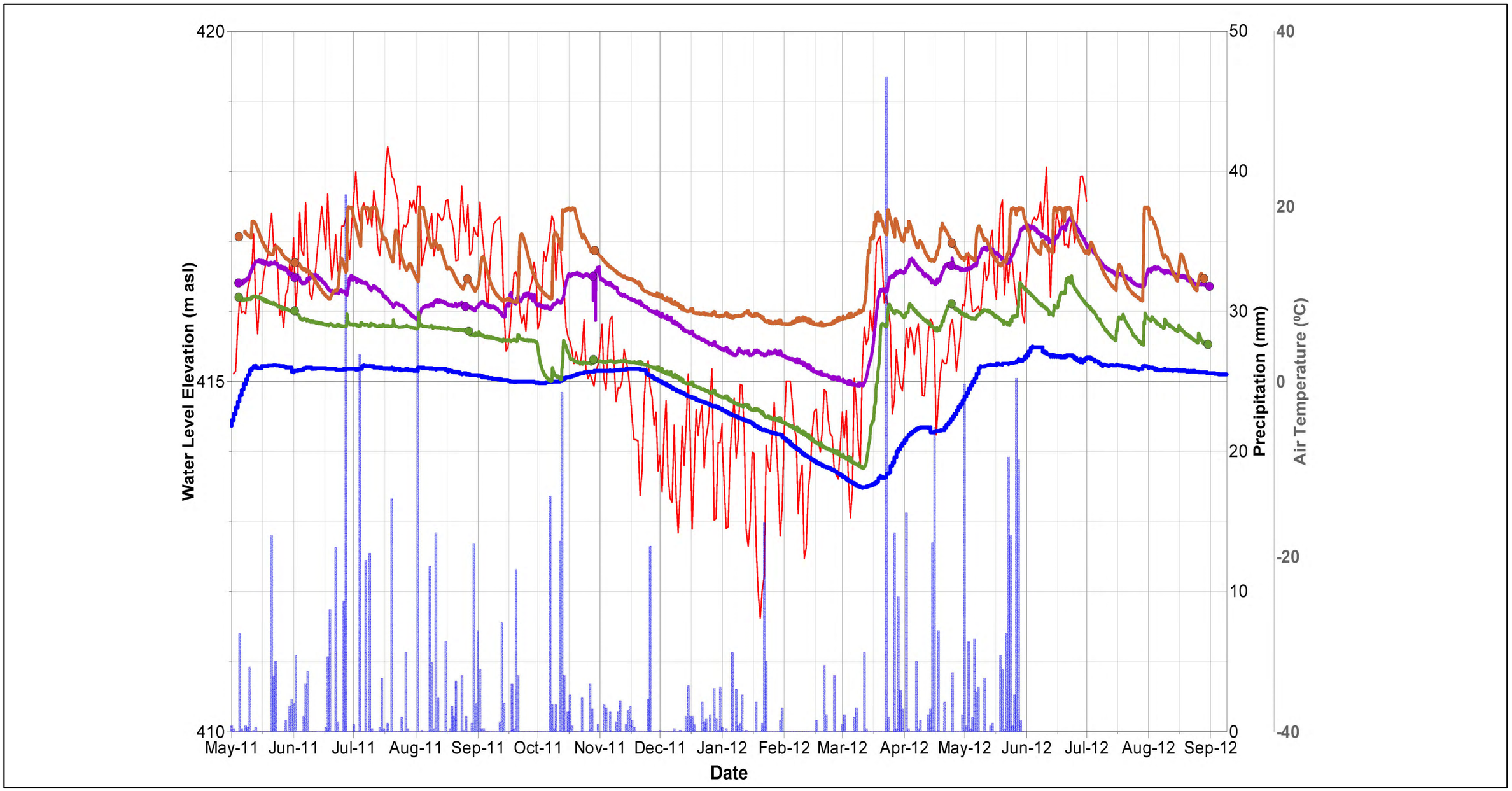


Figure 3-35: Upper Marmion Reservoir Annual Water Level Fluctuations Post Seine River Management Plan



LEGEND

- BRH-0003B
- BRH-0009
- BHR-00013
- Upper Marmion Reservoir
- Average Daily Air Temperature
- Total Daily Precipitation

NOTES:

Colored circles represent manual water level measurements.

PROJECT
HAMMOND REEF GOLD PROJECT
ATIKOKAN, ONTARIO, CANADA

TITLE
ANNUAL WATER LEVEL FLUCTUATION UPPER MARMION RESERVOIR

Golder Associates
Mississauga, Ontario

PROJECT NO. 13-1118-0010			VERSION 2
DESIGN	CGE	14 Nov. 2008	**FIGURE: 3-36**
GIS	JO	2 Dec. 2013	
CHECK	SP	2 Dec. 2013	
REVIEW	SP	2 Dec. 2013	

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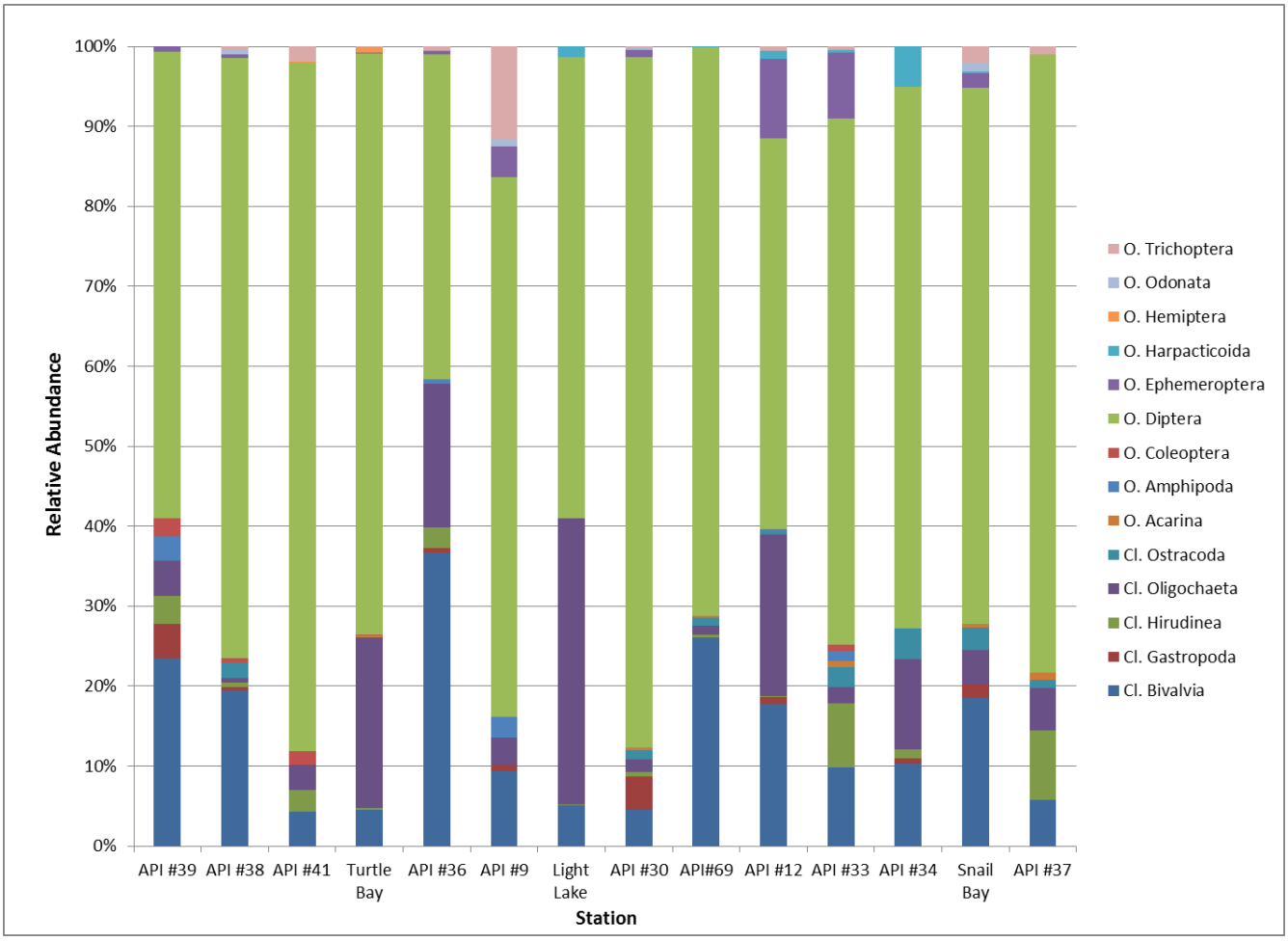
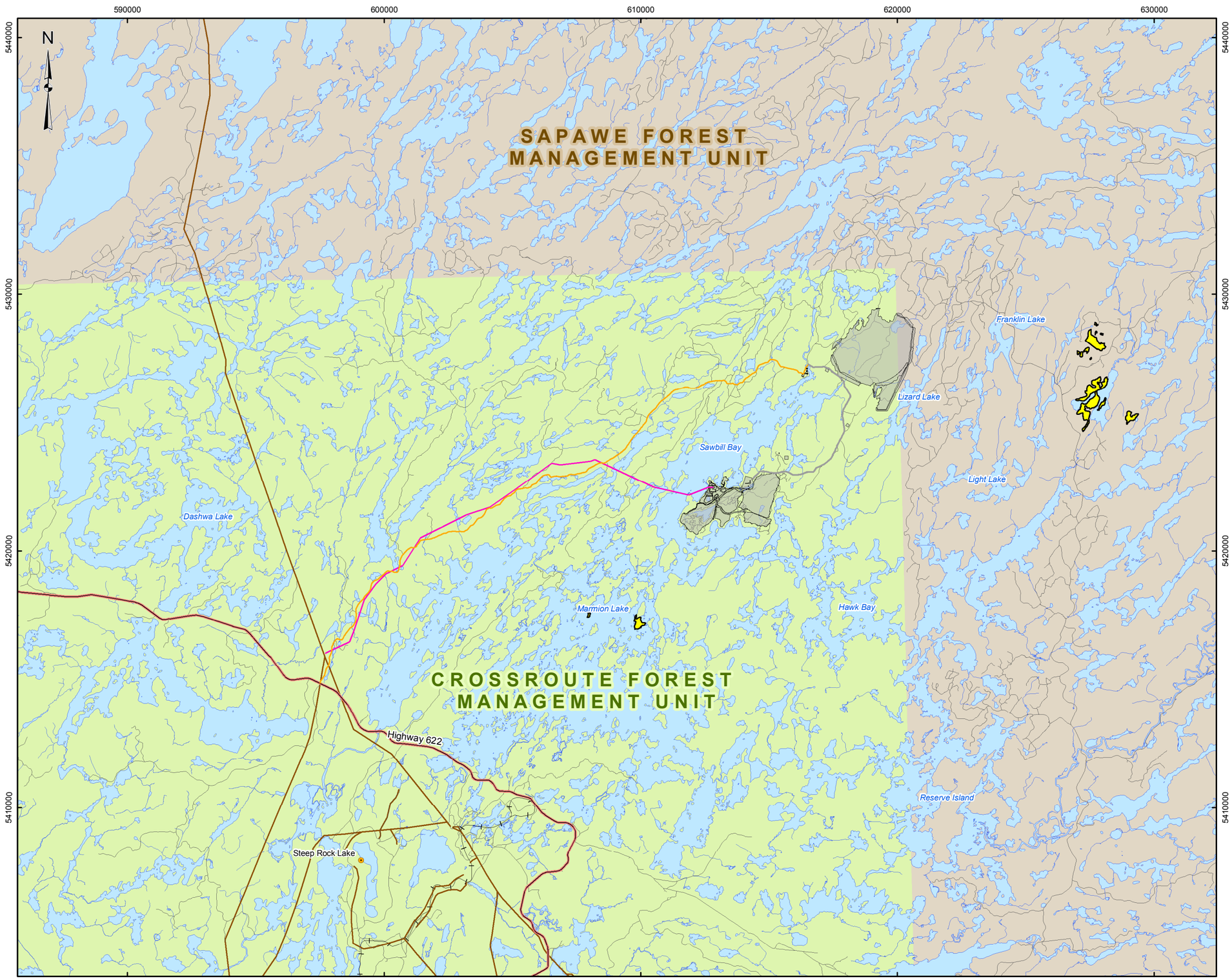


Figure 3-37: Distribution of Major Benthic Taxa



LEGEND

- Small Community
- Provincial Highway
- Existing Railway
- EN_1120009_1
- River/Stream
- Lake
- Old Growth Forest
- Crossroute Forest Management Unit
- Sapawe Forest Management Unit
- Mine Site Road
- Access Road (Hardtack / Sawbill)
- Project Transmission Line
- Project Facilities

REFERENCE

Base Data - Provided by OSISKO Hammond Reef Gold Project Ltd
Base Data - MNR NRVIS, obtained 2004
Produced by Golder Associates Ltd under licence from
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Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 15N

1 0.5 0 1 2 3 4 5 6 7
SCALE 1:150,000 KILOMETRES

PROJECT
HAMMOND REEF GOLD PROJECT
ATIKOKAN, ONTARIO, CANADA

TITLE
FOREST MANAGEMENT UNITS AND OLD GROWTH FOREST

Golder Associates
Mississauga, Ontario

PROJECT NO. 1656263			SCALE AS SHOWN	VERSION 2
DESIGN	CGE	14 Nov. 2008		
GIS	SO	12 Jan. 2018		
CHECK	AA	12 Jan. 2018		
REVIEW	AA	12 Jan. 2018		

FIGURE: 3-38

S:\Clients\OsiskoHammond_Reef\99_PROJ\1656263_CMC_EA_Support\40_PROD\0007_FMU_Updates_2018\1656263-0007-RT-0001.mxd

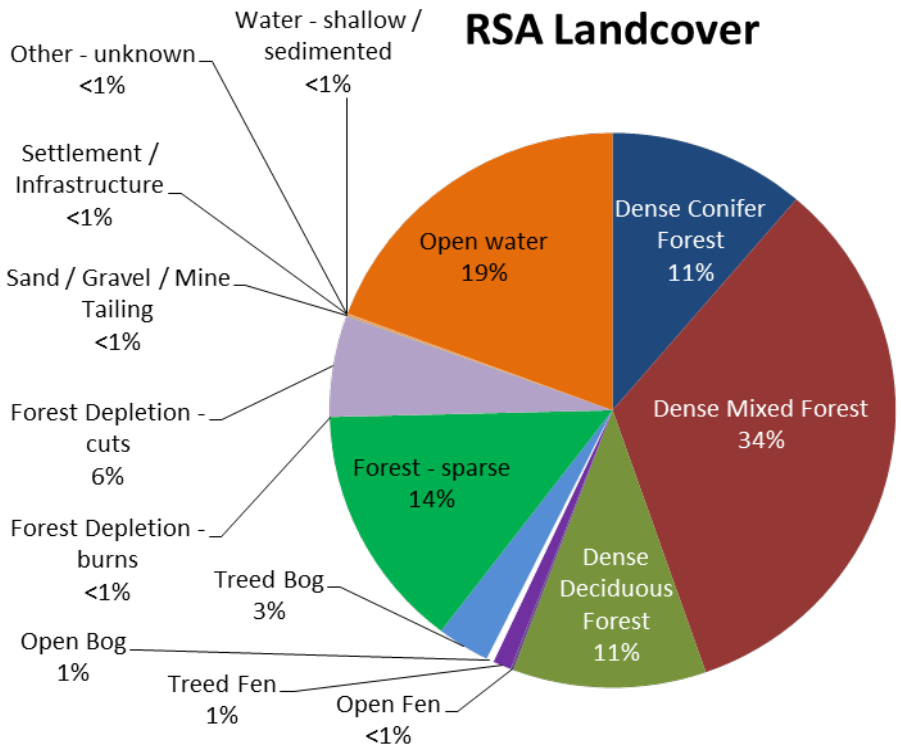

Figure 3-39: Pie Chart Illustrating Regional Study Area Landcover Distribution

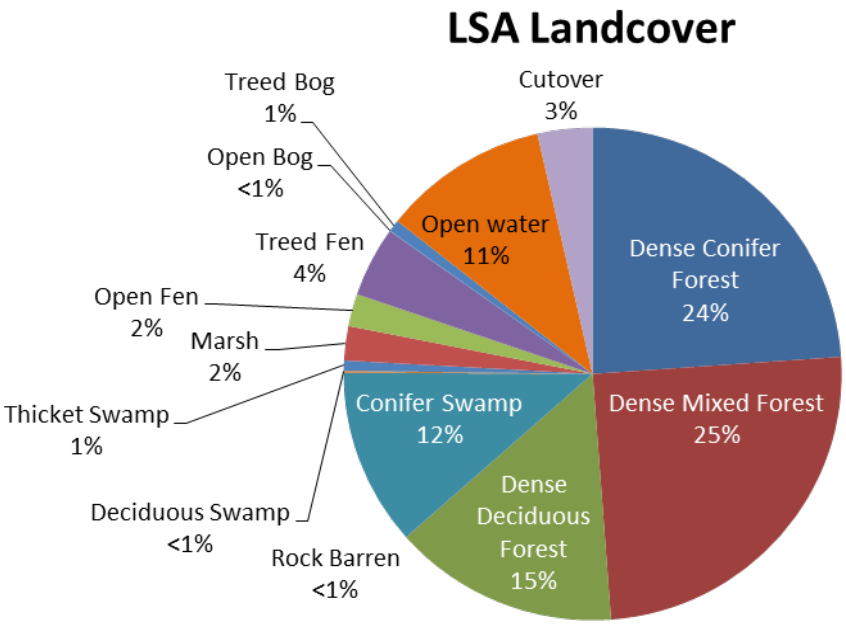

Figure 3-40: Pie Chart Illustrating Local Study Area Landcover Distribution

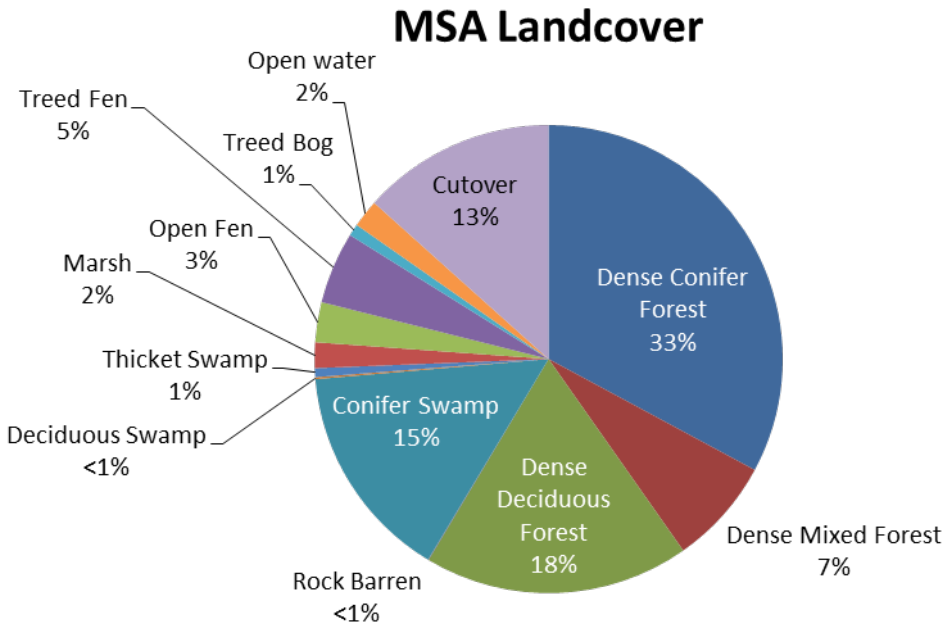

Figure 3-41: Pie Chart Illustrating Mine Study Area Landcover Distribution

600000 610000 620000

5430000 5420000

N

Serpent Lake
Cornell Lake
Sawbill Bay
Mitta Lake
Lynxhead Bay
Marmion Reservoir
Hawk Bay

BBS15 Incidental
BBS10
BBS81 Incidental
BBS18
BBS33
Incidental
BBS38
BBS24
LW02
BBS41 Incidental
BBS27
Incidental
LW05
LW04
HRFR01
BBS62
EWPW15
BBS104
HRTU16
Highway 622

LEGEND

- Potential Bald Eagle Nest
- Provincial Highway
- Trail
- Road
- Power Transmission Line
- River/Stream
- Lake
- Wetland
- Mine Site Road
- Access Road (Hardtack / Sawbill)
- Project Transmission Line
- Project Facilities
- Terrestrial Local Study Area

Bald Eagle	Canada Warbler	Common Nighthawk	Snapping Turtle
No Data	No Data	No Data	ES-E/W18
ES-A	ES-D	W18	W18
W1	ES-E	ES-H	
	ES-F	W18	
	ES-G		
	W12		

REFERENCE

Base Data - Provided by OSISKO Hammond Reef Gold Project Ltd.
Base Data - MNR NRVIS, obtained 2004
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Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 15N

1,000 0 1,000 2,000 3,000 4,000
SCALE 1:100,000 METRES

PROJECT
HAMMOND REEF GOLD PROJECT
ATIKOKAN, ONTARIO, CANADA

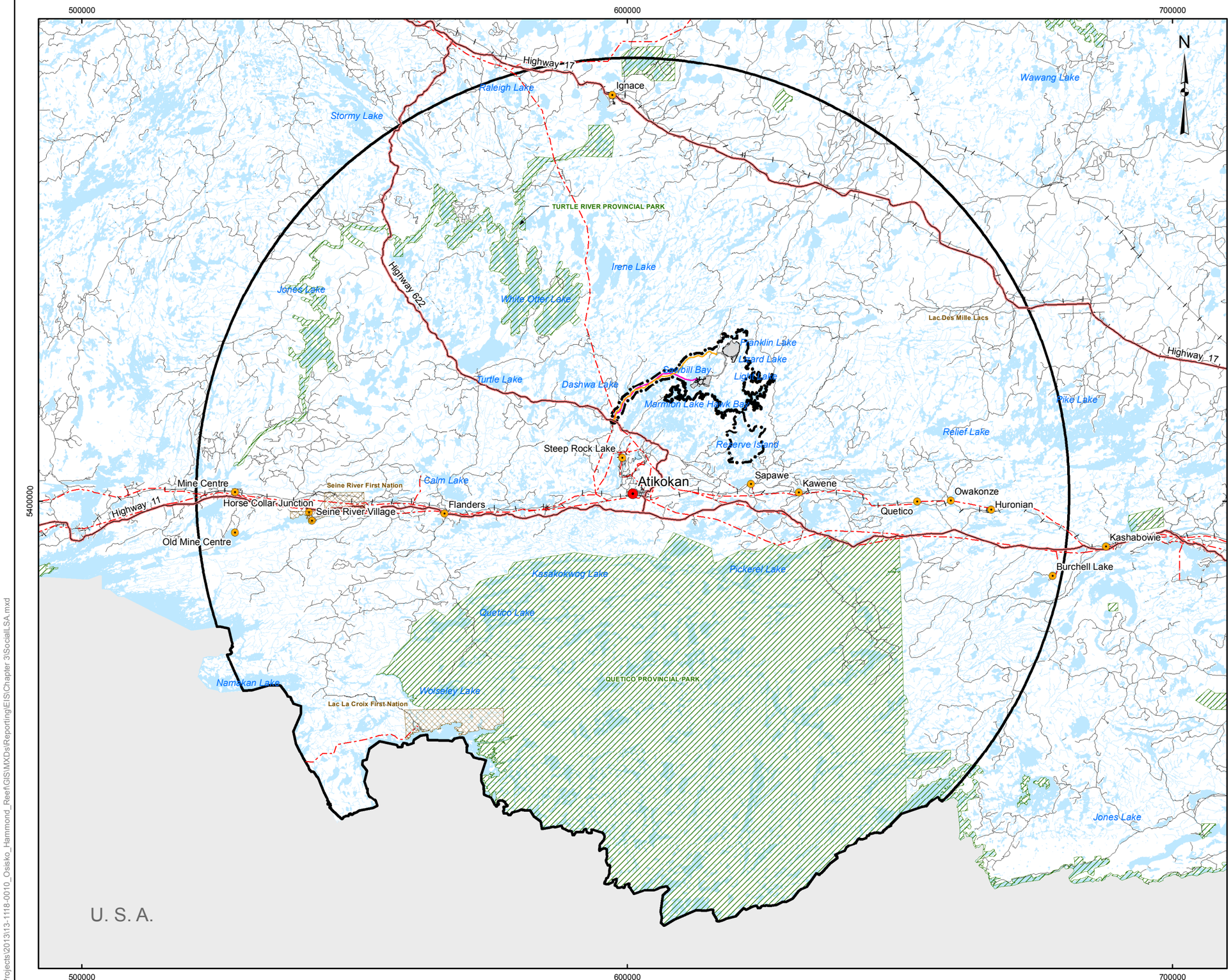
TITLE
SPECIES AT RISK OBSERVATIONS

Golder Associates
Mississauga, Ontario

PROJECT NO. 13-1118-0010			SCALE AS SHOWN	VERSION 2
DESIGN	CGE	14 Nov. 2008		
GIS	JO	2 Dec. 2013		
CHECK	SP	2 Dec. 2013		
REVIEW	SP	2 Dec. 2013		

FIGURE: 3-42

G:\Projects\2013\13-1118-0010_Osisko_Hammond_Reef\GIS\MXDs\Reporting\EIS\Chapter 3\SAR_Locations.mxd



LEGEND

- Local Study Area City/Town
- Small Community
- Provincial Highway
- Road
- Existing Railway
- River/Stream
- Lake
- Provincial Park
- First Nations Reserve
- Mine Site Road
- Access Road (Sawbill / Hardtack)
- Project Transmission Line
- Project Facilities
- Land Use and Resources Local Study Area
- Socio-Economic Local Study Area

REFERENCE

Base Data - Provided by OSISKO Hammond Reef Gold Project Ltd
Base Data - MNR NRVIS, obtained 2004
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Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 15N

10 5 0 10 20 30 40
SCALE 1:700,000 KILOMETRES

PROJECT
HAMMOND REEF GOLD PROJECT
ATIKOKAN, ONTARIO, CANADA

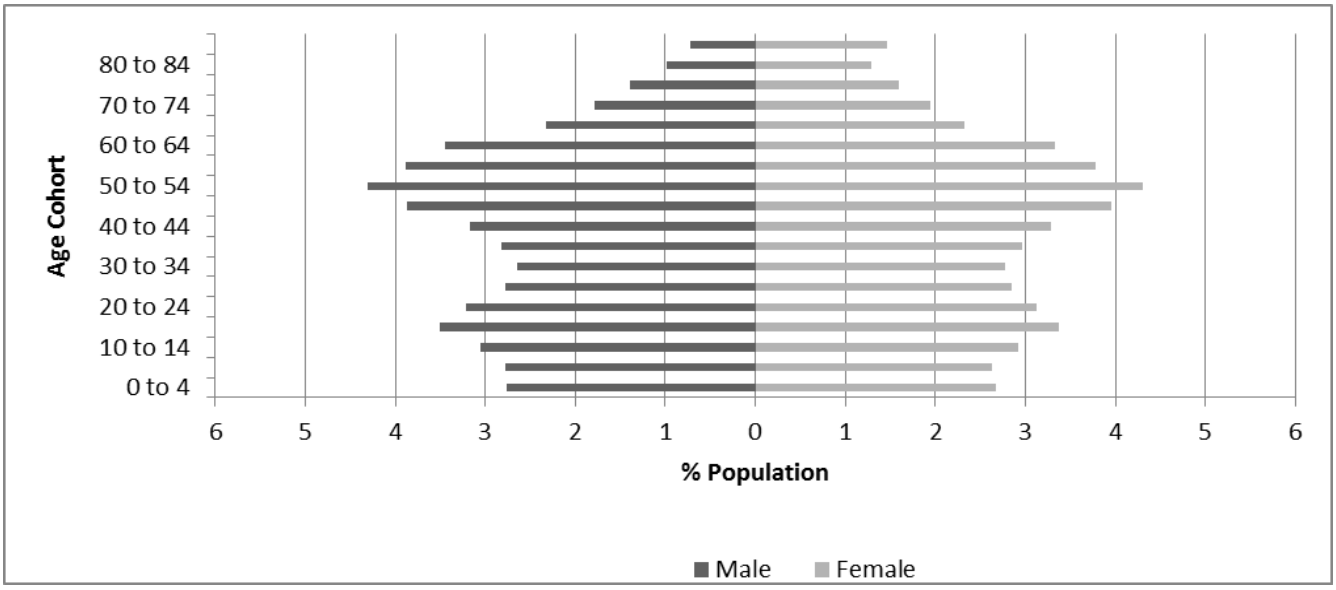
TITLE
SOCIO-ECONOMIC LOCAL STUDY AREA

Golder Associates
Mississauga, Ontario

PROJECT NO. 13-1118-0010			SCALE AS SHOWN	VERSION 2
DESIGN	CGE	14 Nov. 2008		
GIS	JO	2 Dec. 2013		
CHECK	SP	2 Dec. 2013		
REVIEW	SP	2 Dec. 2013		

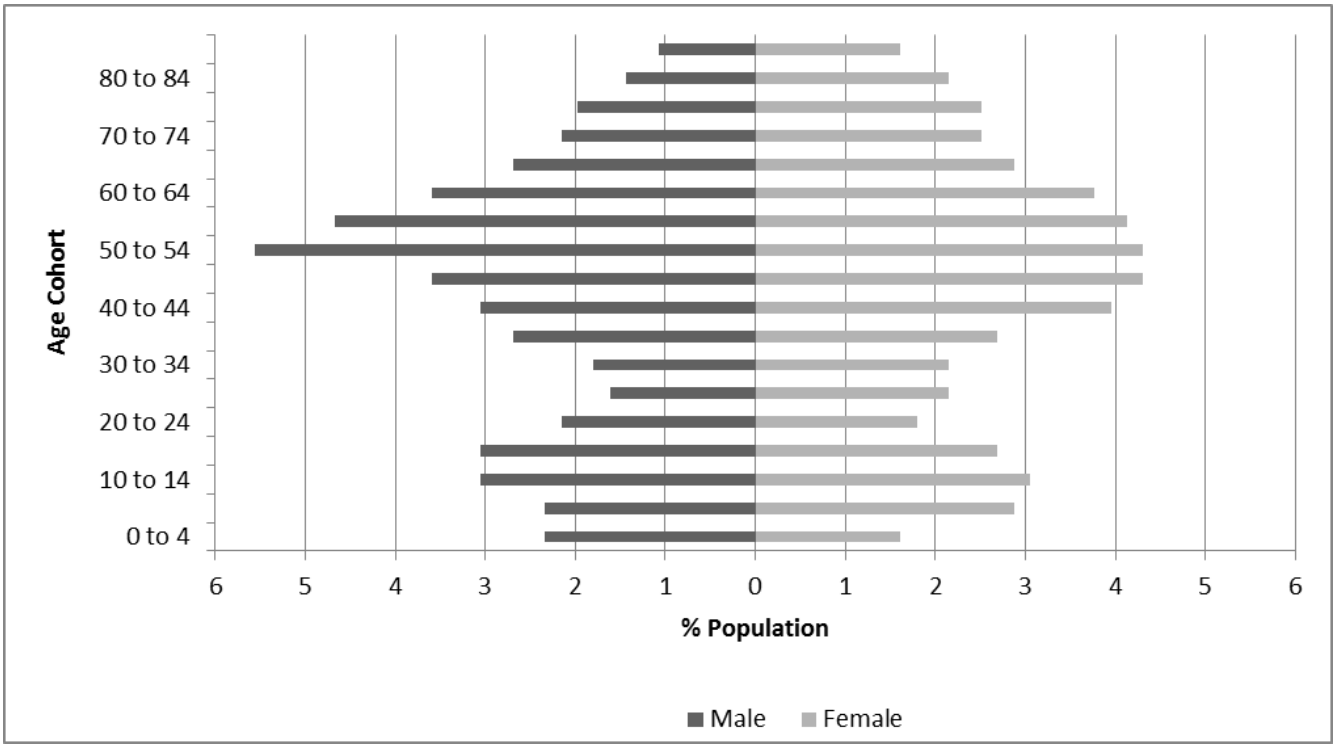
FIGURE: 3-43

G:\Projects\2013\13-1118-0010_Osisko_Hammond_Reef\GIS\MXDs\Reporting\EIS\Chapter 3\SocialLSA.mxd



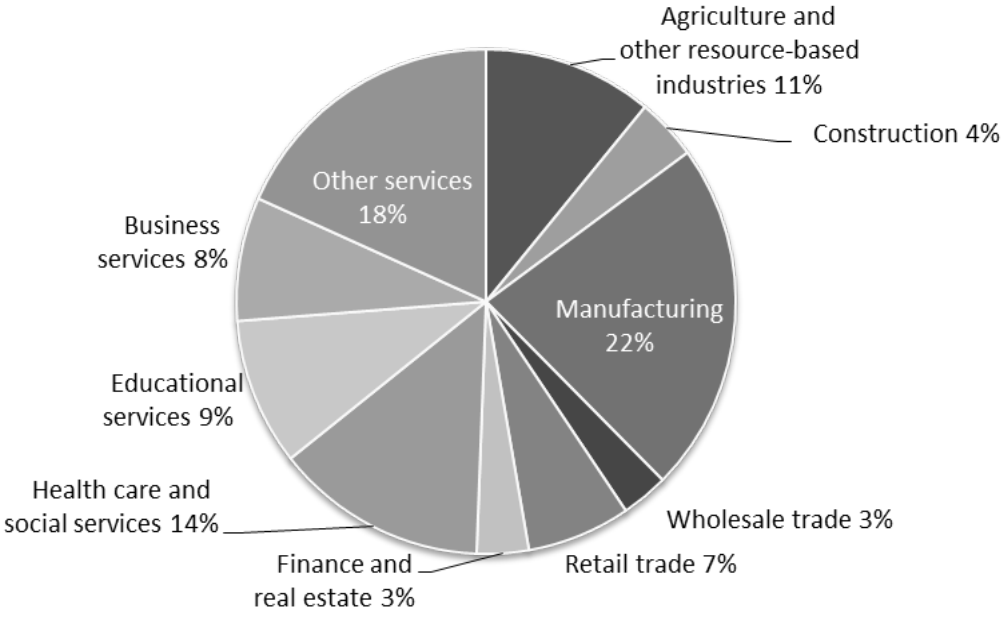
Source: StatsCan 2012.

Figure 3-44: Age Profile for the Regional Study Area (2011)



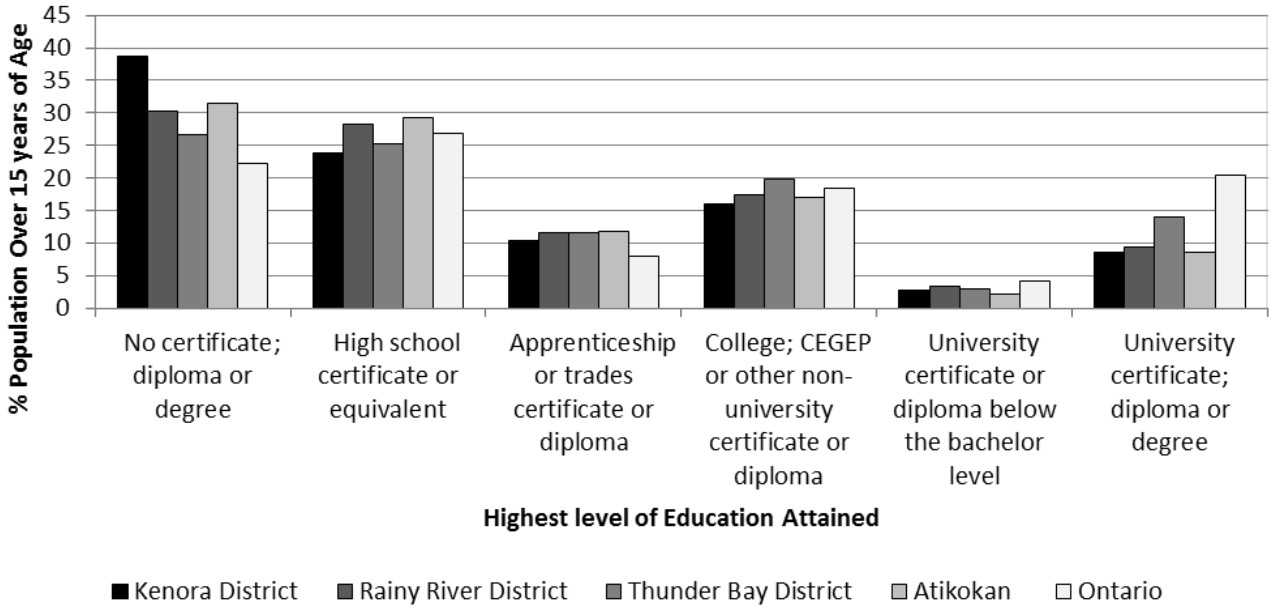
Source: StatsCan 2012.

Figure 3-45: Age Profile for Atikokan (2011)



Source: StatsCan 2007.

Figure 3-46: Labour Force Distribution by Industry in the Local Study Area (2006)



Source: StatsCan 2007.

Figure 3-47: Educational Attainment in the Socio-economic Environment RSA for Population over 15 Years of Age (2006)

550000 600000 650000

5450000 5400000 5350000

KENORA, UNORGANIZED

THUNDER BAY, UNORGANIZED

UON LAKE 25D

Highway 622

Highway 17

Highway 11

Highway 11b

Jones Lake

Irene Lake

White Otter Lake

Franklin Lake

Lizard Lake

Sawbill Bay

Light Lake

Turtle Lake

Dashwa Lake

Marmion Lake

Hawk Bay

Relief Lake

Reserve Island

Steep Rock Lake

Calm Lake

Mine Centre

Horse Collar Junction

Old Mine Centre

Seine River Village

Flanders

Atikokan

Sapawe

Kawene

Quetico

Owakonze

Huronian

Kasakokwog Lake

Pickerel Lake

Quetico Lake

Tubman Lake

ley Lake

N

0 500 1,000 1,500 2,000
METERS

LEGEND

- Local Study Area City/Town
- Small Community
- Provincial Highway
- Existing Railway
- Power Transmission Line
- River/Stream
- Lake
- Daycare/Pre-School
- Library
- Recreation Facility
- Public Swimming Pool
- Hotel/Lodge
- Waste Disposal Site
- Ambulance
- Fire Station
- Hospital
- Police
- School
- Mine Site Road
- Access Road (Hardtack / Sawbill)
- Project Transmission Line
- Project Facilities
- Local Study Area

REFERENCE

Base Data - Provided by OSISKO Hammond Reef Gold Project Ltd
Base Data - MNR NRVIS, obtained 2004
Produced by Golder Associates Ltd under licence from
Ontario Ministry of Natural Resources, © Queens Printer 2008
Waste Disposal Site - Town of Atikokan Official Plan Review Appendix 7.
Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 15N

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SCALE 1:500,000 KILOMETRES

PROJECT
HAMMOND REEF GOLD PROJECT
ATIKOKAN, ONTARIO, CANADA

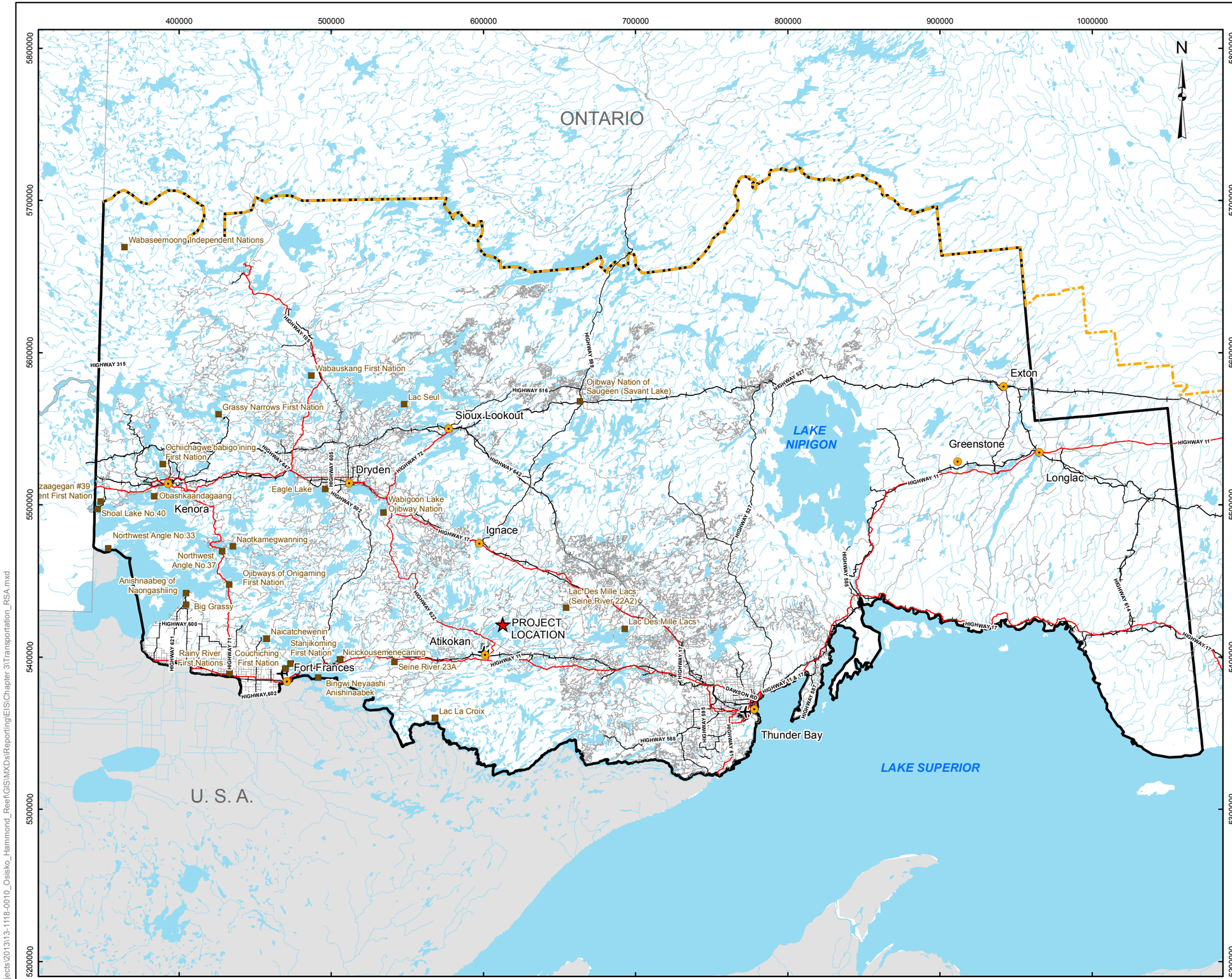
TITLE
SERVICES AND INFRASTRUCTURE IN THE LOCAL STUDY AREA

Golder Associates
Mississauga, Ontario

PROJECT NO. 13-1118-0010			SCALE AS SHOWN	VERSION 2
DESIGN	CGE	14 Nov. 2008		
GIS	JO	2 Dec. 2013		
CHECK	SP	2 Dec. 2013		
REVIEW	SP	2 Dec. 2013		

FIGURE: 3-48

G:\Projects\2013\13-1118-0010_Osisko_Hammond_Reef\GIS\MXDs\Reporting\EIS\Chapter 3\Services_Infrastructure_LSA.mxd



LEGEND

- Project Location
- City/Town
- Airport/Airstrip
- First Nation Community
- Provincial Highway
- Regional Road
- Road
- Existing Railway
- Far North Border
- River/Stream
- Lake
- Regional Study Area

REFERENCE

Base Data - Provided by OSISKO Hammond Reef Gold Project Ltd.
Base Data - MNR NRVIS, obtained 2004
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25 0 25 50 75 100 125
SCALE 1:2,500,000 KILOMETERS

PROJECT
HAMMOND REEF GOLD PROJECT
ATIKOKAN, ONTARIO, CANADA

TITLE
TRANSPORTATION IN THE SOCIO-ECONOMIC ENVIRONMENT REGIONAL STUDY AREA

Golder Associates
Mississauga, Ontario

PROJECT NO. 13-1118-0010			SCALE AS SHOWN	VERSION 2
DESIGN	CGE	14 Nov. 2008	FIGURE: 3-49	
GIS	JO	2 Dec. 2013		
CHECK	SP	2 Dec. 2013		
REVIEW	SP	2 Dec. 2013		

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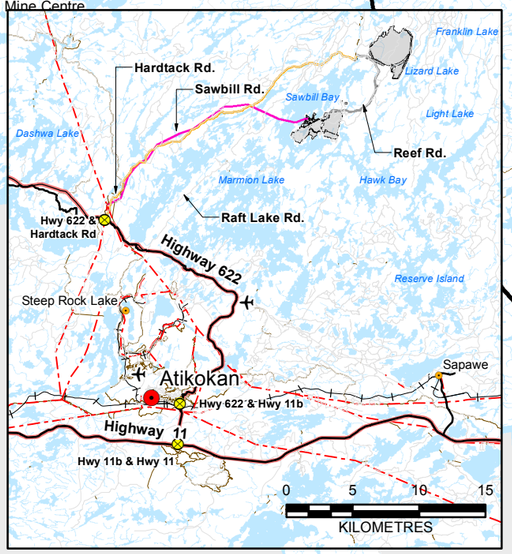
550000 600000 650000

5450000 5400000 5350000

N

Jones Lake
White Otter Lake
Irene Lake
Franklin Lake
Lizard Lake
Sawbill Bay
Light Lake
Turtle Lake
Dashwa Lake
Highway 622
Marmion Lake
Hawk Bay
Hwy 622 & Hardtack Rd
Highway 622
Steep Rock Lake
Reserve Island
Relief Lake
Highway 17
Calm Lake
Atikokan
Hwy 622 & Hwy 11b
Sapawe
Kawene
Owakonze
Huronian
Quetico
Mine Centre
Horse Collar Junction
Seine River Village
Flanders
Hwy 11b & Hwy 11
Highway 11
Highway 11b
Old Mine Centre
Kasakokwog Lake
Pickerel Lake
Quetico Lake
Tubman Lake
Wolseley Lake



LEGEND

- Local Study Area City/Town
- Small Community
- Airport/Airstrip
- Provincial Highway
- Regional Road
- Road
- Trail
- Existing Railway
- Power Transmission Line
- River/Stream
- Lake
- Traffic Study Location
- Mine Site Road
- Access Road (Hardtack / Sawbill)
- Project Transmission Line
- Project Facilities
- Local Study Area

REFERENCE

Base Data - Provided by OSISKO Hammond Reef Gold Project Ltd
Base Data - MNR NRVIS, obtained 2004
Produced by Golder Associates Ltd under licence from
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Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 15N

5 2.5 0 5 10 15 20 25 30
SCALE 1:500,000 KILOMETRES

PROJECT
HAMMOND REEF GOLD PROJECT
ATIKOKAN, ONTARIO, CANADA

TITLE
TRANSPORTATION IN THE SOCIO-ECONOMIC ENVIRONMENT LOCAL STUDY AREA

Golder Associates
Mississauga, Ontario

PROJECT NO. 13-1118-0010			SCALE AS SHOWN	VERSION 2
DESIGN	CGE	14 Nov. 2008		
GIS	JO	2 Dec. 2013		
CHECK	SP	2 Dec. 2013		
REVIEW	SP	2 Dec. 2013		

FIGURE: 3-50

G:\Projects\2013\13-1118-0010_Osisko_Hammond_Reef\GIS\MXDs\Reporting\EIS\Chapter 3\Transportation_LSA.mxd

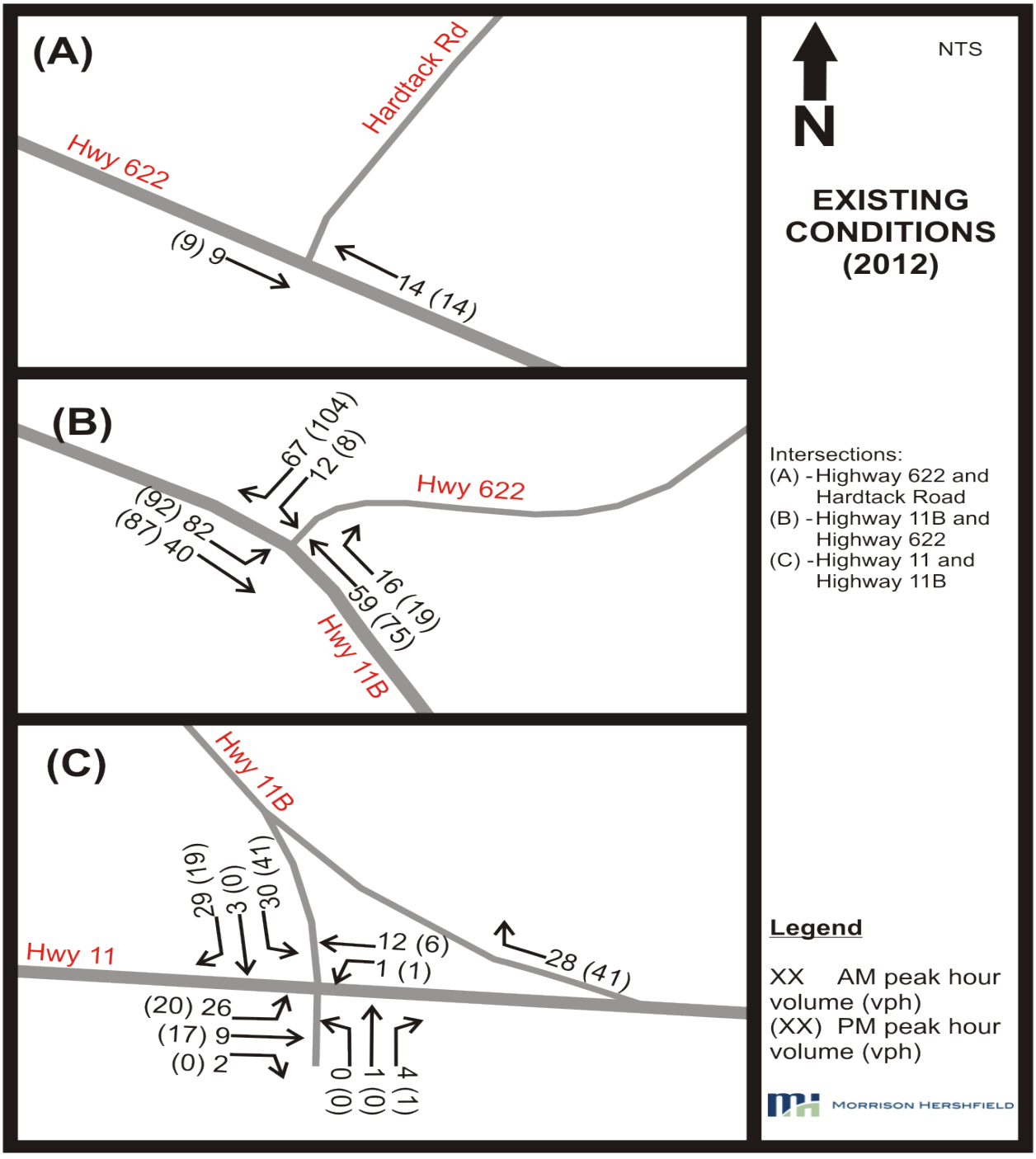
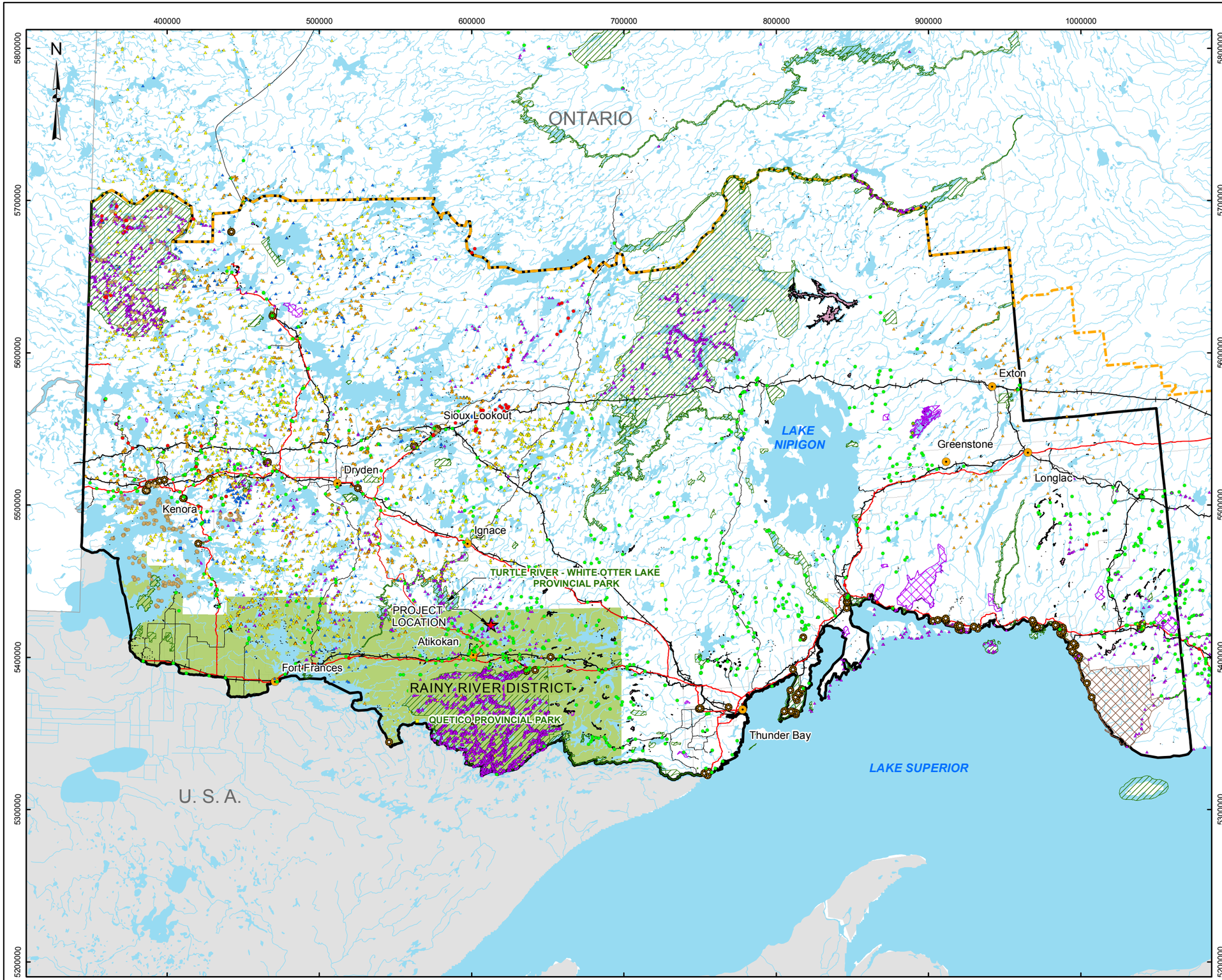


Figure 3-51: Existing Traffic Conditions



LEGEND

- Project Location
- City/Town
- Provincial Highway
- Road
- Existing Railway
- Far North Border
- River/Stream
- Lake
- Rainy River District

Recreation Locations

- Access Point
- Beach
- Boat Cache, Commercial
- Boat Cache, Private
- Boat Cache, Resource Harvest
- Boathouse
- Clubhouse
- Designated Camping Site
- Picnic Site
- Trailhead Location
- Trail
- Potential Tourism Area
- Cottage Recreation Site/Area
- Recreation Camp
- Tourism Established Area
- Provinvial Park
- National Park
- Conservation Area
- Regional Study Area

REFERENCE

Base Data - Provided by OSISKO Hammond Reef Gold Project Ltd.
Base Data - MNR NRVIS, obtained 2004
Produced by Golder Associates Ltd under licence from
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Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 15N

25 12.5 0 25 50 75 100 125
SCALE 1:2,500,000 KILOMETRES

PROJECT
HAMMOND REEF GOLD PROJECT
ATIKOKAN, ONTARIO, CANADA

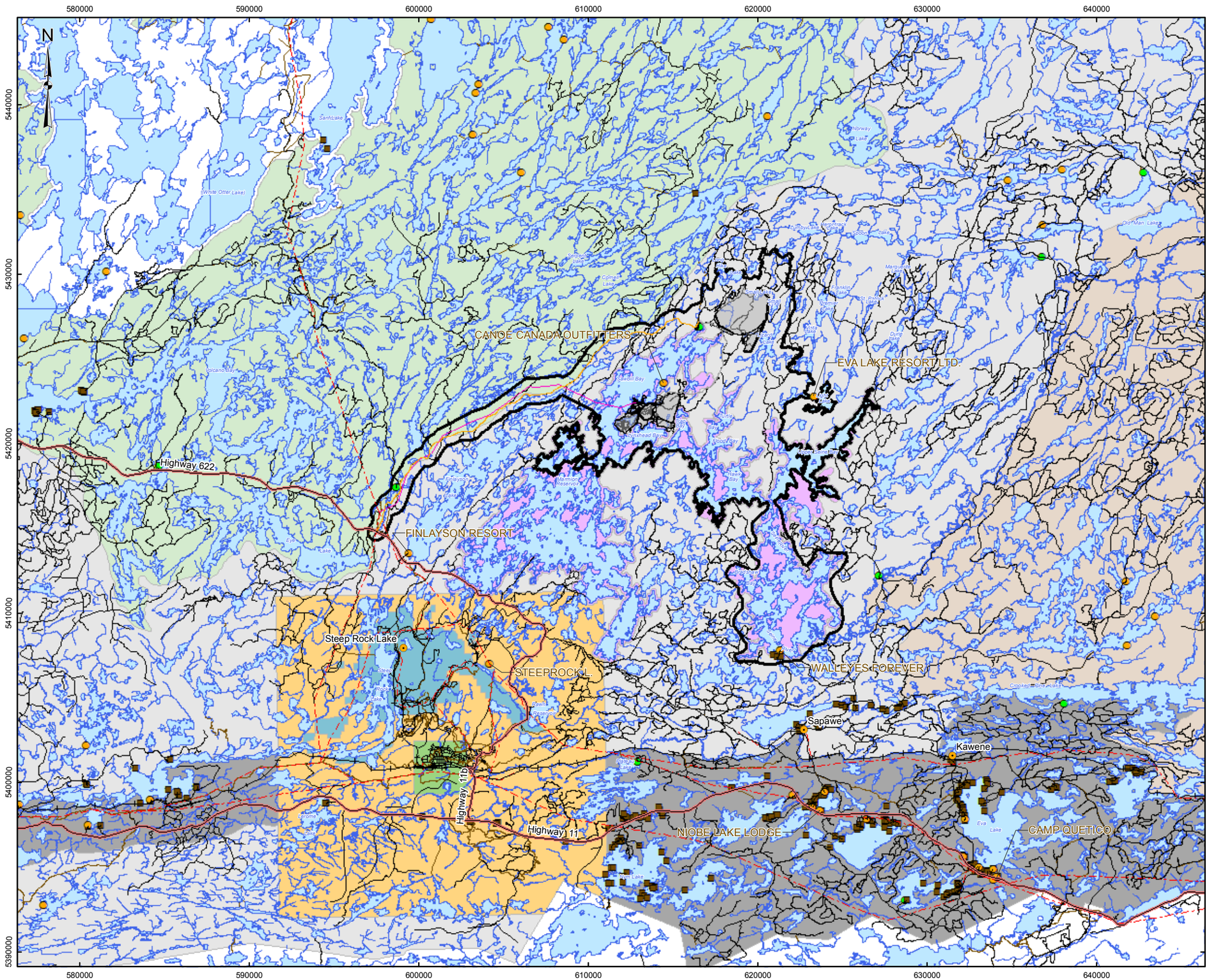
TITLE
TOURISM AND RECREATION IN THE SOCIO-ECONOMIC ENVIRONMENT REGIONAL STUDY AREA

Golder Associates
Mississauga, Ontario

PROJECT NO. 13-1118-0010			SCALE AS SHOWN	VERSION 2
DESIGN	CGE	14 Nov. 2008		
GIS	JO	2 Dec. 2013		
CHECK	SP	2 Dec. 2013		
REVIEW	SP	2 Dec. 2013		

FIGURE: 3-52

G:\Projects\2013\13-1118-0010_Osisko_Hammond_Reef\GIS\MXDs\Reporting\EIS\Chapter 3\TourismRecreation_RSA.mxd



LEGEND

- Small Community
- Provincial Highway
- Road
- Existing Railway
- Power Transmission Line
- River/Stream
- Lake
- Cottage
- Tourism Establishment
- Access Point
- Trail
- Mine Site Road
- Access Road (Hardtack / Sawbill)
- Project Transmission Line
- Project Facilities
- Local Study Area

General Resource Area

- Finlayson
- Greytrout
- Highway 11
- Marmion
- Mercutio
- Steep Rock
- Township of Atikokan
- Townsite Atikokan

REFERENCE

Base Data - Provided by OSISKO Hammond Reef Gold Project Ltd
Base Data - MNR NRVIS, obtained 2004
Produced by Golder Associates Ltd under licence from
Ontario Ministry of Natural Resources, © Queens Printer 2008
Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 15N

4 2 0 4 8 12
SCALE 1:225,000 KILOMETRES

PROJECT
HAMMOND REEF GOLD PROJECT
ATIKOKAN, ONTARIO, CANADA

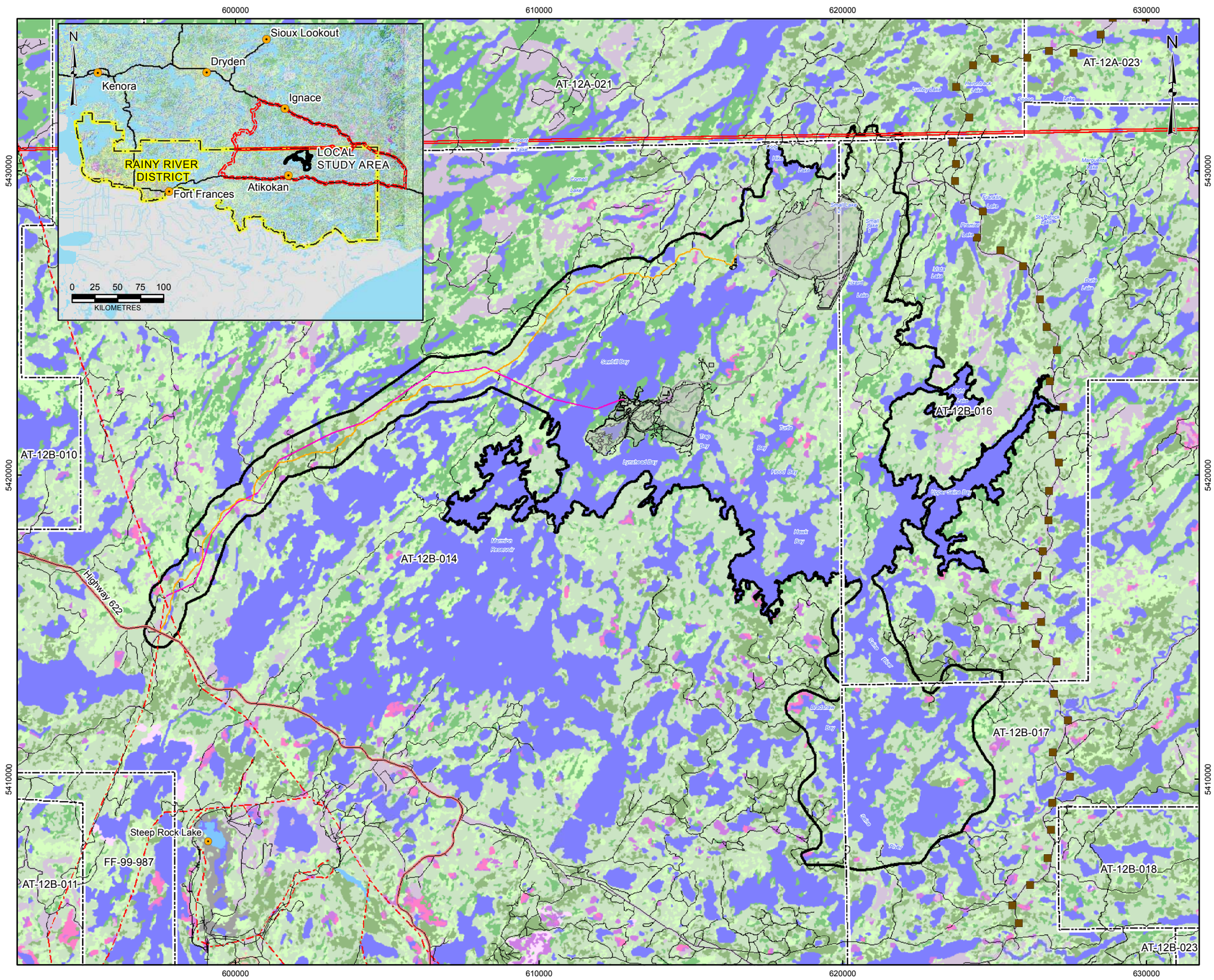
TITLE
TOURISM AND RECREATION IN THE SOCIO-ECONOMIC ENVIRONMENT LOCAL STUDY AREA

Golder Associates
Mississauga, Ontario

PROJECT NO. 13-1118-0010			SCALE AS SHOWN	VERSION 2
DESIGN	CGE	14 Nov. 2008		
GIS	JO	2 Dec. 2013		
CHECK	SP	2 Dec. 2013		
REVIEW	SP	2 Dec. 2013		

FIGURE: 3-53

G:\Projects\2013\13-1118-0010_Osisko_Hammond_Reef\GIS\MXDs\Reporting\EIS\Chapter 3\TourismRecreation_LRU_LSA.mxd



LEGEND

- Small Community
- Provincial Highway
- Road
- Existing Railway
- Power Transmission Line
- Bear Population Index Line
- Wildlife Management Unit
- Bear Management Area
- Mine Site Road
- Access Road (Hardtack / Sawbill)
- Project Transmission Line
- Project Facilities
- Local Study Area

Land Cover

1. Water - deep clear
2. Water - shallow / sedimented
3. Settlement / Infrastructure
4. Sand / Gravel / Mine Tailings
5. Bedrock
6. Mudflats
7. Forest Depletion - cuts
8. Forest Depletion - burns
9. Forest - regenerating depletion
10. Forest - sparse
11. Forest - dense deciduous
12. Forest - dense mixed
13. Forest - dense coniferous
15. Marsh - intertidal
16. Marsh - supertidal
17. Marsh - inland
18. Swamp - deciduous
19. Swamp - coniferous
20. Fen - open
21. Fen - treed
22. Bog - open
23. Bog - treed
24. Tundra Heath
25. Agriculture - Pasture / abandoned fields
27. Agriculture - cropland
28. Other - unknown
29. Other - cloud / shadow

REFERENCE

Base Data - Provided by OSISKO Hammond Reef Gold Project Ltd
Base Data - MNR NRVIS, obtained 2004
Produced by Golder Associates Ltd under licence from
Ontario Ministry of Natural Resources, © Queens Printer 2008
Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 15N

2,000 1,000 0 2,000 4,000 6,000
METERS

PROJECT
HAMMOND REEF GOLD PROJECT
ATIKOKAN, ONTARIO, CANADA

TITLE
HUNTING IN THE SOCIO-ECONOMIC ENVIRONMENT LOCAL STUDY AREA

Golder Associates
Mississauga, Ontario

PROJECT NO. 13-1118-0010			SCALE AS SHOWN	VERSION 2
DESIGN	CGE	14 Nov. 2008		
GIS	JO	2 Dec. 2013		
CHECK	SP	2 Dec. 2013		
REVIEW	SP	2 Dec. 2013		

FIGURE: 3-54

G:\Projects\2013\13-1118-0010_Osisko_Hammond_Reef\GIS\MXD\sr\Reporting\EIS\Chapter 3\Hunting_LandResourceUseLSA.mxd

600000 610000 620000 630000

5430000 5420000 5410000

AT047 AT051 AT044 AT040 AT039 AT046 AT041 AT029 AT032 AT030 AT025

Serpent Lake, Cornell Lake, Lumby Lake, Herontrack Lake, Spoon Lake, Marguerite Lake, Franklin Lake, St. Patrick Lake, Premier Lake, Small Lake, Vista Lake, Lizard Lake, Dune Lake, Sawbill Bay, Turtle Bay, Trap Bay, Lynxhead Bay, Flood Bay, Upper Seine Bay, Hawk Bay, Marmion Reservoir, Bradshaw Bay, Seine River

Highway 622

Steep Rock Lake

N

LEGEND

- Small Community
- Provincial Highway
- Road
- Existing Railway
- Power Transmission Line
- River/Stream
- Lake
- Trapper Cabin
- Former Trapper Cabin
- Trapline Area
- Mine Site Road
- Access Road (Hardtack / Sawbill)
- Project Transmission Line
- Project Facilities
- Local Study Area

REFERENCE

Base Data - Provided by OSISKO Hammond Reef Gold Project Ltd
Base Data - MNR NRVIS, obtained 2004
Produced by Golder Associates Ltd under licence from
Ontario Ministry of Natural Resources, © Queens Printer 2008
Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 15N

2 1 0 2 4 6 8
SCALE 1:125,000 KILOMETRES

PROJECT
HAMMOND REEF GOLD PROJECT
ATIKOKAN, ONTARIO, CANADA

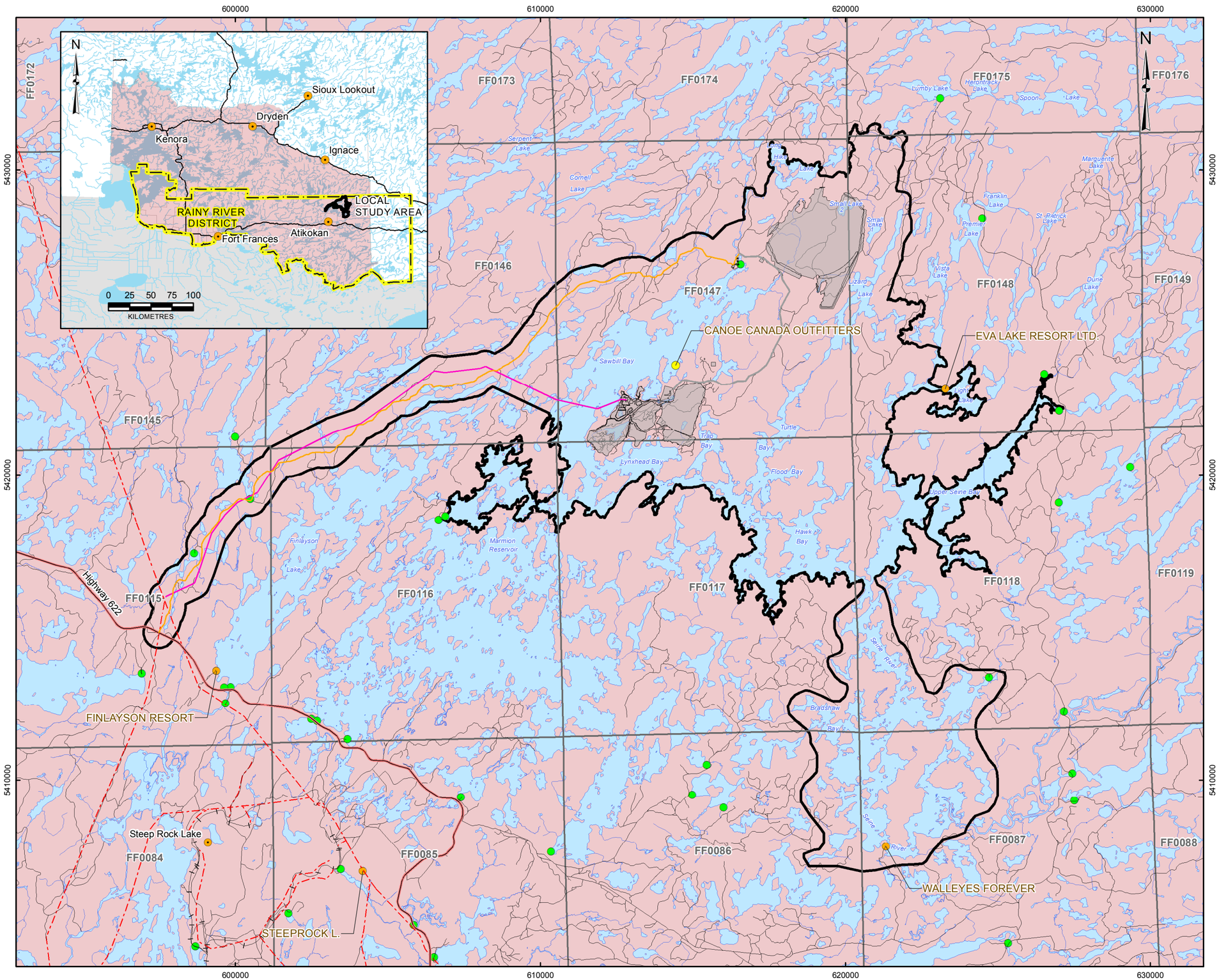
TITLE
TRAPPING IN THE SOCIO-ECONOMIC ENVIRONMENT LOCAL STUDY AREA

Golder Associates
Mississauga, Ontario

PROJECT NO. 13-1118-0010			SCALE AS SHOWN	VERSION 2
DESIGN	CGE	14 Nov. 2008		
GIS	JO	2 Dec. 2013		
CHECK	SP	2 Dec. 2013		
REVIEW	SP	2 Dec. 2013		

FIGURE: 3-55

G:\Projects\2013\13-1118-0010_Osisko_Hammond_Reef\GIS\MXDs\Reporting\EIS\Chapter 3\Trapping_LandResourceUseLSA.mxd



LEGEND

- Small Community
- Provincial Highway
- Road
- Existing Railway
- Power Transmission Line
- River/Stream
- Lake
- Tourism Establishment
- Former Tourism Establishment
- Access Point
- Bait Harvest Area
- Fisheries Management Unit No.5
- Mine Site Road
- Access Road (Hardtack / Sawbill)
- Project Transmission Line
- Project Facilities
- Local Study Area

REFERENCE

Base Data - Provided by OSISKO Hammond Reef Gold Project Ltd
Base Data - MNR NRVIS, obtained 2004
Produced by Golder Associates Ltd under licence from
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Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 15N

2 1 0 2 4 6 8
SCALE 1:125,000 KILOMETRES

PROJECT
HAMMOND REEF GOLD PROJECT
ATIKOKAN, ONTARIO, CANADA

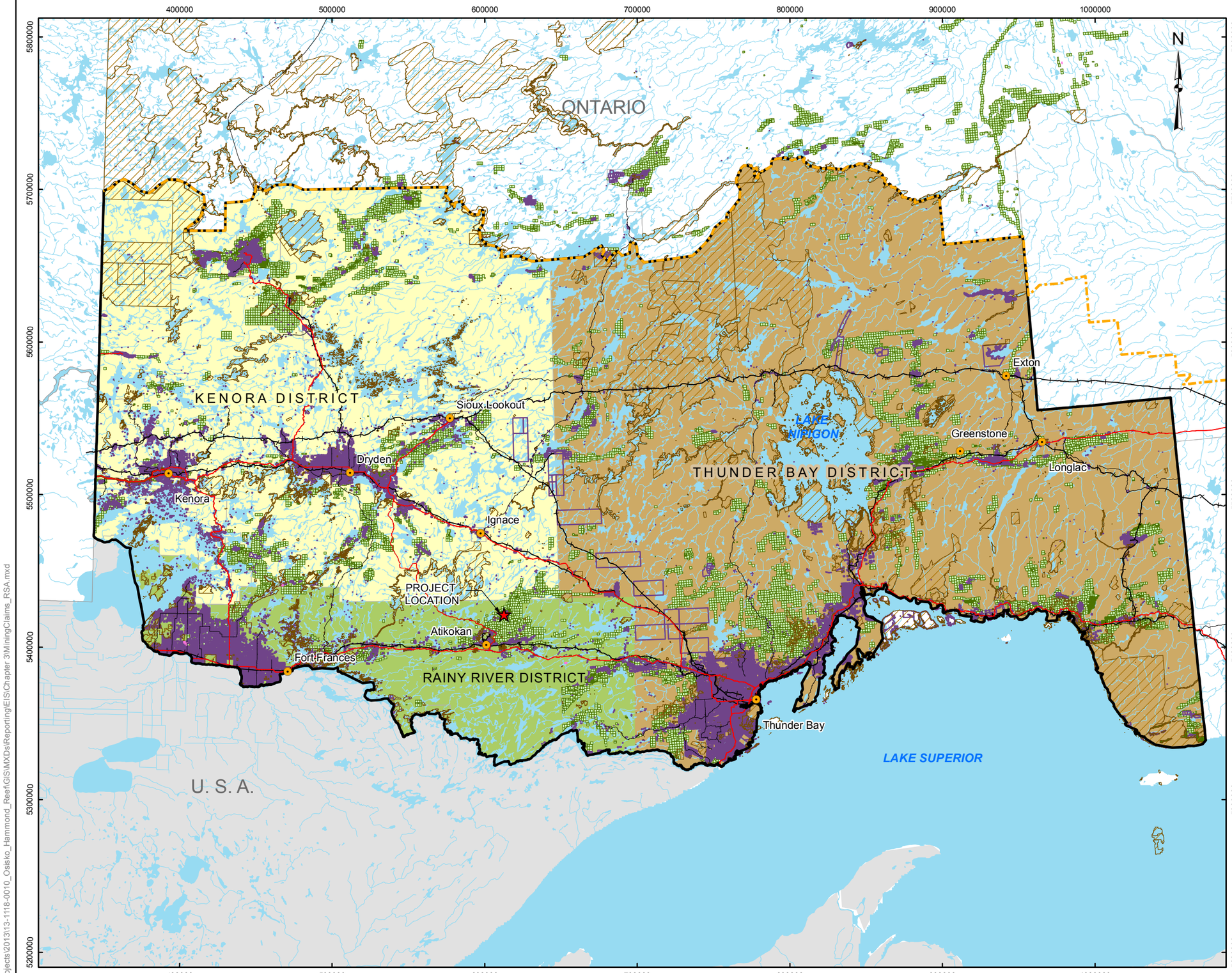
TITLE
FISHERIES INFORMATION IN THE SOCIO-ECONOMIC ENVIRONMENT LOCAL STUDY AREA

Golder Associates
Mississauga, Ontario

PROJECT NO. 13-1118-0010			SCALE AS SHOWN	VERSION 2
DESIGN	CGE	14 Nov. 2008		
GIS	JO	2 Dec. 2013		
CHECK	SP	2 Dec. 2013		
REVIEW	SP	2 Dec. 2013		

FIGURE: 3-56

G:\Projects\2013\13-1118-0010_Osisko_Hammond_Reef\GIS\MXD\sIReporting\EIS\Chapter 3\Fisheries_LandResourceUseLSA.mxd



LEGEND

- Project Location
- City/Town
- Provincial Highway
- Road
- Existing Railway
- Far North Border
- River/Stream
- Lake
- Region of Kenora
- Region of Rainy River
- Region of Thunder Bay

Mining Claims

- Pending Claims
- Active Mining Claims
- Active Dispositions
- Active Withdraws
- Regional Study Area

REFERENCE

Base Data - Provided by OSISKO Hammond Reef Gold Project Ltd.
Base Data - MNR NRVIS, obtained 2004
Produced by Golder Associates Ltd under licence from
Ontario Ministry of Natural Resources, © Queens Printer 2008
Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 15N

50 25 0 50 100 150
SCALE 1:2,500,000 KILOMETRES

PROJECT
HAMMOND REEF GOLD PROJECT
ATIKOKAN, ONTARIO, CANADA

TITLE
MINING CLAIMS IN THE SOCIO-ECONOMIC ENVIRONMENT REGIONAL STUDY AREA

Golder Associates
Mississauga, Ontario

PROJECT NO. 13-1118-0010			SCALE AS SHOWN	VERSION 2
DESIGN	CGE	14 Nov. 2008		
GIS	JO	2 Dec. 2013		
CHECK	SP	2 Dec. 2013		
REVIEW	SP	2 Dec. 2013		

FIGURE: 3-57

G:\Projects\2013\13-1118-0010_Osisko_Hammond_Reef\GIS\MXD\sReporting\EIS\Chapter 3\MiningClaims_RSA.mxd

600000 610000 620000 630000

5430000 5420000 5410000

N

Highway 622

Steep Rock Lake

Serpent Lake
Cornell Lake
Lumby Lake
Herrintrack Lake
Spoon Lake
Marguerite Lake
Franklin Lake
Small Lake
Premier Lake
Strathcona Lake
Lizard Lake
Dune Lake
Sawbill Bay
Turtle Bay
Lynxhead Bay
Flood Bay
Upper Seine Bay
Marmion Reservoir
Hawk Bay
Bradshaw Bay
Seine River

LEGEND

- Small Community
- Provincial Highway
- Road
- Existing Railway
- Power Transmission Line
- River/Stream
- Lake
- Mine Site Road
- Access Road (Hardtack / Sawbill)
- Project Transmission Line
- Project Facilities
- Local Study Area

Mining Claims

- Osisko Claims
- Active Mining Claims
- Active Withdrawals
- Active Dispositions
- Manley Pattents
- Osisko Dispositions
- Disposition Ownership Uncertain

REFERENCE

Base Data - Provided by OSISKO Hammond Reef Gold Project Ltd
Base Data - MNR NRVIS, obtained 2004
Produced by Golder Associates Ltd under licence from
Ontario Ministry of Natural Resources, © Queens Printer 2008
Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 15N

1 0.5 0 1 2 3 4
KILOMETRES

PROJECT
HAMMOND REEF GOLD PROJECT
ATIKOKAN, ONTARIO, CANADA

TITLE
MINING CLAIMS IN THE SOCIO-ECONOMIC ENVIRONMENT LOCAL STUDY AREA

Golder Associates
Mississauga, Ontario

PROJECT NO. 13-1118-0010			SCALE AS SHOWN	VERSION 2
DESIGN	CGE	14 Nov. 2008		
GIS	JO	2 Dec. 2013		
CHECK	KDV	2 Dec. 2013		
REVIEW	KDV	2 Dec. 2013		

FIGURE: 3-58

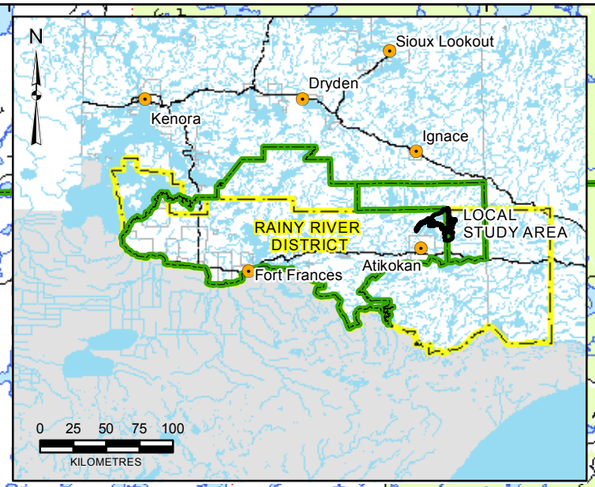
G:\Projects\2013\13-1118-0010_Osisko_Hammond_ReefGIS\MXD\sReportingEIS\Chapter 3\MiningClaims_LandResourceUseLSA.mxd

590000 600000 610000 620000

5430000

5420000

5410000



RAINY LAKE TRIBUNAL FOREST MANAGEMENT UNIT

RESOLUTE FOREST MANAGEMENT UNIT

Highway 622

Steep Rock Lake

Sawbill Bay

Lynxhead Bay

Flood Bay

Upper Seine Bay

Mammion Reservoir

Hawk Bay

Turtle Bay

Seine River

Sturgeon Bay

LEGEND

- Small Community
- Provincial Highway
- Road
- Existing Railway
- Existing Transmission Line
- River/Stream
- Lake
- Forest Management Unit
- Wooded Area
- Mine Site Road
- Access Road (Hardtack / Sawbill)
- Project Transmission Line
- Project Facilities
- Local Study Area

REFERENCE

Base Data - Provided by OSISKO Hammond Reef Gold Project Ltd
Base Data - MNR NRVIS, obtained 2004
Produced by Golder Associates Ltd under licence from
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Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 15N

2 1 0 2 4 6 8
SCALE 1:125,000 KILOMETRES

PROJECT
HAMMOND REEF GOLD PROJECT
ATIKOKAN, ONTARIO, CANADA

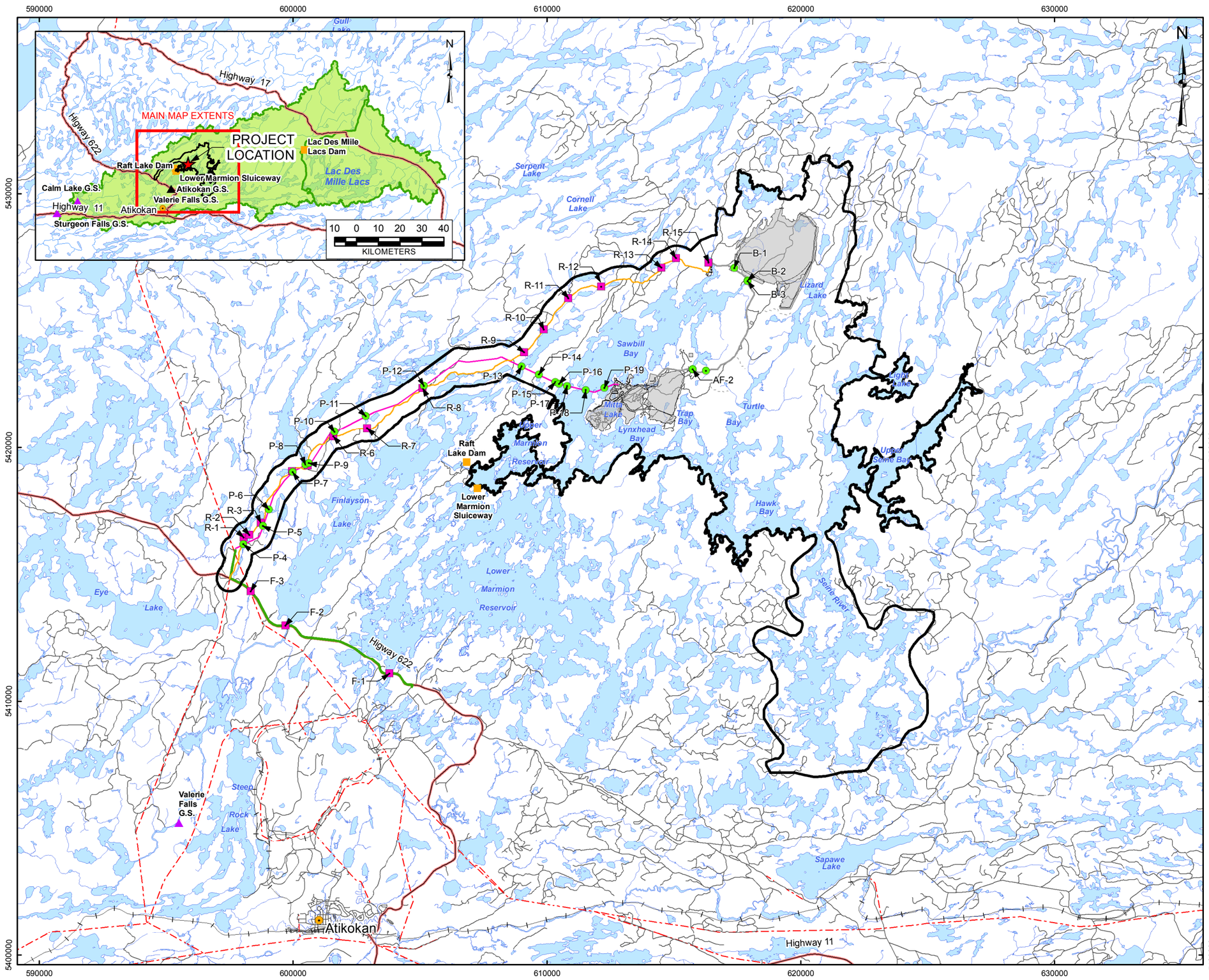
TITLE
FOREST MANAGEMENT UNITS IN THE SOCIO-ECONOMIC ENVIRONMENT LOCAL STUDY AREA

Golder Associates
Mississauga, Ontario

PROJECT NO. 13-1118-0010			SCALE AS SHOWN	VERSION 2
DESIGN	CGE	14 Nov. 2008		
GIS	JO	2 Dec. 2013		
CHECK	SP	2 Dec. 2013		
REVIEW	SP	2 Dec. 2013		

FIGURE: 3-59

G:\Projects\2013\13-1118-0010_Osisko_Hammond_Reef\GIS\MXDs\Reporting\EIS\Chapter 3\FMU_LandResourceUse\LSA_V1.mxd



LEGEND

- City/Town
- Existing Water Crossing (R1)
- New Water Crossing (B1)
- Waterpower Facility
- Water Control Dam Location
- Provincial Highway
- Road
- Trail
- Existing Railway
- Power Transmission Line
- River/Stream
- Lake
- Watershed Boundary
- Mine Site Road
- Access Road (Hardtack / Sawbill)
- Project Transmission Line
- Fibre Optics Line
- Project Facilities
- Local Study Area

REFERENCE

Base Data - Provided by OSISKO Hammond Reef Gold Project Ltd.
Base Data - MNR NRVIS, obtained 2004
Produced by Golder Associates Ltd under licence from
Ontario Ministry of Natural Resources, © Queens Printer 2008
Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 15N

2,000 0 2,000 4,000 6,000 8,000
SCALE 1:150,000 METRES

PROJECT
HAMMOND REEF GOLD PROJECT
ATIKOKAN, ONTARIO, CANADA

TITLE
NAVIGABLE WATERS IN THE SOCIO-ECONOMIC ENVIRONMENT LOCAL STUDY AREA

Golder Associates
Mississauga, Ontario

PROJECT NO. 13-1118-0010			SCALE AS SHOWN	VERSION 2
DESIGN	CGE	14 Nov. 2008		
GIS	JO	2 Dec. 2013		
CHECK	SP	2 Dec. 2013		
REVIEW	SP	2 Dec. 2013		

FIGURE: 3-60

G:\Projects\2013\13-1118-0010_Osisko_Hammond_Reef\GIS\MXDs\Reporting\EIS\Chapter 3\Navigable_Waters_LSA.mxd

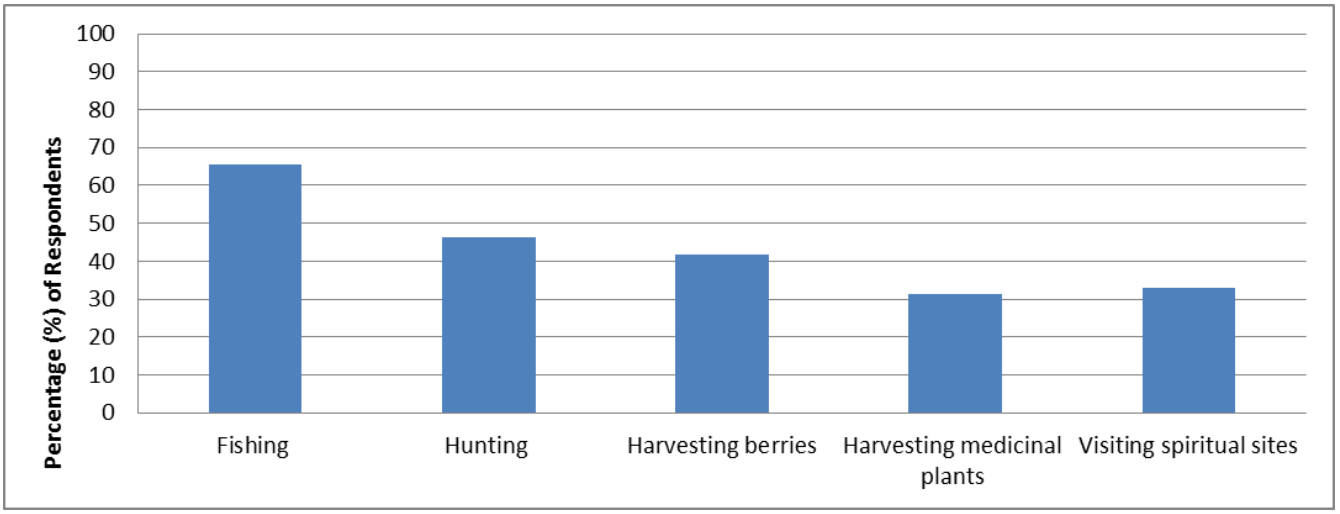


Figure 3-61: Which of these Land Use Activities Do you Practice?