APPENDIX 5.1-3.

DETAILED HABITAT ASSESSMENTS AND SUMMARY OF RESULTS FOR ACCESS ROAD STREAM CROSSINGS.

Page

Table A5.1-3.1. Summary of results from Access Road stream crossing surveys and assessments.

Site	CANARAIL Site Names (if different)	Surveyed	Survey Year	Survey Date	UTM Coordinates			Habitat Rating	ARCH seen[1]	NNST seen[1]	Comments
					Zone	Easting	Northing				
AR-001a	not identified	No	-	-	-	596941	7803828	Important	Yes	Yes	No survey - used CV-142-2
AR-002a	AR-CV-142-1	No	-	-	-	597232	7804417	None	No	No	No survey - used CV-142-1
AR-003a	AR-BR-3004-1	Yes	2008	6-Sep	17W	597545	7804999	Important	Yes	No	Moved, but close enough to old site, used 2008 survey data
AR-004	AR-CV-140-1	Yes	2010	26-Aug	17W	598047	7805662	None	No	No	-
AR-005a	AR-CV-138-1	No	-	-	-	598795	7806915	None	No	No	No survey - used CV-138-1
AR-006	not identified	Yes	2010	26-Aug	17W	598616	7807498	None	No	No	-
AR-007	AR-BR-3001-1	No	-	-	-	598708	7808054	Important	Yes	No	No survey - used BR-137-1
AR-008	AR-CV-136-2	Yes	2010	26-Aug	17W	598461	7809104	Marginal	No	No	-
AR-009a	AR-CV-2047-1	Yes	2010	26-Aug	17W	598690	7810889	None	No	No	-
AR-010a	not identified	Yes	2010	26-Aug	17W	599526	7811586	None	No	No	-
AR-011a	AR-CV-2044-2	Yes	2010	26-Aug	17W	600316	7812164	None	No	No	-
AR-011b	AR-CV-2044-1	Yes	2010	26-Aug	17W	600706	7812749	Marginal	No	Yes	-
AR-012a	AR-CV-2041-1	Yes	2008	7-Sep	17W	598611	7814760	Important	Yes	Yes	Moved, but close enough to old site, used 2008 survey data
AR-013a	AR-CV-2040-1	Yes	2008	6-Sep	17W	598453	7815159	Marginal	No	No	Moved, but close enough to old site, used 2008 survey data
AR-014a	AR-CV-2039-1	Yes	2010	26-Aug	17W	597938	7816029	None	No	No	-
AR-014b	AR-CV-2038-1	Yes	2010	26-Aug	17W	598116	7817121	Marginal	No	No	-
AR-015a	AR-CV-2037-1	No	-	-	17W	598413	7817564	None	No	No	No survey - used CV-125-3
AR-016	not identified	Yes	2010	26-Aug	17W	598198	7818092	None	No	No	-
AR-017a	not identified	Yes	2010	26-Aug	17W	598208	7818277	None	No	No	-
AR-018a	AR-BR-2036-1	Yes	2010	26-Aug	17W	598072	7818689	Important	No	No	-
AR-021	AR-BR-2035-1	no	-	-	17W	598439	7819958	Marginal	Yes	No	No survey - used CV-123-3
AR-021a	SAR-CV-2035-1	Yes	2010	26-Aug	17W	598439	7819958	None	No	No	-
AR-022	AR-CV-2034-1	Yes	2010	26-Aug	17W	598788	7820368	None	No	No	-
AR-023	not identified	Yes	2010	26-Aug	17W	599162	7820588	None	No	No	-
AR-024	AR-CV-2032-2	Yes	2010	26-Aug	17W	599218	7821715	None	No	No	-
AR-025	AR-CV-2029-2	Yes	2010	26-Aug	17W	599733	7824412	None	No	No	-
AR-026	AR-CV-2027-1	Yes	2010	26-Aug	17W	600253	7826609	None	No	No	-
AR-027	AR-CV-2026-1	Yes	2010	26-Aug	17W	600506	7827212	None	No	No	-
AR-028	AR-BR-2023-1	Yes	2010	26-Aug	17W	601695	7829211	None	No	No	-
AR-029	AR-CV-2023-3	Yes	2010	27-Aug	17W	601585	7829579	None	No	No	-
AR-030	AR-CV-2023-2	Yes	2010	27-Aug	17W	601566	7829618	None	No	No	-
AR-030a	SAR-CV-2022-1	Yes	2010	27-Aug	17W	601932	7830020	None	No	No	-
AR-031	not identified	Yes	2010	27-Aug	17W	601777	7830247	None	No	No	-
AR-032	AR-CV-2022-1	Yes	2010	27-Aug	17W	602453	7830448	None	No	No	-

Table A5.1-3.1. Continued.

Site	CANARAIL Site Names (if different)	Surveyed	Survey Year	Survey Date	UTM Coordinates			Habitat Rating	ARCH seen[1]	NNST seen[1]	Comments
					Zone	Easting	Northing				
AR-037	CV-105-1	No	-	-	17W	603377	7833529	None	No	No	No survey - used CV-105-1
AR-037a	BR-105-1	No	-	-	17W	604168	7833822	None	No	No	No survey - used BR-105-1
AR-037b	SAR-CV-2021-02-1	Yes	2010	27-Aug	17W	604922	7832569	None	No	No	-
AR-038	AR-CV-2018-1	Yes	2010	27-Aug	17W	605987	7830021	None	No	No	-
AR-039	AR-CV-2017-1	Yes	2010	27-Aug	17W	606257	7830507	None	No	No	-
AR-040	AR-CV-2016-3	Yes	2010	27-Aug	17W	606900	7831117	None	No	No	-
AR-041	AR-CV-2016-2	Yes	2010	27-Aug	17W	607103	7831165	None	No	No	-
AR-042	AR-CV-2016-1	Yes	2010	27-Aug	17W	607142	7831203	None	No	No	-
AR-043	not identified	Yes	2010	27-Aug	17W	607564	7831818	None	No	No	-
AR-044	AR-CV-2012-2	Yes	2010	27-Aug	17W	609027	7833055	None	No	No	-
AR-045	AR-BR-2009-1	Yes	2010	27-Aug	17W	610345	7835263	None	No	No	-
AR-046	AR-BR-2006-1	Yes	2010	27-Aug	17W	611907	7837816	None	No	No	-
AR-046a	SAR-CV-2006-1	Yes	2010	27-Aug	17W	612347	7837920	None	No	No	-
AR-046b	SAR-CV-2006-2	Yes	2010	27-Aug	17W	612605	7837788	None	No	No	-
AR-046c	SAR-CV-2006-3	Yes	2010	27-Aug	17W	612688	7837780	None	No	No	-
AR-047	AR-CV-2005-1	Yes	2010	27-Aug	17W	611601	7838996	None	No	No	-
AR-048	AR-BR-2002-1	Yes	2010	27-Aug	17W	609169	7840472	Important	No	No	-
AR-049	AR-CV-2001-3	Yes	2010	27-Aug	17W	609043	7840472	None	No	No	-
AR-050	AR-CV-2000-2	Yes	2010	27-Aug	17W	608057	7841040	Marginal	No	No	-
-	AR-BR-2000-1	Yes	2011	14-Aug	17W	607634	7841130	Important	No	No	-
AR-051	AR-BR-92-1	Yes	2008	6-Sep	17W	605447	7842553	None	No	No	-
AR-052	AR-BR-91-1	Yes	2010	27-Aug	17W	604966	7843678	None	No	No	-
AR-053a	CV-86-1	No	-	-	17W	606176	7848863	None	No	No	No survey - used CV-86-1
AR-054	AR-CV-85-2	No	-	-	17W	606430	7850047	None	No	No	No survey -used CV-85-2
AR-055	AR-CV-84-2	No	-	-	17W	606433	7850951	None	No	No	No survey - used CV-84-2
AR-057	CV-84-1	No	-	-	17W	606403	7851175	None	No	No	No survey - used CV-84-1
AR-058a	AR-CV-83-4	No	-	-	17W	606448	7851614	None	No	No	No survey - used CV-83-4
AR-059	AR-CV-83-3	No	-	-	17W	606483	7852063	None	No	No	No survey - used CV-83-3
AR-060	AR-CV-83-2	No	-	-	17W	606478	7852238	None	No	No	No survey - used CV-83-2
AR-061	AR-CV-83-1	No	-	-	17W	606477	7852298	None	No	No	No survey - used CV-83-1
AR-062a	AR-CV-82-4	No	-	-	17W	606192	7852873	None	No	No	No survey - used CV-82-4
AR-063a	not identified	No	-	-	17W	606137	7852920	None	No	No	No survey - used CV-82-3
AR-064	AR-CV-82-2	No	-	-	17W	606007	7853029	Marginal	No	No	No survey - used CV-82-2
AR-065	AR-CV-82-1	No	-	-	17W	605880	7853148	None	No	No	No survey - used CV-82-1

Table A5.1-3.1. Continued.

Site	CANARAIL Site Names (if different)	Surveyed	Survey Year	Survey Date	UTM Coordinates			Habitat Rating	ARCH seen[1]	NNST seen[1]	Comments
					Zone	Easting	Northing				
AR-066a	AR-CV-81-7	No	-	-	17W	605809	7853237	None	No	No	No survey - used CV-81-7
AR-067a	AR-CV-81-6	No	-	-	17W	605785	7853264	None	No	No	No survey - used CV-81-6
AR-068a	AR-CV-81-5	No	-	-	17W	605703	7853360	None	No	No	No survey - used CV-81-5
AR-069a	AR-CV-81-4	No	-	-	17W	605531	7853667	None	No	No	No survey - used CV-81-4
AR-070a	AR-CV-81-3	No	-	-	17W	605533	7853918	None	No	No	No survey - used CV-81-3
AR-071a	AR-CV-81-2	No	-	-	17W	605562	7854048	None	No	No	No survey - used CV-81-2
AR-072a	AR-CV-81-1	No	-	-	17W	605564	7854098	None	No	No	No survey - used CV-81-1
AR-073a	AR-CV-80-5	No	-	-	17W	605562	7854128	None	No	No	No survey - used CV-80-5
AR-074a	CV-80-4	No	-	-	17W	605509	7854444	None	No	No	No survey - used CV-80-4
AR-075a	CV-80-3	No	-	-	17W	605510	7854492	None	No	No	No survey - used CV-80-3
AR-076a	CV-80-2	No	-	-	17W	605516	7854688	None	No	No	No survey - used CV-80-2
AR-077	AR-CV-80-1	No	-	-	17W	605558	7854898	None	No	No	No survey - used CV-80-1
AR-078a	not identified	No	-	-	17W	605621	7854991	None	No	No	No survey - used CV-79-4
AR-079a	AR-CV-79-4	No	-	-	17W	605639	7855073	None	No	No	No survey - used CV-79-4
AR-080a	not identified	Yes	2010	27-Aug	17W	605644	7855249	None	No	No	-
AR-080b	not identified	Yes	2010	27-Aug	17W	605647	7855353	Marginal	No	No	-
AR-081a	AR-CV-79-3	No	-	-	17W	605648	7855390	None	No	No	No survey - used CV-79-3
AR-082a	AR-CV-79-2	No	-	-	17W	605617	7855644	None	No	No	No survey - used CV-79-2
AR-083a	AR-CV-79-1	No	-	-	17W	605584	7855844	Marginal	No	No	No survey - used CV-79-1
AR-084	AR-CV-78-3	No	-	-	17W	605556	7856098	None	No	No	No survey - used CV-78-3
AR-085	AR-CV-78-2	No	-	-	17W	605567	7856199	Marginal	No	No	No survey - used CV-78-2
AR-086	AR-CV-78-1	No	-	-	17W	605608	7856401	Marginal	No	Yes	No survey - used CV-78-1
AR-087a	not identified	Yes	2008	11-Sep	17W	605644	7856491	None	No	No	Moved, but close enough to old site, used 2008 survey data
AR-088	not identified	Yes	2010	27-Aug	17W	605350	7857293	None	No	No	-
AR-091a	not identified	Yes	2010	27-Aug	17W	605221	7857810	None	No	No	-
AR-092a	AR-CV-77-2	No	-	-	17W	605175	7857862	None	No	No	No survey - used CV-77-2
AR-093a	AR-CV-77-1	Yes	2010	27-Aug	17W	605119	7857926	None	No	No	-
AR-094a	AR-CV-76-4	Yes	2010	27-Aug	17W	604981	7858113	None	No	No	-
AR-095a	AR-CV-76-3	No	-	-	17W	604411	7858643	None	No	No	No survey - used CV-76-3
AR-096a	AR-CV-76-2	No	-	-	17W	604366	7858668	None	No	No	No survey - used CV-76-2
AR-097a	AR-CV-76-1	No	-	-	17W	604273	7858720	None	No	No	No survey - used CV-76-1
AR-098a	AR-CV-75-2	No	-	-	17W	603993	7858908	None	No	No	No survey - used CV-75-2
AR-100a	AR-CV-75-1	No	-	-	17W	603817	7859344	None	No	No	No survey - used CV-75-1
AR-101a	AR-CV-74-1	Yes	2010	27-Aug	17W	603833	7859860	None	No	No	-

Table A5.1-3.1. Continued.

Site	CANARAIL Site Names (if different)	Surveyed	Survey Year	Survey Date	UTM Coordinates			Habitat Rating	ARCH seen[1]	NNST seen[1]	Comments
					Zone	Easting	Northing				
AR-102a	not identified	Yes	2010	27-Aug	17W	603836	7859963	None	No	No	-
AR-104a	AR-CV-73-1	No	-	-	17W	603121	7861103	None	No	No	No survey - used CV-73-1
AR-105a	AR-CV-71-1	No	-	-	17W	602600	7862482	None	No	No	No survey - used CV-71-1
AR-106	AR-CV-69-2	No	-	-	17W	602202	7864345	None	No	No	No survey - used CV-69-2
AR-107	not identified	Yes	2010	27-Aug	17W	602214	7864423	None	No	No	-
AR-108a	CV-68-1	No	-	-	17W	601063	7865453	None	No	No	No survey - used CV-68-1
AR-108b	SAR-CV-1075-01-1	No	-	-	17W	599852	7865546	Marginal	No	No	No survey - used Q67 + 200
AR-109a	AR-CV-67-1	No	-	-	17W	600277	7866056	None	No	No	No survey - used CV-67-1
AR-110	AR-CV-65-2	No	-	-	17W	599195	7867292	None	No	No	No survey - used CV-65-2
AR-111a	AR-CV-65-1	Yes	2010	27-Aug	17W	599070	7867576	None	No	No	-
AR-112a	AR-CV-64-1	No	-	-	17W	598944	7867866	None	No	No	No survey - used CV-64-1
AR-113	AR-CV-63-1	No	-	-	17W	598574	7868711	None	No	No	No survey - used CV-63-1
AR-113a	SAR-CV-1072-01-1	Yes	2010	27-Aug	17W	599337	7868429	None	No	No	-
AR-114	AR-CV-62-1	No	-	-	17W	598208	7869545	Important	Yes	Yes	No survey - used CV-62-1
AR-117a	AR-CV-60-1	No	-	-	17W	598618	7871737	None	No	No	No survey - used CV-60-1
AR-118a	AR-BR-59-1	No	-	-	17W	598833	7872584	Marginal	No	No	No survey - used BR-59-1
AR-118b	not identified	Yes	2010	27-Aug	17W	598882	7872381	Marginal	No	No	-
AR-119	not identified	Yes	2010	27-Aug	17W	599144	7873657	None	No	No	-
AR-120	AR-BR-57-1	No	-	-	17W	599485	7874417	Important	Yes	Yes	No survey - used BR-57-1
AR-121	AR-CV-56-1	Yes	2008	11-Sep	17W	598910	7875756	Marginal	No	No	-
AR-122	AR-CV-53-1	No	-	-	17W	597718	7878092	None	No	No	No survey - used CV-53-1
AR-123a	CV-52-2	No	-	-	17W	597276	7878344	Important	No	Yes	No survey - used CV-52-2
AR-125a	AR-CV-52-1	No	-	-	17W	596944	7878542	None	No	No	No survey - used CV-52-1
AR-127a	not identified	Yes	2011	14-Aug	17W	596641	7879168	Important	Yes	Yes	-
AR-127b	not identified	Yes	2011	14-Aug	17W	596637	7879272	Important	No	No	-
AR-127c	AR-CV-51-2	No	-	-	17W	596637	7879338	Marginal	Yes	No	No survey - used CV-51-2
AR-127d	CV-51-1	No	-	-	17W	596688	7879658	None	No	No	No survey - used CV-51-1
AR-129	AR-CV-50-2	No	-	-	17W	596979	7880030	None	No	No	No survey - used CV-50-2
AR-131a	AR-CV-50-1	No	-	-	17W	597380	7880641	None	No	No	No survey - used CV-50-1
AR-132a	AR-CV-49-3	No	-	-	17W	597491	7880783	Marginal	No	No	No survey - used CV-49-3
AR-133	AR-CV-49-2	No	-	-	17W	597816	7881217	None	No	No	No survey - used CV-49-2
AR-134a	AR-CV-49-1	No	-	-	17W	597994	7881458	None	No	No	No survey - used CV-49-1
AR-135	CV-45-1	No	-	-	17W	597158	7884189	None	No	No	No survey - used CV-45-1
AR-136	AR-CV-44-3	No	-	-	17W	596543	7884971	Marginal	Yes	Yes	No survey - used CV-44-3

Table A5.1-3.1. Continued.

Site	CANARAIL Site Names (if different)	Surveyed	Survey Year	Survey Date	UTM Coordinates			Habitat Rating	ARCH seen[1]	NNST seen[1]	Comments
					Zone	Easting	Northing				
AR-141	AR-CV-44-2	No	-	-	17W	596578	7885507	None	No	No	No survey - used CV-44-2
AR-142	AR-CV-44-1	No	-	-	17W	596586	7885817	Important	No	No	No survey - used CV-44-1
AR-143	AR-CV-43-2	No	-	-	17W	596595	7886206	None	No	No	No survey - used CV-R35
AR-144 + AR-145 (opposite river banks)	AR-NBR-46-1	No	-	-	17W	596708 596752	7886472 7886511	Important	Yes	Yes	No survey - used CV-R34
AR-146	AR-NCV-45-1	Yes	2008	9-Sep	17W	597111	7886751	None	No	No	-
AR-147a	AR-NBR-44-1	No	-	-	17W	597664	7887369	Important	Yes	Yes	No survey - used CV-R33
AR-148a	AR-NCV-44-3	No	-	-	17W	597643	7887568	Marginal	No	No	No survey - used CV-R32
AR-149a	AR-NCV-44-2	No	-	-	17W	597589	7887649	None	No	No	No survey - used CV-R32
AR-150	AR-NCV-44-1	No	-	-	17W	597403	7888239	None	No	No	No survey - used CV-R31
AR-151	AR-NCV-43-1	No	-	-	17W	597303	7888579	Marginal	No	No	No survey - used CV-R30
AR-158a	CV-42-1	No	-	-	17W	597432	7889757	Important	No	Yes	No survey - used CV-R29
AR-159a	AR-NCV-41-2	No	-	-	17W	597206	7890349	None	No	No	No survey - used CV-R28
AR-161a	CV-40-2	No	-	-	17W	596887	7891238	Important	No	Yes	No survey - used CV-R27
AR-162	not identified	No	-	-	17W	596733	7891501	None	No	No	No survey - used CV-R25
AR-163	AR-NCV-40-1	No	-	-	17W	596492	7891657	None	No	No	No survey - used CV-R24
AR-165a	CV-39-2	Yes	2011	14-Aug	17W	596135	7892241	None	No	No	-
AR-165b	AR-CV-39-1	Yes	2010	27-Aug	17W	595865	7892700	Marginal	No	No	-
AR-165c	not identified	Yes	2011	14-Aug	17W	595855	7892741	Marginal	Yes	Yes	-
AR-166a	AR-CV-38-2	Yes	2008	12-Sep	17W	595695	7893117	None	No	No	Moved, but close enough to old site, used 2008 survey data
AR-167a	AR-NCV-38-1	Yes	2008	9-Sep	17W	595591	7893481	None	No	No	Moved, but close enough to old site, used 2008 survey data
AR-168 (Ravn River)	AR-BR-37-1	Yes	2008	5-Sep	17W	595324	7893927	Important	No	No	-
AR-170a	AR-CV-1041-1	Yes	2008	5-Sep	17W	595188	7894237	None	No	No	Moved, but close enough to old site, used 2008 survey data
AR-170b	AR-CV-1040-2	Yes	2011	14-Aug	17W	594794	7894792	None	No	No	-
AR-170c	AR-CV-1040-1	Yes	2011	14-Aug	17W	594534	7895010	None	No	No	-
AR-170d	not identified	Yes	2011	14-Aug	17W	594576	7895273	None	No	No	-
AR-174	AR-CV-1037-1	Yes	2008	12-Sep	17W	592347	7895648	None	No	No	-
AR-175	AR-CV-1037-0	Yes	2008	12-Sep	17W	591970	7895911	None	No	No	-
AR-176	AR-BR-1036-1	Yes	2008	2-Sep	17W	591560	7896479	Important	No	No	-
AR-177	AR-CV-1036-1	Yes	2008	13-Sep	17W	591561	7896708	Important	No	No	-
AR-178a	AR-NCV-31-2	No	-	-	17W	591338	7897174	None	No	No	No survey - used CV-R08
AR-180	AR-NCV-28-1	No	-	-	17W	588135	7898203	Important	Yes	No	No survey - used CV-R07
AR-181	AR-NCV-27-4	No	-	-	17W	587648	7898460	None	no	No	No survey - used CV-R06
AR-182	AR-NCV-27-3	No	-	-	17W	587557	7898529	None	no	No	No survey - used CV-R05

Table A5.1-3.1. Continued.

Site	CANARAIL Site Names (if different)	Surveyed	Survey Year	Survey Date	UTM Coordinates			Habitat Rating	ARCH seen[1]	NNST seen[1]	Comments
					Zone	Easting	Northing				
AR-183	AR-NCV-27-2	No	-	-	17W	587447	7898612	Important	No	No	No survey - used CV-R04
AR-184	AR-NCV-26-1a	No	-	-	17W	586723	7898969	None	No	No	No survey - used CV-R03
AR-185	AR-NCV-25-2	No	-	-	17W	586100	7899456	None	no	No	No survey - used CV-R02
AR-186a	AR-CV-25-1	No	-	-	17W	585784	7899607	None	no	No	No survey - used CV-R01
AR-187a (east shore of river)	AR-BR-25-1	Yes	2008	9-Sep	17W	585343	7899939	Important	No	No	Moved, but close enough to old site, used 2008 survey data
AR-187b	SAR-CV-1029-01-1	Yes	2010	27-Aug	17W	585703	7900187	Marginal	No	No	-
AR-187c	SAR-CV-1029-01-2	Yes	2010	27-Aug	17W	585808	7900502	Marginal	No	No	-
AR-188a (west shore of river)	AR-BR-25-1	Yes	2008	9-Sep	17W	585334	7899946	Important	No	No	Moved, but close enough to old site, used 2008 survey data
AR-189a	AR-NCV-24-4	Yes	2008	10-Sep	17W	585285	7899980	Marginal	No	No	Moved, but close enough to old site, used 2008 survey data
AR-190a	AR-CV-24-3	Yes	2008	10-Sep	17W	585213	7900028	Marginal	No	No	Moved, but close enough to old site, used 2008 survey data
AR-191a	AR-CV-24-2	Yes	2008	10-Sep	17W	584985	7900137	None	No	No	Moved, but close enough to old site, used 2008 survey data
AR-192a	AR-CV-24-1	No	-	-	17W	584805	7900335	Marginal	No	No	No survey - used CV-24-1
AR-193a	AR-CV-23-2	Yes	2011	14-Aug	17W	584269	7900408	None	No	No	-
AR-193b	not identified	Yes	2011	14-Aug	17W	584237	7900416	None	No	No	-
AR-194a	AR-CV-23-1	Yes	2010	27-Aug	17W	584030	7900537	Marginal	No	No	-
AR-195a	AR-CV-22-5	Yes	2010	27-Aug	17W	583374	7900726	Marginal	No	No	-
AR-196	CV-22-3 and CV-22-4	No	-	-	17W	583188	7900834	Marginal	Yes	No	No survey - used CV-22-3
AR-197a	AR-CV-22-2	No	-	-	17W	583047	7900883	None	No	No	No survey - used CV-22-2
AR-198	AR-CV-22-1	No	-	-	17W	582783	7900938	None	No	No	No survey - used CV-22-1
AR-199a	AR-CV-21-2	Yes	2008	10-Sep	17W	582526	7900959	None	No	No	Moved, but close enough to old site, used 2008 survey data
AR-200a	AR-CV-21-1	No	-	-	17W	581646	7901240	None	No	No	No survey - used CV-21-1a and CV-21-1b
AR-202a	AR-CV-20-2	No	-	-	17W	581239	7901314	None	No	No	No survey - used CV-20-2
AR-202b	AR-CV-20-1	No	-	-	17W	581081	7901335	Marginal	No	No	No survey - used CV-20-1
AR-203	AR-CV-19-3	Yes	2008	10-Sep	17W	580411	7901426	None	No	No	-
AR-204	AR-CV-19-2	Yes	2008	12-Sep	17W	580297	7901473	None	No	No	-
AR-205	AR-CV-19-1	Yes	2008	12-Sep	17W	579732	7901853	Important	No	No	-
AR-206	AR-CV-18-3	No	-	-	17W	579372	7901954	None	No	No	No survey - used CV-18-3
AR-207	AR-CV-18-2	No	-	-	17W	579049	7902076	None	No	No	No survey - used CV-18-2
AR-208	AR-CV-18-1	No	-	-	17W	578827	7902196	Important	Yes	No	No survey - used CV-18-1
AR-209	AR-CV-17-2	No	-	-	17W	578713	7902258	None	No	No	No survey - used CV-17-2
AR-210	AR-CV-16-3	Yes	2008	3-Sep	17W	577740	7902616	Important	Yes	No	-
AR-211	AR-CV-16-2	No	-	-	17W	577420	7902924	None	No	No	No survey - used CV-16-2
AR-212	AR-CV-16-1	No	-	-	17W	577083	7903093	Important	Yes	No	No survey - used CV-16-1
AR-213	AR-CV-15-1	No	-	-	17W	576887	7903200	None	No	No	No survey - used CV-15-1

Table A5.1-3.1. Continued.

Site	CANARAIL Site Names (if different)	Surveyed	Survey Year	Survey Date	UTM Coordinates			Habitat Rating	ARCH seen[1]	NNST seen[1]	Comments
					Zone	Easting	Northing				
AR-214	CV-14-3	No	-	-	17W	575848	7903596	Marginal	Yes	No	No survey - used CV-14-3
AR-215	AR-CV-14-2	No	-	-	17W	575573	7903722	None	No	No	No survey - used CV-14-2
AR-216	CV-14-1	No	-	-	17W	575470	7903801	None	No	No	No survey - used CV-14-1
AR-217	AR-CV-13-2	No	-	-	17W	575210	7903977	None	No	No	No survey - used CV-13-2
AR-218	CV-13-1	No	-	-	17W	574964	7904074	Marginal	Yes	No	No survey - used CV-13-1
AR-219	AR-CV-12-2	No	-	-	17W	574212	7904456	None	No	No	No survey - used CV-12-2
AR-220	AR-CV-12-1	No	-	-	17W	573687	7904616	None	No	No	No survey - used CV-12-1
AR-221	AR-BR-11-1	Yes	2008	6-Sep	17W	572910	7904789	Important	No	No	-
AR-222	AR-CV-11-1	Yes	2008	12-Sep	17W	572505	7905070	None	No	No	-
AR-223	CV-10-1	No	-	-	17W	572308	7905329	Important	No	No	No survey - used CV-10-1
AR-225	AR-CV-8-2	No	-	-	17W	570836	7906409	None	No	No	No survey - used CV-8-2
AR-226	AR-BR-8-1	No	-	-	17W	570767	7906506	Important	Yes	No	No survey - used BR-8-1
AR-227	AR-CV-8-1	No	-	-	17W	570095	7906925	Important	Yes	No	No survey - used CV-8-1
AR-228	CV-7-3	No	-	-	17W	569714	7907173	None	No	No	No survey - used CV-7-3
AR-230	AR-CV-7-1	No	-	-	17W	569285	7907443	Important	Yes	No	No survey - used CV-7-1
AR-231	CV-6-3	No	-	-	17W	569037	7907606	Important	Yes	No	No survey - used CV-6-3
AR-232	AR-CV-6-2	Yes	2008	12-Sep	17W	568584	7907828	None	No	No	-
AR-233	AR-CV-6-1	Yes	2008	16-Jul	17W	568533	7907875	Important	Yes	no	-
AR-234	AR-CV-5-3	Yes	2008	8-Aug	17W	567980	7908172	None	No	No	-
AR-235	AR-CV-5-1	No	-	-	17W	567628	7908366	None	No	No	No survey - used CV-5-1
AR-236	AR-CV-4-3	No	-	-	17W	567369	7908581	None	No	No	No survey - used CV-4-3
AR-237	AR-CV-4-1	Yes	2008	13-Sep	17W	566974	7908820	Important	No	No	-
AR-238	AR-CV-3-2	No	-	-	17W	566686	7909185	None	No	No	No survey - used CV-3-2
AR-239	not identified	Yes	2010	27-Aug	17W	566398	7909386	None	No	No	-
AR-240	AR-CV-3-1	Yes	2008	15-Jul	17W	565962	7909634	Important	No	No	-
AR-241	AR-CV-2-2	Yes	2008	8-Aug	17W	565737	7909806	None	No	No	-
AR-245	AR-CV-2-1	Yes	2008	13-Sep	17W	565488	7910032	Important	No	No	-
AR-247	AR-CV-1-2	Yes	2008	15-Jul	17W	564716	7910411	Marginal	No	No	-
AR-248	AR-CV-1003-3	Yes	2008	12-Sep	17W	563854	7910936	None	No	No	-
AR-249	AR-CV-1003-2	Yes	2008	13-Sep	17W	563830	7910960	Important	No	No	-
AR-250	AR-CV-1003-1	Yes	2008	12-Sep	17W	563690	7911105	Important	No	No	-
AR-251	AR-CV-1002-2	Yes	2008	13-Sep	17W	563521	7911406	Important	No	No	-
AR-251a	not identified	No	-	-	17W	563779	7911450	None	No	No	No survey - used CV-000-1a
AR-252	AR-CV-1002-1	Yes	2008	12-Sep	17W	563439	7911554	Marginal	No	No	-

Table A5.1-3.1. Continued.

Site	CANARAIL Site Names (if different)	Surveyed	Survey Year	Survey Date	UTM Coordinates			Habitat Rating	ARCH seen[1]	NNST seen[1]	Comments
					Zone	Easting	Northing				
AR-253 + AR-254 (banks of Mary River)	AR-BR-Mary River	Yes	2008	13-Sep	17W	562727 562577	7911876 911920	Important	No	No	-
AR-255	AR-CV-1000-3	Yes	2008	12-Sep	17W	561987	7912332	None	No	No	-
AR-256	AR-CV-1000-2	Yes	2008	12-Sep	17W	561883	7912385	None	No	No	-
AR-257	AR-CV-1000-1	Yes	2008	12-Sep	17W	561361	7912725	None	No	No	-

[1] - includes all ARCH or NNST that were captured.

Table A5.1-3.2. List of assessments used to evaluate habitat within at each Access Road stream crossing site.

Site	Comments
AR-001a	See Railway assessment CV-142-2
AR-002a	See Railway assessment CV-142-1
AR-005a	See Railway assessment CV-138-1
AR-007	See Railway assessment BR-137-1
AR-015a	See Railway assessment CV-125-3
AR-021	See Railway assessment CV-123-3
AR-037	See Railway assessment CV-105-1
AR-037a	See Railway assessment BR-105-1
AR-053a	See Railway assessment CV-086-1
AR-054	See Railway assessment CV-085-2
AR-055	See Railway assessment CV-084-2
AR-057	See Railway assessment CV-084-1
AR-058a	See Railway assessment CV-083-4 a
AR-059	See Railway assessment CV-083-3a
AR-060	See Railway assessment CV-083-2a
AR-061	See Railway assessment CV-083-1a
AR-062a	See Railway assessment CV-082-4a and CV-082-4b
AR-063a	See Railway assessment CV-082-3a
AR-064	See Railway assessment CV-082-2a
AR-065	See Railway assessment CV-082-1a
AR-067a	See Railway assessment CV-081-6a and CV-081-6b
AR-068a	See Railway assessment CV-081-5a
AR-069a	See Railway assessment CV-081-4a
AR-070a	See Railway assessment CV-081-3
AR-071a	See Railway assessment CV-081-2
AR-073a	See Railway assessment CV-080-5
AR-074a	See Railway assessment CV-080-4
AR-075a	See Railway assessment CV-080-3
AR-076a	See Railway assessment CV-080-2
AR-077	See Railway assessment CV-080-1a
AR-078a	See Railway assessment CV-079-4a
AR-079a	See Railway assessment CV-079-4a
AR-081a	See Railway assessment CV-079-3
AR-082a	See Railway assessment CV-079-2
AR-083a	See Railway assessment CV-079-1
AR-084	See Railway assessment CV-078-3
AR-085	See Railway assessment CV-078-2
AR-086	See Railway assessment CV-078-1
AR-092a	See Railway assessment CV-077-2
AR-095a	See Railway assessment CV-076-3
AR-096a	See Railway assessment CV-076-2
AR-097a	See Railway assessment CV-076-1
AR-098a	See Railway assessment CV-075-2
AR-100a	See Railway assessment CV-075-1
AR-104a	See Railway assessment CV-073-1

Table A5.1-3.2. Continued.

Site	Comments
AR-105a	See Railway assessment CV-071-1
AR-106	See Railway assessment CV-069-2
AR-108a	See Railway assessment CV-068-1
AR-109a	See Railway assessment CV-067-1
AR-110	See Railway assessment CV-065-2
AR-112a	See Railway assessment CV-064-1
AR-113	See Railway assessment CV-063-1
AR-114	See Railway assessment CV-062-1
AR-117a	See Railway assessment CV-060-1
AR-118a	See Railway assessment BR-059-1
AR-120	See Railway assessment BR-057-1
AR-122	See Railway assessment CV-053-1
AR-123a	See Railway assessment CV-052-2
AR-125a	See Railway assessment CV-052-1
AR-127c	See Railway assessment CV-051-2
AR-127d	See Railway assessment CV-051-1
AR-129	See Railway assessment CV-050-2
AR-131a	See Railway assessment CV-050-1
AR-132a	See Railway assessment CV-049-3
AR-133	See Railway assessment CV-049-2
AR-134a	See Railway assessment CV-049-1
AR-135	See Railway assessment CV-045-1
AR-136	See Railway assessment CV-044-3
AR-141	See Railway assessment CV-044-2
AR-142	See Railway assessment CV0-44-1
AR-143	See Railway assessment CV-R35
AR-144	See Railway assessment CV-R34
AR-145	See Railway assessment CV-R34
AR-147a	See Railway assessment CV-R33
AR-148a	See Railway assessment CV-R32
AR-149a	See Railway assessment CV-R32
AR-150	See Railway assessment CV-R31
AR-151	See Railway assessment CV-R30
AR-158a	See Railway assessment CV-R29
AR-159a	See Railway assessment CV-R28
AR-161a	See Railway assessment CV-R27
AR-162	See Railway assessment CV-R25
AR-163	See Railway assessment CV-R24
AR-178a	See Railway assessment CV-R08
AR-180	See Railway assessment CV-R07
AR-181	See Railway assessment CV-R06
AR-182	See Railway assessment CV-R05
AR-183	See Railway assessment CV-R04
AR-184	See Railway assessment CV-R03
AR-185	See Railway assessment CV-R02
AR-186a	See Railway assessment CV-R01

Table A5.1-3.2. Continued.

Site	Comments
AR-192a	See Railway assessment CV-024-1
AR-196	See Railway assessment CV-022-3
AR-197a	See Railway assessment CV-022-2
AR-198	See Railway assessment CV-022-1
AR-200a	See Railway assessment CV-021-1 and CV-021-1b
AR-202a	See Railway assessment CV-020-2
AR-202b	See Railway assessment CV-020-1
AR-206	See Railway assessment CV-018-3
AR-207	See Railway assessment CV-018-2
AR-208	See Railway assessment CV-018-1
AR-209	See Railway assessment CV-017-2
AR-211	See Railway assessment CV-016-2
AR-212	See Railway assessment CV-016-1
AR-213	See Railway assessment CV-015-1
AR-214	See Railway assessment CV-014-3
AR-215	See Railway assessment CV-014-2
AR-216	See Railway assessment CV-014-1
AR-217	See Railway assessment CV-013-2
AR-218	See Railway assessment CV-013-1
AR-219	See Railway assessment CV-012-2
AR-220	See Railway assessment CV-012-1
AR-223	See Railway assessment CV-010-1
AR-225	See Railway assessment CV-008-2
AR-226	See Railway assessment BR-008-1
AR-227	See Railway assessment CV-008-1
AR-228	See Railway assessment CV-007-3
AR-230	See Railway assessment CV-007-1
AR-231	See Railway assessment CV-006-3
AR-235	See Railway assessment CV-005-1
AR-236	See Railway assessment CV-004-3
AR-238	See Railway assessment CV-003-2
AR-251a	See Railway assessment CV-000-1a

MILNE INLET TOTE ROAD

MINE SITE

Camp Lake

MAP A

MAP B

MAP C

RAWN RIVER CAMP

MAP D

MAP E

MID-RAIL CAMP

Mid-rail Camp Lake

MAP F

MAP G

Cockburn Lake

MAP H

COCKBURN TUNNELS CAMP

Cockburn Lake

MAP I

Cockburn Lake

COCKBURN SOUTH CAMP

MAP J

MAP K

STEENSBY PORT

STEENSBY INLET

SCALE 3 1.5 0 3 6 9 12 15 km

LEGEND:

ACCESS ROAD CROSSING SURVEY YEAR
- 2007
- 2008
- 2010

STREAM CROSSING

FISH BARRIER (CONFIRMED)

FISH BARRIER (AERIAL PHOTO INTERPRETATION)

MILNE INLET TOTE ROAD (EXISTING)

RAILWAY ALIGNMENT (PROPOSED)

CONSTRUCTION ACCESS ROAD (PROPOSED)

WATER

INFRASTRUCTURE

NOTES:

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2. TOPOGRAPHY PROVIDED BY EAGLE MAPPING (2005).
3. PROPOSED RAILWAY ALIGNMENT PROVIDED BY CANRAIL CONSULTANTS INC.
4. PROPOSED RAILWAY CONSTRUCTION ACCESS ROAD ALIGNMENT PROVIDED BY CANRAIL CONSULTANTS INC. DRAWING NO.: RAILWAY ALIGNMENT AND CONST ACCESS RD - MARY RIVER STEENSBY 2010 -12AUG2010.DWG
5. LOCATION OF PROPOSED INFRASTRUCTURE IS APPROXIMATE AND SUBJECT TO FIELD ADJUSTEMENTS

BAFFINLAND IRON MINES CORPORATION

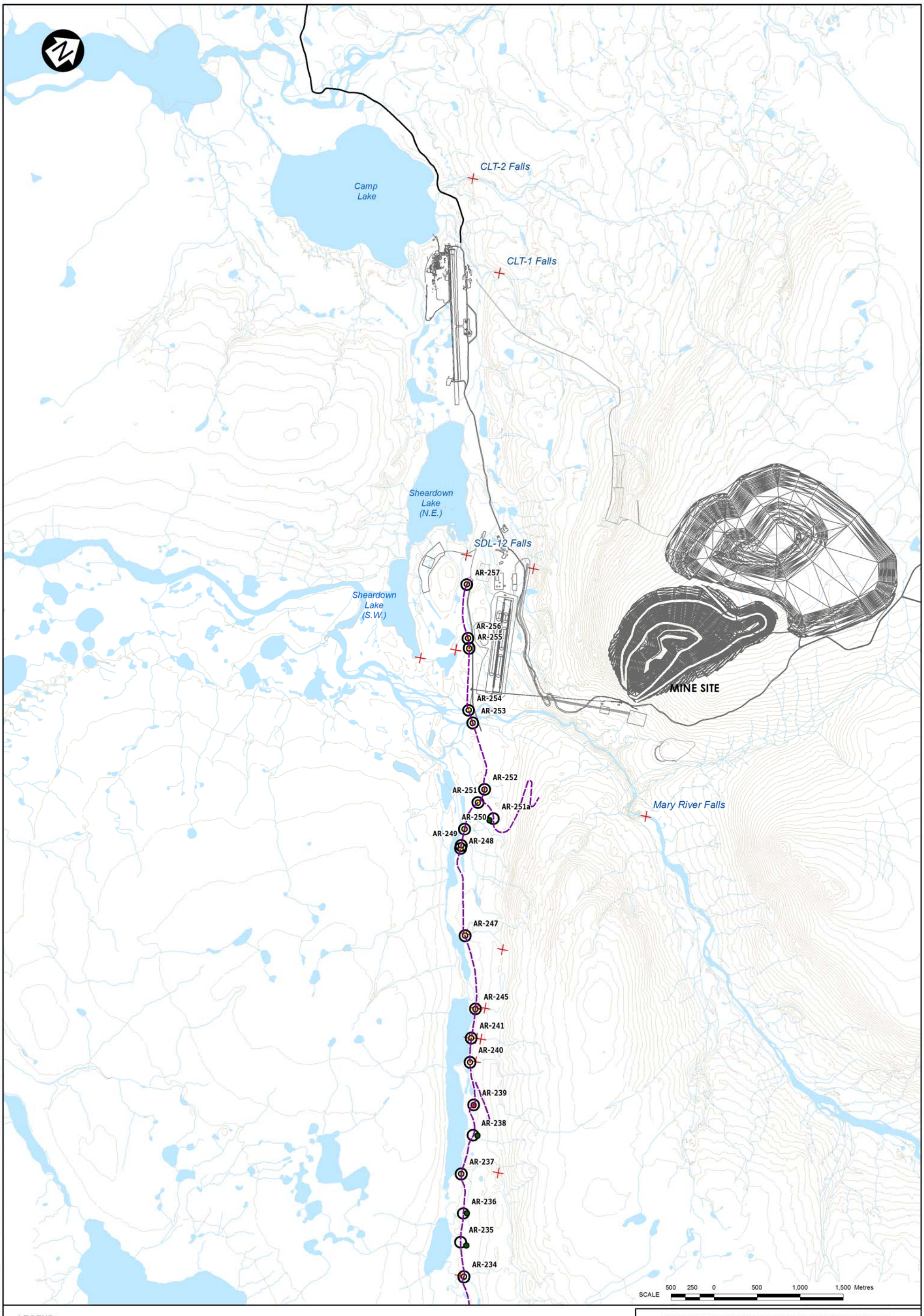
MARY RIVER PROJECT

Access Road Stream Crossing Sites

North/South Consultants Inc.
Aquatic Environment Specialists

P/A NO. -
REF NO. -
DATE: 19/11/2010
REV 2

Path: G:\MARYRIV_GDB\EIS_GDB\EIS_Figures_2010EIS_Figures\MXD\Synthesis_RailLine_AccessRoad\Rev2Apdx\20101119_ApdxAR_Overview_.mxd



LEGEND:

ACCESS ROAD CROSSING SURVEY YEAR
- 2007
- 2008
- 2010

STREAM CROSSING
FISH BARRIER (CONFIRMED)
FISH BARRIER (AERIAL PHOTO INTERPRETATION)

CONTOUR
MILNE INLET TOTE ROAD (EXISTING)
RAILWAY ALIGNMENT (PROPOSED)
CONSTRUCTION ACCESS ROAD (PROPOSED)
WATER
INFRASTRUCTURE (PROPOSED FOR CONSTRUCTION AND OPERATIONS PERIODS)

NOTES:

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4. PROPOSED RAILWAY CONSTRUCTION ACCESS ROAD ALIGNMENT PROVIDED BY CANRAIL CONSULTANTS INC. DRAWING NO.: RAILWAY ALIGNMENT AND CONST ACCESS RD - MARY RIVER STEENSBY 2010 -12AUG2010.dwg
5. LOCATION OF PROPOSED INFRASTRUCTURE IS APPROXIMATE AND SUBJECT TO FIELD ADJUSTEMENTS
6. CONTOUR INTERVAL IS 25 M AND IS IN METRES.

BAFFINLAND IRON MINES CORPORATION

MARY RIVER PROJECT

Access Road Stream Crossing Sites (MAP A)

North/South Consultants Inc.
Aquatic Environment Specialists

P/A NO.	REF NO.
-	03-13-1
DATE: 15/12/2011	REV 2

Path: G:\MARYRIV_GDB\EIS_GDB\FEIS\UpdatedMapping\Baseline appendicies\7C8-19_to_7C11-19_App5_1-3_MapsAtoK_.mxd

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-257
UTM Coordinates: 17 W 561361 7912725
Date/Time Surveyed: 12-Sept-2008/09:09

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted: N **Effort (min):** N/A **Electrofisher Settings:** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

Upstream left of SDLT-12 (above the reach 2 portion that has been assessed during previous surveys). This is definitely not fish habitat.

Baffinland Iron Mines
Mary River Project

North/South Consultants Inc.
Aquatic Environment Specialists

Fish Habitat Quality – NO FISH HABITAT

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-257
UTM Coordinates: 17 W 561361 7912725
Date/Time Surveyed: 12-Sept-2008/09:09

Photographs

A

Figure 1. View at crossing across (A).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-256
UTM Coordinates: 17 W 561883 7912385
Date/Time Surveyed: 12-Sept-2008/09:16

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted: N **Effort (min):** N/A **Electrofisher Settings:** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

At UTM 17 W 562006 7912120 there is a downstream lake that might provide overwintering fish habitat. Fish would need to cross a very marshy, somewhat steep area to get to this site. The water is low and while there is a small channel, flooded terrestrial makes up most of the substrate. This site is basically at the top end of the river and the source is runoff.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-256
UTM Coordinates: 17 W 561883 7912385
Date/Time Surveyed: 12-Sept-2008/09:16

Photographs

A

B

C

D

Figure 1. View of habitat at crossing (A), downstream of crossing (B), upstream of crossing (C), and an aerial view of the barrier between downstream pond and lake (D).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-255
UTM Coordinates: 17 W 561987 7912332
Date/Time Surveyed: 12-Sept-2008/09:25

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted: N **Effort (min):** N/A **Electrofisher Settings:** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

There is nice potential stream habitat up near the crossing, but the same marshy area that separates both AR-156 and 155 from the large downstream pond. In addition to It being marshy, any hint of a channel is blocked at some point by high and dry land before reaching the downstream pond. There are also quite a few sections of marsh along the stream between pond and crossing. There is a small, shallow pond upstream of the crossing as well.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-255
UTM Coordinates: 17 W 561987 7912332
Date/Time Surveyed: 12-Sept-2008/09:25

Photographs


A


B


C


D

Figure 1. View of habitat at crossing (A), downstream of crossing (B), upstream of crossing (C), and of downstream barrier (dry) (D).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-254
UTM Coordinates: 17 W 562577 7911920
Date/Time Surveyed: 13-Sept-08

General Physical Characteristics

Floodplain Width (m):	221	**Channel Pattern:**	Meandering	**Stage:**	Low
Channel Confinement:	PC	**Channel Gradient (range):**	0.25°	**Flow Regime:**	PER
Bank Height (range in m):	0-4.0	**Bank Shape:**	100% S	**T_W (°C):**	N/M

Hydrology & Habitat Characteristics

Distance and Direction from Crossing (m)	Channel Width (m)		Water Depth (m)				Water Velocity (m/s)			
	Wetted	High Water	25%	50%	75%	Max	25%	50%	75%	Max
40D	22	68	0.6			0.75-1.0	0.11			>1.0
0	28	37	0.09			~1.0	0.15			>1.0
40U	26	45	0.33			~0.75	0.45			>1.0

Distance and Direction from Crossing (m)	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
40D	10	30	20	40			20 sand	10	10	30	30
0	45		25		10	Rapid 20		10	10	35	45
40U	40		20		25	Rapid 15	10 sand	10	10	30	40

Fisheries Information

Electrofishing Conducted: N **Effort (min):** N/A **Electrofisher Settings:** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	High	High
NNST	Low	No	Moderate	Moderate

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-254
UTM Coordinates: 17 W 562577 7911920
Date/Time Surveyed: 13-Sept-08

Comments & Summary

This is the Mary River. Many fish have been captured/observed in this river in previous surveys

Photographs

A

B

Figure 1. View at 40m upstream across (A), and crossing across (B).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-253
UTM Coordinates: 17 W 562727 7911876
Date/Time Surveyed: 13-Sept-08 /16:59

General Physical Characteristics

Floodplain Width (m):	>200	**Channel Pattern:**	Straight	**Stage:**	Very low
Channel Confinement:	NC-PC	**Channel Gradient (range):**	0.25-0.5°	**Flow Regime:**	PER
Bank Height (range in m):	0-4.0	**Bank Shape:**	100% S	**T_W (°C):**	Ice

Hydrology & Habitat Characteristics

Distance and Direction from Crossing (m)	Channel Width (m)		Water Depth (m)				Water Velocity (m/s)			
	Wetted	High Water	25%	50%	75%	Max	25%	50%	75%	Max
40D	12	37	-	-	-	-	-	-	-	-
0	12	55	-	-	-	-	-	-	-	-
40U	9.3	87	0.05	0.13	0.07	0.13	0.22	0.26	0.14	0.32

Distance and Direction from Crossing (m)	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
40D							25	10	35	20	10
0							15	15	20	20	30
40U		70	30				20 sand	20	20	20	20

Fisheries Information

Electrofishing Conducted: N
Effort (min): N/A
Electrofisher Settings: N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	High	Moderate
NNST	No	No	Moderate	Moderate

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-253
UTM Coordinates: 17 W 562727 7911876
Date/Time Surveyed: 13-Sept-08 /16:59

Comments & Summary

Many fish observed in this stream previously.

Photographs

A

B

C

Figure 1. View at 40m downstream across (A), crossing across (B), and 40m upstream across (C).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-252
UTM Coordinates: 17 W 563439 7911554
Date/Time Surveyed: 12-Sept-2008/09:44

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted: N **Effort (min):** N/A **Electrofisher Settings:** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	Low	No
NNST	No	No	Low	No

Comments & Summary

Fish would be able to access this site from Mary River. Water in the channel is very low (<0.05 m) and the substrate is layered with algae and flooded terrestrial. This is marginal fish habitat at best during the spring/summer when water is higher. The crossing is pretty much at the upstream limit of fish passage, the land flattens and the channel is lost directly above it.

Baffinland Iron Mines
Mary River Project

North/South Consultants Inc.
Aquatic Environment Specialists

Fish Habitat Quality – MARGINAL

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-252
UTM Coordinates: 17 W 563439 7911554
Date/Time Surveyed: 12-Sept-2008/09:44

Photographs

A

B

C

D

Figure 1. View of habitat at crossing (A), downstream of crossing (B), upstream of crossing (C), and of substrate (D).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-251
UTM Coordinates: 17 W 563521 7911406
Date/Time Surveyed: 13-Sept-08 /16:30

General Physical Characteristics

Floodplain Width (m):	>200	**Channel Pattern:**	Sinuous	**Stage:**	Normal-low
Channel Confinement:	NC	**Channel Gradient (range):**	0.0-0.5º	**Flow Regime:**	PER
Bank Height (range in m):	0.0-0.1	**Bank Shape:**	50% UD-Flooded, 50% V	**T_W (°C):**	Ice

Hydrology & Habitat Characteristics

Distance and Direction from Crossing (m)	Channel Width (m)		Water Depth (m)				Water Velocity (m/s)			
	Wetted	High Water	25%	50%	75%	Max	25%	50%	75%	Max
40D	9.6	13.2	0.06	0.01	0.08	0.08	0.09	0.00	0.00	0.04
0	3.9	flooded	0.16	0.2	0.08	0.2	0.01	0.13	vegetation	0.13
40U	4.5	flooded	0.01	0.01	0.14	0.14	0.00	Too shallow	0.09	0.09

Distance and Direction from Crossing (m)	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
40D	90		10				10 sand 40 algae		30	20	
0	90		10				50 algae		10	40	
40U	80		20				70 algae	10	10	5	

Fisheries Information

Electrofishing Conducted: N **Effort (min):** N/A **Electrofisher Settings:** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	High	Moderate
NNST	No	No	Moderate	Moderate

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-251
UTM Coordinates: 17 W 563521 7911406
Date/Time Surveyed: 3-Sept-08 /16:30

Comments & Summary

Upstream limit at UTM 17 W 563970 7911354. Connected to downstream large river in the area.

Photographs

A **B** **C** **D**

Figure 1. View at 40m downstream across (A), 40m upstream across (B), crossing channel 1 across (C), and crossing channel 2 across (D).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-250
UTM Coordinates: 17 W 563690 7911105
Date/Time Surveyed: 12-Sept-08 /09:56

General Physical Characteristics

Floodplain Width (m):	67	**Channel Pattern:**	Meandering, single	**Stage:**	Normal-low
Channel Confinement:	PC	**Channel Gradient (range):**	0-1°	**Flow Regime:**	PER
Bank Height (range in m):	0.0-0.4	**Bank Shape:**	80% S, 20% V	**T_W (°C):**	0.5

Hydrology & Habitat Characteristics

Distance and Direction from Crossing (m)	Channel Width (m)		Water Depth (m)				Water Velocity (m/s)			
	Wetted	High Water	25%	50%	75%	Max	25%	50%	75%	Max
40D	2.75	flooded	0.15	0.16	0.15		0.16	0.03	0.00	
20D	15.8	23.8	0.01	0.04	0.11		0.00	too shallow	0.13	
0	13.0	16.4	0.16	0.08	0.1		0.00	0.12	0.05	
20U	4.8	6.9	0.06	0.03	0.09		0.00	0.30	0.16	
40U	8.2	10.3	0.06	0.04	0.08		0.05	0.2	0.07	
60U	5.7	7.5	0.05	0.06	0.03		-	0.07	0.00	

Distance and Direction from Crossing (m)	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
40D		50	50				25 Ft,25 algae			50	
20D	40	50			10		30 Ft,20 algae	20	20	9	1
0	30	40			30		10 algae	10	55	20	5
20U	10	40			50			10	20	50	20
40U	20	40			40		10 Ft 10 algae	30	30	20	
60U	60	30			10		40 moss, 10 algae		30	18	2

Baffinland Iron Mines
Mary River Project

North/South Consultants Inc.
Aquatic Environment Specialists

Fish Habitat Quality – IMPORTANT

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-250
UTM Coordinates: 17 W 563690 7911105
Date/Time Surveyed: 12-Sept-08 /09:56

Fisheries Information

Electrofishing Conducted: N
Effort (min): N/A
Electrofisher Settings: N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	High	Moderate
NNST	No	No	Moderate	Low

Comments & Summary

No visible barriers downstream between site and Mary River. Upstream limit of passage = UTM 17 W 563930 7911343. Confluence at UTM 17 W 563638 7911104; stream that contains very nice fish habitat and is connected to the Mary River. Note: after ~ 100 m U/S of the crossing there are stretches of marshy ground that fish would have difficulty getting past currently. If there were more water they probably could go through.

Baffinland Iron Mines
Mary River Project

North/South Consultants Inc.
Aquatic Environment Specialists

Fish Habitat Quality – IMPORTANT

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-250
UTM Coordinates: 17 W 563690 7911105

Date/Time Surveyed: 12-Sept-08 /09:56

Photographs

Figure 1. View at 60m downstream across (A), 40m (B), 20m (C), crossing across (D), 20m upstream across (E), 40m (F), 60m (G), and upstream limit of fish passage (H).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-249
UTM Coordinates: 17 W 563830 7910960
Date/Time Surveyed: 13-Sept-08 /16:05

General Physical Characteristics

s

Floodplain Width (m):	>200	**Channel Pattern:**	Sinuous	**Stage:**	Normal-low
Channel Confinement:	NC	**Channel Gradient (range):**	1°	**Flow Regime:**	PER
Bank Height (range in m):	0.0-0.15	**Bank Shape:**	60% UD-Flooded, 40% V	**T_W (°C):**	N/M

Hydrology & Habitat Characteristics

Distance and Direction from Crossing (m)	Channel Width (m)		Water Depth (m)				Water Velocity (m/s)			
	Wetted	High Water	25%	50%	75%	Max	25%	50%	75%	Max
0	1.65	flooded	0.1	0.26	0.16	0.26	0.15	0.18	0.00	
40U	12.7	15.5	0.04	0.10	0.06	0.1	0.2	0.02	0.00	0.2

Distance and Direction from Crossing (m)	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
40D		70	30				20 clay	10	20	40	10
0	75		25				20 ft	35	25	20	
40U	45		20		35		40 ft	25	25	10	

Fisheries Information

Electrofishing Conducted: N
Effort (min): N/A
Electrofisher Settings: N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	Moderate	Moderate
NNST	No	No	Moderate	Moderate

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-249
UTM Coordinates: 17 W 563830 7910960
Date/Time Surveyed: 13-Sept-08 /16:05

Comments & Summary

Last September this site was fished and fish were present. Downstream lake is located at 17 W 563803 7910936. This site looks like nice fish habitat. There is one main channel that leads down to the DS lake, but it goes underground for ~0.5 m. The subterranean flow is still quite strong, so the fish may be able to get through.

Photographs

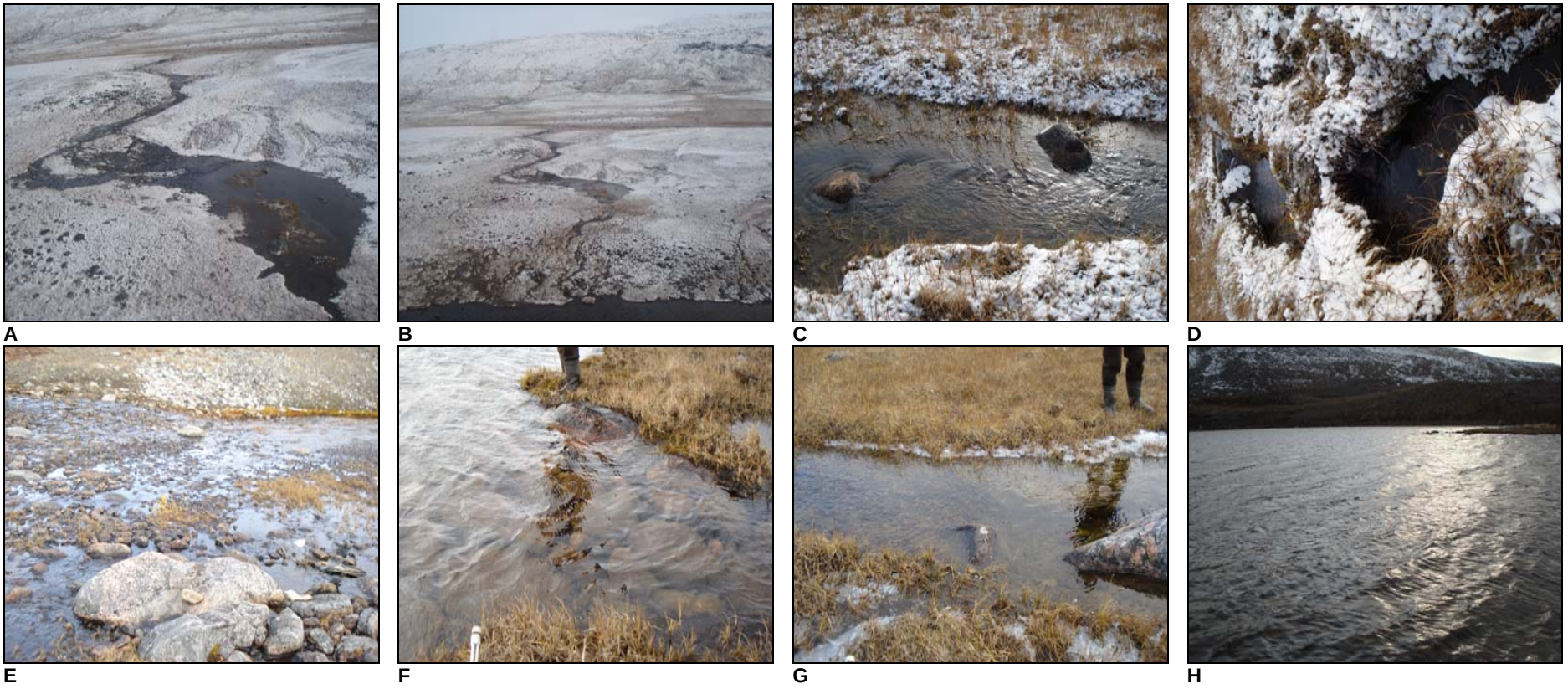


Figure 1. Aerial view of crossing upstream (A), confluence with downstream river (B), crossing (C), potential downstream barrier (water underground) (D), 40m upstream across (E), confluence with downstream lake across (F), crossing across (G), and downstream lake (H).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-248
UTM Coordinates: 17 W 563854 7910936
Date/Time Surveyed: 11-Sept-2008/11:07

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted: N **Effort (min):** N/A **Electrofisher Settings:** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

Source is pond at UTM 17 W 563912 7910926, that is very shallow. Currently totally dry. This is likely never fish habitat. There is a small channel, but no banks that define a depth of water that is passable.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-248
UTM Coordinates: 17 W 563854 7910936
Date/Time Surveyed: 11-Sept-2008/11:07

Photographs

A

B

C

D

Figure 1. View of habitat at crossing (A), downstream of crossing (B), upstream of crossing (C), and at the upstream pond (D).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-247
UTM Coordinates: 17 W 564716 7910411
Date/Time Surveyed: 13-Sept-08 /15:37

General Physical Characteristics

ss

Floodplain Width (m):	15	**Channel Pattern:**	Straight, simple	**Stage:**	Normal
Channel Confinement:	C	**Channel Gradient (range):**	1.5-2º	**Flow Regime:**	PER
Bank Height (range in m):	No banks	**Bank Shape:**	UD-Rocks	**T_W (°C):**	N/M

Hydrology & Habitat Characteristics

Distance and Direction from Crossing (m)	Channel Width (m)		Water Depth (m)				Water Velocity (m/s)			
	Wetted	High Water	25%	50%	75%	Max	25%	50%	75%	Max
0	6.1	10.2	0.16	0.21	0.17	0.35	0.19	0.17	0.04	0.19
40U	8.7	27	0.06	0.16	0.06	0.16	0.47	0.11	0.26	0.47

Distance and Direction from Crossing (m)	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
40D (lake)		90	10				85 sand			10	5
0	90		10					5		60	35
40U		40			60				10	25	65

Fisheries Information

Electrofishing Conducted: N **Effort (min):** N/A **Electrofisher Settings:** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	Moderate	No
NNST	No	No	Moderate	No

Baffinland Iron Mines
Mary River Project

North/South Consultants Inc.
Aquatic Environment Specialists

Fish Habitat Quality – MARGINAL

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-247
UTM Coordinates: 17 W 564716 7910411
Date/Time Surveyed: 13-Sept-08 /15:37

Comments & Summary

Downstream lake at UTM 17 W 564738 7910386. Fish can reach the crossing site from the downstream lake. The crossing site itself has lots of algae all over the rocks, which often indicates an absence of fish in the Project Study Area. There is a cascade upstream at UTM 17 W 564708 7910441, which is currently a barrier with low water, but could possibly be passed, but could possibly be passed during periods of high water. Upstream limit of passage at UTM 17 W 564971 7910651.

Photographs

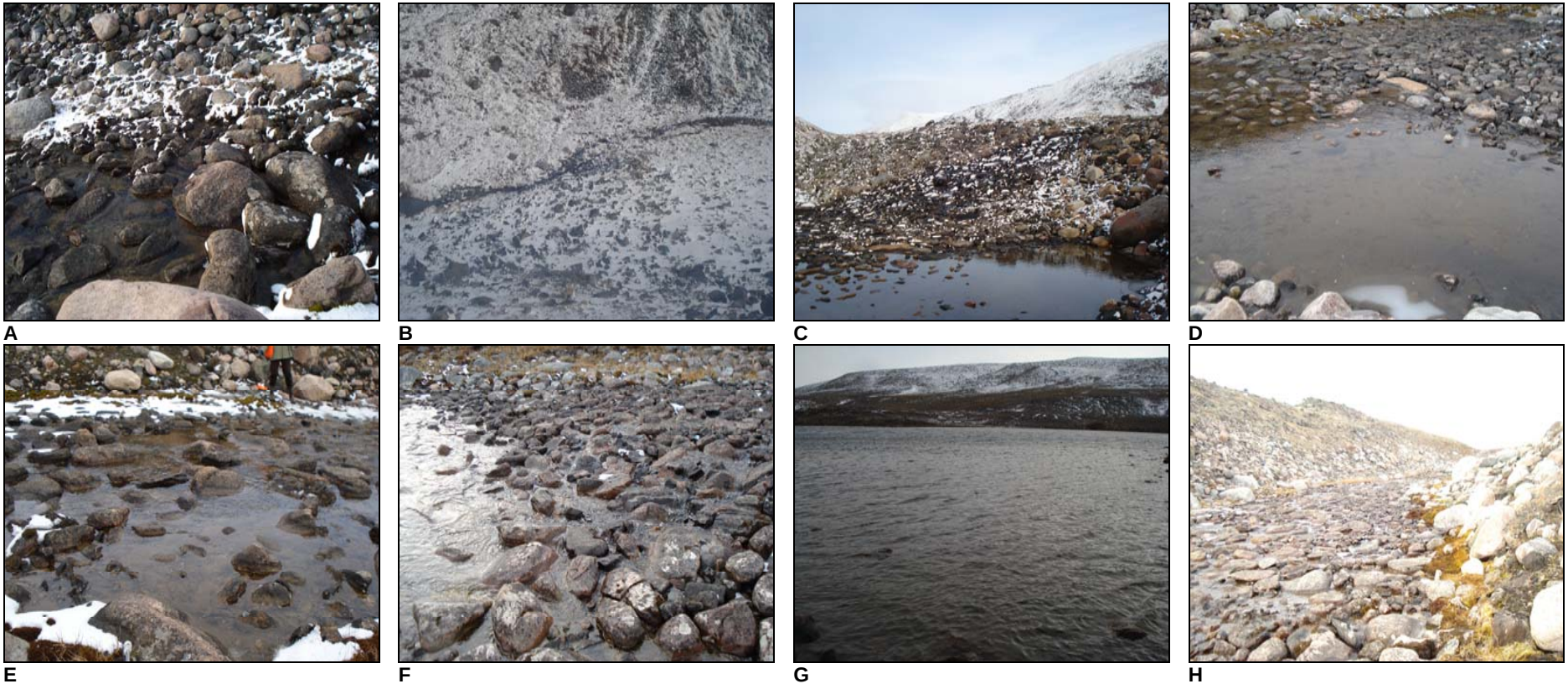


Figure 1. view at crossing (A), upstream barrier (B), upstream cascade (C), 40m upstream across (D), crossing across (E), confluence with downstream lake across (F), confluence with downstream (G), and confluence with downstream lake upstream (H).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-245
UTM Coordinates: 17 W 565488 7910032
Date/Time Surveyed: 13-Sept-08 /15:06

General Physical Characteristics

Floodplain Width (m):	On a hill	**Channel Pattern:**	Meandering	**Stage:**	Normal-low
Channel Confinement:	NC-PC	**Channel Gradient (range):**	1.5º	**Flow Regime:**	PER
Bank Height (range in m):	0.0-0.2	**Bank Shape:**	90% V 10% UD-Flooded	**T_W (°C):**	N/M

Hydrology & Habitat Characteristics

Distance and Direction from Crossing (m)	Channel Width (m)		Water Depth (m)				Water Velocity (m/s)			
	Wetted	High Water	25%	50%	75%	Max	25%	50%	75%	Max
40D	0.7	flooded	0.35	0.08	-	0.35	0.10	0.28	-	
0	0.7	0.7	0.26	0.05	-	0.26	0.01		-	
40U	0.8	0.8	0.19	0.06	0.42		0.07	0.64	1.14	

Distance and Direction from Crossing (m)	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
40D	40	30	30				10 FT,20 sand	70			
0	20	30	30		20		40FT,20 sand	20	20		
40U	10	20	10		60		20 FT	10	30	30	10

Fisheries Information

Electrofishing Conducted: N **Effort (min):** N/A **Electrofisher Settings:** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	Moderate	Moderate
NNST	No	No	Low	Low

Rail Alignment Watercourse Crossing Assessment

Location

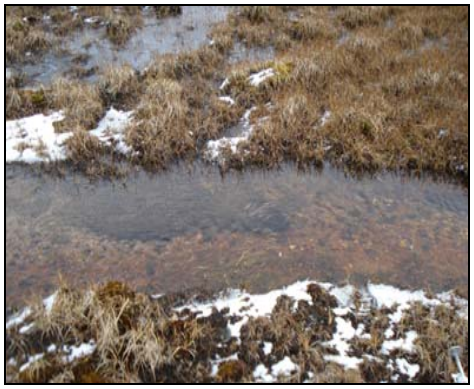
Crossing ID: AR-245
UTM Coordinates: 17 W 565488 7910032
Date/Time Surveyed: 13-Sept-08 /15:06

Comments & Summary

Potential partial barrier at UTM 17 W 565480 7910031(~ 5m downstream of crossing), it is 0.51 m high and the velocity is 1.01 m/s. This site is lower down on the same watercourse as AR-246 fish habitat.

Photographs

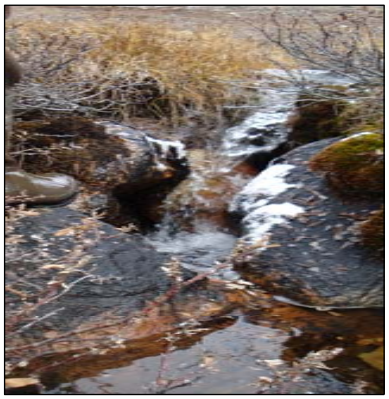
A



B

C

D



E

F

Figure 1. Aerial view of crossing (A), 40m downstream across (B), crossing across (C), 40m upstream across (D), downstream barrier (E), and upstream barrier-cascade 40m upstream (F).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-241
UTM Coordinates: 17 W 565737 7909806
Date/Time Surveyed: 13-Sept-08 /14:42

General Physical Characteristics

SSs

Floodplain Width (m):	On a hill	**Channel Pattern:**	Sinuous, single channel	**Stage:**	Normal
Channel Confinement:	PC	**Channel Gradient (range):**	2.5-3.0	**Flow Regime:**	PER
Bank Height (range in m):	0.1-0.5	**Bank Shape:**	70% UC, 30% V	**T_W (°C):**	Ice

Hydrology & Habitat Characteristics

Distance and Direction from Crossing (m)	Channel Width (m)		Water Depth (m)				Water Velocity (m/s)			
	Wetted	High Water	25%	50%	75%	Max	25%	50%	75%	Max
0	1.7	2.5	0.07	0.09	0.09	0.26	0.56	0.05	0.09	0.56

Distance and Direction from Crossing (m)	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
0	20		30		50			10	25	40	25

Fisheries Information

Electrofishing Conducted: N
Effort (min): N/A
Electrofisher Settings: N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

There is a potential downstream barrier at UTM 17 W 565724 7909784. Cascade is 0.42 m tall, velocity is 0.67m/s. Velocity is slow because the water is hitting rocks on its way down, but there are no intermediate pools for fish to rest in. Maximum depth of pool at top of cascade is 0.15 m. The only real fish habitat here is between the barrier at UTM 17 W 565724 7909784 and the lake at UTM 17 W 565720 7909765.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-241
UTM Coordinates: 17 W 565737 7909806
Date/Time Surveyed: 13-Sept-08 /14:42

Photographs


A


B


C

Figure 1. View at crossing across (A), downstream barrier facing downstream (B), and downstream barrier (C).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-240
UTM Coordinates: 17 W 565962 7909634
Date/Time Surveyed: 12-Sept-2008/12:43

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted: N **Effort (min):** N/A **Electrofisher Settings:** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	High	No
NNST	No	No	Low	No

Comments & Summary

The access road crossing is only 20 m away from the rail crossing at CV-003-01. A separate, detailed assessment is not necessary for this crossing, but it should be noted that this is important fish habitat, much like CV-003-01; note no pictures were taken, because it was the same as CV-003-01.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-239
UTM Coordinates: 17 W 566398 7909386
Date/Time Surveyed: 27-Aug-10

General Physical Characteristics

Floodplain Width (m):	N/M	**Channel Pattern:**	N/M	**Stage:**	N/A
Channel Confinement:	N/M	**Channel Gradient (range):**	N/M	**Flow Regime:**	EPH
Bank Height (range in m):	N/M	**Bank Shape:**	N/M	**T_W (°C):**	N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted:	N	**Effort (min):**	N/A	**Electrofisher Settings:**	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

Dry, poorly defined channel which drains to a shallow lake with downstream connectivity to a deep lake.

Baffinland Iron Mines
Mary River Project

North/South Consultants Inc.
Aquatic Environment Specialists

Fish Habitat Quality – NO FISH HABITAT

Rail Alignment Watercourse Crossing Assessment

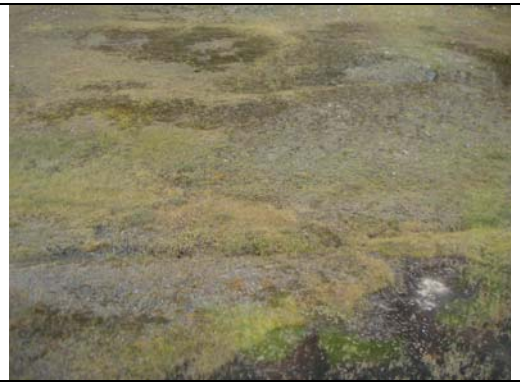
Location

Crossing ID: AR-239
UTM Coordinates: 17 W 566398 7909386

Date/Time Surveyed: 27-Aug-10

Photographs

A



B

C

Figure 1. Upstream from crossing (A), view at crossing (B), view downstream from crossing (C).

AR-237
AR-236
AR-235
AR-234
AR-233
AR-232
AR-231
AR-230
AR-229
AR-228
AR-227
AR-226
AR-225
AR-223
AR-222
AR-221
AR-220
AR-219
AR-218
AR-217
AR-216
AR-215
AR-214
AR-213
AR-212
AR-211
AR-210
AR-209
AR-208
AR-207
AR-206
AR-205

SCALE 500 250 0 500 1,000 1,500 Metres

LEGEND:

ACCESS ROAD CROSSING SURVEY YEAR
- 2007
- 2008
- 2010
- STREAM CROSSING
- FISH BARRIER (CONFIRMED)
- FISH BARRIER (AERIAL PHOTO INTERPRETATION)

- CONTOUR
- MILNE INLET TOTE ROAD (EXISTING)
- RAILWAY ALIGNMENT (PROPOSED)
- CONSTRUCTION ACCESS ROAD (PROPOSED)
- WATER
- INFRASTRUCTURE

NOTES:

1. BASE MAP 1:50,000 © HER MAJESTY THE QUEEN IN RIGHTS OF CANADA DEPARTMENT OF NATURAL RESOURCES (2009.) ALL RIGHTS RESERVED.
2. TOPOGRAPHY PROVIDED BY EAGLE MAPPING (2005).
3. PROPOSED RAILWAY ALIGNMENT PROVIDED BY CANRAIL CONSULTANTS INC.
4. PROPOSED RAILWAY CONSTRUCTION ACCESS ROAD ALIGNMENT PROVIDED BY CANRAIL CONSULTANTS INC. DRAWING NO.: RAILWAY ALIGNMENT AND CONST ACCESS RD - MARY RIVER STEENSBY 2010 -12AUG2010.DWG
5. LOCATION OF PROPOSED INFRASTRUCTURE IS APPROXIMATE AND SUBJECT TO FIELD ADJUSTEMENTS
6. CONTOUR INTERVAL IS 25 AND IS IN METRES.

BAFFINLAND IRON MINES CORPORATION

MARY RIVER PROJECT

Access Road Stream Crossing Sites (MAP B)

North/South Consultants Inc.
Aquatic Environment Specialists

P/A NO.	REF NO.
-	-
DATE: 19/11/2010	REV 2

Path: G:\MARYRIV_GDB\EIS_GDB\EIS_Figures_2010EIS_Figures\MXD\Synthesis_RailLine_AccessRoad\Rev2Apdx\20101119_ApdxAR_sg.mxd

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-237
UTM Coordinates: 17 W 566974 7908820
Date/Time Surveyed: 13-Sept-08 /14:12

General Physical Characteristics

Floodplain Width (m):	11	**Channel Pattern:**	Sinuous	**Stage:**	Normal
Channel Confinement:	PC	**Channel Gradient (range):**	0.75º	**Flow Regime:**	PER
Bank Height (range in m):	0.2-0.4	**Bank Shape:**	100% V	**T_W (°C):**	Ice

Hydrology & Habitat Characteristics

Distance and Direction from Crossing (m)	Channel Width (m)		Water Depth (m)				Water Velocity (m/s)			
	Wetted	High Water	25%	50%	75%	Max	25%	50%	75%	Max
0	2.75	5.2	0.13	0.25	0.15	0.25	0.05	0.17	0.44	0.44
40U	3.2	6.0	0.32	0.25	0.22	0.39	0.23	0.23	0.00	0.23
80U	7.13	15.77	0.03	0.01			Too shallow	Too shallow		

Distance and Direction from Crossing (m)	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
40D								30	55	10	5
0	70		10		20			5	30	60	5
40U	70	20	10					20	50	30	
80U							50FT	40	10		

Fisheries Information

Electrofishing Conducted: N **Effort (min):** N/A **Electrofisher Settings:** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	High	High
NNST	No	No	Low	Low

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-237
UTM Coordinates: 17 W 566974 7908820
Date/Time Surveyed: 13-Sept-08 /14:12

Comments & Summary

Large lake 5% shallow, 95% deep pool, 30 m downstream at UTM 17 W 566940 7908817. Definitely fish habitat / Wetted width =2.47. Just upstream of the crossing the stream splits to the left and the right (~10 m upstream). There is a large lake just downstream of the crossing, same stream as CV-004-1

Photographs

Figure 1. View at crossing across (A), 40m upstream left channel 1 (B), 40m upstream left channel 2 across (C), 40m upstream centre channel across (D), 40m upstream right channel across (E), crossing across (F), downstream lake (G), and downstream lake substrate (H).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-234
UTM Coordinates: 17 W 567980 7908172
Date/Time Surveyed: 12-Sept-2008/14:11

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted: N **Effort (min):** N/A **Electrofisher Settings:** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

Not fish habitat at the crossing (channel of boulders with a little bit of water flowing underneath). Fish habitat stops ~40 m downstream of the crossing (UTM 17 W 567952 7908146) Upstream the gradient is 4°. The stream connects to a large downstream lake at UTM 17 W 567742 7908112. This upstream source of the stream is a shallow pond.

Baffinland Iron Mines
Mary River Project

North/South Consultants Inc.
Aquatic Environment Specialists

Fish Habitat Quality – NO FISH HABITAT

Rail Alignment Watercourse Crossing Assessment

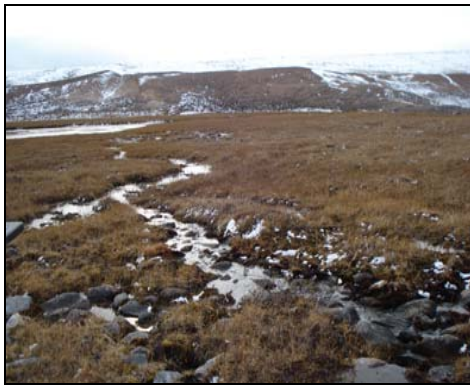
Location

Crossing ID: AR-234
UTM Coordinates: 17 W 567980 7908172
Date/Time Surveyed: 12-Sept-2008/14:11

Photographs


A


B


C


C

Figure 1. View of habitat at crossing (A), at downstream barrier (B), downstream of barrier (C), and upstream of barrier (D).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-233
UTM Coordinates: 17 W 568533 7907875
Date/Time Surveyed: 13-Sept-08 /13:46

General Physical Characteristics

Floodplain Width (m):	128	**Channel Pattern:**	Braided, meandering	**Stage:**	Normal-low
Channel Confinement:	NC-PC	**Channel Gradient (range):**	1°	**Flow Regime:**	PER
Bank Height (range in m):	0-0.45	**Bank Shape:**	30%UC, 70% V	**T_W (°C):**	Ice

Hydrology & Habitat Characteristics

Distance and Direction from Crossing (m)	Channel Width (m)		Water Depth (m)				Water Velocity (m/s)			
	Wetted	High Water	25%	50%	75%	Max	25%	50%	75%	Max
40D (4ch)	5.45	7.6	0.13	0.2	0.19	0.2	0.2	0.17	0.01	0.2
0 (5 ch)	6.3	10.2	0.14	0.1	0.16	0.16	0.04	0.00	0.00	0.06

Distance and Direction from Crossing (m)	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
40D	50	30			20			20	60	20	
0	40	40			20			30	50	20	

Fisheries Information

Electrofishing Conducted: N **Effort (min):** N/A **Electrofisher Settings:** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	High	High
NNST	No	No	Low	Low

Rail Alignment Watercourse Crossing Assessment

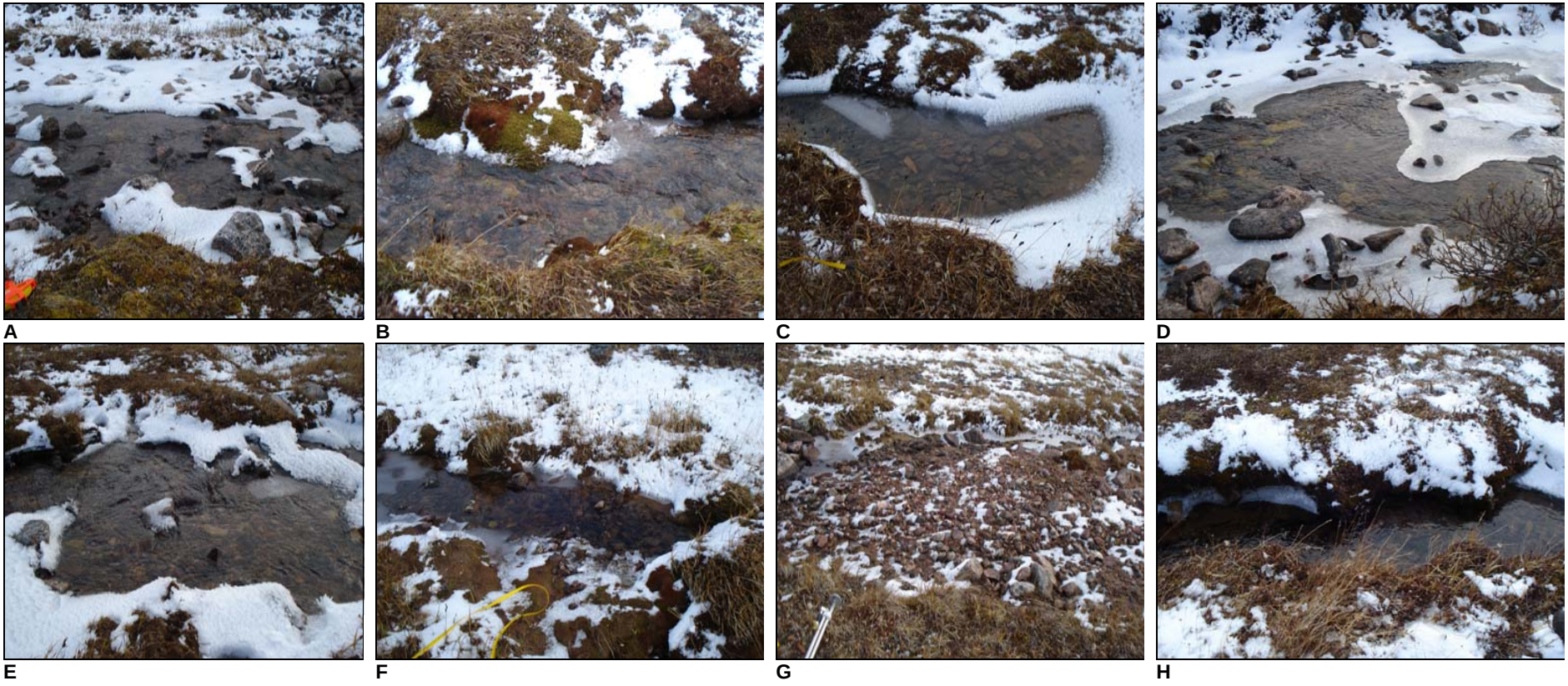
Location

Crossing ID: AR-233
UTM Coordinates: 17 W 568533 7907875
Date/Time Surveyed: 13-Sept-08 /13:46

Comments & Summary

Fished ~ 100 m US in summer at CV-006-01. Wetted width was 3.13 . Note: there are many channels from the same source running through this area.

Photographs



A **B** **C** **D**

E **F** **G** **H**

Figure 1. View at 40m DS channel 1 from right across (A), 40m DS channel 3 from right across (B), 40m DS channel 4 from right across (C), crossing channel 1 from right across (D), crossing channel 2 from right across (E), crossing channel 3 from right across (F), at crossing channel 4 from right across (G), and crossing channel 5 across (H).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-232
UTM Coordinates: 17 W 568584 7907828
Date/Time Surveyed: 12-Sept-2008/14:35

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted: N **Effort (min):** N/A **Electrofisher Settings:** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

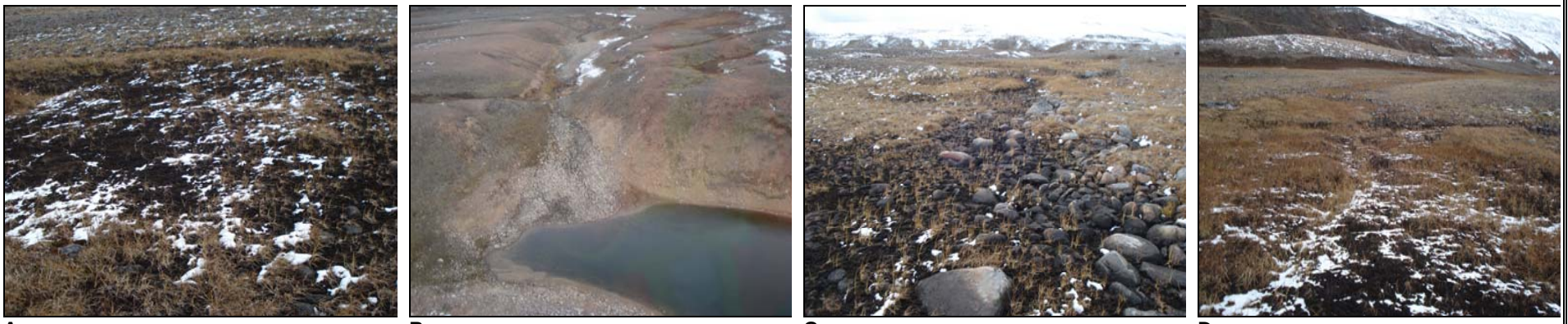
Currently completely dry. The stream is never fish habitat. There is a barrier right at the confluence with downstream lake even when there is water.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-232
UTM Coordinates: 17 W 568584 7907828
Date/Time Surveyed: 12-Sept-2008/14:35

Photographs



A **B** **C** **D**

Figure 1. View of habitat at crossing (A), downstream barrier (B), downstream of crossing (C), and upstream of crossing (D).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-222
UTM Coordinates: 17 W 572505 7905070
Date/Time Surveyed: 12-Sept-2008/14:51

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted: N **Effort (min):** N/A **Electrofisher Settings:** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

The crossing itself is a barrier in the channel (giant boulders blocking passage). Even when water is high, fish could not get past it. There is another barrier downstream at UTM 17 W 572393 7904988. Fish will not get upstream past this point (120 m D/S of crossing). There is another barrier at UTM 17 W 572371 7904938(180 M D/S of crossing). This stream has patches of good habitat, but is generally inaccessible to fish upstream of UTM 17 W 572371 7904938. Source of water for this stream is runoff, empties into downstream river at UTM 17 W 572145 7904827.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-222
UTM Coordinates: 17 W 572505 7905070
Date/Time Surveyed: 12-Sept-2008/14:51

Photographs

A B C

D

Figure 1. Aerial view of confluence with lake downstream (A), view of habitat at the crossing (B), and of downstream barriers (C-D).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-221
UTM Coordinates: 17 W 572910 7904789
Date/Time Surveyed: 6-Sept-08/07:42

General Physical Characteristics

BB
Floodplain Width (m): 148
Channel Pattern: Braided, sinuous
Stage: Normal
Channel Confinement: PC
Channel Gradient (range): 0-4°
Flow Regime: PER
Bank Height (range in m): 0-4
Bank Shape: UD(rocks with UC sand)
T_W (°C): 0.0

Hydrology & Habitat Characteristics

Distance and Direction from Crossing (m)	Channel Width (m)		Water Depth (m)				Water Velocity (m/s)			
	Wetted	High Water	25%	50%	75%	Max	25%	50%	75%	Max
40D (3 chnls)	20.4	40	0.27	0.1	0.49	0.52	0.19	0.19	1.19	1.19
20D(2 chnls)	37.1	56.3	0.26	0.19	0.56	0.56	0.22	0.28	0.06	0.52
0 (2 chnls)	35.8	56	0.22	0.22	0.4	0.54	0.19	0.15	0.53	0.63
20U (3 chnls)	29.2	61.3	0.54	0.23	0.39	0.39	0.00	0.00	0.27	0.75
40U (5 chnls)	31.4	56	0.05	0.16	0.27	0.33	0.26	0.44	0.81	0.715

Distance and Direction from Crossing (m)	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
40D	5	35	5		25	Rapid 30	15	20	20	15	30
20D	30	25	15		20	Rapid 10	10	20	30	20	20
0	20	40	10		5	Rapid 25	10	20	30	20	20
20U	15	40	20		5	Rapid 20	10	15	25	25	30
40U	35	15	5		20	Rapid 25	10	10	30	20	30

Fisheries Information

Electrofishing Conducted: N
Effort (min): N/A
Electrofisher Settings: N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	High	Low
NNST	No	No	Low	No

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-221
UTM Coordinates: 17 W 572910 7904789
Date/Time Surveyed: 6-Sept-08/07:42

Comments & Summary

This is the same stream as BR-011-1. Crossing site on left bank at UTM 17 W 572901 7904834.

Photographs

A B C D E

Figure 1. View of habitat 40 (A) and 20 m (B) downstream of crossing, at the crossing (C), and 20 (D), and 40 m (E), upstream of the crossing.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-210
UTM Coordinates: 17 W 577740 7902616
Date/Time Surveyed: 3-Sept-08 /07:43

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

Distance and Direction from Crossing (m)	Channel Width (m)		Water Depth (m)				Water Velocity (m/s)			
	Wetted	High Water	25%	50%	75%	Max	25%	50%	75%	Max
80D	4.20	50.29	0.13	0.22	0.44	0.44	0.00	0.03	0.00	0.03
60D	10.3	54.86	0.16	0.34	0.32	0.34	0.0	0.0	0.0	0.0
40D	DEAD END-flow veers into currently inaccessible adjacent pool and heads downstream									
20D	3.95	54.86	0.06	0.13	0.05	0.13	0.00	0.00	0.00	0.0
0	2.33	68.58	0.14	0.24	0.43	0.43	0.11	0.15	0.00	0.00
20U	17.37	84.12	0.13	0.24	0.58	0.58	0.00	0.00	0.00	0.00
40U	6.2	45.72	0.02	0.09	0.30	0.30	0.00	0.25	0.38	0.38

Distance and Direction from Crossing (m)	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
80D	10	70	20						20	80	
60D		25	75							100	
40D	DEAD END-flow veers into currently inaccessible adjacent pool and heads downstream										
20D		100					20 FT		40	30	10
0	20	70	10						20	80	
20U	20	40	40						10	70	20
40U	35	20	45				40 FT		20	30	10

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-210
UTM Coordinates: 17 W 577740 7902616
Date/Time Surveyed: 3-Sept-08 /07:43

Fisheries Information

Electrofishing Conducted: Y
Effort (min): 8:50
Electrofisher Settings: 500V, 40Hz, 30%

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	3	0.45	85-100	-
NNST	0	-	-	-

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	Moderate	Low
NNST	Low	No	Low	No

Comments & Summary

The water temperature was 4.5°C

At 40m downstream there is a dead end. Flow veers into currently inaccessible adjacent pool as it heads downstream. The flow is under rocks. All fish were caught at crossing, water very murky.

Baffinland Iron Mines
Mary River Project

North/South Consultants Inc.
Aquatic Environment Specialists

Fish Habitat Quality – MARGINAL

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-210
UTM Coordinates: 17 W 577740 7902616
Date/Time Surveyed: 3-Sept-08 /07:43

Photographs

Figure 1. View at 40m DS across (A), 20m downstream across (B), 20m upstream across (C), 40m upstream across (D), crossing (E), crossing downstream (F), crossing upstream (G), and upstream lake (H).

AR-209
AR-208
AR-207
AR-206
AR-205
AR-204
AR-203
AR-202b
AR-202a
AR-200a
AR-199a
AR-198
AR-197a
AR-196
AR-195a
AR-194a
AR-193b
AR-193a
AR-192a
AR-191a
AR-190a
AR-189a
AR-188a
AR-187c
AR-187a
AR-187b
AR-186a
AR-185
AR-184
AR-183
AR-182
AR-181
AR-180
AR-178a
AR-177
AR-176
AR-175

SCALE 500 250 0 500 1,000 1,500 Metres

LEGEND:

ACCESS ROAD CROSSING SURVEY YEAR
- 2007
- 2008
- 2010
- 2011

STREAM CROSSING
FISH BARRIER (CONFIRMED)
FISH BARRIER (AERIAL PHOTO INTERPRETATION)

CONTOUR
MILNE INLET TOTE ROAD (EXISTING)
RAILWAY ALIGNMENT (PROPOSED)
CONSTRUCTION ACCESS ROAD (PROPOSED)
WATER
INFRASTRUCTURE (PROPOSED FOR CONSTRUCTION AND OPERATIONS PERIODS)

NOTES:

1. BASE MAP: © HER MAJESTY THE QUEEN IN RIGHTS OF CANADA DEPARTMENT OF NATURAL RESOURCES (2009.) ALL RIGHTS RESERVED.
2. TOPOGRAPHY PROVIDED BY EAGLE MAPPING (2005).
3. PROPOSED RAILWAY ALIGNMENT PROVIDED BY CANRAIL CONSULTANTS INC.
4. PROPOSED RAILWAY CONSTRUCTION ACCESS ROAD ALIGNMENT PROVIDED BY CANRAIL CONSULTANTS INC. DRAWING NO.: RAILWAY ALIGNMENT AND CONST ACCESS RD - MARY RIVER STEENSBY 2010 -12AUG2010.dwg
5. LOCATION OF PROPOSED INFRASTRUCTURE IS APPROXIMATE AND SUBJECT TO FIELD ADJUSTEMENTS
6. CONTOUR INTERVAL IS 25 M AND IS IN METRES.

BAFFINLAND IRON MINES CORPORATION

MARY RIVER PROJECT

Access Road Stream Crossing Sites (MAP C)

North/South Consultants Inc.
Aquatic Environment Specialists

P/A NO.	REF NO.
-	03-13-3
DATE: 15/12/2011	REV 2

Path: G:\MARYRIV_GDB\EIS_GDB\FEIS\UpdatedMapping\Baseline appendicies\7C8-19_to_7C11-19_App5_1-3_MapsAtoK.mxd

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-205
UTM Coordinates: 17 W 579732 7901853
Date/Time Surveyed: 12-Sept-2008/15:32

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted: N **Effort (min):** N/A **Electrofisher Settings:** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	High	No
NNST	No	No	Low	No

Comments & Summary

Downstream lake at UTM 17 W 579682 7901652. Same stream as CV-019-1.Looks like nice fish habitat up to the crossing point, then there are a lot of boulders and low water upstream of that point. Apparent barrier at UTM 17 W 579753 7901873 (approximately 20m upstream of crossing).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-205
UTM Coordinates: 17 W 579732 7901853
Date/Time Surveyed: 12-Sept-2008/15:32

Photographs

A

B

C

D

E

Figure 1. View of habitat at crossing (A), downstream of crossing (B), upstream of crossing (C), boulders in channel (D), and of channel disappearing underground downstream of crossing (E).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-204
UTM Coordinates: 17 W 580297 7901473
Date/Time Surveyed: 12-Sept-2008/15:39

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted: N **Effort (min):** N/A **Electrofisher Settings:** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

Downstream barrier at UTM 17 W 580313 7901413. Two sets of falls block the 2 left-most channels and there's an additional right-hand dry channel (fish cannot get upstream past this point). The crossing itself has nice fish habitat. Downstream lake at UTM 17 W 580312 7901344. Upstream limit of extent of fish habitat at UTM 17 W 580303 7901534.

Baffinland Iron Mines
Mary River Project

North/South Consultants Inc.
Aquatic Environment Specialists

Fish Habitat Quality – NO FISH HABITAT

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-204
UTM Coordinates: 17 W 580297 7901473
Date/Time Surveyed: 12-Sept-2008/15:39

Photographs

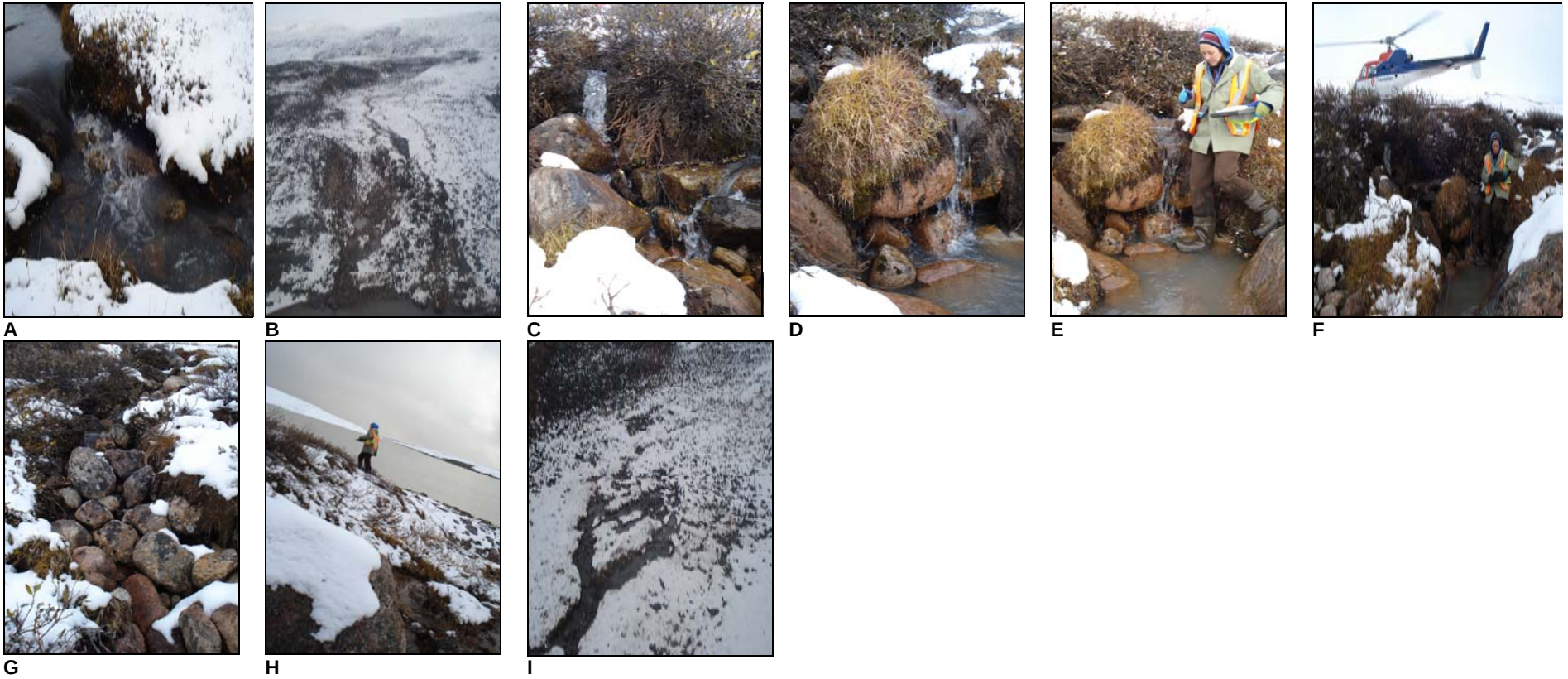


Figure 1. View of habitat at crossing (A), confluence with lake downstream (B), downstream barriers (C-G), downstream lake (H), and upstream limit of potential habitat (I).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-203
UTM Coordinates: 17 W 580411 7901426
Date/Time Surveyed: 10-Sept-2008/18:05

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted: N
Effort (min): N/A
Electrofisher Settings: N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

There is an upstream pond at UTM 17 W 580581 7901558 that appears to feed the stream, which could be deep enough to overwinter. Due to snow, there was no obvious channel. Unlikely that fish get past boulders at UTM 17 W 580396 7901390 from downstream lake at UTM 17 W 580386 7901335.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-203
UTM Coordinates: 17 W 580411 7901426
Date/Time Surveyed: 10-Sept-2008/18:05

Photographs

A

B

C

D

E

F

Figure 1. View at crossing downstream (A), crossing across (B), crossing upstream (C), confluence with downstream lake (D), downstream boulder barrier (E), and upstream pond (F).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-199a
UTM Coordinates: 17 W 582469 7900930
Date/Time Surveyed: 10-Sept-2008/17:32

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted: N **Effort (min):** N/A **Electrofisher Settings:** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

Downstream barrier at UTM 17 W 582057 7900941. The site itself is only approximately 100m downstream of another rock barrier at UTM 17 W 582551 7901005. The site itself is nice fish habitat, but it is not accessible to any fish.

Baffinland Iron Mines
Mary River Project

North/South Consultants Inc.
Aquatic Environment Specialists

Fish Habitat Quality – NO FISH HABITAT

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-199a
UTM Coordinates: 17 W 582469 7900930
Date/Time Surveyed: 10-Sept-2008/17:32

Photographs

A

B

C

D

E

Figure 1. View at crossing downstream (A), crossing across (B), crossing upstream (C), downstream barrier (D), and upstream barrier (E).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-195a
UTM Coordinates: 17 W 583374 7900726
Date/Time Surveyed: 27-Aug-10

General Physical Characteristics

Floodplain Width (m):	N/M	**Channel Pattern:**	N/M	**Stage:**	N/A
Channel Confinement:	N/M	**Channel Gradient (range):**	N/M	**Flow Regime:**	INT
Bank Height (range in m):	N/M	**Bank Shape:**	N/M	**T_W (°C):**	N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted:	N	**Effort (min):**	N/A	**Electrofisher Settings:**	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	Low	No

Comments & Summary

Saturated area that eventually connects to Angajurjualuk Lake. No channel development at crossing area; ponded water. Discontinuous to Angajurjualuk Lake. No water flow. No headwaters.

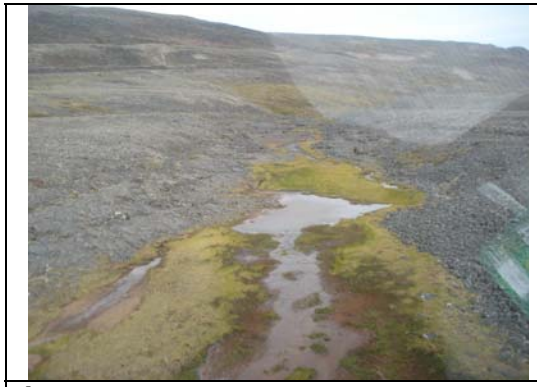
Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-195a
UTM Coordinates: 17 W 583374 7900726

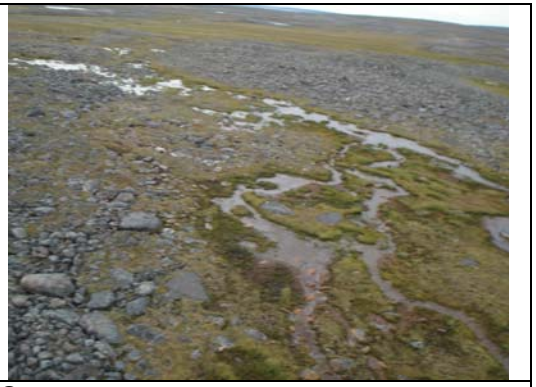
Date/Time Surveyed: 27-Aug-10

Photographs



A

B



C

D

E

F

Figure 1. Upstream from crossing (A), view at crossing (B), view downstream of crossing (C and D), view of saturated flat area downstream of crossing area (E), looking upstream towards crossing area at saturated flat area (F).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-194a
UTM Coordinates: 17 W 584030 7900537
Date/Time Surveyed: 27-Aug-10

General Physical Characteristics

Floodplain Width (m):	N/M	**Channel Pattern:**	Braided	**Stage:**	N/A
Channel Confinement:	N/M	**Channel Gradient (range):**	N/M	**Flow Regime:**	PER
Bank Height (range in m):	N/M	**Bank Shape:**	N/M	**T_W (°C):**	N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted:	N	**Effort (min):**	N/A	**Electrofisher Settings:**	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	Low	No
NNST	Low	No	Moderate	No

Comments & Summary

Permanent watercourse with connectivity downstream to Angajurjualuk Lake. Braided channel and cobble/gravel dominated substrate at crossing area. Channel is discontinuous approximately 200 m upstream of crossing. Fish presence is assumed based on downstream connectivity to Angajurjualuk Lake.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-194a
UTM Coordinates: 17 W 584030 7900537

Date/Time Surveyed: 27-Aug-10

Photographs

A

B

C

D

Figure 1. At crossing looking upstream (A), view at crossing (B), view at crossing (C), view downstream of crossing (D).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-193b
UTM Coordinates: 17 W 584237 7900416
Date/Time Surveyed: 14-Aug-2011/12:25

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted: N
Effort (min): N/A
Electrofisher Settings: N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

In 2010, a desktop assessment was conducted for this site and Fish Habitat Quality was designated as No Fish Habitat. That designation was maintained as a result of the information collected during a site visit in 2011.

Ground at site boggy with no defined channel. Exposed boulders approximately 30 m upstream; could be a small amount of flow here during spring freshet but fish cannot access the area.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-193b
UTM Coordinates: 17 W 584237 7900416
Date/Time Surveyed: 14-Aug-2011/12:25

Photographs

A

B

C

D

E

Figure 1. View at the crossing to the north (A), east (B), south (C) and west (D), and of the substrate (E).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-193a
UTM Coordinates: 17 W 584629 7900408
Date/Time Surveyed: 14-Aug-2011/12:20

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted: N
Effort (min): N/A
Electrofisher Settings: N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

In 2010, a desktop assessment was conducted for this site and Fish Habitat Quality was designated as No Fish Habitat. That designation was maintained as a result of the information collected during a site visit in 2011.

No water present at site although exposed boulders indicate occasional spring flow through the area from the upstream lake that is known to be Important fish habitat. If water were present, flow would occur below the boulders.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-193a
UTM Coordinates: 17 W 584629 7900408
Date/Time Surveyed: 14-Aug-2011/12:20

Photographs

A

B

C

Figure 1. View upstream (A), downstream (B), and across (C) at the crossing.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-191a
UTM Coordinates: 17 W 584922 7900098
Date/Time Surveyed: 10-Sept-2008/16:29

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted: N **Effort (min):** N/A **Electrofisher Settings:** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

Really only a depression in a hillside. There is no defined channel.

Baffinland Iron Mines
Mary River Project

North/South Consultants Inc.
Aquatic Environment Specialists

Fish Habitat Quality – NO FISH HABITAT

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-191a
UTM Coordinates: 17 W 584922 7900098
Date/Time Surveyed: 10-Sept-2008/16:29

Photographs

A

B

C

Figure 1. Aerial views of the crossing site (A-C).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-190a
UTM Coordinates: 17 W 585123 7899940
Date/Time Surveyed: 10-Sept-08

General Physical Characteristics

Floodplain Width (m):	>200	**Channel Pattern:**	Linear	**Stage:**	Normal-low
Channel Confinement:	NC	**Channel Gradient (range):**	N/M	**Flow Regime:**	INT
Bank Height (range in m):	0.28	**Bank Shape:**	100% V	**T_W (°C):**	N/M

Hydrology & Habitat Characteristics

Distance and Direction from Crossing (m)	Channel Width (m)		Water Depth (m)				Water Velocity (m/s)			
	Wetted	High Water	25%	50%	75%	Max	25%	50%	75%	Max
60D	2.5	5	0.06	0.05	0.06		0.01	0.00	0.00	
40D	1.75	12	0.11	0.15	0.16	0.16	0.00	0.00	0.00	
20D	5	13	0.16	0.10	0.08	0.16	0.05	0.01	0.00	
0	3	6	0.15	0.18	0.11	0.18	0.00	0.00	0.00	
20U	3	7	0.08	0.15	0.17	0.20	0.00	0.04	0.00	0.04
40U	0	3		0.05				0.00		
60U	0	3		0.05				0.00		

Distance and Direction from Crossing (m)	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
60D	5	85			10				30	30	40
40D	10	90							30	40	30
20D	10	85			5				15	40	45
0		100							40	45	15
20U		95	5						30	35	35
40U		100							10	40	50
60U		100							10	40	50

Fisheries Information

Electrofishing Conducted: N
Effort (min): N/A
Electrofisher Settings: N/A

Baffinland Iron Mines
Mary River Project

North/South Consultants Inc.
Aquatic Environment Specialists

Fish Habitat Quality – MARGINAL

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-190a
UTM Coordinates: 17 W 585123 7899940
Date/Time Surveyed: 10-Sept-08

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	Moderate	None
NNST	Low	No	Moderate	None

Comments & Summary

Already fished stream nearby at BR-025-1.

Photographs


A.


B


C


D


E


F

Figure 1. View at 40m downstream across (A), 20m downstream (B), crossing across (C), 20m upstream across (D), 40m upstream (E), and 60m upstream (F).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-189a
UTM Coordinates: 17 W 585181 7899892
Date/Time Surveyed: 10-Sept-08 /15:06

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

Distance and Direction from Crossing (m)	Channel Width (m)		Water Depth (m)				Water Velocity (m/s)			
	Wetted	High Water	25%	50%	75%	Max	25%	50%	75%	Max
60D	1.0	31		0.15				0.00		
40D	0.5	31			0.02				0.00	
20D	7.0	32	0.10				0.00			
0	7.0	54	0.27	No Water			0.00	No Water		
20U	8.0	34	0.27				0.00			
40U	8.0	47	0.15				0.01			
60U	17.0	40		0.06				0.08		

Distance and Direction from Crossing (m)	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
60D		100					5	5	30	35	25
40D		100					5	5	30	35	25
20D	20	70			10		15	5	25	35	20
0	5	75	15	5			15	5	25	35	20
20U		80	20				20	10	15	40	15
40U	10	85			5		15	10	20	40	15
60U	5	90			5		10	5	25	35	25

Fisheries Information

Electrofishing Conducted: N
Effort (min):
Electrofisher Settings:

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	Moderate	Low
NNST	No	No	Moderate	Low

Baffinland Iron Mines
Mary River Project

North/South Consultants Inc.
Aquatic Environment Specialists

Fish Habitat Quality – MARGINAL

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-189a
UTM Coordinates: 17 W 585181 7899892
Date/Time Surveyed: 10-Sept-08 /15:06

Comments & Summary

Channel almost completely dry at this point; only a small amount of standing water right at crossing. Already fished downstream at BR-025-1. Note: Started assessing AR-189 only 20m upstream and went down to 100 m downstream, based on UTM 17 W 585273 7899851.

Photographs


A


B


C


D


E


F


G

Figure 1. View at 60m downstream across (A), 40m (B), 20m (C), crossing across (D), 20m upstream across (E), 40m (F), and 60m (G).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-188a
UTM Coordinates: 17 W 585245 7899838
Date/Time Surveyed: 9-Sept-08 /15:49

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

Distance and Direction from Crossing (m)	Channel Width (m)		Water Depth (m)				Water Velocity (m/s)			
	Wetted	High Water	25%	50%	75%	Max	25%	50%	75%	Max
100D	10	10.5	0.15	0.07	0.16	0.16	0.16	0.04	0.61	0.61
80D	11.6	11.6	0.16	0.09	0.05	0.26	0.34	0.16	0.00	0.64
60D	7.5	7.5	0.14	0.08	0.04	0.26	0.3	0.04	0.23	-
40D	11.15	12.4	0.12	0.14	0.17	0.24	0.00	0.23	0.18	0.52
20D	11.4	11.4	0.2	0.05	0.14	0.12	0.15	0.11	0.25	0.4
0	12.7	15.1	0.08	0.15	0.14	0.26	0.05	0.17	0.22	-
20U	12.9	12.9	0.1	0.08	0.1	0.18	0.22	0.51	0.24	0.61

Distance and Direction from Crossing (m)	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
100D	50	30			20		20	20	30	20	10
80D	60	30			10		25	10	35	20	10
60D	60	40					20	30	30	15	5
40D	50	35	5		10		20	30	30	20	
20D	30	30	10		30		15	30	20	25	10
0	50	20	10		20		20	15	20	35	10
20U	30	30	10		30		5	10	50	25	10

Fisheries Information

Electrofishing Conducted: N **Effort (min):** N/A **Electrofisher Settings:** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	High	Moderate
NNST	Low	No	Moderate	Low

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-188a
UTM Coordinates: 17 W 585245 7899838
Date/Time Surveyed: 9-Sept-08 /15:49

Comments & Summary

Electrofishing already conducted at an upstream site.

Photographs


A


B


C


D


E


F


G

Figure 1. View of habitat 100 (A), 80 (B), 60 (C), 40 (D), and 20 m (E) downstream of crossing, at the crossing (F), and 20 (G) upstream of the crossing.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-187a
UTM Coordinates: 17 W 585302 7899789
Date/Time Surveyed: 9-Sept-08 /17:05

General Physical Characteristics

Floodplain Width (m):	N/M	**Channel Pattern:**	Braided, straight	**Stage:**	Normal
Channel Confinement:	NC-PC	**Channel Gradient (range):**	0.75°	**Flow Regime:**	PER
Bank Height (range in m):	0.0-0.75	**Bank Shape:**	100% UC (but above water)	**T_W (°C):**	N/M

Hydrology & Habitat Characteristics

Distance and Direction from Crossing (m)	Channel Width (m)		Water Depth (m)				Water Velocity (m/s)			
	Wetted	High Water	25%	50%	75%	Max	25%	50%	75%	Max
60D	28	46	0.29	0.19	0.39	0.39	0.67	0.81	0.96	0.96
40D	34	46	0.37	0.16	0.19	0.39	0.45	0.12	0.17	0.91
20D	46	46	0.03	0.07	0.21	0.46	0.07	0.54	0.29	-
0	25	25	0.36	0.25	0.26	-	0.20	0.43	0.38	0.64
20U	18	22	0.36	0.23	0.13	-	0.54	0.66	0.61	
40U	34	34	0.39	0.24	0.15	-	0.45	0.21	0.24	0.95
60U	27	33	0.45	0.1	0.17	0.45	0.57	0.2	0.32	0.57

Distance and Direction from Crossing (m)	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
60D	15	30	20		15	20 rapid	15	5	25	40	15
40D	40	20	20		20		10	5	30	35	20
20D	20	10	40		30		5	5	20	50	20
0	30	25	25		20		25	5	20	35	15
20U	50	15	5		30		20	10	25	35	10
40U	40	20	20		30		20	20	25	25	10
60U	20	20	10		30	20 rapid	20	15	25	30	10

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-187a
UTM Coordinates: 17 W 585302 7899789
Date/Time Surveyed: 9-Sept-08 /17:05

Fisheries Information

Electrofishing Conducted: N
Effort (min): N/A
Electrofisher Settings: N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	High	High
NNST	Low	No	Moderate	Moderate

Comments & Summary

Electrofishing already done for nearby rail route bridge. No additional electrofishing necessary. Started at UTM 17 W 585273 7899851 and moved downstream. Large, open floodplain.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-187a
UTM Coordinates: 17 W 585302 7899789
Date/Time Surveyed: 9-Sept-08 /17:05

Photographs

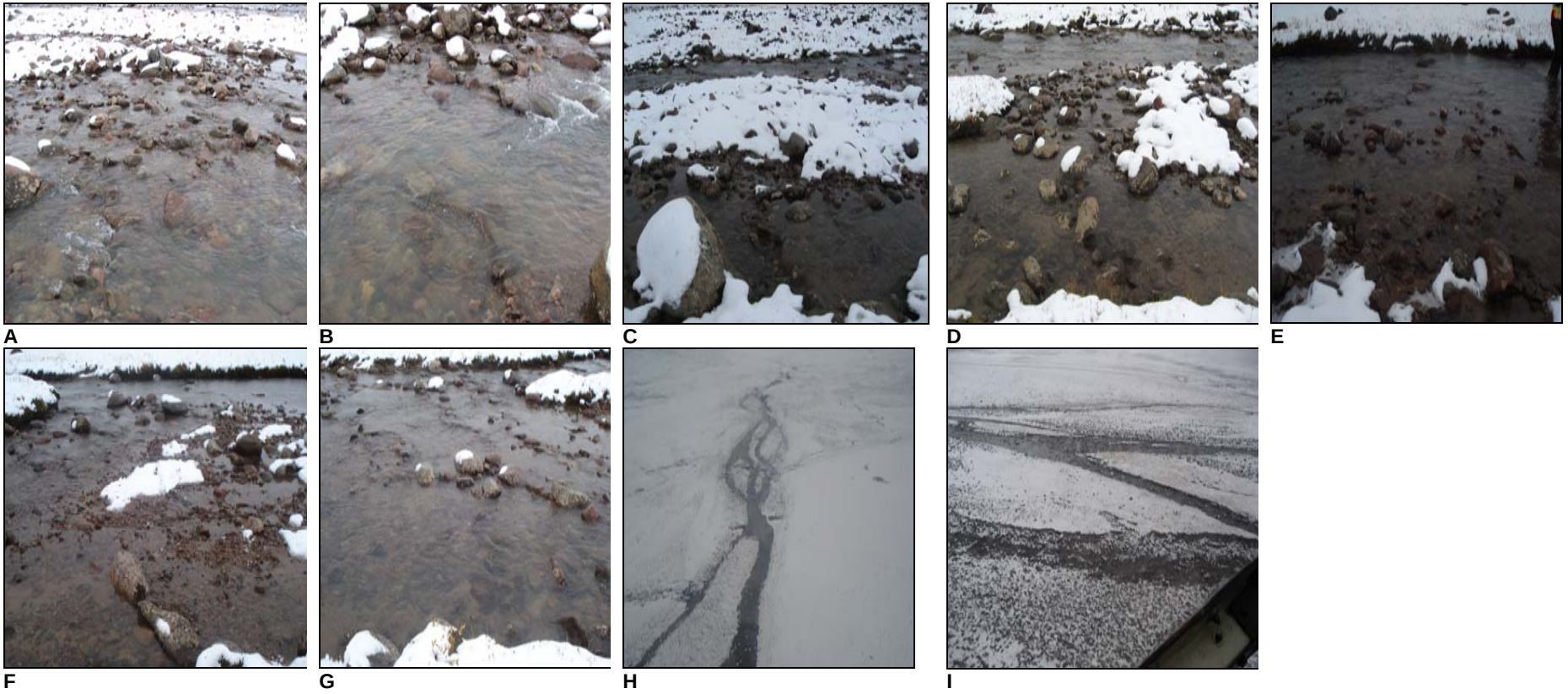


Figure 1. View at 60m downstream across (A), 40m (B), 20m (C), at crossing across (D), 20m upstream across (E), 40m (F), 60m (G), aerial of crossing (H), and aerials of AR-197 & AR-188 crossings (I).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-187b
UTM Coordinates: 17 W 585703 7900187
Date/Time Surveyed: 27-Aug-10

General Physical Characteristics

Floodplain Width (m):	N/M	**Channel Pattern:**	N/M	**Stage:**	N/A
Channel Confinement:	N/M	**Channel Gradient (range):**	N/M	**Flow Regime:**	PER
Bank Height (range in m):	N/M	**Bank Shape:**	N/M	**T_W (°C):**	N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted:	N	**Effort (min):**	N/A	**Electrofisher Settings:**	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	Low	No
NNST	Low	No	Moderate	No

Comments & Summary

Permanent watercourse with connectivity downstream to Angajurjualuk Lake. Cobble/gravel dominated substrate. Fish presence is assumed based on downstream connectivity to Angajurjualuk Lake.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-187b
UTM Coordinates: 17 W 585703 7900187

Date/Time Surveyed: 27-Aug-10

Photographs

A

B

C

D

Figure 1. At crossing looking upstream (A), view at crossing (B), downstream of crossing (C), view further downstream of crossing (D).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-187c
UTM Coordinates: 17 W 585808 7900502
Date/Time Surveyed: 27-Aug-10

General Physical Characteristics

Floodplain Width (m):	N/M	**Channel Pattern:**	N/M	**Stage:**	N/A
Channel Confinement:	N/M	**Channel Gradient (range):**	N/M	**Flow Regime:**	PER
Bank Height (range in m):	N/M	**Bank Shape:**	N/M	**T_W (°C):**	N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted:	N	**Effort (min):**	N/A	**Electrofisher Settings:**	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	Low	No
NNST	Low	No	Moderate	No

Comments & Summary

Permanent watercourse with connectivity downstream to Angajurjualuk Lake. Substrate dominated by fines at crossing area and by cobble further upstream and downstream. Fish presence is assumed based on downstream connectivity to Angajurjualuk Lake.

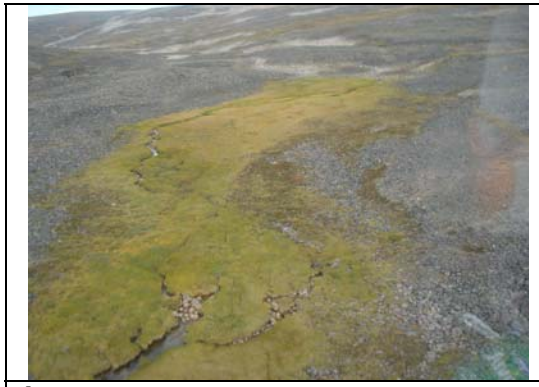
Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-187c
UTM Coordinates: 17 W 585808 7900502

Date/Time Surveyed: 27-Aug-10

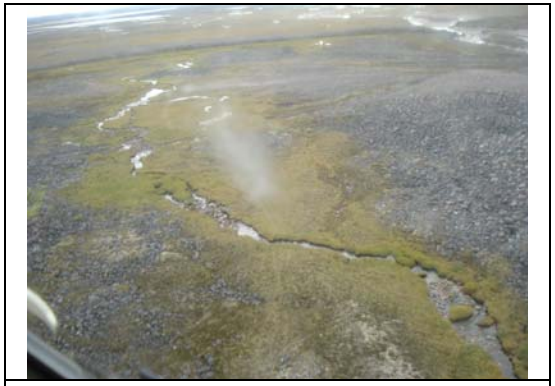
Photographs



A

B

C



D

Figure 1. At crossing looking upstream (A), view at crossing (B), view at crossing (C), view downstream of crossing (D).

AR-178a
AR-177
AR-176
AR-175
AR-174
RAVN RIVER CAMP
AR-170d
AR-170c
AR-170b
AR-170a
AR-168
AR-167a
AR-166a
AR-165b
AR-165c
AR-165a
AR-163
AR-162
AR-161a
Pingimajuq Ridge
AR-159a
AR-158a
AR-151
AR-150
AR-149a
AR-148a
AR-147a
AR-146
AR-144
AR-145
AR-143
AR-142
AR-141
AR-136
AR-135

SCALE 500 250 0 500 1,000 1,500 Metres

LEGEND:

ACCESS ROAD CROSSING SURVEY YEAR
- 2007
- 2008
- 2010
- 2011

STREAM CROSSING
FISH BARRIER (CONFIRMED)
FISH BARRIER (AERIAL PHOTO INTERPRETATION)

CONTOUR
MILNE INLET TOTE ROAD (EXISTING)
RAILWAY ALIGNMENT (PROPOSED)
CONSTRUCTION ACCESS ROAD (PROPOSED)
WATER
INFRASTRUCTURE (PROPOSED FOR CONSTRUCTION AND OPERATIONS PERIODS)

NOTES:

1. BASE MAP: © HER MAJESTY THE QUEEN IN RIGHTS OF CANADA DEPARTMENT OF NATURAL RESOURCES (2009.) ALL RIGHTS RESERVED.
2. TOPOGRAPHY PROVIDED BY EAGLE MAPPING (2005).
3. PROPOSED RAILWAY ALIGNMENT PROVIDED BY CANRAIL CONSULTANTS INC.
4. PROPOSED RAILWAY CONSTRUCTION ACCESS ROAD ALIGNMENT PROVIDED BY CANRAIL CONSULTANTS INC. DRAWING NO.: RAILWAY ALIGNMENT AND CONST ACCESS RD - MARY RIVER STEENSBY 2010 -12AUG2010.dwg
5. LOCATION OF PROPOSED INFRASTRUCTURE IS APPROXIMATE AND SUBJECT TO FIELD ADJUSTEMENTS
6. CONTOUR INTERVAL IS 25 M AND IS IN METRES.

BAFFINLAND IRON MINES CORPORATION

MARY RIVER PROJECT

Access Road Stream Crossing Sites (MAP D)

North/South Consultants Inc.
Aquatic Environment Specialists

P/A NO.	REF NO.
-	03-13-4
DATE: 15/12/2011	REV 2

Path: G:\MARYRIV_GDB\EIS_GDB\FEIS\UpdatedMapping\Baseline appendicies\7C8-19_to_7C11-19_App5_1-3_MapsAtoK.mxd

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-177
UTM Coordinates: 17 W 591561 7896708
Date/Time Surveyed: 13-Sept-08 /11:34

General Physical Characteristics

Floodplain Width (m):	60	**Channel Pattern:**	Meandering, single	**Stage:**	Normal-low
Channel Confinement:	NC	**Channel Gradient (range):**	0º	**Flow Regime:**	PER
Bank Height (range in m):	0-0.2	**Bank Shape:**	90% S, 10% V	**T_W (°C):**	N/M

Hydrology & Habitat Characteristics

Distance and Direction from Crossing (m)	Channel Width (m)		Water Depth (m)				Water Velocity (m/s)			
	Wetted	High Water	25%	50%	75%	Max	25%	50%	75%	Max
40D	3.7	4.6	0.06	0.06	0.07		Frozen slush			
0	2.83	4.15	0.12	0.21	0.25		Frozen slush			
40U	13.1	23.9	0.02	0.03	0.02		Frozen slush			

Distance and Direction from Crossing (m)	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
40D		Frozen					30 silt	50	20		
0		Frozen					10 sand 40 silt	20	30		
40U		Frozen					30 algae 10 silt	50	5	5	

Fisheries Information

Electrofishing Conducted: N **Effort (min):** N/A **Electrofisher Settings:** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	Low	Low
NNST	Moderate	No	High	Low

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-177
UTM Coordinates: 17 W 591561 7896708
Date/Time Surveyed: 13-Sept-08 /11:34

Comments & Summary

is an area to the north of a previously assessed stream that might be a second channel during higher, fluid water. Currently they are just isolated pools. Water velocity and stream morphology weren't sampled because the water was frozen. Some dry patches exist between this stream and the nearby lake. Under higher water conditions this would be excellent habitat. Downstream lake at UTM 17 W 591741 7896728. Upstream limit of passage = UTM 17 W 591477 7896575. This is a very nice NNST habitat. Water levels would need to be a little higher to make it ideal, but the banks make it look as though in the summer, spring water might be 0.1m deep, wetted width = 4.85m

Photographs

A

B

C

D

E

Figure 1. View at 40m downstream across (A), crossing downstream (B), crossing across (C), crossing upstream (D), and 40m upstream across (E).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-176
UTM Coordinates: 17 W 591560 7896479
Date/Time Surveyed: 2-Sept-08

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

Distance and Direction from Crossing (m)	Channel Width (m)		Water Depth (m)				Water Velocity (m/s)			
	Wetted	High Water	25%	50%	75%	Max	25%	50%	75%	Max
40D	6.7		0.56	0.51	0.25		0.06	0.15	0.02	
20D	6.1		0.44	0.61	0.28		0.07	0.10	0	
0	5.7		0.38	0.63	0.31		0	0.08	0	
20U	6.7		0.47	0.68	0.38		0.05	0.005	0	
40U	Large lake									

Distance and Direction from Crossing (m)	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
20D							85		5	5	5
0							95	2	1	2	

Fisheries Information

Electrofishing Conducted: N
Effort (min): N/A
Electrofisher Settings: N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	Low	High
NNST	Low	No	Moderate	High

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-176
UTM Coordinates: 17 W 591560 7896479
Date/Time Surveyed: 2-Sept-08

Comments & Summary

At the crossing, the water temperature was 6.0 °C and the water levels were normal.

Not ideal fish habitat due to predominantly fine substrate and no cover, but at least a migration corridor to more suitable habitat. The large lake upstream is very likely an overwintering habitat, it appears deep from the air. Downstream there are no barriers between it and another big lake.

Photographs

A

B

C

Figure 1. View at crossing downstream (A), crossing cross (B), and crossing upstream (C).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-175
UTM Coordinates: 17 W 591970 7895911
Date/Time Surveyed: 12-Sept-2008/17:12

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted: N **Effort (min):** N/A **Electrofisher Settings:** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

Upstream pond at UTM 17 W 591708 7895864, but not connected to site. The area is full of small puddles ~0.1 m deep with soil substrate that are completely isolated from each other by dry terrestrial vegetation. There is no channel to follow to locate its confluence.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-175
UTM Coordinates: 17 W 591561 7896708
Date/Time Surveyed: 12-Sept-2008/17:12

Photographs

A

B

C

Figure 1. View of habitat at crossing (A), downstream of crossing (B), and upstream of crossing (C).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-174
UTM Coordinates: 17 W 592347 7895648
Date/Time Surveyed: 12-Sept-2008/17:00

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted: N **Effort (min):** N/A **Electrofisher Settings:** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

The crossing is all flooded terrestrial. No defined channel and no flow. No upstream water source (just runoff). Approximately 60 m downstream of the crossing, fish habitat beginning at UTM 17 W 592344 7895709, but the connection to the downstream at UTM 17 W 592340 7895739 is not persistent (most channels go underground, others have no water.)

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-174
UTM Coordinates: 17 W 592347 7895648
Date/Time Surveyed: 12-Sept-2008/17:00

Photographs


A


B


C


D


E


F


G

Figure 1. View at crossing (A), at crossing downstream (B), at crossing upstream (C), downstream barrier (D), downstream lake (E), limit of fish passage downstream of crossing (F), and limit of fish passage downstream of downstream crossing (G).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-170d
UTM Coordinates: 17 W 594576 7895273
Date/Time Surveyed: 14-Aug-2011/09:30

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted: N
Effort (min): N/A
Electrofisher Settings: N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

In 2010, a desktop assessment was conducted for this site and Fish Habitat Quality was designated as No Fish Habitat. That designation was maintained as a result of the information collected during a site visit in 2011.

No water present at site and willows are growing within a slightly defined channel.

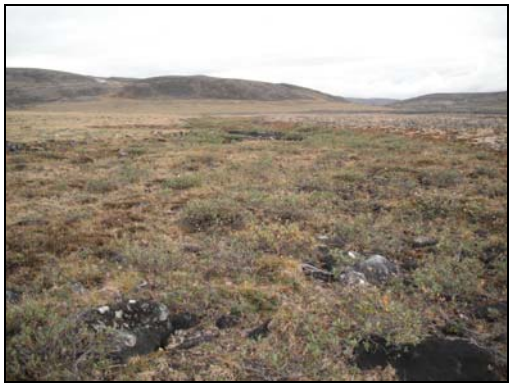
There is no upstream source of water for the site aside from spring run-off.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-170d
UTM Coordinates: 17 W 594576 7895273
Date/Time Surveyed: 14-Aug-2011/09:30

Photographs



A

B

C

D

E

Figure 1. View to the north (A), east (B), south (C), and west (D) of the crossing, substrate at crossing (E).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-170c
UTM Coordinates: 17 W 594534 7895010
Date/Time Surveyed: 14-Aug-2011/09:20

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted: N
Effort (min): N/A
Electrofisher Settings: N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

In 2010, a desktop assessment was conducted for this site and Fish Habitat Quality was designated as No Fish Habitat. That designation was maintained as a result of the information collected during a site visit in 2011.

No water present at site and a defined channel is only obvious for an isolated stretch about 5-10 m long.

There is no upstream source of water for the site aside from spring run-off.

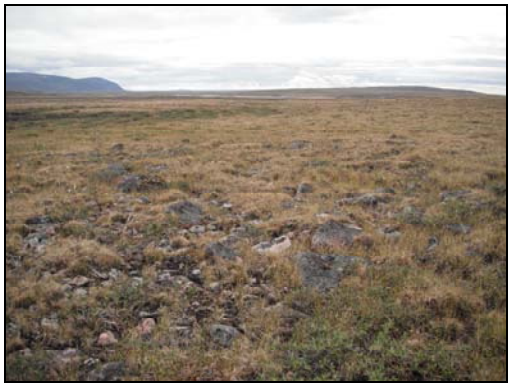
Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-170c
UTM Coordinates: 17 W 594534 7895010
Date/Time Surveyed: 14-Aug-2011/09:20

Photographs

A



B

C

D

E

F

Figure 1. View to the north (A), east (B), south (C), and west (D) of the crossing, substrate at crossing (E), and dry pond near the crossing (F).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-170b
UTM Coordinates: 17 W 594794 7894792
Date/Time Surveyed: 14-Aug-2011/09:05

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted: N
Effort (min): N/A
Electrofisher Settings: N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

In 2010, a desktop assessment was conducted for this site and Fish Habitat Quality was designated as No Fish Habitat. That designation was maintained as a result of the information collected during a site visit in 2011.

No water present at site and a defined channel is not obvious.

The upstream pond is too shallow for overwintering.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-170b
UTM Coordinates: 17 W 594794 7894792
Date/Time Surveyed: 14-Aug-2011/09:05

Photographs

A

B

C

D

E

F

Figure 1. View to the north (A), east (B), south (C), and west (D) of the crossing, substrate at crossing (E), and upstream pond (F).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-170a
UTM Coordinates: 17 W 595183 7894221
Date/Time Surveyed: 5-Sept-08 /08:10

General Physical Characteristics

Floodplain Width (m):	34.75	**Channel Pattern:**	Meandering, braided	**Stage:**	Normal
Channel Confinement:	NC-PC	**Channel Gradient (range):**	0.25-0.5°	**Flow Regime:**	INT
Bank Height (range in m):	0-0.1	**Bank Shape:**	50%UC, 50% UD-Flooded	**T_W (°C):**	3

Hydrology & Habitat Characteristics

Distance and Direction from Crossing (m)	Channel Width (m)		Water Depth (m)				Water Velocity (m/s)			
	Wetted	High Water	25%	50%	75%	Max	25%	50%	75%	Max
0	12.9	14	0.16	0.09	0.07	0.16	0.00	0.00	0.00	

Distance and Direction from Crossing (m)	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
0	30	70					90FT	5	5		

Fisheries Information

Electrofishing Conducted: Y **Effort (min):** 4:08 **Electrofisher Settings:** 500V, 40Hz, 30%

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	0	-	-	-
NNST	0	-	-	-

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-170a
UTM Coordinates: 17 W 595183 7894221

Date/Time Surveyed: 5-Sept-08 /08:10

Comments & Summary

There is a lot of FT downstream. Most of the substrate here is FT due to recent rains. Water source is the same for CV-R19 and R20. This is the preferred channel. The site probably has a small amount of water throughout the open water season pools, but fish would not be able to reach it due to dry patches downstream. Even if water were higher, the cascades downstream near the Ravn River would likely prevent fish passage. Cascade is at UTM 17 W 595165 7894042.

Photographs

A

B

C

Figure 1. View at crossing downstream (A), crossing across (B), and crossing upstream (C).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-168
UTM Coordinates: 17 W 595324 7893927
Date/Time Surveyed: 5-Sept-08 /08:45

General Physical Characteristics

Floodplain Width (m):	High water	**Channel Pattern:**	Straight	**Stage:**	Normal
Channel Confinement:	PC	**Channel Gradient (range):**	<0.25	**Flow Regime:**	PER
Bank Height (range in m):	0-2	**Bank Shape:**	20% UC,80% S	**T_W ($^{\circ}$C):**	5.0

Hydrology & Habitat Characteristics

Distance and Direction from Crossing (m)	Channel Width (m)		Water Depth (m)				Water Velocity (m/s)			
	Wetted	High Water	25%	50%	75%	Max	25%	50%	75%	Max
100D										
80D										
60D										
40D	116	135	0.2	0.43	1.1	>1.0	.14-back eddy	0.29	0.21	>1.0
20D	122	142	0.5	0.93	1.05	>1.0	.09	0.10	0.13	>1.0
0	124	129	0.31	1.0	-	>1.0	0.2-back eddy	0.24		>1.0
20U	128	158	0.52	0.70	1.15	>1.0	0.0	0.13	0.09	>1.0
40U	132	173	0.51	0.8	1.03	>1.0	0.02	0.01	0.17	>1.0
60U										
80U										
100U										

Distance and Direction from Crossing (m)	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
100D											
80D											
60D											
40D			50	40		10-rapid	30	2	25	25	15
20D			50	50			60		20	15	5
0			50	50			60		10	25	5
20U			50	50			80		5	10	5
40U			50	50			97			2	1
60U											
80U											
100U											

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-168
UTM Coordinates: 17 W 595324 7893927
Date/Time Surveyed: 5-Sept-08 /08:45

Fisheries Information

Electrofishing Conducted: N **Effort (min):** **Electrofisher Settings:**

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	0	-	-	-
NNST	0	-	-	-

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	High	High
NNST	Moderate	No	High	High

Comments & Summary

Did not need to fish, can use data from R-22.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-168
UTM Coordinates: 17 W 595324 7893927

Date/Time Surveyed: 5-Sept-08 /08:45

Photographs


A


B


C


D


E

Figure 1. View at 40m downstream across (A), 20m downstream across (B), crossing across (C), 20m upstream across (D), and 40m upstream across (E).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-167a
UTM Coordinates: 17 W 595498 7893452
Date/Time Surveyed: 9-Sept-2008/14:33

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted: N **Effort (min):** N/A **Electrofisher Settings:** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

There is currently no defined channel and no flow. There is a large river downstream (UTM 17 W 595358 7893418.), but fish cannot access the site from there.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-167a
UTM Coordinates: 17 W 595498 7893452
Date/Time Surveyed: 9-Sept-2008/14:33

Photographs

A

B

C

D

Figure 1. View of habitat at crossing (A), downstream of crossing (B), upstream of crossing (C), and at the confluence with the downstream river (D).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-166a
UTM Coordinates: 17 W 595660 7893113
Date/Time Surveyed: 12-Sept-2008/16:46

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

N/M

General Physical Characteristics

Fisheries Information

Electrofishing Conducted: N **Effort (min):** N/A **Electrofisher Settings:** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

There is a small amount of water at the crossing (max = 0.05m) and it is flowing towards the downstream pond (UTM 17 W 595617 7893080). Site is over flooded terrestrial vegetation, and there is no obvious channel or persistent source of water (flow caused by recent snow). There is a shallow pond upstream, but its banks are too high for it to currently drain downhill (UTM 17 W 595743 7893082).

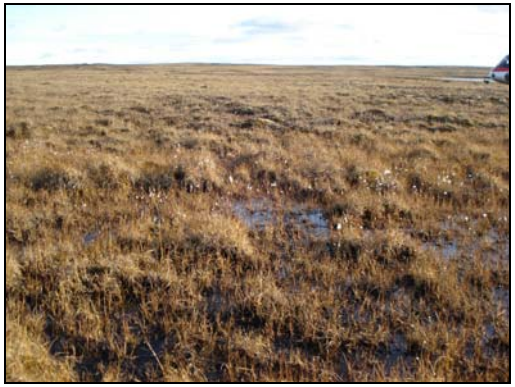
While the downstream lake is quite deep and may provide overwintering habitat for fish, it would only occasionally flood this site, and fish would not chose to move from the lake into this area anyway.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-166a
UTM Coordinates: 17 W 595660 7893113
Date/Time Surveyed: 12-Sept-2008/16:46

Photographs



A

B

C

Figure 1. View of habitat at crossing (A), downstream of crossing (B), and upstream of crossing (C).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-165c
UTM Coordinates: 17 W 595854 7892741
Date/Time Surveyed: 14-Aug-2011/10:30

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted: N **Effort (min):** N/A **Electrofisher Settings:** N/A

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	Observed	-	~90-100	-
NNST	Observed	-	-	-

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	Moderate	High
NNST	No	No	Moderate	High

Comments & Summary

In 2010, a desktop assessment was conducted for this site and Fish Habitat Quality was designated as No Fish Habitat. That designation was changed to Marginal as a result of the information collected during a site visit in 2011.

Dry tundra with no evidence of a channel was present at crossing UTM. A nearby stream at 17W 595841 7892720 was likely the intended target of this assessment.

When water levels are higher, this stream is connected to ponds both upstream and downstream of the crossing that may be deep enough to provide overwintering habitat. The stream channel at the crossing site is clearly defined, but currently dry. Upstream of the crossing the channel contains water, and both ARCH and NNST were seen.

During the spring when water levels are higher the crossing is definitely connected to overwintering waterbodies.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-165c
UTM Coordinates: 17 W 595854 7892741
Date/Time Surveyed: 14-Aug-2011/10:30

Photographs

A

B

C

D

Figure 1. View at crossing (A); nearby stream looking upstream (B), downstream (C), and across (D).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-165b
UTM Coordinates: 17 W 595865 7892700
Date/Time Surveyed: 27-Aug-10

General Physical Characteristics

Floodplain Width (m):	N/M	**Channel Pattern:**	N/M	**Stage:**	N/A
Channel Confinement:	N/M	**Channel Gradient (range):**	N/M	**Flow Regime:**	PER
Bank Height (range in m):	N/M	**Bank Shape:**	N/M	**T_W (°C):**	N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted:	N	**Effort (min):**	N/A	**Electrofisher Settings:**	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	Low	No
NNST	Low	No	Moderate	No

Comments & Summary

Permanent watercourse with connectivity downstream to Ravn River. Cobble/gravel dominated substrate. Crossing area situated between two shallow waterbodies (each <4 m deep). Fish presence is assumed based on downstream connectivity to Ravn River.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-165b
UTM Coordinates: 17 W 595865 7892700

Date/Time Surveyed: 27-Aug-10

Photographs

A

B

C

D

E

F

Figure 1. Overview of crossing looking upstream (A), view looking upstream from crossing (B), crossing area panned upstream to downstream (C-E), downstream view from crossing area (F).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-165a
UTM Coordinates: 17 W 596135 7892241
Date/Time Surveyed: 14-Aug-2011/10:45

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted: N
Effort (min): N/A
Electrofisher Settings: N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

In 2010, a desktop assessment was conducted for this site and Fish Habitat Quality was designated as No Fish Habitat. That designation was maintained as a result of the information collected during a site visit in 2011.

This site itself is dry tundra without a defined channel. During the early part of spring freshet this area may be connected to the downstream pond through spring run-off, but the pond is isolated and too shallow for overwintering.

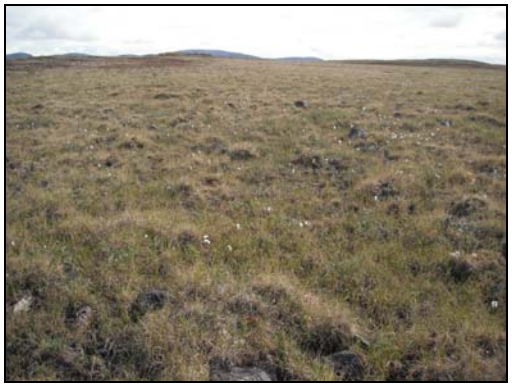
Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-165a
UTM Coordinates: 17 W 596135 7892241
Date/Time Surveyed: 14-Aug-2011/10:45

Photographs

A



B

C

D

E

Figure 1. View upstream (A), downstream (B), and across (C) at crossing.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-146
UTM Coordinates: 17 W 597111 7886751
Date/Time Surveyed: 9-Sept-2008/8:56

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted: N **Effort (min):** N/A **Electrofisher Settings:** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

This stream flows into LE-41, which is isolated and is not fish habitat, therefore there is no fish use of this stream.
At the crossing the wetted channel width was 0.38 m and the high water channel width was 1.4 m.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-146
UTM Coordinates: 17 W 597111 7886751

Date/Time Surveyed: 9-Sept-2008/8:56

Photographs

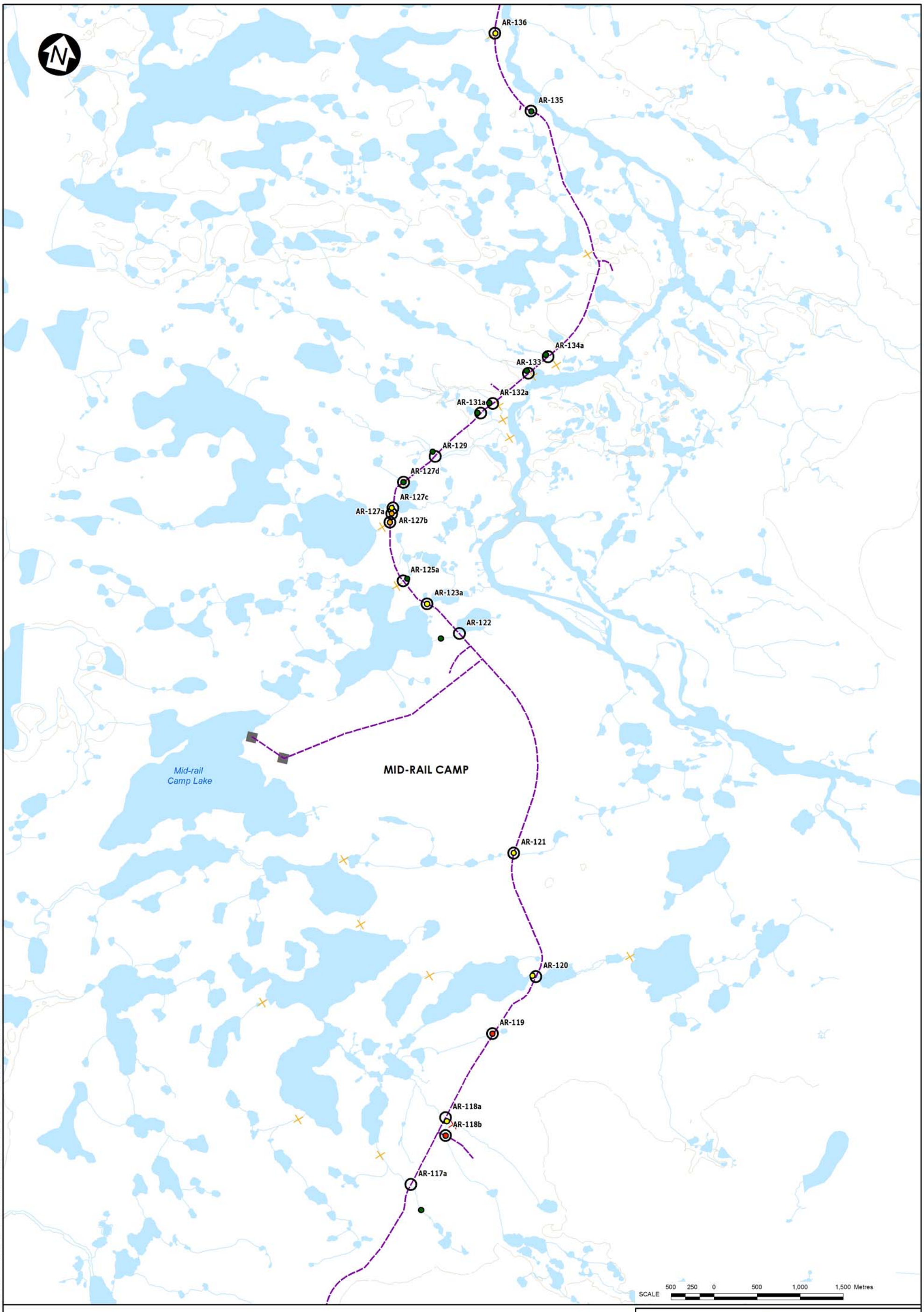

A


B


C


D

Figure 1. View at crossing (across right channel) (A), at crossing across (B), at crossing downstream (C), and at crossing upstream (D).



LEGEND:

ACCESS ROAD CROSSING SURVEY YEAR
- 2007
- 2008
- 2010
- 2011

STREAM CROSSING
FISH BARRIER (CONFIRMED)
FISH BARRIER (AERIAL PHOTO INTERPRETATION)

CONTOUR
MILNE INLET TOTE ROAD (EXISTING)
RAILWAY ALIGNMENT (PROPOSED)
CONSTRUCTION ACCESS ROAD (PROPOSED)
WATER
INFRASTRUCTURE (PROPOSED FOR CONSTRUCTION AND OPERATIONS PERIODS)

NOTES:

1. BASE MAP: © HER MAJESTY THE QUEEN IN RIGHTS OF CANADA DEPARTMENT OF NATURAL RESOURCES (2009.) ALL RIGHTS RESERVED.
2. TOPOGRAPHY PROVIDED BY EAGLE MAPPING (2005).
3. PROPOSED RAILWAY ALIGNMENT PROVIDED BY CANRAIL CONSULTANTS INC.
4. PROPOSED RAILWAY CONSTRUCTION ACCESS ROAD ALIGNMENT PROVIDED BY CANRAIL CONSULTANTS INC. DRAWING NO.: RAILWAY ALIGNMENT AND CONST ACCESS RD - MARY RIVER STEENSBY 2010 -12AUG2010.dwg
5. LOCATION OF PROPOSED INFRASTRUCTURE IS APPROXIMATE AND SUBJECT TO FIELD ADJUSTEMENTS
6. CONTOUR INTERVAL IS 25 M AND IS IN METRES.

BAFFINLAND IRON MINES CORPORATION

MARY RIVER PROJECT

Access Road Stream Crossing Sites (MAP E)

North/South Consultants Inc.
Aquatic Environment Specialists

P/A NO.	REF NO.
-	03-13-5
DATE: 15/12/2011	REV 2

Path: G:\MARYRIV_GDB\EIS_GDB\FEIS\UpdatedMapping\Baseline appendicies\7C8-19_to_7C11-19_App5_1-3_MapsAtoK.mxd

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-127b
UTM Coordinates: 17 W 596637 7879272
Date/Time Surveyed: 14-Aug-2011/10:50

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted: N **Effort (min):** N/A **Electrofisher Settings:** N/A

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	Observed	-	~130	-
NNST	Observed	-	-	-

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	Moderate	High
NNST	No	No	High	High

Comments & Summary

In 2010, a desktop assessment was conducted for this site and Fish Habitat Quality was designated as No Fish Habitat. That designation has since been changed to Important as a result of the information collected during a site visit in 2011.

Both ARCH and NNST were seen at the crossing.

The lakes upstream and downstream of this stream are not deep enough for overwintering, but fish here have access to a large number of interconnected streams, rivers and lakes, some of which are sufficiently deep to provide overwintering habitat. While some of the stream branches in the area are currently dry, fish movements are not completely blocked at any point.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-127b
UTM Coordinates: 17 W 596637 7879272
Date/Time Surveyed: 14-Aug-2011/10:50

Photographs

A

B

C

Figure 1. View upstream (A), downstream (B), and across (C) at crossing.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-127a
UTM Coordinates: 17 W 596641 7879168
Date/Time Surveyed: 14-Aug-2011/10:55

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted: N
Effort (min): N/A
Electrofisher Settings: N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	Moderate	High
NNST	No	No	High	High

Comments & Summary

In 2010, a desktop assessment was conducted for this site and Fish Habitat Quality was designated as No Fish Habitat. That designation has since been changed to Important as a result of the information collected during a site visit in 2011.

This site is connected to AR-127b (where both ARCH and NNST were seen), and it provides similar habitat.

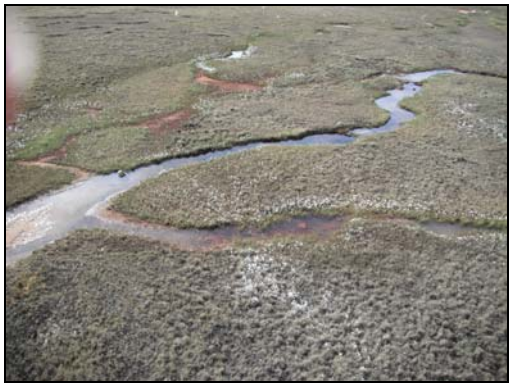
The lakes upstream and downstream of this stream are not deep enough for overwintering, but fish here have access to a large number of interconnected streams, rivers and lakes, some of which are sufficiently deep to provide overwintering habitat. While some of the stream branches in the area are currently dry, fish movements are not completely blocked at any point.

Rail Alignment Watercourse Crossing Assessment

Location

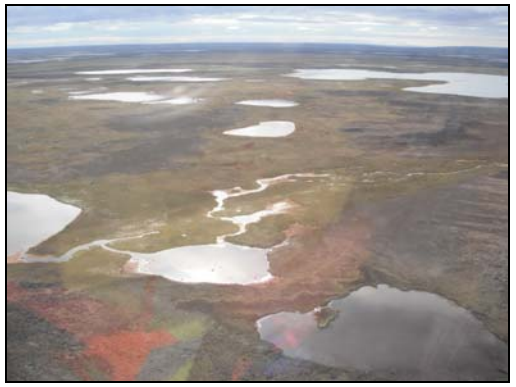
Crossing ID: AR-127a
UTM Coordinates: 17 W 596641 7879168
Date/Time Surveyed: 14-Aug-2011/10:55

Photographs



A

B



C

Figure 1. Aerial view upstream of the crossing (A), at the crossing (B), and the series of interconnected lakes and streams in the area (C).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-121
UTM Coordinates: 17 W 598910 7875756
Date/Time Surveyed: 11-Sept-2008/10:36

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted: N **Effort (min):** N/A **Electrofisher Settings:** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	Low	No

Comments & Summary

Marshy with flooded terrestrial substrate. Under higher water levels it has a very slight chance of being a NNST habitat, but there is currently too much vegetation. No defined channel. Some of the nearby ponds look to have somewhat better substrate. Fish would have to get through a lot of poor habitat to get here from the downstream lake at UTM 17 W 597106 7875076. Most ponds between here and there are not connected by channels.

Rail Alignment Watercourse Crossing Assessment

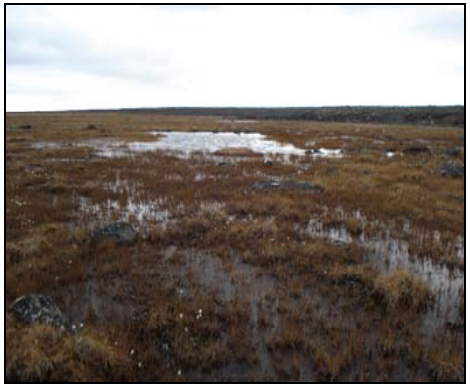
Location

Crossing ID: AR-121
UTM Coordinates: 17 W 598910 7875756
Date/Time Surveyed: 11-Sept-2008/10:36

Photographs


A


B


C

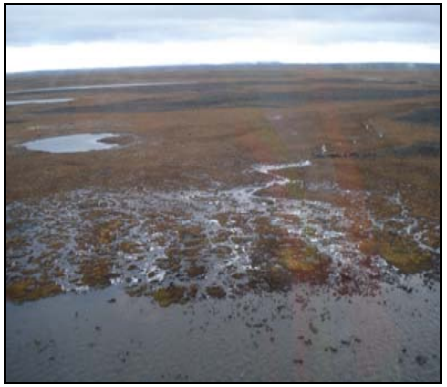

D

Figure 1. View at crossing across (A), at crossing downstream (B), at crossing upstream (C), and downstream confluence with large lake (D).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-119
UTM Coordinates: 17 W 599144 7873657
Date/Time Surveyed: 27-Aug-10

General Physical Characteristics

Floodplain Width (m):	N/M	**Channel Pattern:**	N/M	**Stage:**	N/A
Channel Confinement:	N/M	**Channel Gradient (range):**	N/M	**Flow Regime:**	EPH
Bank Height (range in m):	N/M	**Bank Shape:**	N/M	**T_W (°C):**	N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted:	N	**Effort (min):**	N/A	**Electrofisher Settings:**	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

Saturated, flat area that is a part of Mid-Rail Camp Lake watershed. No channel development and discontinuous to downstream waterbodies. No water flow. No significant headwaters.

Rail Alignment Watercourse Crossing Assessment

Location

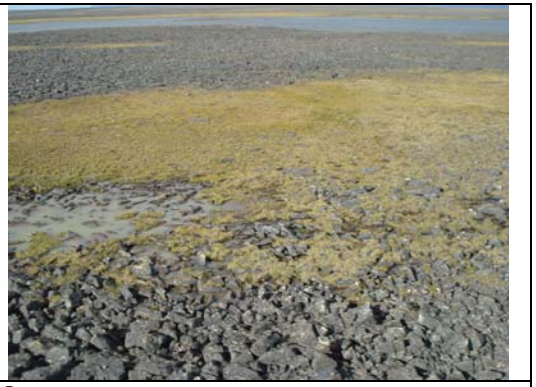
Crossing ID: AR-119
UTM Coordinates: 17 W 599144 7873657

Date/Time Surveyed: 27-Aug-10

Photographs

A

B



C

D

Figure 1. Overview of crossing area (A), at crossing area looking upstream at small pond (B), close-up of crossing area (C), view looking upstream (D).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-118b
UTM Coordinates: 17 W 598882 7872381
Date/Time Surveyed: 27-Aug-10

General Physical Characteristics

Floodplain Width (m):	N/M	**Channel Pattern:**	UD	**Stage:**	N/A
Channel Confinement:	N/M	**Channel Gradient (range):**	N/M	**Flow Regime:**	PER
Bank Height (range in m):	N/M	**Bank Shape:**	N/M	**T_W (°C):**	N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted:	N	**Effort (min):**	N/A	**Electrofisher Settings:**	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	Low	No
NNST	Low	No	Moderate	No

Comments & Summary

Permanent watercourse with connectivity downstream to known fish bearing (NNST) waterbodies. No headwater lake. Fish presence is assumed based on downstream connectivity to fish bearing lakes.

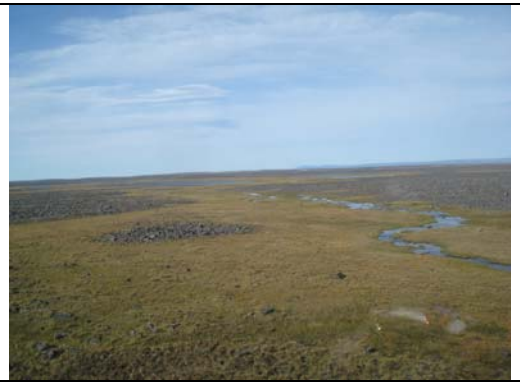
Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-118b
UTM Coordinates: 17 W 598882 7872381
Date/Time Surveyed: 27-Aug-10

Photographs

A



B

C

D

E

Figure 1. View looking at crossing area (A), view looking downstream from crossing (B), view looking upstream from crossing (C), upstream view from downstream extent of watercourse (D), aerial view of crossing area; looking upstream (E).

AR-117a
AR-114
AR-113
AR-113a
AR-112a
AR-111a
AR-110
AR-109a
AR-108b
AR-108a
AR-106
AR-107
AR-105a
AR-104a
AR-101a
AR-102a
AR-100a
AR-098a
AR-097a
AR-096a
AR-095a

SCALE 500 250 0 500 1,000 1,500 Metres

LEGEND:

ACCESS ROAD CROSSING SURVEY YEAR
- 2007
- 2008
- 2010

STREAM CROSSING
FISH BARRIER (CONFIRMED)
FISH BARRIER (AERIAL PHOTO INTERPRETATION)

CONTOUR
MILNE INLET TOTE ROAD (EXISTING)
RAILWAY ALIGNMENT (PROPOSED)
CONSTRUCTION ACCESS ROAD (PROPOSED)
WATER
INFRASTRUCTURE

NOTES:

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3. PROPOSED RAILWAY ALIGNMENT PROVIDED BY CANRAIL CONSULTANTS INC.
4. PROPOSED RAILWAY CONSTRUCTION ACCESS ROAD ALIGNMENT PROVIDED BY CANRAIL CONSULTANTS INC. DRAWING NO.: RAILWAY ALIGNMENT AND CONST ACCESS RD - MARY RIVER STEENSBY 2010 -12AUG2010.DWG
5. LOCATION OF PROPOSED INFRASTRUCTURE IS APPROXIMATE AND SUBJECT TO FIELD ADJUSTEMENTS
6. CONTOUR INTERVAL IS 25 AND IS IN METRES.

BAFFINLAND IRON MINES CORPORATION

MARY RIVER PROJECT

Access Road Stream Crossing Sites (MAP F)

North/South Consultants Inc.
Aquatic Environment Specialists

P/A NO.	REF NO.
-	-
DATE: 19/11/2010	REV 2

Path: G:\MARYRIV_GDB\EIS_GDB\EIS_Figures_2010EIS_Figures\MXD\Synthesis_RailLine_AccessRoad\Rev2Apdx\20101119_ApdxAR_sg.mxd

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-113a
UTM Coordinates: 17 W 599337 7868429
Date/Time Surveyed: 27-Aug-10

General Physical Characteristics

Floodplain Width (m):	N/M	**Channel Pattern:**	UD	**Stage:**	N/A
Channel Confinement:	N/M	**Channel Gradient (range):**	N/M	**Flow Regime:**	EPH
Bank Height (range in m):	N/M	**Bank Shape:**	N/M	**T_W (°C):**	N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted:	N	**Effort (min):**	N/A	**Electrofisher Settings:**	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

Saturated, flat area with no channel development. Drainage not obvious. No water flow. No significant headwaters.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-113a
UTM Coordinates: 17 W 599337 7868429

Date/Time Surveyed: 27-Aug-10

Photographs

A

B

C

Figure 1. View at crossing (A), view south from crossing (B), view north from crossing (C).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-111a
UTM Coordinates: 17 W 599070 7867576
Date/Time Surveyed: 27-Aug-10

General Physical Characteristics

Floodplain Width (m):	N/M	**Channel Pattern:**	N/M	**Stage:**	N/A
Channel Confinement:	N/M	**Channel Gradient (range):**	N/M	**Flow Regime:**	EPH
Bank Height (range in m):	N/M	**Bank Shape:**	N/M	**T_W (°C):**	N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted:	N	**Effort (min):**	N/A	**Electrofisher Settings:**	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

Saturated, flat area that is a part of Mid-Rail Camp Lake watershed. No channel development and discontinuous to downstream waterbodies. No water flow. No significant headwaters.

Rail Alignment Watercourse Crossing Assessment

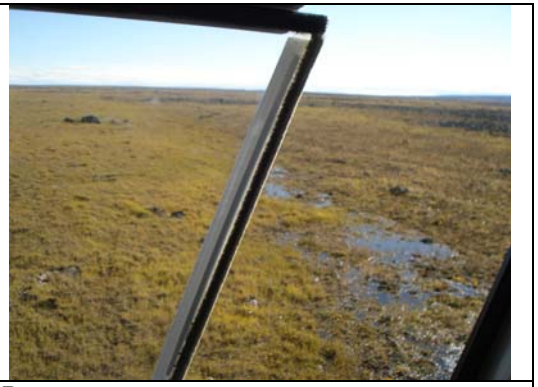
Location

Crossing ID: AR-111a
UTM Coordinates: 17 W 599070 7867576

Date/Time Surveyed: 27-Aug-10

Photographs

A



B

Figure 1. View looking upstream (A), view looking downstream (B).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-108b
UTM Coordinates: 17 W 599826 7865539
Date/Time Surveyed: 7-Sept-2008/17:00

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

Distance and Direction from Crossing (m)	Channel Width (m)		Water Depth (m)				Water Velocity (m/s)			
	Wetted	High Water	25%	50%	75%	Max	25%	50%	75%	Max
20D DS pond						1				
0	Dry									
20U US pond						.5				

Distance and Direction from Crossing (m)	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
20D DS pond									10	50	40
0	dry										
20U US pond										30	70

Fisheries Information

Electrofishing Conducted: Y **Effort (min):** 6:30 **Electrofisher Settings:** 800V, 50Hz, 30%

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	0	-	-	-
NNST	0	-	-	-

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	Low	Low
NNST	Low	No	Moderate	Low

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-108b
UTM Coordinates: 17 W 599826 7865539
Date/Time Surveyed: 7-Sept-2008/17:00

Comments & Summary

The water temperature was 2.0 ˚C.

The area between the quarry as the proposed road location contains two channels that are currently mostly dry pools, but probably provide fish habitat during high water levels. Electrofished between the pond downstream of the potential barrier at UTM 17 W 599767 7865644 and the pond upstream of the barrier in the left channel. More barriers (dry patch of rock) exist downstream of the large pool we fished (UTM 17 W 600224 7865358. UTM 17 W 599326 7865694, UTM17 W 598927 7865411). It appears that habitat is only accessible during high water in the spring.

Photographs

A

B

C

D

E

F

Figure 1. View of quarry upstream (A), quarry across (B), quarry downstream (C), downstream barriers (D-E), and barrier between upstream and downstream pond (F).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-107
UTM Coordinates: 17 W 602214 7864423
Date/Time Surveyed: 27-Aug-10

General Physical Characteristics

Floodplain Width (m):	N/M	**Channel Pattern:**	UD	**Stage:**	N/A
Channel Confinement:	N/M	**Channel Gradient (range):**	N/M	**Flow Regime:**	EPH
Bank Height (range in m):	N/M	**Bank Shape:**	N/M	**T_W (°C):**	N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted:	N	**Effort (min):**	N/A	**Electrofisher Settings:**	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

Saturated, flat area that eventually connects to Cockburn River. No channel development and discontinuous to Cockburn River. No water flow. No significant headwaters.

Rail Alignment Watercourse Crossing Assessment

Location

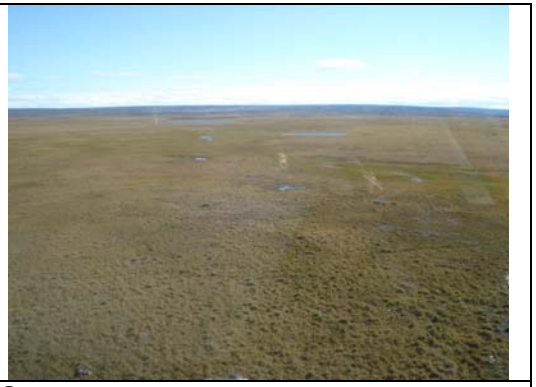
Crossing ID: AR-107
UTM Coordinates: 17 W 602214 7864423

Date/Time Surveyed: 27-Aug-10

Photographs

A

B



C

Figure 1. View looking upstream from crossing (A), view at crossing (B), downstream from crossing (C).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-102a
UTM Coordinates: 17 W 603836 7859963
Date/Time Surveyed: 27-Aug-10

General Physical Characteristics

Floodplain Width (m):	N/M	**Channel Pattern:**	UD	**Stage:**	N/A
Channel Confinement:	N/M	**Channel Gradient (range):**	N/M	**Flow Regime:**	EPH
Bank Height (range in m):	N/M	**Bank Shape:**	N/M	**T_W (°C):**	N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted:	N	**Effort (min):**	N/A	**Electrofisher Settings:**	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

Saturated, flat area that eventually connects to AR-101A then Cockburn River. No channel development and discontinuous to Cockburn River. No water flow. No headwaters.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-102a
UTM Coordinates: 17 W 603836 7859963

Date/Time Surveyed: 27-Aug-10

Photographs

A

B

Figure 1. View of crossing (A), view looking downstream (B).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-101a
UTM Coordinates: 17 W 603833 7859860
Date/Time Surveyed: 27-Aug-10

General Physical Characteristics

Floodplain Width (m):	N/M	**Channel Pattern:**	UD	**Stage:**	N/A
Channel Confinement:	N/M	**Channel Gradient (range):**	N/M	**Flow Regime:**	EPH
Bank Height (range in m):	N/M	**Bank Shape:**	N/M	**T_W (°C):**	N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted:	N	**Effort (min):**	N/A	**Electrofisher Settings:**	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

Saturated, flat area that eventually connects to Cockburn River. No channel development and discontinuous to Cockburn River. No water flow. No headwaters.

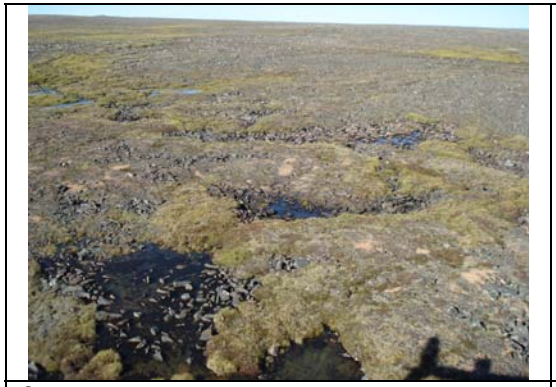
Rail Alignment Watercourse Crossing Assessment

Location

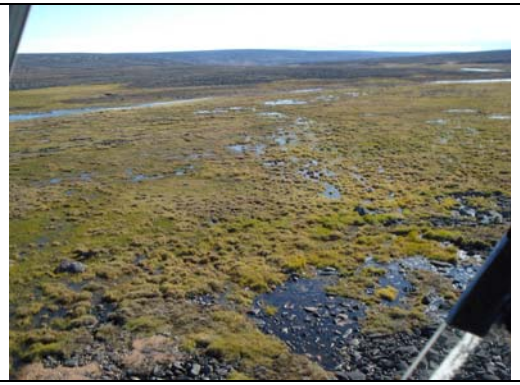
Crossing ID: AR-101a
UTM Coordinates: 17 W 603833 7859860

Date/Time Surveyed: 27-Aug-10

Photographs



A



B

C

Figure 1. View looking upstream (A), view looking downstream (B), view upstream of crossing area (C).

AR-098a
AR-097a
AR-096a
AR-095a
AR-094a
AR-093a
AR-092a
AR-091a
AR-088
AR-087a
AR-086
AR-085
AR-084
AR-083a
AR-082a
AR-080b
AR-080a
AR-081a
AR-077
AR-079a
AR-076a
AR-078a
AR-075a
AR-074a
AR-073a
AR-072a
AR-070a
AR-071a
AR-069a
AR-068a
AR-067a
AR-065
AR-066a
AR-064
AR-063a
AR-062a
AR-061
AR-060
AR-059
AR-058a
AR-057
AR-055
AR-054
AR-053a
AR-052

SCALE 500 250 0 500 1,000 1,500 Metres

LEGEND:

ACCESS ROAD CROSSING SURVEY YEAR
- 2007
- 2008
- 2010
- STREAM CROSSING
- FISH BARRIER (CONFIRMED)
- FISH BARRIER (AERIAL PHOTO INTERPRETATION)

- CONTOUR
- MILNE INLET TOTE ROAD (EXISTING)
- RAILWAY ALIGNMENT (PROPOSED)
- CONSTRUCTION ACCESS ROAD (PROPOSED)
- WATER
- INFRASTRUCTURE

NOTES:

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4. PROPOSED RAILWAY CONSTRUCTION ACCESS ROAD ALIGNMENT PROVIDED BY CANRAIL CONSULTANTS INC. DRAWING NO.: RAILWAY ALIGNMENT AND CONST ACCESS RD - MARY RIVER STEENSBY 2010 -12AUG2010.DWG
5. LOCATION OF PROPOSED INFRASTRUCTURE IS APPROXIMATE AND SUBJECT TO FIELD ADJUSTEMENTS
6. CONTOUR INTERVAL IS 25 AND IS IN METRES.

BAFFINLAND IRON MINES CORPORATION

MARY RIVER PROJECT

Access Road Stream Crossing Sites (MAP G)

North/South Consultants Inc.
Aquatic Environment Specialists

P/A NO.	REF NO.
-	-
DATE: 19/11/2010	REV 2

Path: G:\MARYRIV_GDB\EIS_GDB\EIS_Figures_2010EIS_Figures\MXD\Synthesis_RailLine_AccessRoad\Rev2Apdx\20101119_ApdxAR_sg.mxd

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-094a
UTM Coordinates: 17 W 604981 7858113
Date/Time Surveyed: 27-Aug-10

General Physical Characteristics

Floodplain Width (m):	N/M	**Channel Pattern:**	N/M	**Stage:**	N/A
Channel Confinement:	N/M	**Channel Gradient (range):**	N/M	**Flow Regime:**	EPH
Bank Height (range in m):	N/M	**Bank Shape:**	N/M	**T_W (°C):**	N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted:	N	**Effort (min):**	N/A	**Electrofisher Settings:**	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

Poorly defined channel at crossing area. Drains into Cockburn River; however, the watercourse has a 45 degree slope downstream from crossing, which is a barrier to upstream moving fish.

No photographs available.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-093a
UTM Coordinates: 17 W 605119 7857926
Date/Time Surveyed: 27-Aug-10

General Physical Characteristics

Floodplain Width (m):	N/M	**Channel Pattern:**	UD	**Stage:**	N/A
Channel Confinement:	N/M	**Channel Gradient (range):**	N/M	**Flow Regime:**	EPH
Bank Height (range in m):	N/M	**Bank Shape:**	N/M	**T_W (°C):**	N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted:	N	**Effort (min):**	N/A	**Electrofisher Settings:**	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

Dry; no channel. No fish habitat. Drains into Cockburn River.

Rail Alignment Watercourse Crossing Assessment

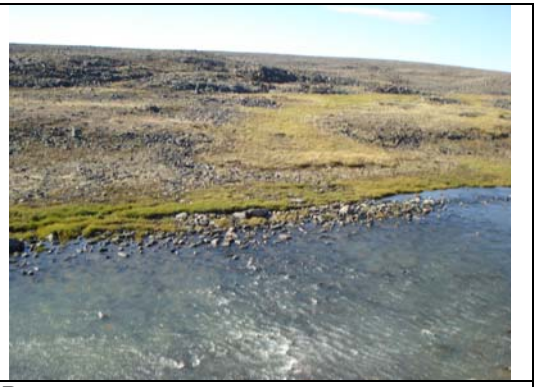
Location

Crossing ID: AR-093a
UTM Coordinates: 17 W 605119 7857926

Date/Time Surveyed: 27-Aug-10

Photographs

A



B

Figure 1. View at crossing looking upstream (A), looking upstream from river to crossing (B).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-091a
UTM Coordinates: 17 W 605221 7857810
Date/Time Surveyed: 27-Aug-10

General Physical Characteristics

Floodplain Width (m):	N/M	**Channel Pattern:**	UD	**Stage:**	N/A
Channel Confinement:	N/M	**Channel Gradient (range):**	N/M	**Flow Regime:**	EPH
Bank Height (range in m):	N/M	**Bank Shape:**	N/M	**T_W (°C):**	N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted:	N	**Effort (min):**	N/A	**Electrofisher Settings:**	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

Poorly defined channel at crossing area. Drains into Cockburn River; however, the watercourse has a 45 degree slope downstream from crossing, which is a barrier to upstream moving fish.

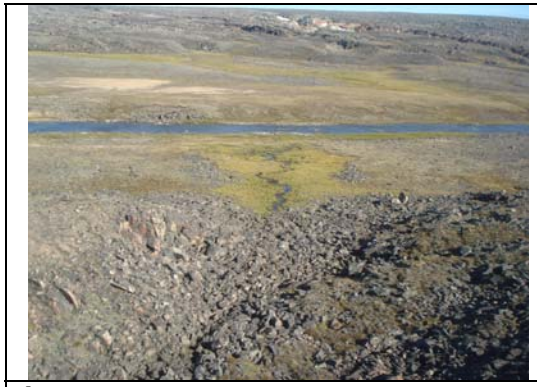
Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-091a
UTM Coordinates: 17 W 605221 7857810

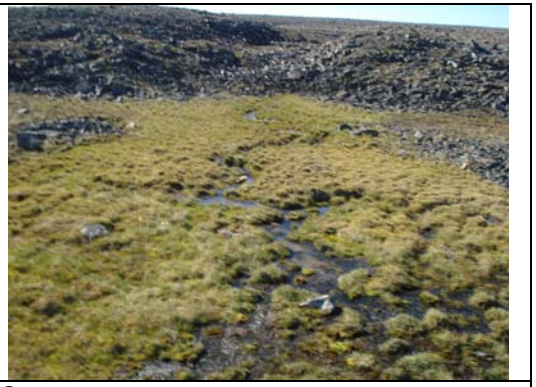
Date/Time Surveyed: 27-Aug-10

Photographs



A

B



C

Figure 1. Looking downstream from upstream of crossing (A), looking upstream from Cockburn River at high bank (B), looking at saturated crossing area (C).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-088
UTM Coordinates: 17 W 605350 7857293
Date/Time Surveyed: 27-Aug-10

General Physical Characteristics

Floodplain Width (m):	N/M	**Channel Pattern:**	N/M	**Stage:**	N/A
Channel Confinement:	N/M	**Channel Gradient (range):**	N/M	**Flow Regime:**	EPH
Bank Height (range in m):	N/M	**Bank Shape:**	N/M	**T_W (°C):**	N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted:	N	**Effort (min):**	N/A	**Electrofisher Settings:**	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

Drainage was a series of small, disjoined, shallow ponds near crossing location. No channel development and dry downstream of crossing. Eventually drains into Cockburn River.

Rail Alignment Watercourse Crossing Assessment

Location

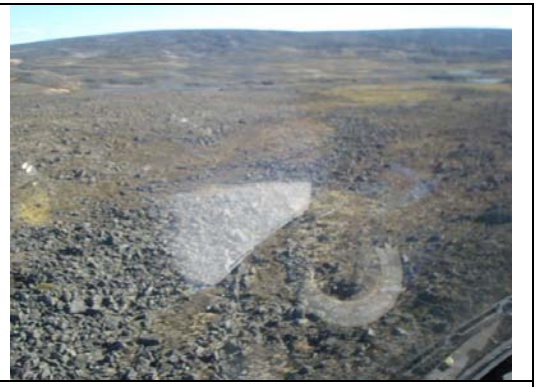
Crossing ID: AR-088
UTM Coordinates: 17 W 605350 7857293

Date/Time Surveyed: 27-Aug-10

Photographs

A

B



C

Figure 1. Upstream extent of drainage (A), at crossing location (B), looking downstream from crossing area (C).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-087a
UTM Coordinates: 17 W 605632 7856501
Date/Time Surveyed: 11-Sept-2008/10:00

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted: N **Effort (min):** N/A **Electrofisher Settings:** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

Crossing is frozen flooded terrestrial with no channel. There is a potential barrier UTM 17 W 605689 7856471, rocks and then the stream moves underground. There is no actual water in this part of the channel currently. Downstream of the crossing beyond the barrier the water empties into a marshy area that eventually connects with a large river.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-087a
UTM Coordinates: 17 W 605632 7856501

Date/Time Surveyed: 11-Sept-2008/10:00

Photographs

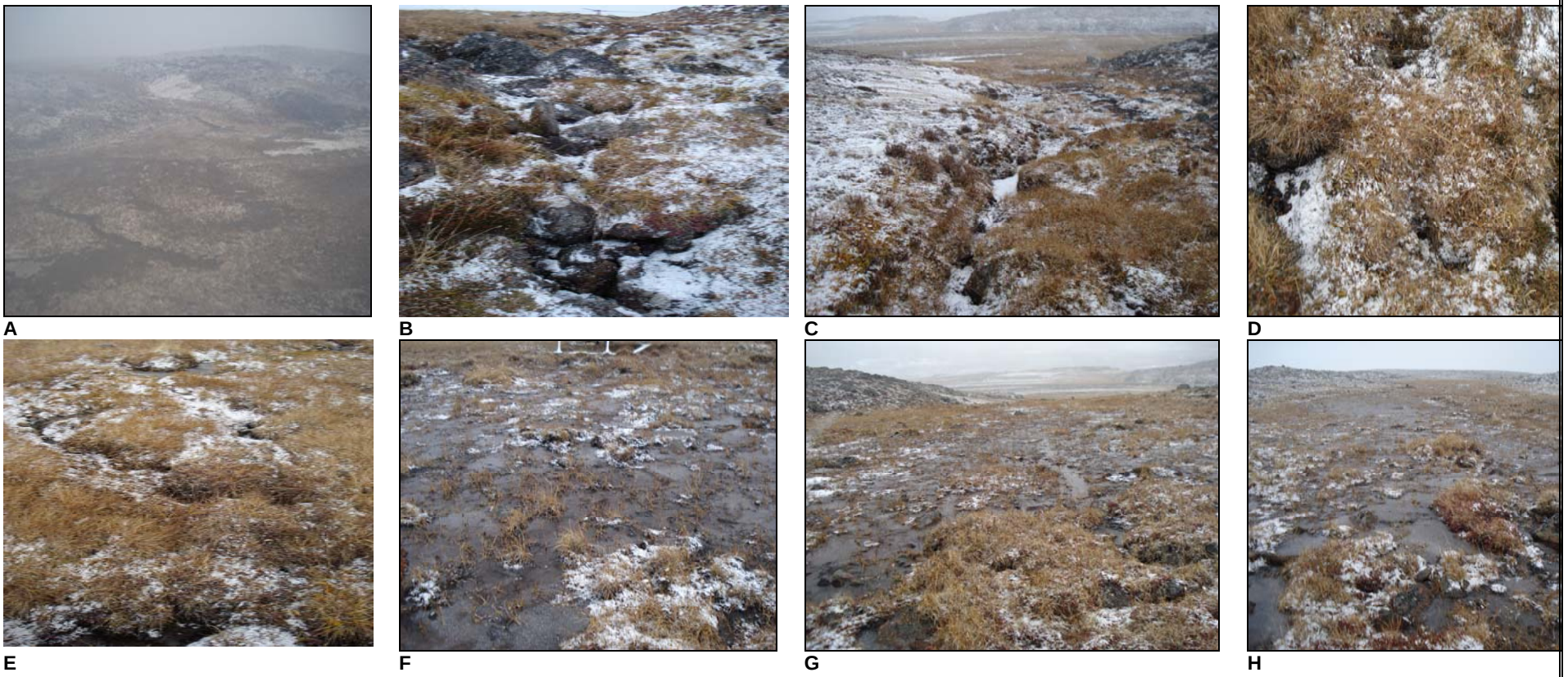


Figure 1. Aerial view of downstream (A), downstream barrier (B), downstream barrier 2 (C), subsurface water (D-E), at crossing across (F), at crossing downstream (G), and crossing upstream (H).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-080b
UTM Coordinates: 17 W 605647 7855353
Date/Time Surveyed: 27-Aug-10

General Physical Characteristics

Floodplain Width (m):	N/M	**Channel Pattern:**	N/M	**Stage:**	N/A
Channel Confinement:	N/M	**Channel Gradient (range):**	N/M	**Flow Regime:**	INT
Bank Height (range in m):	N/M	**Bank Shape:**	N/M	**T_W (°C):**	N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted:	N	**Effort (min):**	N/A	**Electrofisher Settings:**	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	Moderate	No

Comments & Summary

Intermittent watercourse with minimal channel development at crossing location. May provide habitat for NNST due to proximity to compensation lake. Cobble/gravel dominated substrate.

Rail Alignment Watercourse Crossing Assessment

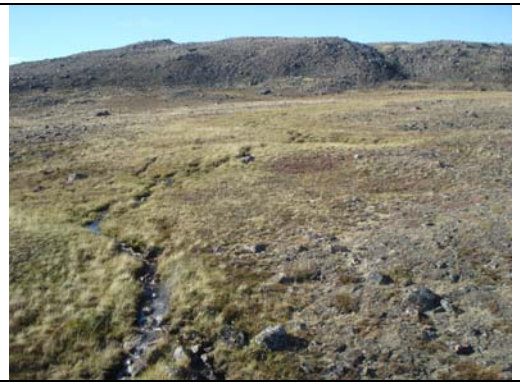
Location

Crossing ID: AR-080b
UTM Coordinates: 17 W 605647 7855353

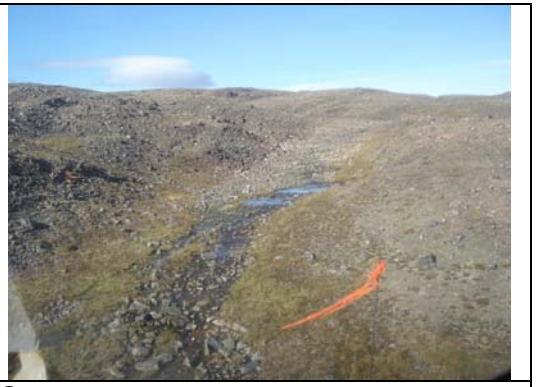
Date/Time Surveyed: 27-Aug-10

Photographs

A



B



C

Figure 1. View upstream from crossing (A), view looking upstream from Cockburn River (B), upstream view where channel begins to disappear (C).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-080a
UTM Coordinates: 17 W 605644 7855249
Date/Time Surveyed: 27-Aug-10

General Physical Characteristics

Floodplain Width (m):	N/M	**Channel Pattern:**	UD	**Stage:**	N/A
Channel Confinement:	N/M	**Channel Gradient (range):**	N/M	**Flow Regime:**	EPH
Bank Height (range in m):	N/M	**Bank Shape:**	N/M	**T_W (°C):**	N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted:	N	**Effort (min):**	N/A	**Electrofisher Settings:**	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

Dry, no channel.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-080a
UTM Coordinates: 17 W 605644 7855249

Date/Time Surveyed: 27-Aug-10

Photographs

A

Figure 1. View of dry drain (A).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-072a
UTM Coordinates: 17 W 605524 7854093
Date/Time Surveyed: 12-Aug-07 / 04:20

General Physical Characteristics

Floodplain Width (m):	N/M	**Channel Pattern:**	UD	**Stage:**	N/A
Channel Confinement:	PC	**Channel Gradient (range):**	> 15^{o}	**Flow Regime:**	EPH
Bank Height (range in m):	UD	**Bank Shape:**	UD	**T_W ($^{\circ}$C):**	N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted:	N	**Effort (min):**	N/A	**Electrofisher Settings:**	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

There was no water at this crossing, but high water channel width was 0.9 m. Barriers present –dry, steep gradient downstream and upstream.

The steep gradient between the large river downstream and the crossing prevents fish from reaching the site even during high water.

Baffinland Iron Mines
Mary River Project

North/South Consultants Inc.
Aquatic Environment Specialists

Fish Habitat Quality – NO FISH HABITAT

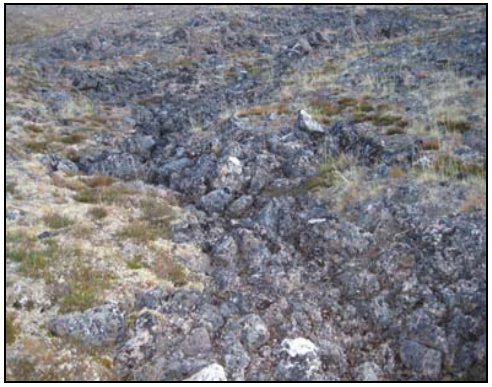
Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-072a
UTM Coordinates: 17 W 605524 7854093

Date/Time Surveyed: 12-Aug-07 / 04:20

Photographs



A

B

C

Figure 1. View of habitat upstream of crossing (A), at the crossing (B) and downstream of crossing (C).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-066a
UTM Coordinates: 17 W 605809 7853239
Date/Time Surveyed: 12-Aug-07 / 22:40

General Physical Characteristics

Floodplain Width (m):	> 200	**Channel Pattern:**	Y-shaped	**Stage:**	N/A
Channel Confinement:	PC	**Channel Gradient (range):**	1^{o}	**Flow Regime:**	EPH
Bank Height (range in m):	UD	**Bank Shape:**	UD	**T_W ($^{\circ}$C):**	N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted:	N	**Effort (min):**	N/A	**Electrofisher Settings:**	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

High water channel width was 0.5 m. Barriers present –no water downstream and at crossing.

Crossing dry, no fish habitat present.

Baffinland Iron Mines
Mary River Project

North/South Consultants Inc.
Aquatic Environment Specialists

Fish Habitat Quality – NO FISH HABITAT

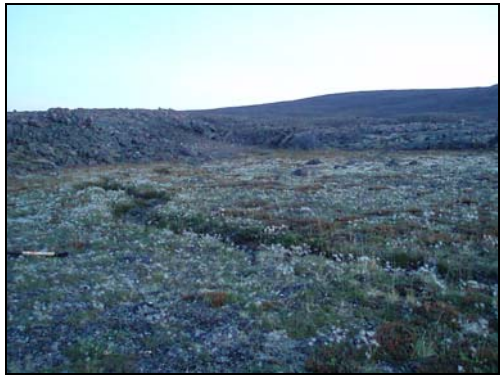
Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-066a
UTM Coordinates: 17 W 605809 7853239

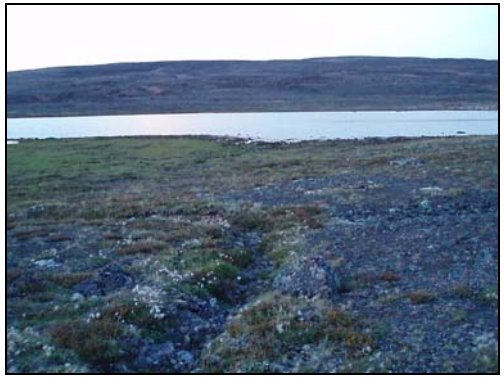
Date/Time Surveyed: 12-Aug-07 / 22:40

Photographs



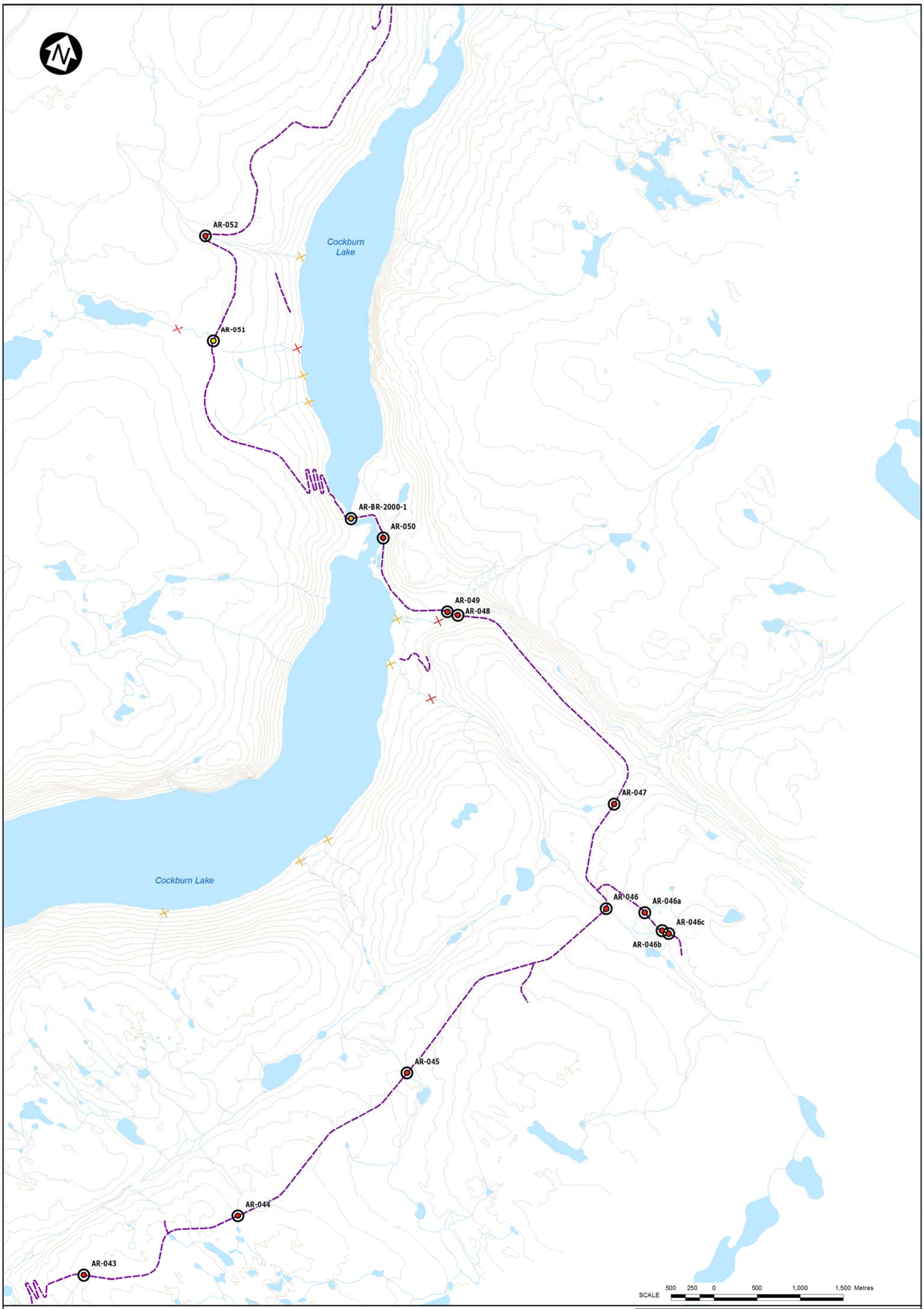
A

B



C

Figure 1. View of habitat upstream of crossing (A), at the crossing (B) and downstream of crossing (C).



LEGEND:

ACCESS ROAD CROSSING SURVEY YEAR
- 2007
- 2008
- 2010
- 2011

STREAM CROSSING
FISH BARRIER (CONFIRMED)
FISH BARRIER (AERIAL PHOTO INTERPRETATION)

CONTOUR
MILNE INLET TOTE ROAD (EXISTING)
RAILWAY ALIGNMENT (PROPOSED)
CONSTRUCTION ACCESS ROAD (PROPOSED)
WATER
INFRASTRUCTURE (PROPOSED FOR CONSTRUCTION AND OPERATIONS PERIODS)

NOTES:

1. BASE MAP: © HER MAJESTY THE QUEEN IN RIGHTS OF CANADA DEPARTMENT OF NATURAL RESOURCES (2009.) ALL RIGHTS RESERVED.
2. TOPOGRAPHY PROVIDED BY EAGLE MAPPING (2005).
3. PROPOSED RAILWAY ALIGNMENT PROVIDED BY CANRAIL CONSULTANTS INC.
4. PROPOSED RAILWAY CONSTRUCTION ACCESS ROAD ALIGNMENT PROVIDED BY CANRAIL CONSULTANTS INC. DRAWING NO.: RAILWAY ALIGNMENT AND CONST ACCESS RD - MARY RIVER STEENSBY 2010 -12AUG2010.dwg
5. LOCATION OF PROPOSED INFRASTRUCTURE IS APPROXIMATE AND SUBJECT TO FIELD ADJUSTEMENTS
6. CONTOUR INTERVAL IS 25 M AND IS IN METRES.

BAFFINLAND IRON MINES CORPORATION

MARY RIVER PROJECT

Access Road Stream Crossing Sites (MAP H)

North/South Consultants Inc.
Aquatic Environment Specialists

P/A NO.	REF NO.
-	03-13-8
DATE: 15/12/2011	REV 2

Path: G:\MARYRIV_GDB\EIS_GDB\FEIS\UpdatedMapping\Baseline appendicies\7C8-19_to_7C11-19_App5_1-3_MapsAtoK.mxd

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-052
UTM Coordinates: 17 W 604966 7843678
Date/Time Surveyed: 27-Aug-10

General Physical Characteristics

Floodplain Width (m):	N/M	**Channel Pattern:**	N/M	**Stage:**	N/A
Channel Confinement:	N/M	**Channel Gradient (range):**	N/M	**Flow Regime:**	INT
Bank Height (range in m):	N/M	**Bank Shape:**	N/M	**T_W (°C):**	N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted:	N	**Effort (min):**	N/A	**Electrofisher Settings:**	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

Watercourse with some channel development and water flow. Drains into Cockburn Lk; however, steep, impassable gradient between the lake and crossing location. Non-fish bearing.

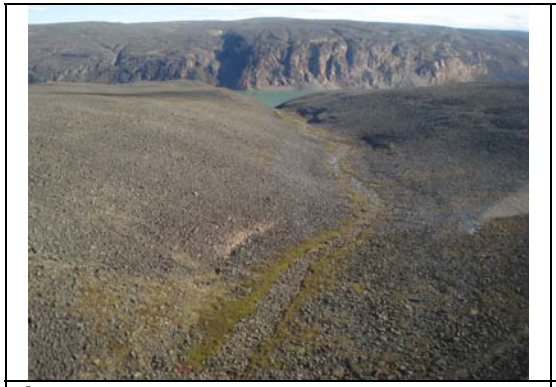
Rail Alignment Watercourse Crossing Assessment

Location

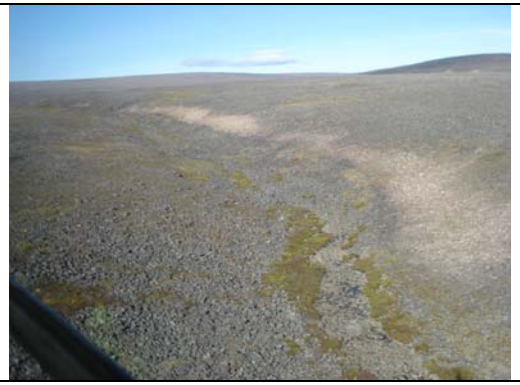
Crossing ID: AR-052
UTM Coordinates: 17 W 604966 7843678

Date/Time Surveyed: 27-Aug-10

Photographs



A



B

C

Figure 1. Downstream view of crossing (A), view upstream of crossing (B), view of steep gradient downstream of crossing near Cockburn Lake (C).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-051
UTM Coordinates: 17 W 605447 7842553
Date/Time Surveyed: 6-Sept-08 /10:14

General Physical Characteristics

Floodplain Width (m):	18	**Channel Pattern:**	Sinuous single channel	**Stage:**	Normal
Channel Confinement:	C	**Channel Gradient (range):**	0.75-2.5°	**Flow Regime:**	PER
Bank Height (range in m):	UD	**Bank Shape:**	Rock	**T_W (°C):**	2.5

Hydrology & Habitat Characteristics

Distance and Direction from Crossing (m)	Channel Width (m)		Water Depth (m)				Water Velocity (m/s)			
	Wetted	High Water	25%	50%	75%	Max	25%	50%	75%	Max
60D	12	14	0.17	0.15	0.24	0.27	0.28	0.14	0.37	0.75
40D	12	17	0.18	0.21	0.2	0.39	1.26	0.33	0.15	1.26
20D	13	17	0.35	0.26	0.14	0.35	0.25	0.36	0.22	0.86
0	11.7	14.1	0.13	0.23	0.24	0.24	0.81	0.56	0.93	0.93
20U	6	13	0.19	0.30	0.22	0.40	0.24	0.73	0.26	0.74
40U	11	14	0.15	0.14	0.1	0.39	0.73	0.18	0.21	0.78
60U	7	22	0.44	0.26	0.14	0.5	0.37	0.9	0.09	0.9

Distance and Direction from Crossing (m)	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
60D	45	20	5		30			15	10	45	30
40D	20	30	10		40				10	40	50
20D	10	20	10		60				5	35	60
0	40		20		40			10	20	40	30
20U	30	10	10		50			10	10	50	30
40U	65	20	5		10			10	30	40	20
60U	60	30			10				20	30	50

Baffinland Iron Mines
Mary River Project

North/South Consultants Inc.
Aquatic Environment Specialists

Fish Habitat Quality – NO FISH HABITAT

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-051
UTM Coordinates: 17 W 605447 7842553
Date/Time Surveyed: 6-Sept-08 /10:14

Fisheries Information

Electrofishing Conducted: Y **Effort (min):** 7:30 **Electrofisher Settings:** 900 V, 60 Hz, 30%

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	0	-	-	-
NNST	0	-	-	-

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

A couple of deep lakes upstream ~ 50m of crossing (may be deep enough for overwintering). Downstream there are a series of cascades and falls that are impassable to fish from Cockburn lake. Passage impossible at UTM 17 W 606399 7842790. No catch electrofishing-could not get the power up over 0.0, the water is very cold; probably the problem. The upstream lakes are currently separated from the crossing by barrier at waypoint 17 W 605008 7842617.

Baffinland Iron Mines
Mary River Project

North/South Consultants Inc.
Aquatic Environment Specialists

Fish Habitat Quality – NO FISH HABITAT

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-051
UTM Coordinates: 17 W 605447 7842553
Date/Time Surveyed: 6-Sept-08 /10:14

Photographs


A


B


C


D


E


F


G


H

Figure 1. View of 60m downstream across (A), 40m downstream across (B), 20m downstream across (C), 20m upstream across (D), 40m upstream across (E), 60m upstream across (F), across crossing (G), and an aerial view of one of the downstream barriers (H).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-BR-2000-1
UTM Coordinates: 17 W 607634 7841130
Date/Time Surveyed: 14-Aug-2011/11:05

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted: N
Effort (min): N/A
Electrofisher Settings: N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	High	High
NNST	No	No	Moderate	Low

Comments & Summary

In 2010, a desktop assessment was conducted for this site and Fish Habitat Quality was designated as Important. That designation was maintained as a result of the information collected during a site visit in 2011.

This crossing is located at the constriction between the north and middle channels of Cockburn Lake, where the railway will cross from the west to the east shore of the lake. Cockburn Lake is important habitat for ARCH, and they can easily move between the crossing site and either the north or middle basin of the lake, both of which provide overwintering habitat. This particular site appears to be shallow enough to freeze to the bottom in the winter, but fish can easily move into either the north or middle basins when freeze-up begins.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-BR-2000-1
UTM Coordinates: 17 W 607634 7841130
Date/Time Surveyed: 14-Aug-2011/11:05

Photographs

A

B

Figure 1. Aerial view of the crossing (A), and the north basin of Cockburn Lake upstream of the crossing (B).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-050
UTM Coordinates: 17 W 608057 7841040
Date/Time Surveyed: 27-Aug-10

General Physical Characteristics

Floodplain Width (m):	N/M	**Channel Pattern:**	N/M	**Stage:**	N/A
Channel Confinement:	N/M	**Channel Gradient (range):**	N/M	**Flow Regime:**	INT
Bank Height (range in m):	N/M	**Bank Shape:**	N/M	**T_W (°C):**	N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted:	N	**Effort (min):**	N/A	**Electrofisher Settings:**	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	Low	No
NNST	No	No	Moderate	No

Comments & Summary

Drains shallow pond upstream of crossing location into Cockburn Lk. Crossing location at transition from flat area adjacent to Cockburn Lk. to steep, impassable gradient immediately upstream. Area adjacent to Cockburn Lk. is accessible to fish; immediately upstream of crossing location is non-fish bearing.

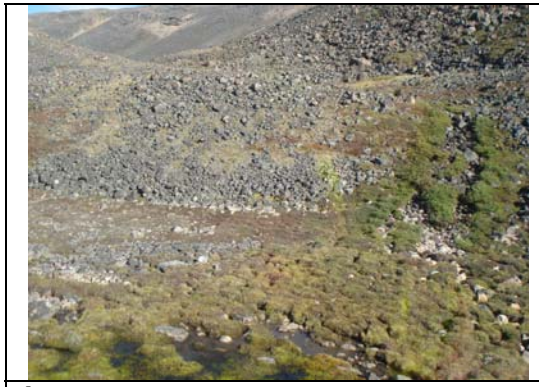
Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-050
UTM Coordinates: 17 W 608057 7841040

Date/Time Surveyed: 27-Aug-10

Photographs



A

B

C

Figure 1. View of steep gradient looking upstream from Cockburn Lk. (A), aerial view of drainage (B), downstream view from sloped area near crossing (C).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-049
UTM Coordinates: 17 W 609043 7840472
Date/Time Surveyed: 27-Aug-10

General Physical Characteristics

Floodplain Width (m):	N/M	**Channel Pattern:**	N/M	**Stage:**	N/A
Channel Confinement:	N/M	**Channel Gradient (range):**	N/M	**Flow Regime:**	PER
Bank Height (range in m):	N/M	**Bank Shape:**	N/M	**T_W (°C):**	N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted:	N	**Effort (min):**	N/A	**Electrofisher Settings:**	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

Steep gradient watercourse with defined channel at crossing location. Drains into AR-048, but a waterfall located at this confluence (downstream of the crossing location) acts as a barrier to upstream fish movements. Non-fish bearing stream.

Rail Alignment Watercourse Crossing Assessment

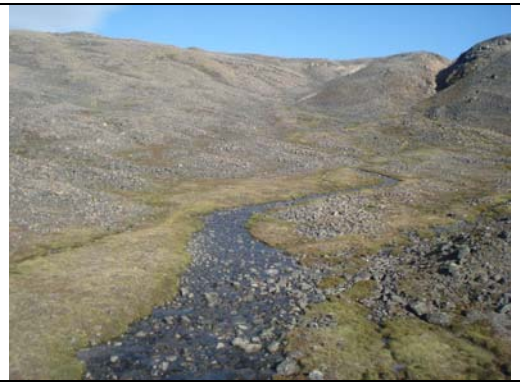
Location

Crossing ID: AR-049
UTM Coordinates: 17 W 609043 7840472

Date/Time Surveyed: 27-Aug-10

Photographs

A



B

C

Figure 1. View of waterfall barrier downstream of crossing (A), view looking upstream from crossing location (B), view looking downstream from crossing location (C).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-048
UTM Coordinates: 17 W 609169 7840472
Date/Time Surveyed: 27-Aug-10 / N/M

General Physical Characteristics

Floodplain Width (m):	N/M	**Channel Pattern:**	Sinuous	**Stage:**	Moderate
Channel Confinement:	C	**Channel Gradient (range):**	4-5°	**Flow Regime:**	PER
Bank Height (range in m):	6.0-8.0	**Bank Shape:**	V	**T_W (°C):**	4.5

Hydrology & Habitat Characteristics

Distance and Direction from Crossing (m)	Channel Width (m)		Water Depth (m)				Water Velocity (m/s)			
	Wetted	High Water	25%	50%	75%	Max	25%	50%	75%	Max
60D	10.0	16.0	0.25	0.04	0.19	0.30	0.67	0.53	0.49	0.67
40D	10.0	15.0	0.10	0.10	0.30	0.21	0.37	0.33	0.92	1.46
20D	7.0	10.0	0.37	0.20	0.30	0.31	0.17	0.93	0.30	1.03
0	11.0	14.0	0.19	0.16	0.28	0.28	0.16	0.69	0.08	1.11
20U	6.0	11.0	0.15	0.24	0.17	0.37	0.50	0.93	0.94	1.50
40U	7.0	16.0	0.17	0.15	0.21	0.30	0.58	0.81	0.70	1.24
60U	15.0	17.0	0.19	0.30	0.10	0.25	0.05	0.53	0.61	0.91

Distance and Direction from Crossing (m)	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Flat	Fines	Gravel	Small Cobble	Large Cobble	Boulders
60D	85		15						5	10	85
40D	100									25	75
20D	90		10						15	15	70
0	90		10						25	25	50
20U	75		25							25	75
40U	100								30	50	20
60U	90		10						15	35	50

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-048
UTM Coordinates: 17 W 609169 7840472
Date/Time Surveyed: 27-Aug-10 / N/M

Fisheries Information

Electrofishing Conducted: N **Effort (min):** N/A **Electrofisher Settings:** N/A

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	0	-	-	-
NNST	0	-	-	-

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	High	Moderate
NNST	No	No	Moderate	Low

Comments & Summary

Although electrofishing was not conducted, habitat near the crossing is suitable for rearing of both species. Connected to Cockburn Lake downstream of crossing; no downstream barriers observed.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-048
UTM Coordinates: 17 W 609169 7840472
Date/Time Surveyed: 27-Aug-10 / N/M

Photographs

A B C

Figure 1. View of watercourse upstream of crossing (A), downstream of crossing (B), upstream view from 60 m upstream of crossing (C), and downstream view from 60 m downstream of crossing (D).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-047
UTM Coordinates: 17 W 611601 7838996
Date/Time Surveyed: 27-Aug-10

General Physical Characteristics

Floodplain Width (m):	N/M	**Channel Pattern:**	UD	**Stage:**	N/A
Channel Confinement:	N/M	**Channel Gradient (range):**	N/M	**Flow Regime:**	EPH
Bank Height (range in m):	N/M	**Bank Shape:**	N/M	**T_W (°C):**	N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted:	N	**Effort (min):**	N/A	**Electrofisher Settings:**	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

Dry, undefined channel which flows to AR-46. No upstream waterbody.

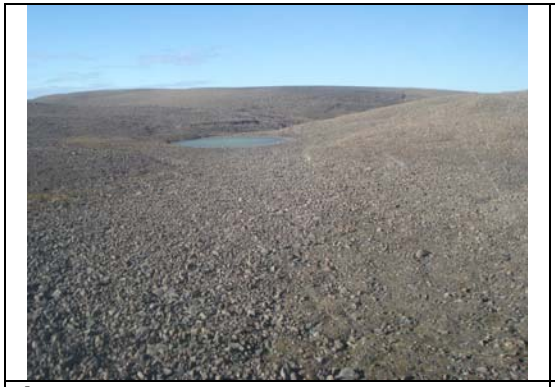
Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-047
UTM Coordinates: 17 W 611601 7838996

Date/Time Surveyed: 27-Aug-10

Photographs



A

B

Figure 1. Upstream of crossing looking downstream (A), view at crossing looking upstream (B).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-046c
UTM Coordinates: 17 W 612688 7837780
Date/Time Surveyed: 27-Aug-10

General Physical Characteristics

Floodplain Width (m):	N/M	**Channel Pattern:**	N/M	**Stage:**	N/A
Channel Confinement:	N/M	**Channel Gradient (range):**	N/M	**Flow Regime:**	EPH
Bank Height (range in m):	N/M	**Bank Shape:**	N/M	**T_W (°C):**	N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted:	N	**Effort (min):**	N/A	**Electrofisher Settings:**	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

Dry terrain, no channel, no headwaters. Drains to a series of small ponds.

Baffinland Iron Mines
Mary River Project

North/South Consultants Inc.
Aquatic Environment Specialists

Fish Habitat Quality – NO FISH HABITAT

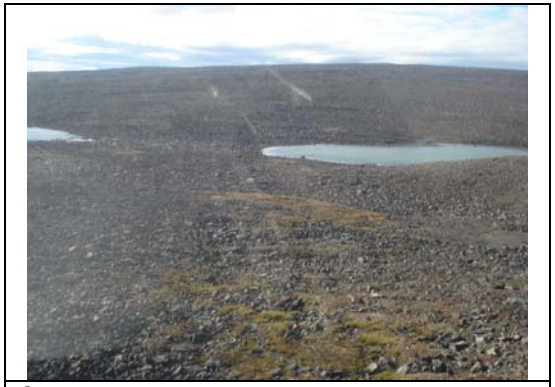
Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-046c
UTM Coordinates: 17 W 612688 7837780

Date/Time Surveyed: 27-Aug-10

Photographs



A

Figure 1. View looking downstream from crossing (A).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-046b
UTM Coordinates: 17 W 612605 7837788
Date/Time Surveyed: 27-Aug-10

General Physical Characteristics

Floodplain Width (m):	N/M	**Channel Pattern:**	N/M	**Stage:**	N/A
Channel Confinement:	N/M	**Channel Gradient (range):**	N/M	**Flow Regime:**	INT
Bank Height (range in m):	N/M	**Bank Shape:**	N/M	**T_W (°C):**	N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted:	N	**Effort (min):**	N/A	**Electrofisher Settings:**	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

Dry terrain, steep, poorly defined channel which drains a series of small shallow ponds into AR-46.

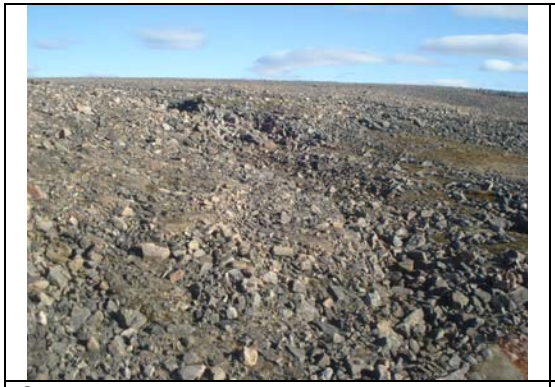
Rail Alignment Watercourse Crossing Assessment

Location

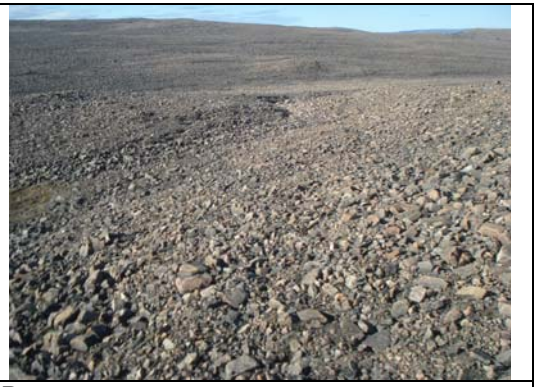
Crossing ID: AR-046b
UTM Coordinates: 17 W 612605 7837788

Date/Time Surveyed: 27-Aug-10

Photographs



A



B

Figure 1. View looking upstream (A), view looking downstream (B).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-046a
UTM Coordinates: 17 W 612347 7837920
Date/Time Surveyed: 27-Aug-10

General Physical Characteristics

Floodplain Width (m):	N/M	**Channel Pattern:**	N/M	**Stage:**	N/A
Channel Confinement:	N/M	**Channel Gradient (range):**	N/M	**Flow Regime:**	INT
Bank Height (range in m):	N/M	**Bank Shape:**	N/M	**T_W (°C):**	N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted:	N	**Effort (min):**	N/A	**Electrofisher Settings:**	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

Dry terrain, steep, poorly defined channel which drains a series of small shallow ponds into AR-46.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-046a
UTM Coordinates: 17 W 612347 7837920

Date/Time Surveyed: 27-Aug-10

Photographs

A

B

C

Figure 1. View looking upstream from crossing (A), view looking downstream from crossing (B), downstream of crossing looking upstream (C).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-046
UTM Coordinates: 17 W 611907 7837816
Date/Time Surveyed: 27-Aug-10

General Physical Characteristics

Floodplain Width (m):	N/M	**Channel Pattern:**	N/M	**Stage:**	N/A
Channel Confinement:	N/M	**Channel Gradient (range):**	N/M	**Flow Regime:**	INT
Bank Height (range in m):	N/M	**Bank Shape:**	N/M	**T_W (°C):**	N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted:	N	**Effort (min):**	N/A	**Electrofisher Settings:**	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

The poorly defined channel connects two shallow ponds; water percolating through drain's rock bed. Eventually drains to Cockburn Lk.; however, there are multiple waterfalls between Cockburn Lk. and the crossing area that are impassable to upstream moving fish.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-046
UTM Coordinates: 17 W 611907 7837816

Date/Time Surveyed: 27-Aug-10

Photographs

A

B

C

D

Figure 1. View looking upstream (A), view looking downstream (B), view of two waterfalls upstream of Cockburn Lk. (C), another waterfall further upstream (D).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-045
UTM Coordinates: 17 W 610345 7835263
Date/Time Surveyed: 27-Aug-10

General Physical Characteristics

Floodplain Width (m):	N/M	**Channel Pattern:**	UD	**Stage:**	N/A
Channel Confinement:	N/M	**Channel Gradient (range):**	N/M	**Flow Regime:**	EPH
Bank Height (range in m):	N/M	**Bank Shape:**	N/M	**T_W (°C):**	N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted:	N	**Effort (min):**	N/A	**Electrofisher Settings:**	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

No channel. Dry. No fish habitat. Shallow pond upstream.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-045
UTM Coordinates: 17 W 610345 7835263

Date/Time Surveyed: 27-Aug-10

Photographs

A

B

Figure 1. Aerial view looking upstream to shallow pond (A), aerial view looking downstream (B).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-044
UTM Coordinates: 17 W 609027 7833055
Date/Time Surveyed: 27-Aug-10

General Physical Characteristics

Floodplain Width (m):	N/M	**Channel Pattern:**	UD	**Stage:**	N/A
Channel Confinement:	N/M	**Channel Gradient (range):**	N/M	**Flow Regime:**	EPH
Bank Height (range in m):	N/M	**Bank Shape:**	N/M	**T_W (°C):**	N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted:	N	**Effort (min):**	N/A	**Electrofisher Settings:**	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

No channel. Rocky slope draining series of small ponds.

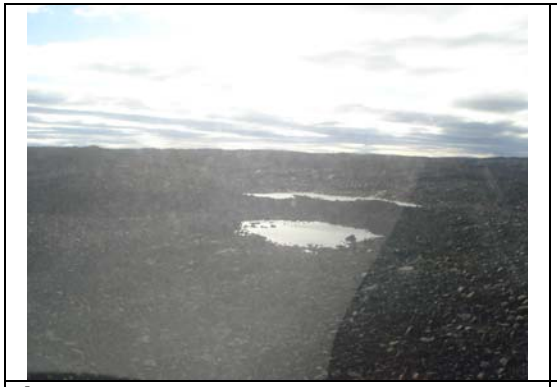
Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-044
UTM Coordinates: 17 W 609027 7833055

Date/Time Surveyed: 27-Aug-10

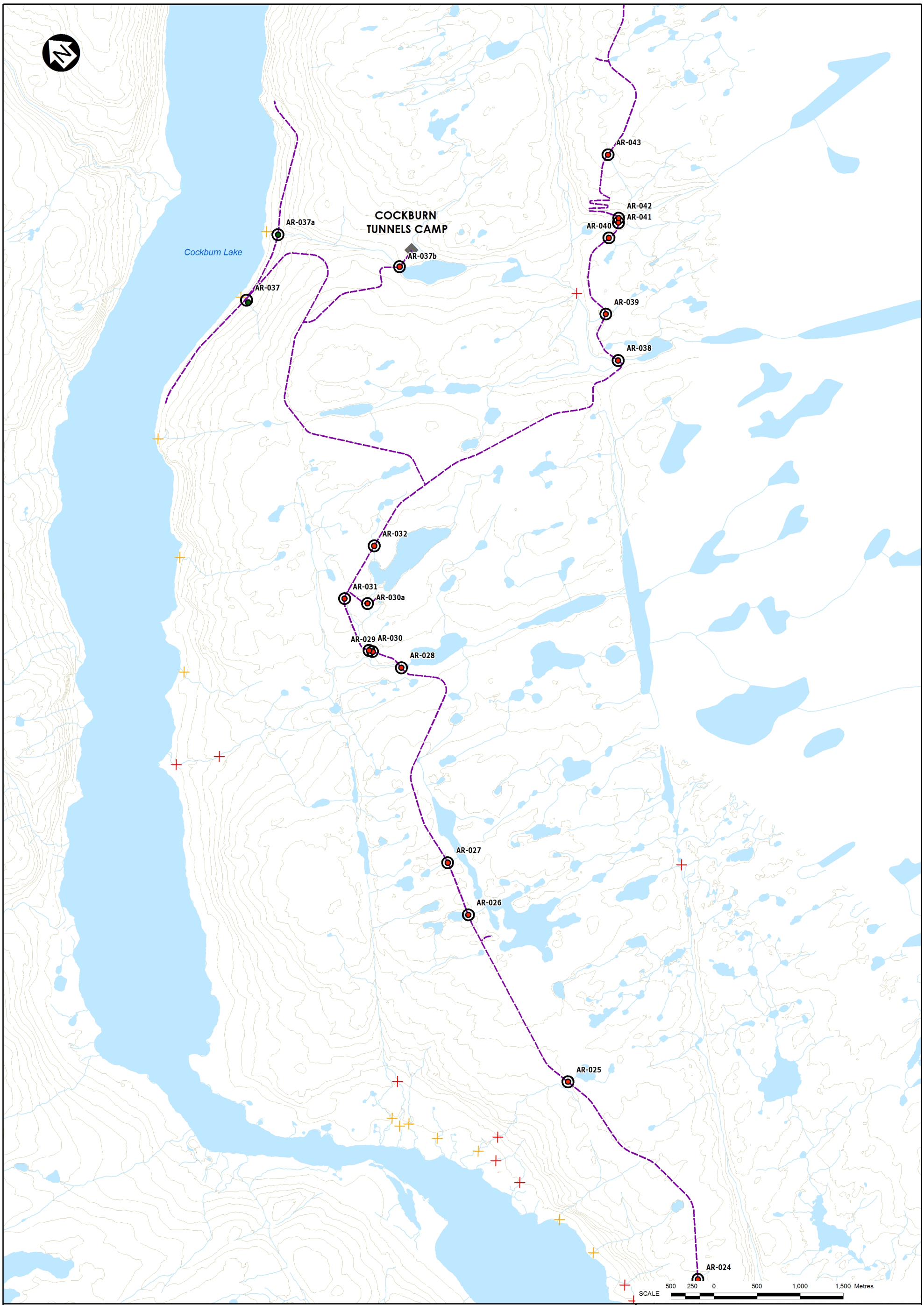
Photographs



A

B

Figure 1. Aerial view looking upstream (A), aerial view looking downstream (B).



LEGEND:

ACCESS ROAD CROSSING SURVEY YEAR
- 2007
- 2008
- 2010

STREAM CROSSING
FISH BARRIER (CONFIRMED)
FISH BARRIER (AERIAL PHOTO INTERPRETATION)

CONTOUR
MILNE INLET TOTE ROAD (EXISTING)
RAILWAY ALIGNMENT (PROPOSED)
CONSTRUCTION ACCESS ROAD (PROPOSED)
WATER
INFRASTRUCTURE

NOTES:

1. BASE MAP 1:50,000 © HER MAJESTY THE QUEEN IN RIGHTS OF CANADA DEPARTMENT OF NATURAL RESOURCES (2009.) ALL RIGHTS RESERVED.
2. TOPOGRAPHY PROVIDED BY EAGLE MAPPING (2005).
3. PROPOSED RAILWAY ALIGNMENT PROVIDED BY CANRAIL CONSULTANTS INC.
4. PROPOSED RAILWAY CONSTRUCTION ACCESS ROAD ALIGNMENT PROVIDED BY CANRAIL CONSULTANTS INC. DRAWING NO.: RAILWAY ALIGNMENT AND CONST ACCESS RD - MARY RIVER STEENSBY 2010 -12AUG2010.DWG
5. LOCATION OF PROPOSED INFRASTRUCTURE IS APPROXIMATE AND SUBJECT TO FIELD ADJUSTEMENTS
6. CONTOUR INTERVAL IS 25 AND IS IN METRES.

BAFFINLAND IRON MINES CORPORATION

MARY RIVER PROJECT

Access Road Stream Crossing Sites (MAP I)

North/South Consultants Inc.
Aquatic Environment Specialists

P/A NO.	REF NO.
-	-
DATE: 19/11/2010	REV 2

Path: G:\MARYRIV_GDB\EIS_GDB\EIS_Figures_2010EIS_Figures\MXD\Synthesis_RailLine_AccessRoad\Rev2Apdx\20101119_ApdxAR_sg.mxd

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-043
UTM Coordinates: 17 W 607564 7831818
Date/Time Surveyed: 27-Aug-10

General Physical Characteristics

Floodplain Width (m):	N/M	**Channel Pattern:**	N/M	**Stage:**	N/A
Channel Confinement:	N/M	**Channel Gradient (range):**	N/M	**Flow Regime:**	EPH
Bank Height (range in m):	N/M	**Bank Shape:**	N/M	**T_W (°C):**	N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted:	N	**Effort (min):**	N/A	**Electrofisher Settings:**	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

Dry, mountain top drain. No headwaters. Channel not well defined.

Rail Alignment Watercourse Crossing Assessment

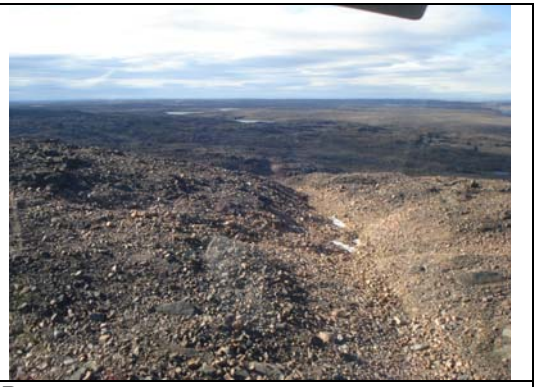
Location

Crossing ID: AR-043
UTM Coordinates: 17 W 607564 7831818

Date/Time Surveyed: 27-Aug-10

Photographs

A



B

Figure 1. Aerial view looking upstream (A), aerial view looking downstream (B).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-042
UTM Coordinates: 17 W 607142 7831203
Date/Time Surveyed: 27-Aug-10

General Physical Characteristics

Floodplain Width (m):	N/M	**Channel Pattern:**	N/M	**Stage:**	N/A
Channel Confinement:	N/M	**Channel Gradient (range):**	N/M	**Flow Regime:**	EPH
Bank Height (range in m):	N/M	**Bank Shape:**	N/M	**T_W (°C):**	N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted:	N	**Effort (min):**	N/A	**Electrofisher Settings:**	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

Dry channel. Steep mountain drain which connects to AR-41.

Baffinland Iron Mines
Mary River Project

North/South Consultants Inc.
Aquatic Environment Specialists

Fish Habitat Quality – NO FISH HABITAT

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-042
UTM Coordinates: 17 W 607142 7831203

Date/Time Surveyed: 27-Aug-10

Photographs

A

B

Figure 1. Aerial view looking downstream (A), aerial view looking upstream (B).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-041
UTM Coordinates: 17 W 607103 7831165
Date/Time Surveyed: 27-Aug-10

General Physical Characteristics

Floodplain Width (m):	N/M	**Channel Pattern:**	N/M	**Stage:**	N/A
Channel Confinement:	N/M	**Channel Gradient (range):**	N/M	**Flow Regime:**	INT
Bank Height (range in m):	N/M	**Bank Shape:**	N/M	**T_W (°C):**	N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted:	N	**Effort (min):**	N/A	**Electrofisher Settings:**	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

Steep gradient drainage between two shallow ponds (each < 2 m deep). No connection to overwintering habitat.

Baffinland Iron Mines
Mary River Project

North/South Consultants Inc.
Aquatic Environment Specialists

Fish Habitat Quality – NO FISH HABITAT

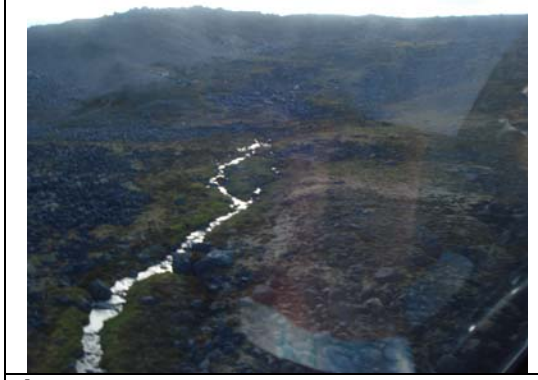
Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-041
UTM Coordinates: 17 W 607103 7831165

Date/Time Surveyed: 27-Aug-10

Photographs



A

B

Figure 1. View at crossing looking upstream (A), view of headwater pond (B).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-040
UTM Coordinates: 17 W 606900 7831117
Date/Time Surveyed: 27-Aug-10

General Physical Characteristics

Floodplain Width (m):	N/M	**Channel Pattern:**	N/M	**Stage:**	N/A
Channel Confinement:	N/M	**Channel Gradient (range):**	N/M	**Flow Regime:**	INT
Bank Height (range in m):	N/M	**Bank Shape:**	N/M	**T_W (°C):**	N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted:	N	**Effort (min):**	N/A	**Electrofisher Settings:**	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

Drainage between two shallow ponds (each < 1 m deep). Poorly defined channel with a ridge between ponds. No connection to overwintering habitat.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-040
UTM Coordinates: 17 W 606900 7831117

Date/Time Surveyed: 27-Aug-10

Photographs

A

B

Figure 1. View downstream from crossing (A), view of upstream pond (B).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-039
UTM Coordinates: 17 W 606257 7830507
Date/Time Surveyed: 27-Aug-10

General Physical Characteristics

Floodplain Width (m):	N/M	**Channel Pattern:**	N/M	**Stage:**	N/A
Channel Confinement:	N/M	**Channel Gradient (range):**	N/M	**Flow Regime:**	INT
Bank Height (range in m):	N/M	**Bank Shape:**	N/M	**T_W (°C):**	N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted:	N	**Effort (min):**	N/A	**Electrofisher Settings:**	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

Drainage between a small, shallow (< 1 m deep) pond (upstream of crossing) and the same lake as AR-38 (< 4 m deep) (downstream). Was dry at time of survey.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-039
UTM Coordinates: 17 W 606257 7830507

Date/Time Surveyed: 27-Aug-10

Photographs

A

B

Figure 1. View downstream from crossing (A), view upstream from crossing (B).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-038
UTM Coordinates: 17 W 605987 7830021
Date/Time Surveyed: 27-Aug-10

General Physical Characteristics

Floodplain Width (m):	N/M	**Channel Pattern:**	N/M	**Stage:**	N/A
Channel Confinement:	N/M	**Channel Gradient (range):**	N/M	**Flow Regime:**	INT
Bank Height (range in m):	N/M	**Bank Shape:**	N/M	**T_W (°C):**	N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted:	N	**Effort (min):**	N/A	**Electrofisher Settings:**	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

Drainage connects two lakes. No defined channel; water percolating through rock. Water depths of upstream and downstream lakes < 4 m; are unlikely to support fish.

Baffinland Iron Mines
Mary River Project

North/South Consultants Inc.
Aquatic Environment Specialists

Fish Habitat Quality – NO FISH HABITAT

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-038
UTM Coordinates: 17 W 605987 7830021

Date/Time Surveyed: 27-Aug-10

Photographs

A

B

C

Figure 1. View downstream of crossing (A), view upstream of crossing (B), view from upstream lake looking downstream (C).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-037b
UTM Coordinates: 17 W 604922 7832569
Date/Time Surveyed: 27-Aug-10

General Physical Characteristics

Floodplain Width (m):	N/M	**Channel Pattern:**	N/M	**Stage:**	N/A
Channel Confinement:	N/M	**Channel Gradient (range):**	N/M	**Flow Regime:**	INT
Bank Height (range in m):	N/M	**Bank Shape:**	N/M	**T_W (°C):**	N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted:	N	**Effort (min):**	N/A	**Electrofisher Settings:**	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

Drainage between Cockburn Lk. (downstream of crossing location) and shallow waterbody (upstream; < 4 m deep) that is unlikely to support fish. Steep gradient between crossing location and Cockburn Lk. would prevent fish from Cockburn Lk. reaching crossing area.

Baffinland Iron Mines
Mary River Project

North/South Consultants Inc.
Aquatic Environment Specialists

Fish Habitat Quality – NO FISH HABITAT

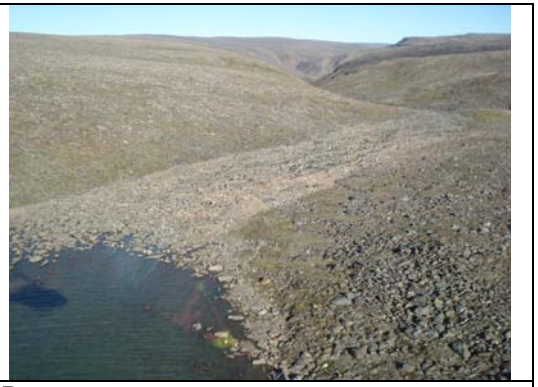
Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-037b
UTM Coordinates: 17 W 604922 7832569
Date/Time Surveyed: 27-Aug-10

Photographs

A



B

Figure 1. View of crossing area (A), outlet of upstream waterbody (B).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-032
UTM Coordinates: 17 W 602453 7830448
Date/Time Surveyed: 27-Aug-10

General Physical Characteristics

Floodplain Width (m):	N/M	**Channel Pattern:**	N/M	**Stage:**	N/A
Channel Confinement:	N/M	**Channel Gradient (range):**	N/M	**Flow Regime:**	EPH
Bank Height (range in m):	N/M	**Bank Shape:**	N/M	**T_W (°C):**	N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted:	N	**Effort (min):**	N/A	**Electrofisher Settings:**	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

No defined channel. No headwaters. No fish habitat. Land ridge prevents waterbody to the East from entering stream.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-032
UTM Coordinates: 17 W 602453 7830448

Date/Time Surveyed: 27-Aug-10

Photographs

A

B

Figure 1. West view of crossing location (A), view of waterbody to the east of crossing (B).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-031
UTM Coordinates: 17 W 601777 7830247
Date/Time Surveyed: 27-Aug-10

General Physical Characteristics

Floodplain Width (m):	N/M	**Channel Pattern:**	UD	**Stage:**	N/A
Channel Confinement:	N/M	**Channel Gradient (range):**	N/M	**Flow Regime:**	EPH
Bank Height (range in m):	N/M	**Bank Shape:**	N/M	**T_W (°C):**	N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted:	N	**Effort (min):**	N/A	**Electrofisher Settings:**	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

Dry channel at crossing, no defined channel. No headwaters. Tributary to AR-030.

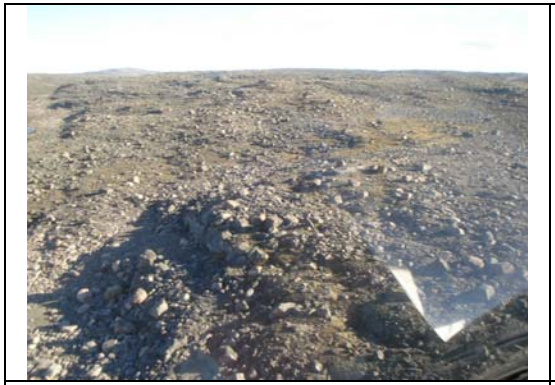
Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-031
UTM Coordinates: 17 W 601777 7830247

Date/Time Surveyed: 27-Aug-10

Photographs



A

B

Figure 1. Aerial view from crossing area looking upstream (A), aerial view of drain's confluence with downstream drain (crossing area is to the right hand side of the photo) (B).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-030a
UTM Coordinates: 17 W 601932 7830020
Date/Time Surveyed: 27-Aug-10

General Physical Characteristics

Floodplain Width (m):	N/M	**Channel Pattern:**	N/M	**Stage:**	N/A
Channel Confinement:	N/M	**Channel Gradient (range):**	N/M	**Flow Regime:**	EPH
Bank Height (range in m):	N/M	**Bank Shape:**	N/M	**T_W (°C):**	N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted:	N	**Effort (min):**	N/A	**Electrofisher Settings:**	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

Dry channel at crossing. Large waterbody upstream from crossing (< 4 meters deep). Land ridge between waterbody and stream. Flow of water from waterbody to stream would only occur under conditions of high water.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-030a
UTM Coordinates: 17 W 601932 7830020

Date/Time Surveyed: 27-Aug-10

Photographs

A

B

Figure 1. View of dry channel at crossing (A), view upstream from crossing (B).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-030
UTM Coordinates: 17 W 601566 7829618
Date/Time Surveyed: 27-Aug-10

General Physical Characteristics

Floodplain Width (m):	N/M	**Channel Pattern:**	N/M	**Stage:**	N/A
Channel Confinement:	N/M	**Channel Gradient (range):**	N/M	**Flow Regime:**	EPH
Bank Height (range in m):	N/M	**Bank Shape:**	N/M	**T_W (°C):**	N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted:	N	**Effort (min):**	N/A	**Electrofisher Settings:**	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

Mountain drain with no headwater lake. Was dry at time of survey. Joins with AR-028.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-030
UTM Coordinates: 17 W 601566 7829618

Date/Time Surveyed: 27-Aug-10

Photographs

A

B

Figure 1. Aerial view from crossing area looking downstream towards confluence with AR-028 drain (A), crossing location (B)

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-029
UTM Coordinates: 17 W 601585 7829579
Date/Time Surveyed: 27-Aug-10

General Physical Characteristics

Floodplain Width (m):	N/M	**Channel Pattern:**	N/M	**Stage:**	N/A
Channel Confinement:	N/M	**Channel Gradient (range):**	N/M	**Flow Regime:**	EPH
Bank Height (range in m):	N/M	**Bank Shape:**	N/M	**T_W (°C):**	N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted:	N	**Effort (min):**	N/A	**Electrofisher Settings:**	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

Dry drain flowing to AR-028 from shallow pond. High gradient.

Rail Alignment Watercourse Crossing Assessment

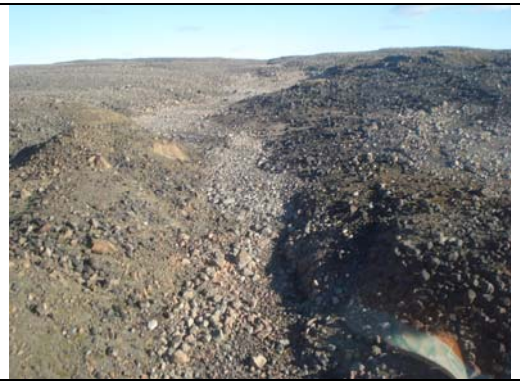
Location

Crossing ID: AR-029
UTM Coordinates: 17 W 601585 7829579

Date/Time Surveyed: 27-Aug-10

Photographs

A



B

C

Figure 1. View of dry drain (A), upstream view of crossing (B), view of upstream pond (C).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-028
UTM Coordinates: 17 W 601695 7829211
Date/Time Surveyed: 26-Aug-10

General Physical Characteristics

Floodplain Width (m):	N/M	**Channel Pattern:**	N/M	**Stage:**	N/A
Channel Confinement:	N/M	**Channel Gradient (range):**	N/M	**Flow Regime:**	INT
Bank Height (range in m):	N/M	**Bank Shape:**	N/M	**T_W (°C):**	N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted:	N	**Effort (min):**	N/A	**Electrofisher Settings:**	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

Drains shallow waterbody to Cockburn Lk. Wetted at crossing area, but dry further downstream. The upstream waterbody is < 4 m deep and is unlikely to support fish. A steep gradient between Cockburn Lk. and the crossing location would prevent fish from Cockburn Lk. reaching crossing area.

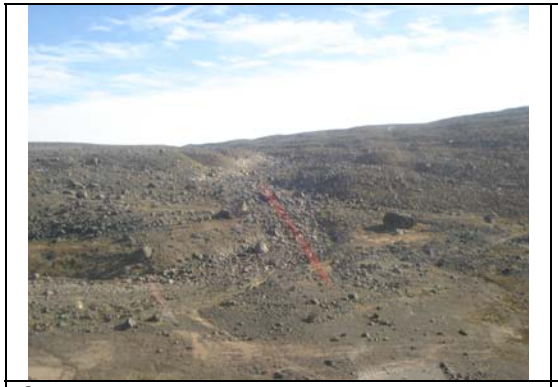
Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-028
UTM Coordinates: 17 W 601695 7829211

Date/Time Surveyed: 26-Aug-10

Photographs



A

B

C

Figure 1. Aerial view from Cockburn Lk. looking upstream at drain's steep gradient (A), aerial view from crossing location looking upstream at headwater lake(B), downstream view of headwater lake and outlet (C).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-027
UTM Coordinates: 17 W 600506 7827212
Date/Time Surveyed: 26-Aug-10

General Physical Characteristics

Floodplain Width (m):	N/M	**Channel Pattern:**	N/M	**Stage:**	N/A
Channel Confinement:	N/M	**Channel Gradient (range):**	N/M	**Flow Regime:**	INT
Bank Height (range in m):	N/M	**Bank Shape:**	N/M	**T_W (°C):**	N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted:	N	**Effort (min):**	N/A	**Electrofisher Settings:**	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

Drainage with no defined channel between two waterbodies. Dry at the time of the survey. The upstream waterbody is < 2 m deep and is unlikely to support fish. The downstream waterbody is ≥ 4 m deep; however, a steep gradient between this waterbody and the crossing location prevents fish from reaching crossing area.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-027
UTM Coordinates: 17 W 600506 7827212

Date/Time Surveyed: 26-Aug-10

Photographs

A

B

Figure 1. Aerial view from crossing area looking upstream towards smaller waterbody (A), aerial view from larger waterbody looking upstream at steep gradient (B).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-026
UTM Coordinates: 17 W 600253 7826609
Date/Time Surveyed: 26-Aug-10

General Physical Characteristics

Floodplain Width (m):	N/M	**Channel Pattern:**	N/M	**Stage:**	N/A
Channel Confinement:	N/M	**Channel Gradient (range):**	N/M	**Flow Regime:**	INT
Bank Height (range in m):	N/M	**Bank Shape:**	N/M	**T_W (°C):**	N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted:	N	**Effort (min):**	N/A	**Electrofisher Settings:**	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

Drainage with no defined channel between two waterbodies. The upstream waterbody is < 3 m deep and is unlikely to support fish. The downstream waterbody is ≥ 4 m deep; however, a steep gradient between the two waterbodies is a barrier to fish moving upstream.

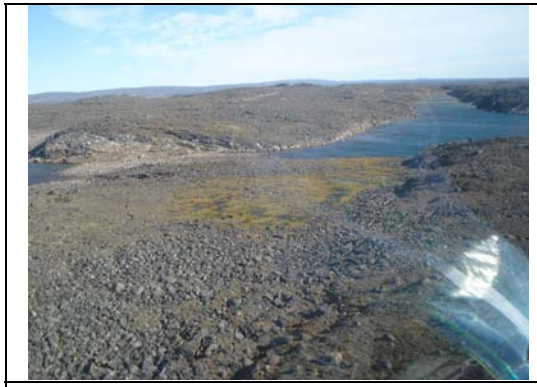
Rail Alignment Watercourse Crossing Assessment

Location

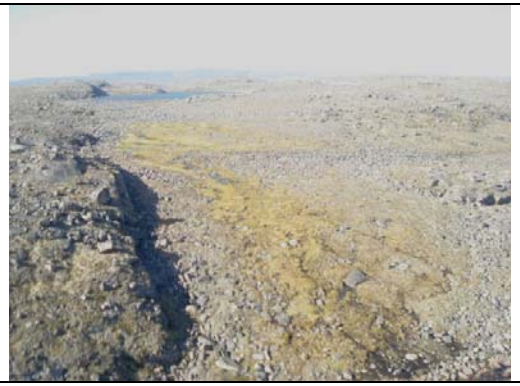
Crossing ID: AR-026
UTM Coordinates: 17 W 600253 7826609

Date/Time Surveyed: 26-Aug-10

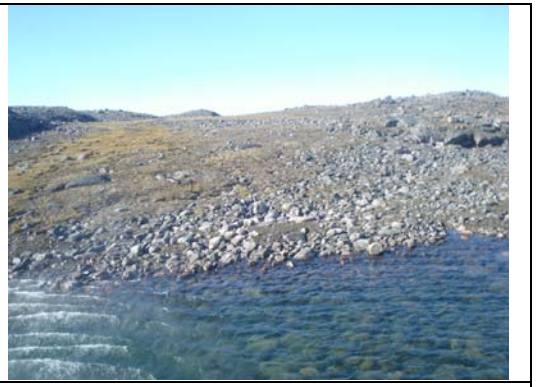
Photographs



A

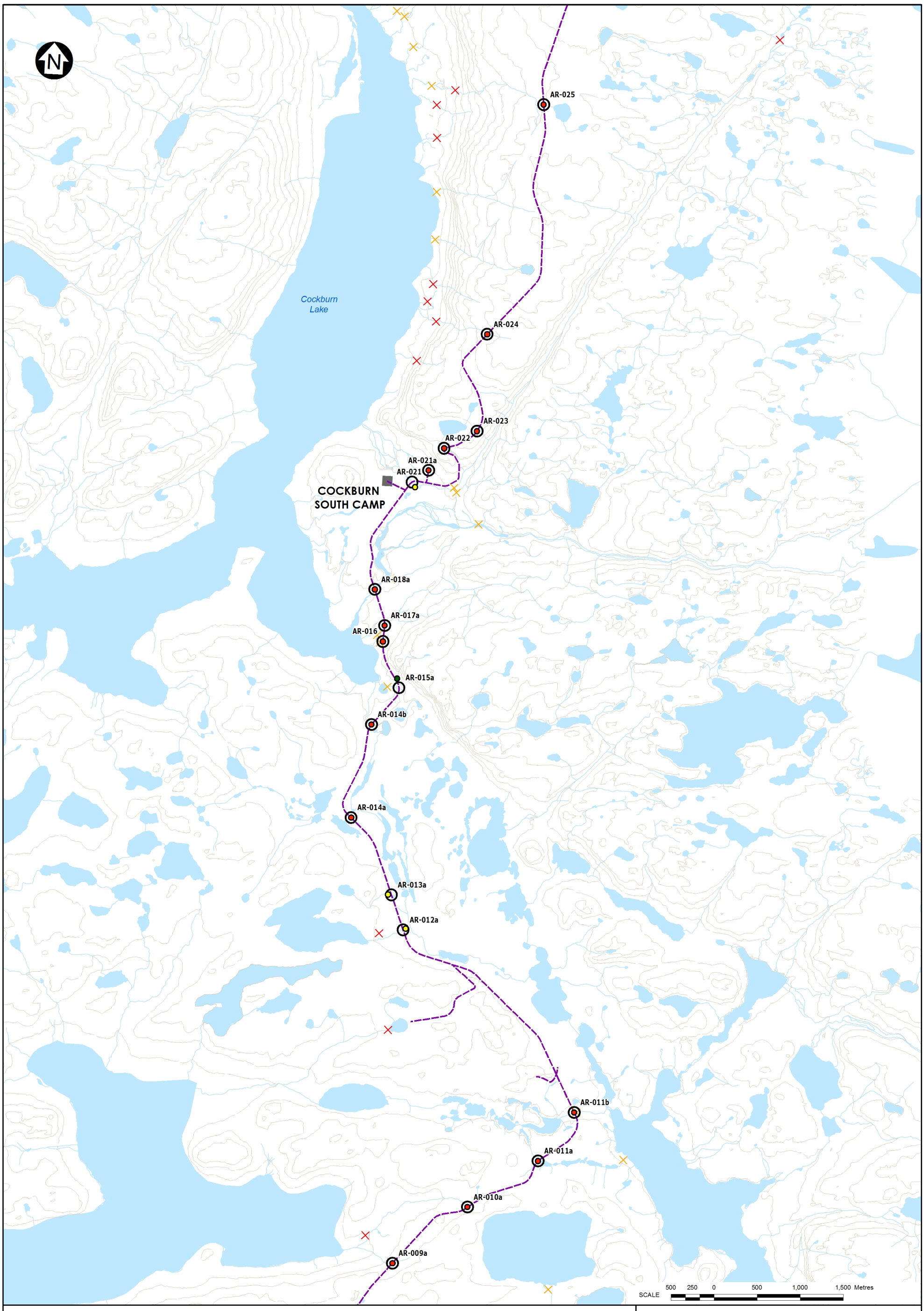


B



C

Figure 1. Aerial view from crossing area looking downstream towards larger waterbody (cobble area is the drainage) (A), aerial view from crossing area looking upstream towards smaller waterbody (B), aerial view from larger waterbody looking upstream at steep gradient (C).



LEGEND:

ACCESS ROAD CROSSING SURVEY YEAR
- 2007
- 2008
- 2010
- STREAM CROSSING
- FISH BARRIER (CONFIRMED)
- FISH BARRIER (AERIAL PHOTO INTERPRETATION)

- CONTOUR
- MILNE INLET TOTE ROAD (EXISTING)
- RAILWAY ALIGNMENT (PROPOSED)
- CONSTRUCTION ACCESS ROAD (PROPOSED)
- WATER
- INFRASTRUCTURE

NOTES:

1. BASE MAP 1:50,000 © HER MAJESTY THE QUEEN IN RIGHTS OF CANADA DEPARTMENT OF NATURAL RESOURCES (2009.) ALL RIGHTS RESERVED.
2. TOPOGRAPHY PROVIDED BY EAGLE MAPPING (2005).
3. PROPOSED RAILWAY ALIGNMENT PROVIDED BY CANRAIL CONSULTANTS INC.
4. PROPOSED RAILWAY CONSTRUCTION ACCESS ROAD ALIGNMENT PROVIDED BY CANRAIL CONSULTANTS INC. DRAWING NO.: RAILWAY ALIGNMENT AND CONST ACCESS RD - MARY RIVER STEENSBY 2010 -12AUG2010.DWG
5. LOCATION OF PROPOSED INFRASTRUCTURE IS APPROXIMATE AND SUBJECT TO FIELD ADJUSTEMENTS
6. CONTOUR INTERVAL IS 25 AND IS IN METRES.

BAFFINLAND IRON MINES CORPORATION

MARY RIVER PROJECT

Access Road Stream Crossing Sites (MAP J)

North/South Consultants Inc.
Aquatic Environment Specialists

P/A NO.	REF NO.
-	-
DATE: 19/11/2010	REV 2

Path: G:\MARYRIV_GDB\EIS_GDB\EIS_Figures_2010EIS_Figures\MXD\Synthesis_RailLine_AccessRoad\Rev2Apdx\20101119_ApdxAR_sg.mxd

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-025
UTM Coordinates: 17 W 599733 7824412
Date/Time Surveyed: 26-Aug-10

General Physical Characteristics

Floodplain Width (m):	N/M	**Channel Pattern:**	N/M	**Stage:**	N/A
Channel Confinement:	N/M	**Channel Gradient (range):**	N/M	**Flow Regime:**	EPH
Bank Height (range in m):	N/M	**Bank Shape:**	N/M	**T_W (°C):**	N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted:	N	**Effort (min):**	N/A	**Electrofisher Settings:**	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

Mountain drain was dry at time of assessment. Draining mountain top waterbody (< 3 meters deep). No fish passage from Cockburn Lk.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-025
UTM Coordinates: 17 W 599733 7824412

Date/Time Surveyed: 26-Aug-10

Photographs

A

B

C

Figure 1. Aerial view upstream of crossing area at headwaters (A), aerial view of crossing area (B), aerial view looking downstream of crossing location (C).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-024
UTM Coordinates: 17 W 599218 7821715
Date/Time Surveyed: 26-Aug-10

General Physical Characteristics

Floodplain Width (m):	N/M	**Channel Pattern:**	N/M	**Stage:**	N/A
Channel Confinement:	N/M	**Channel Gradient (range):**	N/M	**Flow Regime:**	EPH
Bank Height (range in m):	N/M	**Bank Shape:**	N/M	**T_W (°C):**	N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted:	N	**Effort (min):**	N/A	**Electrofisher Settings:**	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

Mountain top drain. No fish habitat. Not connected to upstream waterbody.

Rail Alignment Watercourse Crossing Assessment

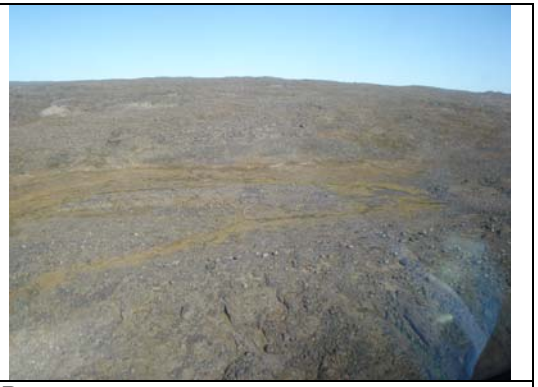
Location

Crossing ID: AR-024
UTM Coordinates: 17 W 599218 7821715

Date/Time Surveyed: 26-Aug-10

Photographs

A



B

Figure 1. Aerial view of crossing location (A), aerial view upstream of crossing location (B).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-023
UTM Coordinates: 17 W 599162 7820588
Date/Time Surveyed: 26-Aug-10

General Physical Characteristics

Floodplain Width (m):	N/M	**Channel Pattern:**	N/M	**Stage:**	N/A
Channel Confinement:	N/M	**Channel Gradient (range):**	N/M	**Flow Regime:**	EPH
Bank Height (range in m):	N/M	**Bank Shape:**	N/M	**T_W (°C):**	N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted:	N	**Effort (min):**	N/A	**Electrofisher Settings:**	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

Mountain drain; steep gradient impassable to upstream moving fish. Channel was dry at the crossing location.

Baffinland Iron Mines
Mary River Project

North/South Consultants Inc.
Aquatic Environment Specialists

Fish Habitat Quality – NO FISH HABITAT

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-023
UTM Coordinates: 17 W 599162 7820588

Date/Time Surveyed: 26-Aug-10

Photographs

A

B

Figure 1. Aerial view from downstream of the crossing location looking upstream (A) and (B).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-022
UTM Coordinates: 17 W 598788 7820368
Date/Time Surveyed: 26-Aug-10

General Physical Characteristics

Floodplain Width (m):	N/M	**Channel Pattern:**	N/M	**Stage:**	N/A
Channel Confinement:	N/M	**Channel Gradient (range):**	N/M	**Flow Regime:**	EPH
Bank Height (range in m):	N/M	**Bank Shape:**	N/M	**T_W (°C):**	N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted:	N	**Effort (min):**	N/A	**Electrofisher Settings:**	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

Dry drain from small deep lake on top of mountain.

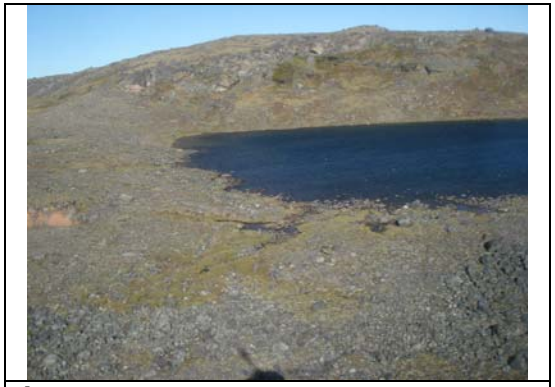
Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-022
UTM Coordinates: 17 W 598788 7820368

Date/Time Surveyed: 26-Aug-10

Photographs



A

Figure 1. Aerial view of dry drain from small deep lake on top of mountain (A)

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-021a
UTM Coordinates: 17 W 598623 7820102
Date/Time Surveyed: 26-Aug-10

General Physical Characteristics

Floodplain Width (m):	N/M	**Channel Pattern:**	N/M	**Stage:**	N/A
Channel Confinement:	N/M	**Channel Gradient (range):**	N/M	**Flow Regime:**	EPH
Bank Height (range in m):	N/M	**Bank Shape:**	N/M	**T_W (°C):**	N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted:	N	**Effort (min):**	N/A	**Electrofisher Settings:**	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

Dry drain which goes to stream entering Cockburn Lk.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality – NO FISH HABITAT**

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-021a
UTM Coordinates: 17 W 598623 7820102

Date/Time Surveyed: 26-Aug-10

Photographs

A

B

C

Figure 1. Aerial view looking upstream towards crossing location (A), aerial view at crossing location (B), aerial view looking downstream of crossing (C)

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-018a
UTM Coordinates: 17 W 598072 7918689
Date/Time Surveyed: 26-Aug-10 / N/M

General Physical Characteristics

Floodplain Width (m): N/M
Channel Pattern: Sinuous
Stage: Moderate
Channel Confinement: PC
Channel Gradient (range): 4-14°
Flow Regime: PER
Bank Height (range in m): 0.75
Bank Shape: S
T_W (°C): 8.5

Hydrology & Habitat Characteristics

Distance and Direction from Crossing (m)	Channel Width (m)		Water Depth (m)				Water Velocity (m/s)			
	Wetted	High Water	25%	50%	75%	Max	25%	50%	75%	Max
60D	20.0	30.0	0.11	0.08	0.25	0.26	0.16	0.38	0.16	0.78
40D	25.0	27.0	0.20	0.14	0.15	0.25	0.25	0.12	0.76	0.76
20D	20.0	21.5	0.10	0.19	0.17	0.38	0.00	0.00	0.12	0.28
0	21.0	23.0	0.10	0.18	0.20	0.39	0.00	0.09	0.23	0.68
20U	31.0	39.0	0.05	0.18	0.14	0.21	0.01	0.43	0.25	0.88
40U	25.0	50.0	0.14	0.20	0.17	0.36	0.40	0.19	0.13	0.83
60U	15.5	46.0	0.28	0.26	0.12	0.39	0.21	0.29	0.12	0.88

Distance and Direction from Crossing (m)	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Flat	Fines	Gravel	Small Cobble	Large Cobble	Boulders
60D	100								5	15	80
40D	100								10	20	70
20D	100								20	30	50
0	100							10	35	35	20
20U	90		10					10	40	35	15
40U	100								30	30	40
60U	100								50	20	30

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-018a
UTM Coordinates: 17 W 598072 7918689
Date/Time Surveyed: 26-Aug-10 / N/M

Fisheries Information

Electrofishing Conducted: N **Effort (min):** N/A **Electrofisher Settings:** N/A

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	0	-	-	-
NNST	0	-	-	-

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	High	Moderate
NNST	No	No	Moderate	Low

Comments & Summary

Although electrofishing was not conducted, habitat near the crossing is suitable for rearing of both species. Connected to Cockburn Lake downstream of crossing; no downstream barriers observed.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-018a
UTM Coordinates: 17 W 598072 7918689
Date/Time Surveyed: 26-Aug-10 / N/M

Photographs

A

B

C

Figure 1. Aerial view of crossing area (A), view upstream of crossing (B), and downstream of crossing (C).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-017a
UTM Coordinates: 17 W 598208 7818277
Date/Time Surveyed: 26-Aug-10

General Physical Characteristics

Floodplain Width (m):	N/M	**Channel Pattern:**	N/M	**Stage:**	N/A
Channel Confinement:	N/M	**Channel Gradient (range):**	N/M	**Flow Regime:**	EPH
Bank Height (range in m):	N/M	**Bank Shape:**	N/M	**T_W (°C):**	N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted:	N	**Effort (min):**	N/A	**Electrofisher Settings:**	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

Crossing was dry during survey. Drains small shallow ponds (each < 1 m deep) into AR-016.

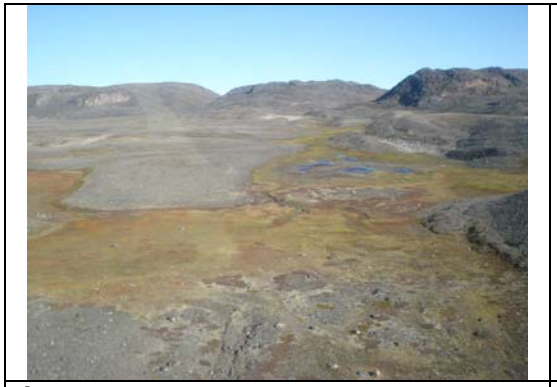
Rail Alignment Watercourse Crossing Assessment

Location

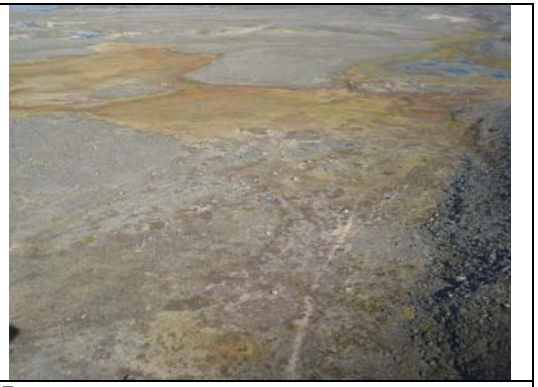
Crossing ID: AR-017a
UTM Coordinates: 17 W 598208 7818277

Date/Time Surveyed: 26-Aug-10

Photographs



A



B

Figure 1. Aerial view of drainage (A), aerial view of crossing location (B).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-016
UTM Coordinates: 17 W 598198 7818092
Date/Time Surveyed: 26-Aug-10

General Physical Characteristics

Floodplain Width (m):	N/M	**Channel Pattern:**	N/M	**Stage:**	N/A
Channel Confinement:	N/M	**Channel Gradient (range):**	N/M	**Flow Regime:**	EPH
Bank Height (range in m):	N/M	**Bank Shape:**	N/M	**T_W (°C):**	N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted:	N	**Effort (min):**	N/A	**Electrofisher Settings:**	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

Ephemeral drain into deep waterbody. Steep gradient downstream of the crossing likely prevents fish passage.

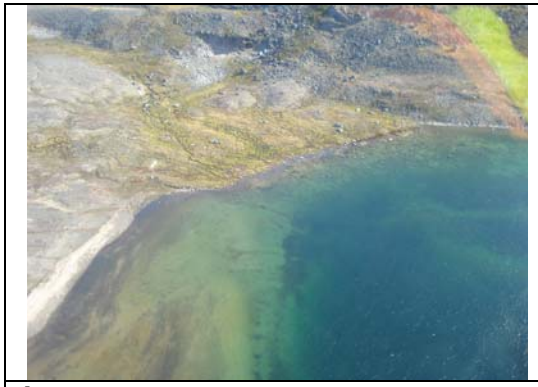
Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-016
UTM Coordinates: 17 W 598198 7818092

Date/Time Surveyed: 26-Aug-10

Photographs



A

B

Figure 1. Aerial view of drain entering waterbody downstream of crossing location (A), aerial view of drain; crossing location above sloped area (B).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-014b
UTM Coordinates: 17 W 598116 7917121
Date/Time Surveyed: 26-Aug-10 / N/M

General Physical Characteristics

Floodplain Width (m):	N/M	**Channel Pattern:**	Meandering	**Stage:**	Low
Channel Confinement:	C	**Channel Gradient (range):**	2-8°	**Flow Regime:**	INT
Bank Height (range in m):	0.28 – 0.35	**Bank Shape:**	V	**T_W (°C):**	4.5

Hydrology & Habitat Characteristics

Distance and Direction from Crossing (m)	Channel Width (m)		Water Depth (m)				Water Velocity (m/s)			
	Wetted	High Water	25%	50%	75%	Max	25%	50%	75%	Max
60D	1.3	2.0	0.09	0.06	0.13	0.13	TRACE			0.01
40D	1.8	2.1	0.01	0.06	0.02	0.06	TRACE			0.01
20D	1.5	2.1	0.04	0.01	0.01	0.06	TRACE			0.01
0	0.80	2.1	0.08	0.07	0.01	0.08	TRACE			0.01
20U	DRY	8.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
40U	IP (0.3)	3.4	0.02	0.04	0.03	0.04	0.00	0.00	0.00	0.00
60U	DRY	2.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Distance and Direction from Crossing (m)	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Flat	Fines	Gravel	Small Cobble	Large Cobble	Boulders
60D		100							40	20	40
40D	5	95						10	20	30	40
20D	5	95						15	20	25	40
0	10					90		5	60	30	10
20U	DRY								60	35	10
40U		100						5	60	25	10
60U	DRY							5	60	25	10

Baffinland Iron Mines
Mary River Project

North/South Consultants Inc.
Aquatic Environment Specialists

Fish Habitat Quality – MARGINAL

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-014b
UTM Coordinates: 17 W 598116 7917121
Date/Time Surveyed: 26-Aug-10 / N/M

Fisheries Information

Electrofishing Conducted: Y **Effort (min):** 2:31 **Electrofisher Settings:** 710V, 30Hz, 12%DC

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	0	-	-	-
NNST	0	-	-	-

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	Low	No
NNST	Low	No	Low	No

Comments & Summary

Fish habitat near the crossing is marginal for rearing of both species due to low water level; however, further downstream, close to where the watercourse enters a waterbody, fish habitat improves (i.e., water depth increases). No fish were captured at the crossing area and fish utilization is likely limited to periods when water levels are higher (e.g., during higher spring water levels; after rainfall).

Baffinland Iron Mines
Mary River Project

North/South Consultants Inc.
Aquatic Environment Specialists

Fish Habitat Quality – MARGINAL

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-014b
UTM Coordinates: 17 W 598116 7917121
Date/Time Surveyed: 26-Aug-10 / N/M

Photographs

A B C D

Figure 1. Aerial view of crossing area (A), view upstream of crossing (B), downstream of crossing (C), and view upstream from 60 m upstream of the crossing (D).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-014a
UTM Coordinates: 17 W 597938 7816029
Date/Time Surveyed: 26-Aug-10

General Physical Characteristics

Floodplain Width (m):	N/M	**Channel Pattern:**	N/M	**Stage:**	N/A
Channel Confinement:	N/M	**Channel Gradient (range):**	N/M	**Flow Regime:**	INT
Bank Height (range in m):	N/M	**Bank Shape:**	N/M	**T_W (°C):**	N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted:	N	**Effort (min):**	N/A	**Electrofisher Settings:**	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

Saturated wetted connection between two shallow waterbodies (each < 3 m deep) that are unlikely to support fish.

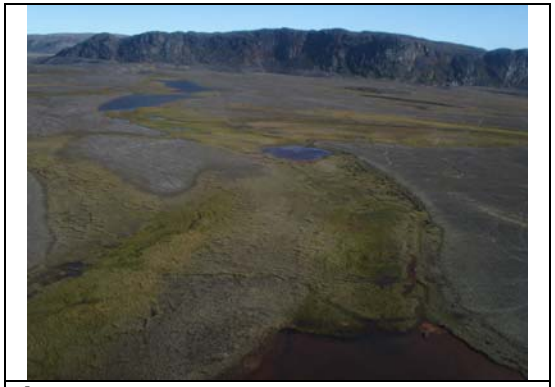
Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-014a
UTM Coordinates: 17 W 597938 7816029

Date/Time Surveyed: 26-Aug-10

Photographs



A

Figure 1. Aerial view of crossing area (A).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-013a
UTM Coordinates: 17 W 598413 7815163
Date/Time Surveyed: 6-Sept-2008/11:45

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted: N
Effort (min): N/A
Electrofisher Settings: N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	Moderate	No

Comments & Summary

The maximum water depth at the crossing was 0.1 m and the substrate composition was 100% silt.

This is more marshy area; the substrate is entirely flooded terrestrial/silt. In the spring and maybe in the summer NNST might use this habitat for spawning. At that point this habitat is also probably very indirectly connected to overwintering habitat. No fish would be here currently. There are several small ponds nearby that look like better open water habitat. No obvious ponds upstream. (All the ponds in this area had NNST in the summer and were shallow (~0.3 m) and had FT/silt as the substrate.)

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-013a
UTM Coordinates: 17 W 598413 7815163
Date/Time Surveyed: 6-Sept-2008/11:45

Photographs


A


B


C

Figure 1. View of habitat at crossing (A), downstream of crossing (B) and upstream of crossing (C).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-012a
UTM Coordinates: 17 W 598639 7814776
Date/Time Surveyed: 7-Sept-08 / 10:45

General Physical Characteristics

Floodplain Width (m):	200	**Channel Pattern:**	Straight	**Stage:**	Normal -high
Channel Confinement:	NC	**Channel Gradient (range):**	0.0-0.25°	**Flow Regime:**	PER
Bank Height (range in m):	0.0-0.2	**Bank Shape:**	30% UC, 70% UD-Flooded	**T_W (°C):**	3.0

Hydrology & Habitat Characteristics

Distance and Direction from Crossing (m)	Channel Width (m)		Water Depth (m)				Water Velocity (m/s)			
	Wetted	High Water	25%	50%	75%	Max	25%	50%	75%	Max
20D	~70	flooded	0.07	0.06	0.03	0.07	0.44	0.00	0.00	0.44
0	52	~62	0.06	0.14	0.06	0.14	0.15	0.08	0.00	0.15
20U	29	~82	0.07	0.06	0.04	0.23	0.05	0.00	0.00	0.05
40U	11.7	flooded	0.07	0.1	0.05	0.18	0.00	0.1	0.00	-
60U	16.1	flooded	0.24	0.06	0.09	0.24	0.00	0.00	0.00	0.00

Distance and Direction from Crossing (m)	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
20D	25		75				40FT		20	30	10
0	10		90				35 sand,35FT		20	15	5
20U	20		80				40 sand,40FT		5	10	5
40U			100				75sand,10Ft	3	5	5	2
60U			100				10FT,78sand		5	5	2

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-012a
UTM Coordinates: 17 W 598639 7814776
Date/Time Surveyed: 7-Sept-08 / 10:45

Fisheries Information

Electrofishing Conducted: Y **Effort (min):** 9:40 **Electrofisher Settings:** 800V, 50HZ, 30%

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	3	0.31	53-87	1-6
NNST	2	0.20	35-65	<1-2

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	High	Moderate
NNST	Moderate	No	High	Moderate

Comments & Summary

Pond downstream is connected to many other ponds indirectly and eventually overwintering habitat, although water levels may prevent passage. Upstream barrier at UTM 17 W 598335 7814707.

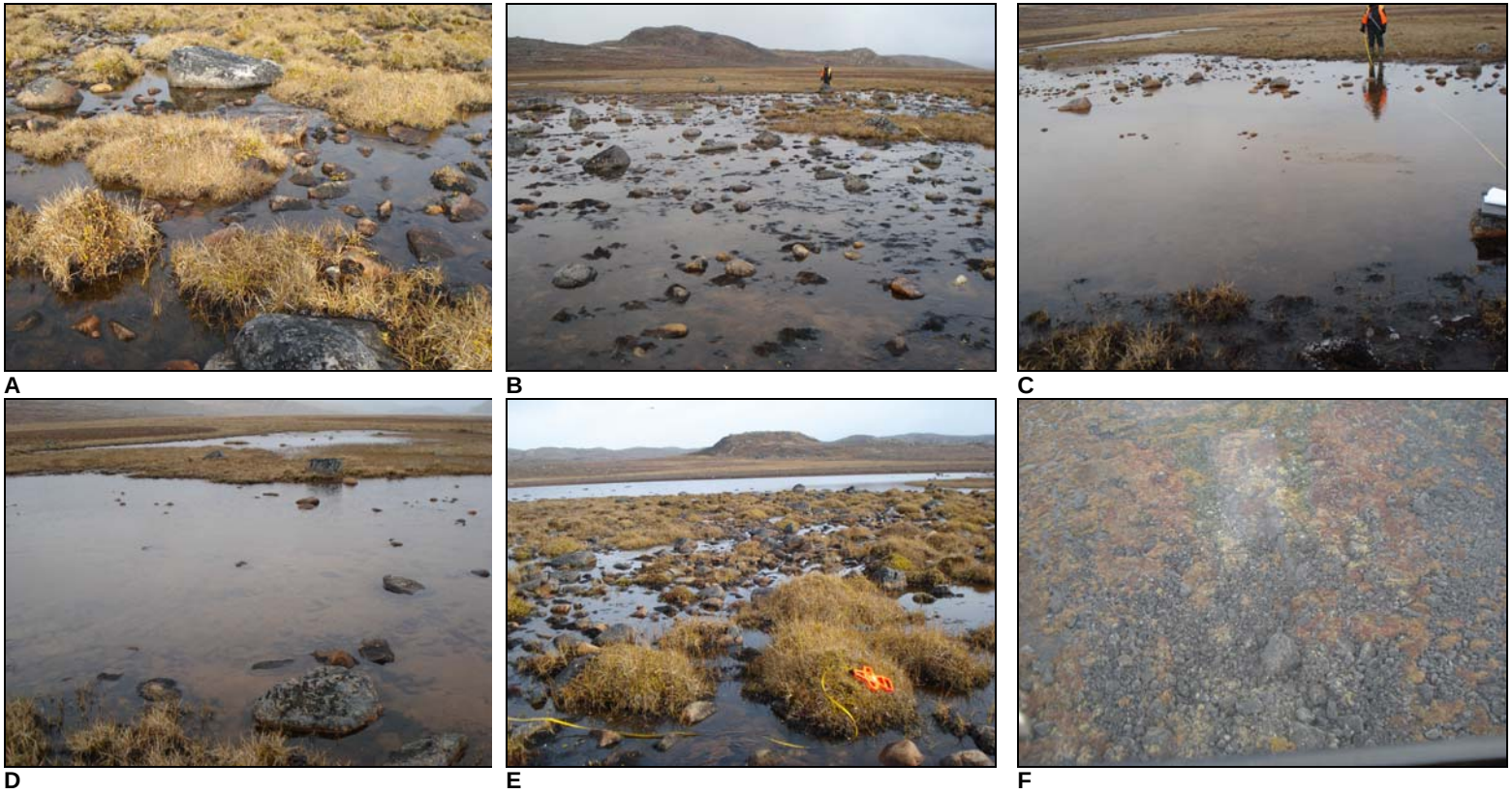
Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-012a
UTM Coordinates: 17 W 598639 7814776

Date/Time Surveyed: 7-Sept-08 / 10:45

Photographs



A **B** **C**

D **E** **F**

Figure 1. View of habitat, (A) 40m downstream across, (B) 20m downstream, (C) 20m upstream, (D) 40m upstream across, (E) at crossing across, and (F) upstream barrier.

AR-011b
AR-011a
AR-010a
AR-009a
AR-008
AR-007
AR-006
AR-005a
AR-004
AR-003a
AR-002a
AR-001a
STEENSBY PORT

SCALE 500 250 0 500 1,000 1,500 Metres

LEGEND:

ACCESS ROAD CROSSING SURVEY YEAR
- 2007
- 2008
- 2010

STREAM CROSSING
FISH BARRIER (CONFIRMED)
FISH BARRIER (AERIAL PHOTO INTERPRETATION)

CONTOUR
MILNE INLET TOTE ROAD (EXISTING)
RAILWAY ALIGNMENT (PROPOSED)
CONSTRUCTION ACCESS ROAD (PROPOSED)
WATER
INFRASTRUCTURE (PROPOSED FOR CONSTRUCTION AND OPERATIONS PERIODS)

NOTES:

1. BASE MAP: © HER MAJESTY THE QUEEN IN RIGHTS OF CANADA DEPARTMENT OF NATURAL RESOURCES (2009.) ALL RIGHTS RESERVED.
2. TOPOGRAPHY PROVIDED BY EAGLE MAPPING (2005).
3. PROPOSED RAILWAY ALIGNMENT PROVIDED BY CANRAIL CONSULTANTS INC.
4. PROPOSED RAILWAY CONSTRUCTION ACCESS ROAD ALIGNMENT PROVIDED BY CANRAIL CONSULTANTS INC. DRAWING NO.: RAILWAY ALIGNMENT AND CONST ACCESS RD - MARY RIVER STEENSBY 2010 -12AUG2010.dwg
5. LOCATION OF PROPOSED INFRASTRUCTURE IS APPROXIMATE AND SUBJECT TO FIELD ADJUSTEMENTS
6. CONTOUR INTERVAL IS 25 M AND IS IN METRES.

BAFFINLAND IRON MINES CORPORATION

MARY RIVER PROJECT

Access Road Stream Crossing Sites (MAP K)

North/South Consultants Inc.
Aquatic Environment Specialists

P/A NO.	REF NO.
-	03-13-11
DATE: 15/12/2011	REV 2

Path: G:\MARYRIV_GDB\EIS_GDB\FEIS\UpdatedMapping\Baseline appendicies\7C8-19_to_7C11-19_App5_1-3_MapsAtoK.mxd

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-011b
UTM Coordinates: 17 W 600706 7812749
Date/Time Surveyed: 26-Aug-10 / N/M

General Physical Characteristics

Floodplain Width (m):	N/M	**Channel Pattern:**	Sinuous	**Stage:**	High
Channel Confinement:	NC	**Channel Gradient (range):**	< 2°	**Flow Regime:**	PER
Bank Height (range in m):	FL	**Bank Shape:**	S	**T_W (°C):**	6.0

Hydrology & Habitat Characteristics

Distance and Direction from Crossing (m)	Channel Width (m)		Water Depth (m)				Water Velocity (m/s)			
	Wetted	High Water	25%	50%	75%	Max	25%	50%	75%	Max
60D	10.3	10.3	0.08	0.10	0.09	0.14	0.00	0.00	0.00	0.00
40D	5.2	5.2	0.05	0.13	0.07	0.19	0.00	0.00	0.00	0.00
20D	4.5	4.5	0.03	0.14	0.05	0.14	0.00	0.00	0.00	0.00
0	4.5	4.5	0.03	0.24	0.03	0.24	0.00	0.00	0.00	0.00
20U	FT	FT								

Distance and Direction from Crossing (m)	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
60D		100					100				
40D		100					100				
20D		100					100				
0		50	50				100				
20U		FT					100				

Fisheries Information

Electrofishing Conducted: Y
Effort (min): 5:57
Electrofisher Settings: 380V, 30Hz, 12%DC

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	0	-	-	-
NNST	16	2.69	N/M	N/M

Baffinland Iron Mines
Mary River Project

North/South Consultants Inc.
Aquatic Environment Specialists

Fish Habitat Quality – MARGINAL

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-011b
UTM Coordinates: 17 W 600706 7812749
Date/Time Surveyed: 26-Aug-10 / N/M

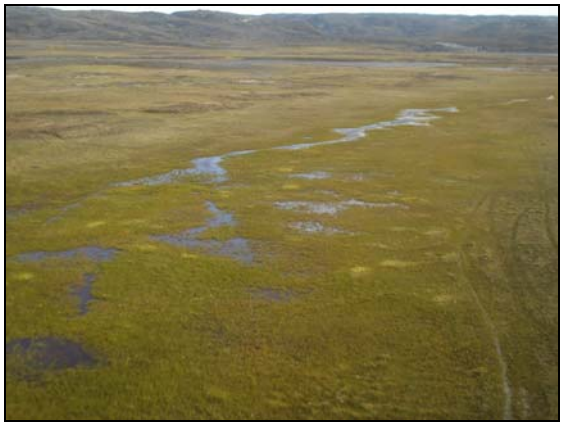
Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	Moderate	No	High	No

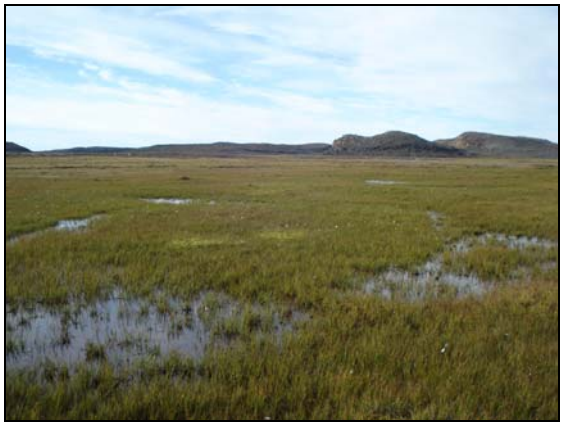
Comments & Summary

Approximately 20 m upstream of the crossing location, the watercourse channel disappears and the habitat becomes fen-like (i.e., saturated grass). NNST habitat would be rated Marginal in this fen-like habitat as water depth is diminished. Habitat at and downstream of the crossing may be used by NNST for spawning. Further downstream, there is a connection to an overwintering waterbody.

Photographs



A



B

C

Figure 1. Aerial view of crossing area (A), view upstream of crossing (B),and view downstream of crossing (C).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-011a
UTM Coordinates: 17 W 600316 7812164
Date/Time Surveyed: 26-Aug-10

General Physical Characteristics

Floodplain Width (m):	N/M	**Channel Pattern:**	N/M	**Stage:**	N/A
Channel Confinement:	N/M	**Channel Gradient (range):**	N/M	**Flow Regime:**	INT
Bank Height (range in m):	N/M	**Bank Shape:**	N/M	**T_W (°C):**	N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted:	N	**Effort (min):**	N/A	**Electrofisher Settings:**	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

Saturated wetted connection between two shallow waterbodies (each < 3 m deep) that are unlikely to support fish.

Baffinland Iron Mines
Mary River Project

North/South Consultants Inc.
Aquatic Environment Specialists

Fish Habitat Quality – NO FISH HABITAT

Rail Alignment Watercourse Crossing Assessment

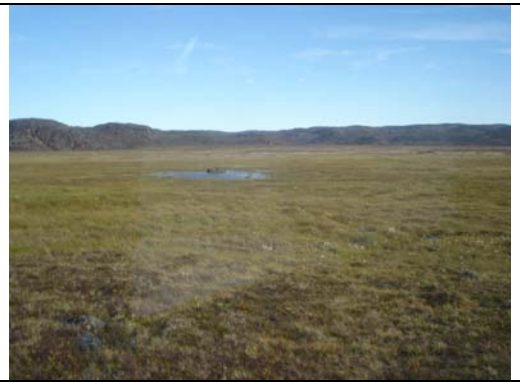
Location

Crossing ID: AR-011a
UTM Coordinates: 17 W 600316 7812164

Date/Time Surveyed: 26-Aug-10

Photographs

A



B

C

Figure 1. View of crossing area (A), view upstream of crossing (B), view downstream of crossing (C).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-010a
UTM Coordinates: 17 W 599526 7811586
Date/Time Surveyed: 26-Aug-10

General Physical Characteristics

Floodplain Width (m):	N/M	**Channel Pattern:**	N/M	**Stage:**	N/A
Channel Confinement:	N/M	**Channel Gradient (range):**	N/M	**Flow Regime:**	EPH
Bank Height (range in m):	N/M	**Bank Shape:**	N/M	**T_W (°C):**	N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted:	N	**Effort (min):**	N/A	**Electrofisher Settings:**	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

Ephemeral saturated drain with disjoined, undefined channel. Drains into AR-009A.

Rail Alignment Watercourse Crossing Assessment

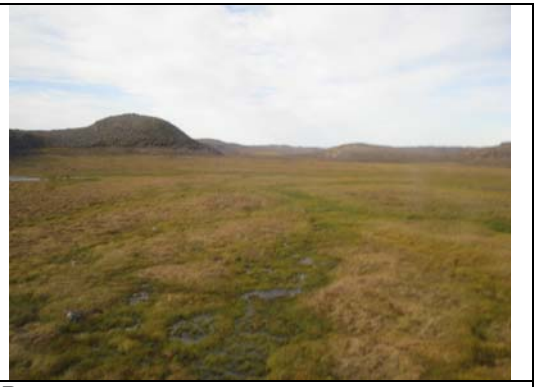
Location

Crossing ID: AR-010a
UTM Coordinates: 17 W 599526 7811586

Date/Time Surveyed: 26-Aug-10

Photographs

A



B

Figure 1. Aerial view of crossing looking upstream (A), aerial view of crossing looking downstream (B).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-009a
UTM Coordinates: 17 W 598690 7810889
Date/Time Surveyed: 26-Aug-10

General Physical Characteristics

Floodplain Width (m):	N/M	**Channel Pattern:**	N/M	**Stage:**	N/A
Channel Confinement:	N/M	**Channel Gradient (range):**	N/M	**Flow Regime:**	INT
Bank Height (range in m):	N/M	**Bank Shape:**	N/M	**T_W (°C):**	N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted:	N	**Effort (min):**	N/A	**Electrofisher Settings:**	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

Intermittent drainage with no defined channel. Drains into potential fish bearing waterbody (> 4 m deep); however, between waterbody and crossing location, the drain had an un-stepped gradient > 30%. Crossing location not accessible to fish from downstream waterbody. No headwater waterbody.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-009a
UTM Coordinates: 17 W 598690 7810889

Date/Time Surveyed: 26-Aug-10

Photographs

A

B

Figure 1. Aerial view of crossing location (A), close-up aerial view of crossing location (B).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-008
UTM Coordinates: 17 W 598461 7809104
Date/Time Surveyed: 26-Aug-10

General Physical Characteristics

Floodplain Width (m):	N/M	**Channel Pattern:**	UD	**Stage:**	N/A
Channel Confinement:	N/M	**Channel Gradient (range):**	N/M	**Flow Regime:**	EPH
Bank Height (range in m):	N/M	**Bank Shape:**	N/M	**T_W (°C):**	N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted:	N	**Effort (min):**	N/A	**Electrofisher Settings:**	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	Moderate	No

Comments & Summary

Ephemeral saturated drain with no defined channel. Drains into potential fish bearing waterbody (> 4 m deep); therefore, assumed rearing habitat for NNST.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-008
UTM Coordinates: 17 W 598461 7809104

Date/Time Surveyed: 26-Aug-10

Photographs

A

B

C

Figure 1. Aerial view looking upstream from crossing location (A), aerial view of drain inlet to waterbody (B), aerial view of crossing location (C).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-006
UTM Coordinates: 17 W 598616 7807498
Date/Time Surveyed: 26-Aug-10

General Physical Characteristics

Floodplain Width (m):	N/M	**Channel Pattern:**	N/M	**Stage:**	N/A
Channel Confinement:	N/M	**Channel Gradient (range):**	N/M	**Flow Regime:**	EPH
Bank Height (range in m):	N/M	**Bank Shape:**	N/M	**T_W (°C):**	N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted:	N	**Effort (min):**	N/A	**Electrofisher Settings:**	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

Ephemeral saturated drain with no defined channel. Drains into a shallow waterbody (< 3 m deep) that is unlikely to support fish.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-006
UTM Coordinates: 17 W 598616 7807498

Date/Time Surveyed: 26-Aug-10

Photographs

A

B

Figure 1. Aerial view of drainage (A), aerial view of crossing location (B)

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-004
UTM Coordinates: 17 W 598047 7805662
Date/Time Surveyed: 26-Aug-10

General Physical Characteristics

Floodplain Width (m):	N/M	**Channel Pattern:**	UD	**Stage:**	N/A
Channel Confinement:	N/M	**Channel Gradient (range):**	N/M	**Flow Regime:**	EPH
Bank Height (range in m):	N/M	**Bank Shape:**	N/M	**T_W (°C):**	N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted:	N	**Effort (min):**	N/A	**Electrofisher Settings:**	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

Ephemeral saturated drain with no defined channel. Drains into a shallow waterbody (< 3 m deep) that is unlikely to support fish.

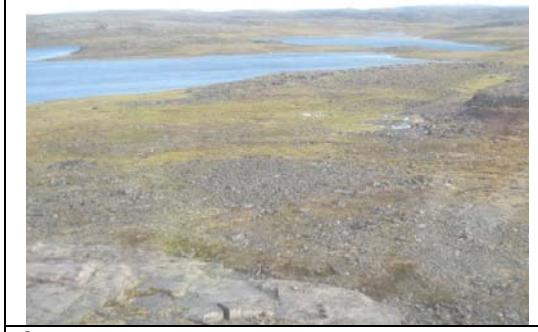
Rail Alignment Watercourse Crossing Assessment

Location

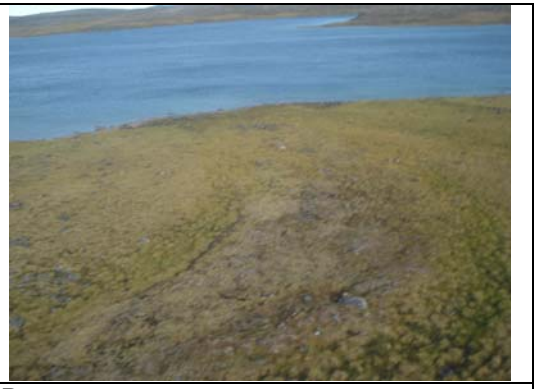
Crossing ID: AR-004
UTM Coordinates: 17 W 598047 7805662

Date/Time Surveyed: 26-Aug-10

Photographs



A



B

Figure 1. Aerial view of drainage (A), aerial view of crossing location (B).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-003a
UTM Coordinates: 17 W 597454 7805480
Date/Time Surveyed: 6-Sept-08 /14:19

General Physical Characteristics

Floodplain Width (m):	N/M	**Channel Pattern:**	Braided, straight	**Stage:**	Normal
Channel Confinement:	PC	**Channel Gradient (range):**	1.5°	**Flow Regime:**	PER
Bank Height (range in m):	UD-2.5	**Bank Shape:**	70% V, 30% S	**T_W (°C):**	4.0

Hydrology & Habitat Characteristics

Distance and Direction from Crossing (m)	Channel Width (m)		Water Depth (m)				Water Velocity (m/s)			
	Wetted	High Water	25%	50%	75%	Max	25%	50%	75%	Max
60D (1 chnls)	44	44	0.07	0.17	0.18	0.37	0.36	0.09	1.32	1.32
40D (3 chnls)	46	72	0.16	0.20	0.57	0.57	0.12	0.57	0.16	0.64
20D (2 chnls)	59	78	0.08	0.26	0.22	0.29	0.25	0.14	0.67	0.85
0 (4 chnls)	60	100	0.06	0.16	0.09	0.28	0.55	0.77	0.64	1.23
20U (3 chnls)	67	134	0.07	0.28	0.22	0.41	0.42	0.34	0.94	0.94
40U (4 chnls)	62.7	85	0.3	0.19	0.19	0.3	0.00	0.49	0.89	0.89
60U (4 chnls)	51.6	100	0.07	0.32	0.37	0.47	0.08	0.27	0.22	0.98

Distance and Direction from Crossing (m)	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
60D	15	40			30	15 rapids		20	30	20	30
40D	40	5	15		40			20	20	40	20
20D	30	10	20		40			15	25	35	25
0	30	20	10		40			5	20	45	30
20U	30	25	10		35			5	20	50	25
40U	30	10	30		30				25	40	35
60U	30	30	10		30				10	60	30

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-003a
UTM Coordinates: 17 W 597454 7805480
Date/Time Surveyed: 6-Sept-08 /14:19

Fisheries Information

Electrofishing Conducted: Y
Effort (min): 10:06
Electrofisher Settings: 700V, 40Hz, 30%

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	5	0.50	57-128	2-15
NNST	0	-	-	-

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	High	Low
NNST	No	No	Low	No

Comments & Summary

Fished along the right side of the main channel.

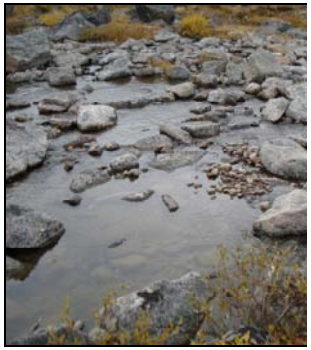
Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-003a
UTM Coordinates: 17 W 597454 7805480
Date/Time Surveyed: 6-Sept-08 /14:19

Photographs


A


B


C


D


E

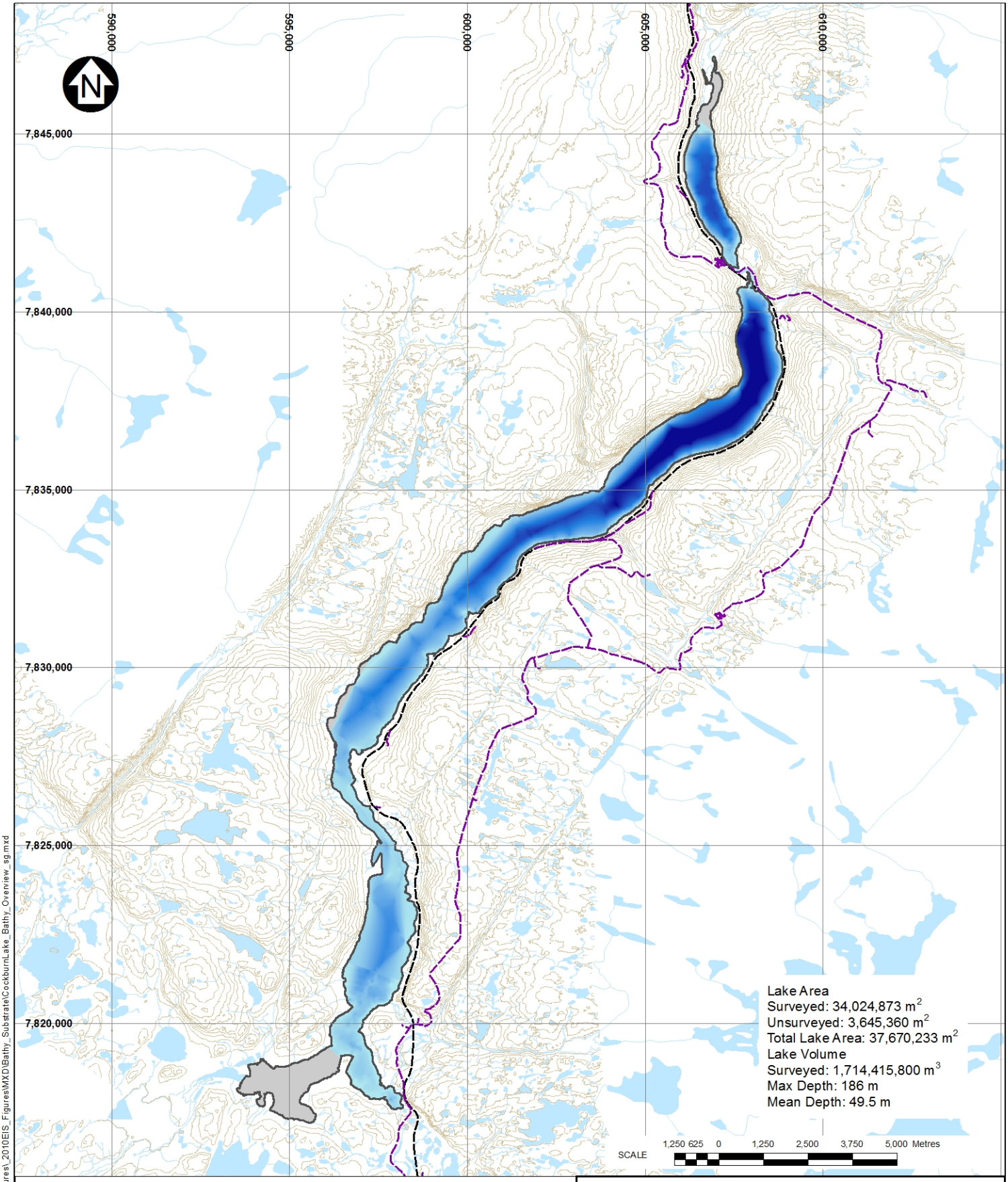

F


G

Figure 1. View of habitat 60 (A), 40 (B), and 20 m (C) downstream of crossing, at the crossing (D), and 20 (E), 40 (F), and 60 m (G) upstream of crossing.

APPENDIX 5.1-4.

COCKBURN LAKE BATHYMETRY AND SUBSTRATE MAPPING.



LEGEND:

- CONTOUR
- RAILWAY CENTERLINE
- CONSTRUCTION ACCESS ROAD

DEPTH

HIGH : 186

LOW : 0

NOTES:

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2. TOPOGRAPHY PROVIDED BY EAGLE MAPPING (2005).
3. DEPTHS OF BATHYMETRIC CONTOURS ARE IN METRES AND ARE RELATIVE TO SHORELINE AT TIME OF SURVEY.
4. CONTOUR INTERVAL IS 25 M AND IS IN METRES.

REV	DATE	ISSUED FOR --	DESIGNED	DRAWN	CHK'D	APP'D
-	DDMMM'10	-	-	-	-	-

BAFFINLAND IRON MINES CORPORATION

MARY RIVER PROJECT

Cockburn Lake
Bathymetry Overview

North/South Consultants Inc.
Aquatic Environment Specialists

P/A NO.	REF NO.
-	-

DATE: 25/10/2010

REV -

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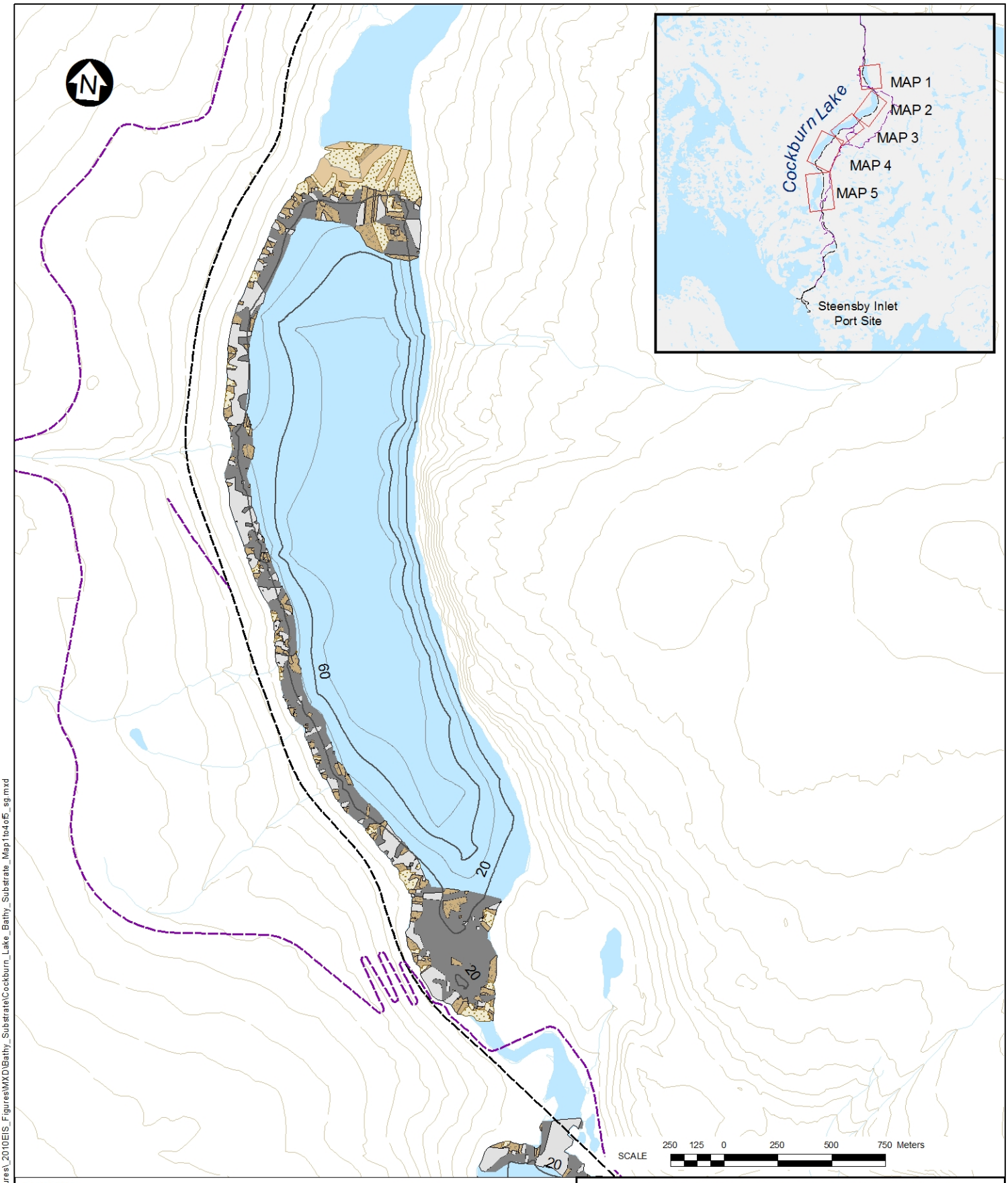

LEGEND:

SUBSTRATE
- BOULDER
- COBBLE - CLAY - MIXED
- COBBLE - PEBBLE
- GRAVEL - COARSE SAND
- SAND

BATHYMETRIC CONTOURS
- MAJOR INTERVALS (20, 60, 100, 140 M)
- MINOR INTERVALS (40, 80, 120, 160 M)
- CONTOUR
- RAILWAY CENTERLINE
- CONSTRUCTION ACCESS ROAD

NOTES:

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MARY RIVER PROJECT

Cockburn Lake Northwest Basin Bathymetry and Substrate - MAP 1 of 5 -

North/South Consultants Inc.
Aquatic Environment Specialists

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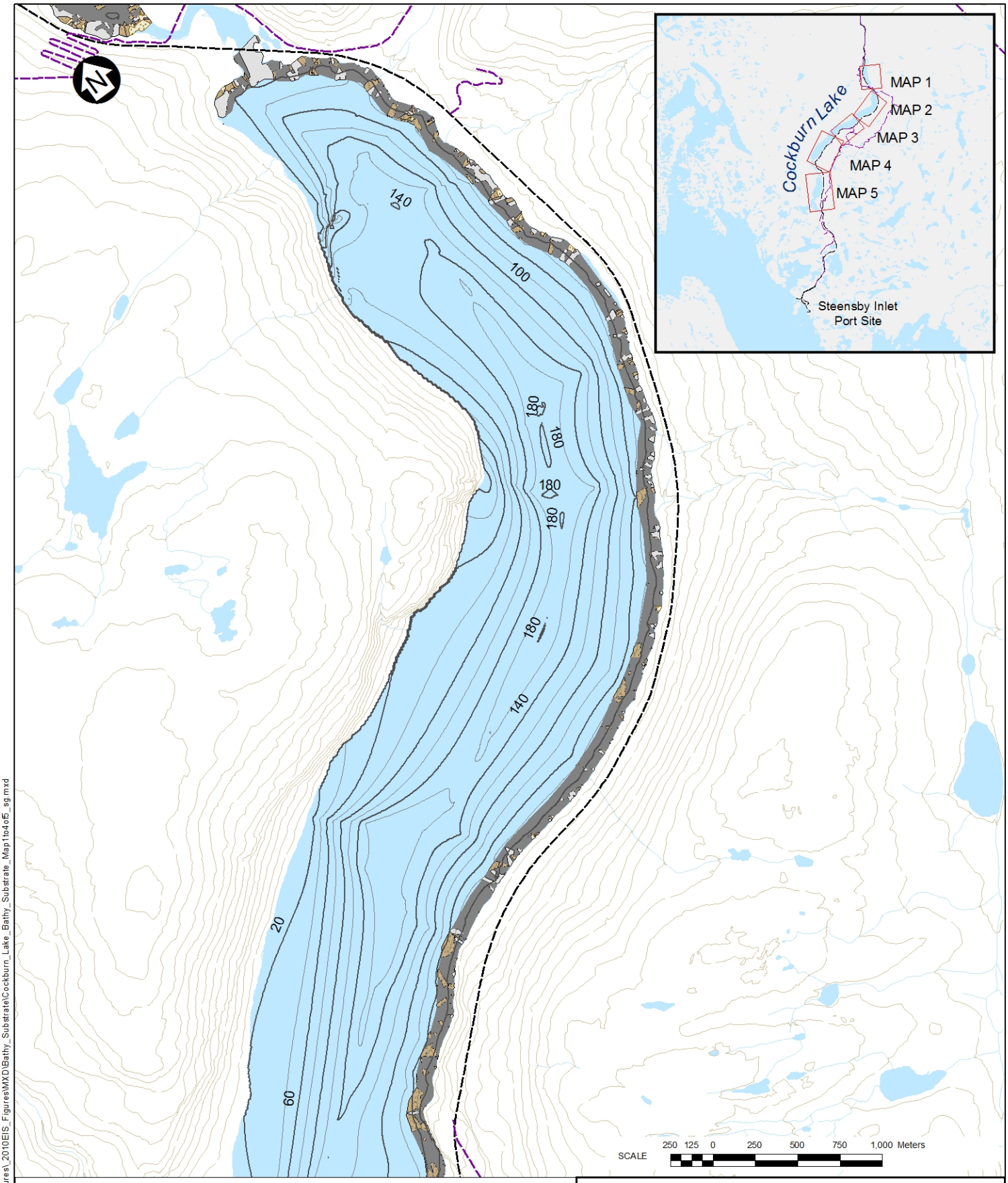

LEGEND:

SUBSTRATE

- BOULDER
- COBBLE - CLAY - MIXED
- COBBLE - PEBBLE
- GRAVEL - COARSE SAND
- SAND

BATHYMETRIC CONTOURS

- MAJOR INTERVALS (20, 60, 100, 140 M)
- MINOR INTERVALS (40, 80, 120, 160 M)
- CONTOUR
- RAILWAY CENTERLINE
- CONSTRUCTION ACCESS ROAD

NOTES:

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4. CONTOUR INTERVAL IS 25 M AND IS IN METRES.

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-	DDMMM'10	ISSUED FOR --	-	-	-	-

BAFFINLAND IRON MINES CORPORATION

MARY RIVER PROJECT

Cockburn Lake Central Basin Bathymetry and Substrate - MAP 2 of 5 -

North/South Consultants Inc.
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-	-

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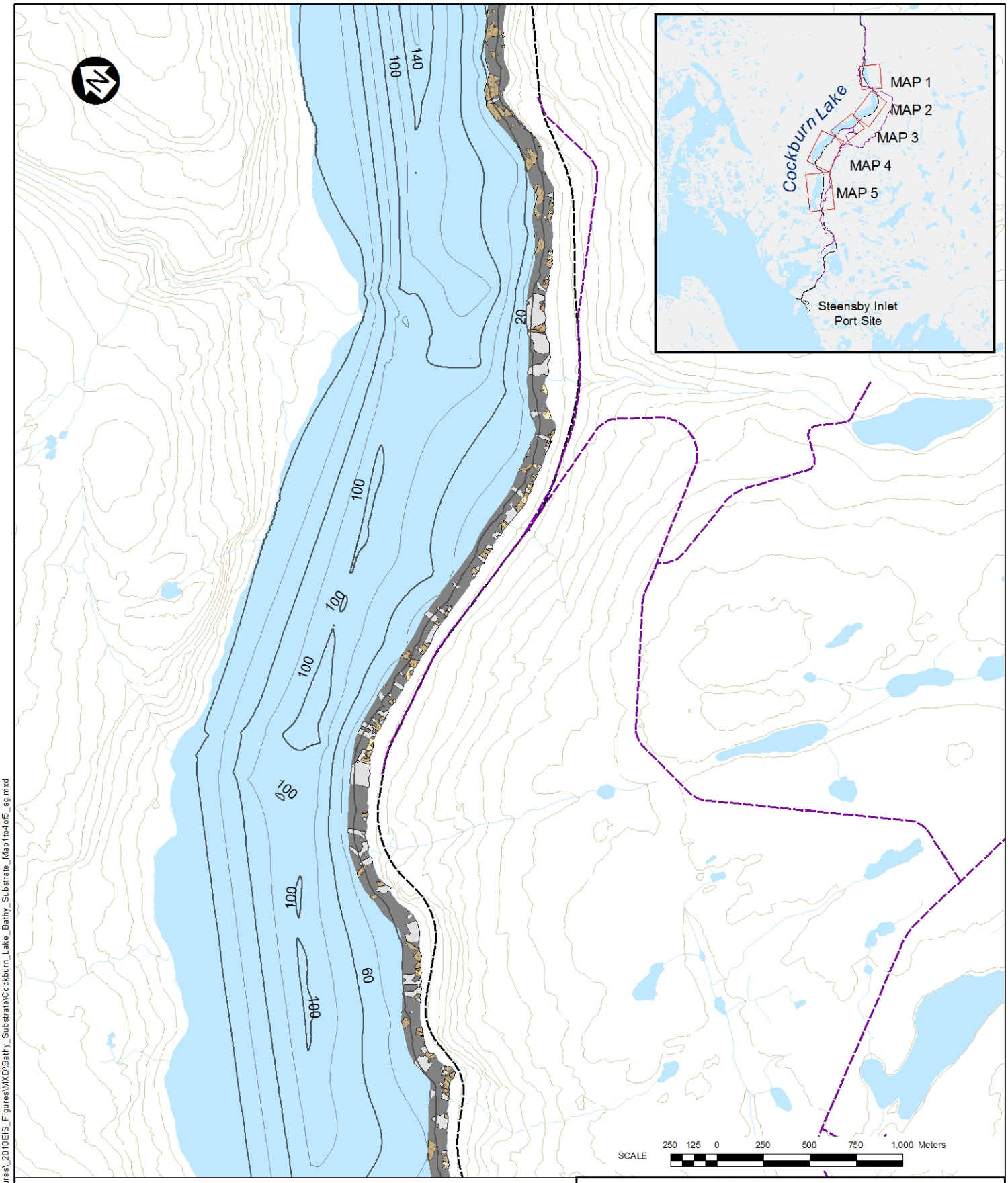

LEGEND:

SUBSTRATE

- BOULDER
- COBBLE - CLAY - MIXED
- COBBLE - PEBBLE
- GRAVEL - COARSE SAND
- SAND

BATHYMETRIC CONTOURS

- MAJOR INTERVALS (20, 60, 100, 140 M)
- MINOR INTERVALS (40, 80, 120, 160 M)
- CONTOUR
- RAILWAY CENTERLINE
- CONSTRUCTION ACCESS ROAD

NOTES:

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Cockburn Lake Central Basin Bathymetry and Substrate - MAP 3 of 5 -

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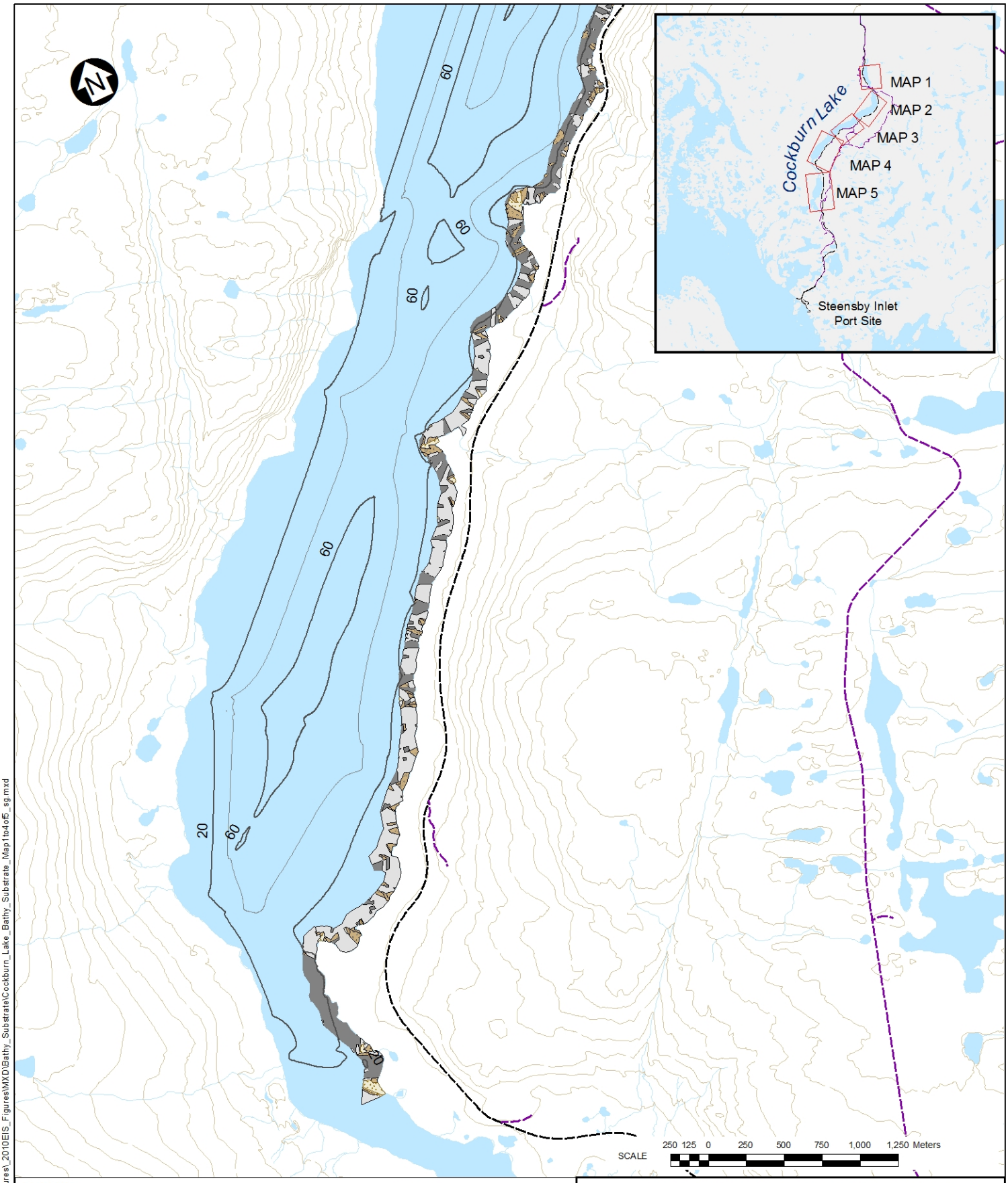

LEGEND:

SUBSTRATE

- BOULDER
- COBBLE - CLAY - MIXED
- COBBLE - PEBBLE
- GRAVEL - COARSE SAND
- SAND

BATHYMETRIC CONTOURS

- MAJOR INTERVALS (20, 60, 100, 140 M)
- MINOR INTERVALS (40, 80, 120, 160 M)
- CONTOUR
- RAILWAY CENTERLINE
- CONSTRUCTION ACCESS ROAD

NOTES:

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4. CONTOUR INTERVAL IS 25 M AND IS IN METRES.

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BAFFINLAND IRON MINES CORPORATION

MARY RIVER PROJECT

Cockburn Lake Central Basin Bathymetry and Substrate - MAP 4 of 5 -

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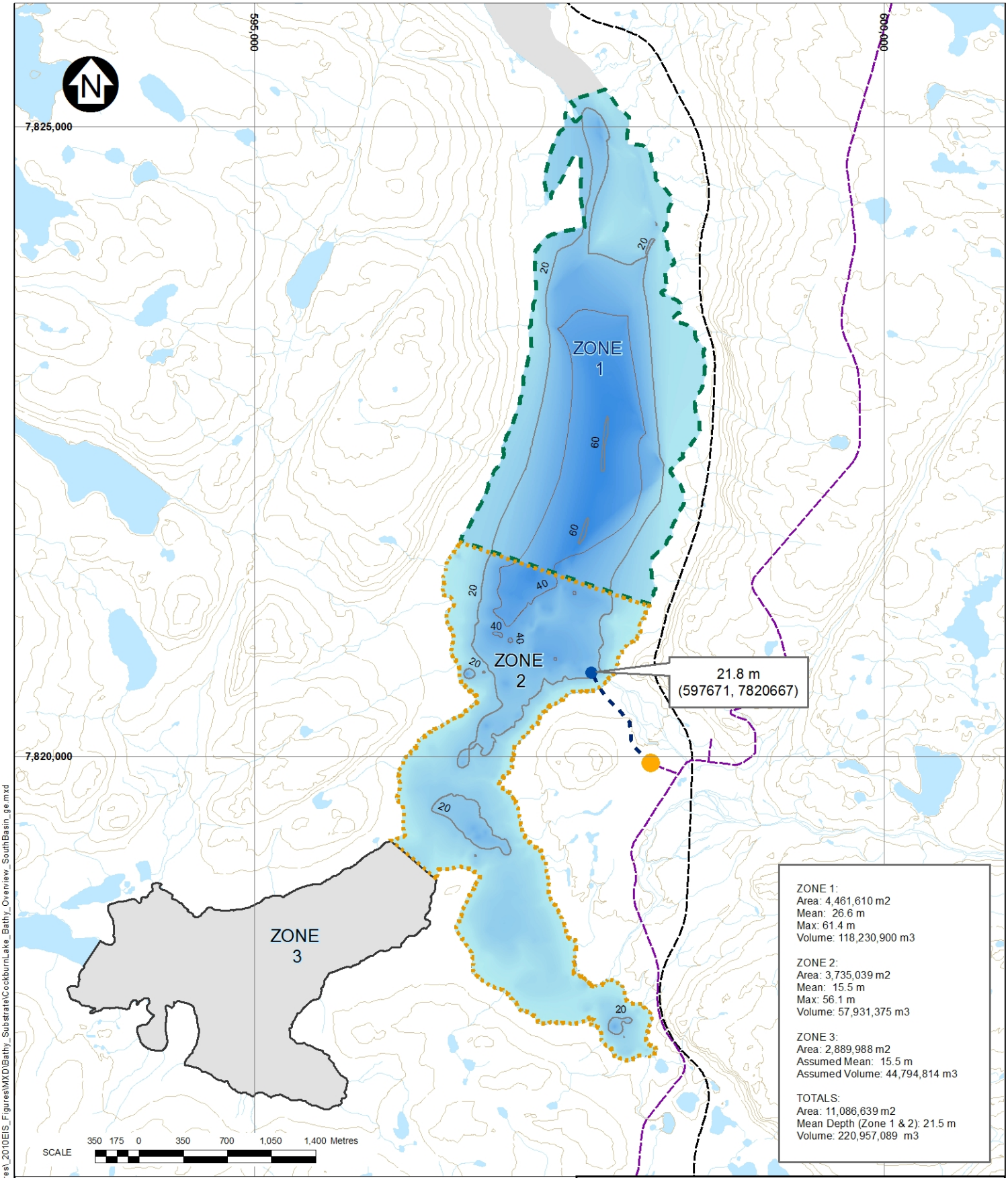

ZONE 1:
Area: 4,461,610 m2
Mean: 26.6 m
Max: 61.4 m
Volume: 118,230,900 m3

ZONE 2:
Area: 3,735,039 m2
Mean: 15.5 m
Max: 56.1 m
Volume: 57,931,375 m3

ZONE 3:
Area: 2,889,988 m2
Assumed Mean: 15.5 m
Assumed Volume: 44,794,814 m3

TOTALS:
Area: 11,086,639 m2
Mean Depth (Zone 1 & 2): 21.5 m
Volume: 220,957,089 m3

LEGEND:

- CONTOUR
- RAILWAY CENTERLINE
- CONSTRUCTION ACCESS ROAD
- PROPOSED CONSTRUCTION CAMP
- PROPOSED WATER INTAKE

DEPTH
HIGH : 61.4
LOW : 0

NOTES:

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-	DDMMM'10	-	-	-	-	-

BAFFINLAND IRON MINES CORPORATION

MARY RIVER PROJECT

Cockburn Lake South Basin
Bathymetry Overview

North/South Consultants Inc.
Aquatic Environment Specialists

P/A NO. -
REF NO. -
DATE: 26/10/2010
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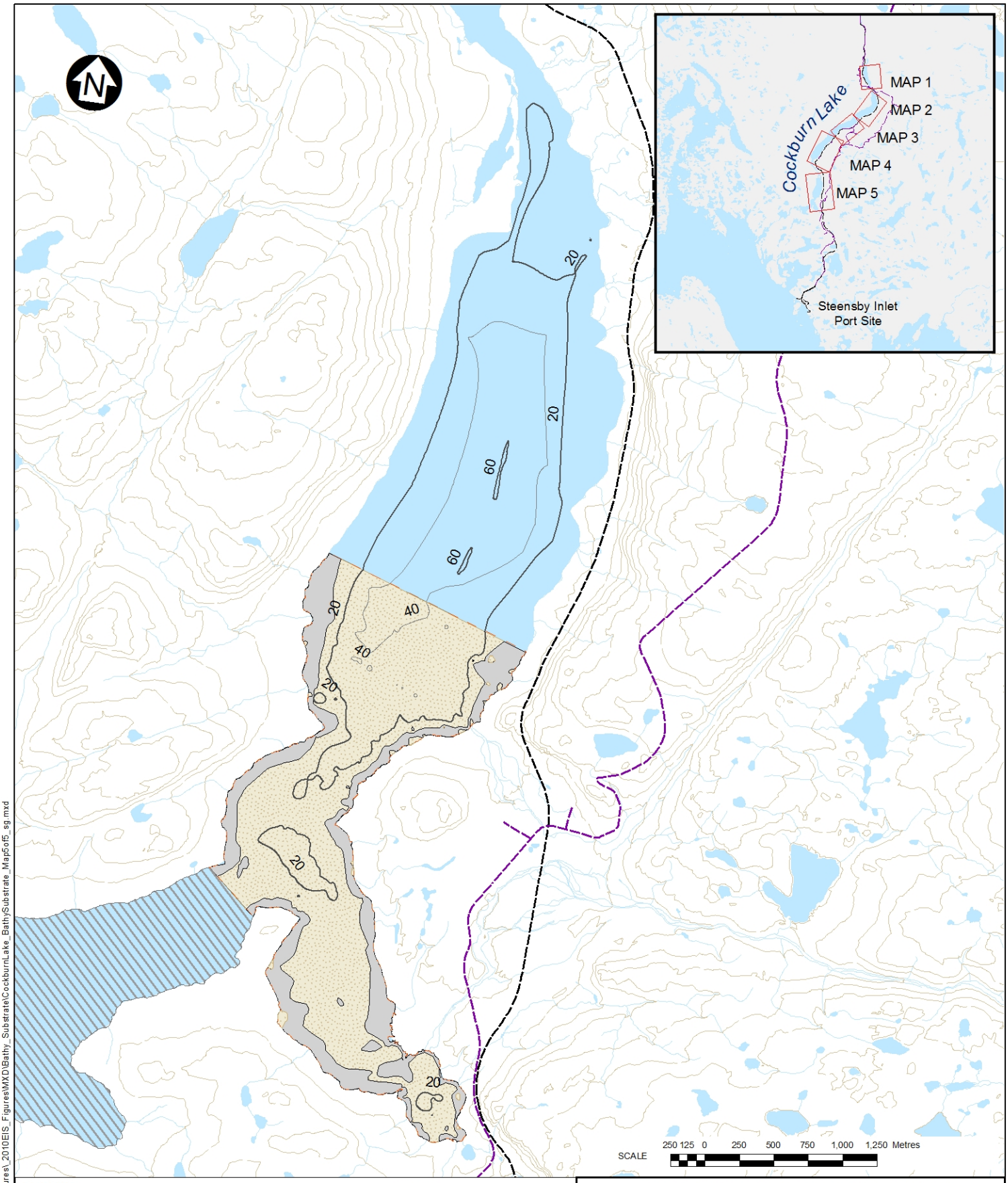

LEGEND:

SUBSTRATE
- COBBLE/BOULDER WITH POCKETS OF SAND
- SAND / SILT / CLAY
- UNSURVEYED
- 2010 SURVEY BOUNDS

BATHYMETRIC CONTOURS
- MAJOR INTERVALS (20, 60, 100, 140 M)
- MINOR INTERVALS (40, 80, 120, 160 M)
- CONTOUR
- RAILWAY CENTERLINE
- CONSTRUCTION ACCESS ROAD

NOTES:

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4. CONTOUR INTERVAL IS 25 M AND IS IN METRES.

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BAFFINLAND IRON MINES CORPORATION

MARY RIVER PROJECT

Cockburn Lake South Basin Bathymetry and Substrate - MAP 5 of 5 -

North/South Consultants Inc.
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P/A NO. -
REF NO. -
DATE: 22/10/2010
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APPENDIX 5.2-1.

DETAILED HABITAT ASSESSMENTS AND SUMMARY OF RESULTS FOR LAKE ENCROACHMENT SITES.

Page

Table A5.2-1.1. Summary of results from Railway lake encroachment surveys and assessments.

Site	CANARAIL Site Names (if different)	Surveyed	Survey Year	Survey Date	UTM Coordinates			Habitat Rating	ARCH seen[1]	NNST seen[1]	Comments
					Zone	Easting	Northing				
LE-015-1	-	yes	2008	20-Jul	17W	576946	7903233	None	No	No	-
LE-017-1	-	yes	2008	20-Jul	17W	577999	7902627	Marginal	No	No	-
LE-019-1	-	yes	2008	24-Jul	17W	580628	7901598	None	No	No	-
LE-023-1	-	yes	2008	24-Jul	17W	584445	7900426	Important	Yes	No	-
LE-024-1	-	yes	2008	24-Jul	17W	584840	7900434	None	No	No	-
LE-024-2	-	yes	2008	24-Jul	17W	585107	7900222	None	No	No	-
LE-R36	not identified	yes	2008	3-Sep	17W	595380	7894213	None	No	No	-
LE-R37	not identified	yes	2008	3-Sep	17W	595790	7893228	None	No	No	-
LE-R38	not identified	yes	2008	3-Sep	17W	595911	7892779	None	No	No	-
LE-R39	not identified	yes	2008	11-Aug	17W	596583	7891540	Marginal	Yes	Yes	-
LE-R40	not identified	yes	2008	3-Sep	17W	597331	7889379	Marginal	No	No	-
LE-R41	NCV-45-1	yes	2008	3-Sep	17W	597137	7886910	None	No	No	-
LE-R42	not identified	yes	2008	3-Sep	17W	597067	7886846	None	No	No	-
LE-047-1	-	yes	2008	4-Sep	17W	597766	7883332	None	No	No	-
LE-048-1	-	yes	2008	4-Sep	17W	598097	7881675	None	No	No	-
LE-051-1	-	yes	2008	4-Sep	17W	596614	7879326	Important	No	No	-
LE-057-1	-	yes	2008	4-Sep	17W	599442	7874619	Important	No	Yes	-
LE-057-2	-	yes	2008	5-Sep	17W	599389	7874250	Important	Yes	Yes	-
LE-062-1	-	yes	2008	5-Sep	17W	598254	7869613	Important	No	Yes	-
LE-068-1	-	yes	2008	4-Aug	17W	601085	7865468	None	No	No	-
LE-074-1	-	yes	2008	26-Jul	17W	603758	7860035	None	No	No	-
LE-082-1	-	yes	2008	4-Aug	17W	606379	7852516	None	No	No	-
LE-095-1	-	yes	2008	4-Aug	17W	608265	7840508	Important	No	No	-
AR-050a	not identified	yes	2010	27-Aug	17W	608027	7840756	Marginal	Yes	Yes	-
AR-050b	not identified	yes	2010	28-Aug	17W	608065	7840787	Marginal	Yes	Yes	-
LE-109-1	-	yes	2008	3-Aug	17W	600834	7832070	Important	No	No	-
LE-117-1	-	yes	2008	3-Aug	17W	597920	7825799	None	No	No	-
LE-121-1	-	yes	2008	2-Aug	17W	598561	7822010	None	No	No	-
LE-127-1	-	yes	2008	3-Aug	17W	598534	7816263	Important	No	Yes	-
LE-127-2	-	yes	2008	3-Aug	17W	598559	7816054	Important	No	Yes	-
LE-127-3	-	yes	2008	3-Aug	17W	598579	7815814	Important	No	Yes	-
LE-128-1	-	yes	2008	3-Aug	17W	598604	7815605	Marginal	No	Yes	-
LE-129-1	-	yes	2008	3-Aug	17W	599356	7814495	Marginal	Yes	Yes	-

Table A5.2-1.1. Continued.

Site	CANARAIL Site Names (if different)	Surveyed	Survey Year	Survey Date	UTM Coordinates			Habitat Rating	ARCH seen[1]	NNST seen[1]	Comments
					Zone	Easting	Northing				
LE-131-1	-	yes	2008	3-Aug	17W	600654	7812572	Marginal	No	Yes	-
LE-132-1	-	yes	2008	3-Aug	17W	600775	7812191	Marginal	Yes	No	-
LE-133-1	-	yes	2008	25-Jul	17W	600853	7810637	None	No	No	-
LE-134-1	-	yes	2008	25-Jul	17W	600381	7810342	None	No	No	-
LE-134-2	-	yes	2008	25-Jul	17W	599985	7810263	None	No	No	-
LE-136-1	-	yes	2008	25-Jul	17W	598899	7809533	Important	Yes	No	-
LE-142-1	-	yes	2008	24-Jul	17W	596885	7803858	Important	no	no	-
LE-142-2	-	yes	2008	24-Jul	17W	597004	7803817	Important	no	no	-
STEP-LE-1-1	-	yes	2008	1-Aug	17W	595035	7802582	Important	No	Yes	-
STEP-LE-2-1	-	yes	2008	1-Aug	17W	594483	7801196	Important	Yes	Yes	-
STEP-LE-6-1	-	yes	2008	1-Aug	17W	594607	7801558	Marginal	Yes	Yes	-
ST28	-	yes	2008	4-Aug	17W	595532	7803279	Marginal	No	Yes	-

[1] - includes all ARCH or NNST that were captured.

MINE INLET TOTE ROAD

MINE SITE

Camp Lake

MAP A

RAVN RIVER CAMP

MAP B

Mid-rail Camp Lake

MID-RAIL CAMP

MAP C

Cockburn Lake

MAP D

Cockburn Lake

COCKBURN TUNNELS CAMP

Cockburn Lake

COCKBURN SOUTH CAMP

MAP E

STEENSBY INLET

STEENSBY PORT

SCALE 3 1.5 0 3 6 9 12 15 km

LEGEND:

LAKE ENCROACHMENT SURVEY YEAR
- 2008
- 2010

STREAM CROSSING

FISH BARRIER (CONFIRMED)

FISH BARRIER (AERIAL PHOTO INTERPRETATION)

MILNE INLET TOTE ROAD (EXISTING)

RAILWAY ALIGNMENT (PROPOSED)

CONSTRUCTION ACCESS ROAD (PROPOSED)

WATER

INFRASTRUCTURE

NOTES:

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2. TOPOGRAPHY PROVIDED BY EAGLE MAPPING (2005).
3. PROPOSED RAILWAY ALIGNMENT PROVIDED BY CANRAIL CONSULTANTS INC.
4. PROPOSED RAILWAY CONSTRUCTION ACCESS ROAD ALIGNMENT PROVIDED BY CANRAIL CONSULTANTS INC. DRAWING NO.: RAILWAY ALIGNMENT AND CONST ACCESS RD - MARY RIVER STEENSBY 2010 -12AUG2010.DWG
5. LOCATION OF PROPOSED INFRASTRUCTURE IS APPROXIMATE AND SUBJECT TO FIELD ADJUSTEMENTS

BAFFINLAND IRON MINES CORPORATION

MARY RIVER PROJECT

Railway Lake Encroachment Sites

North/South Consultants Inc.
Aquatic Environment Specialists

P/A NO.	REF NO.
-	-
DATE: 19/11/2010	REV 2

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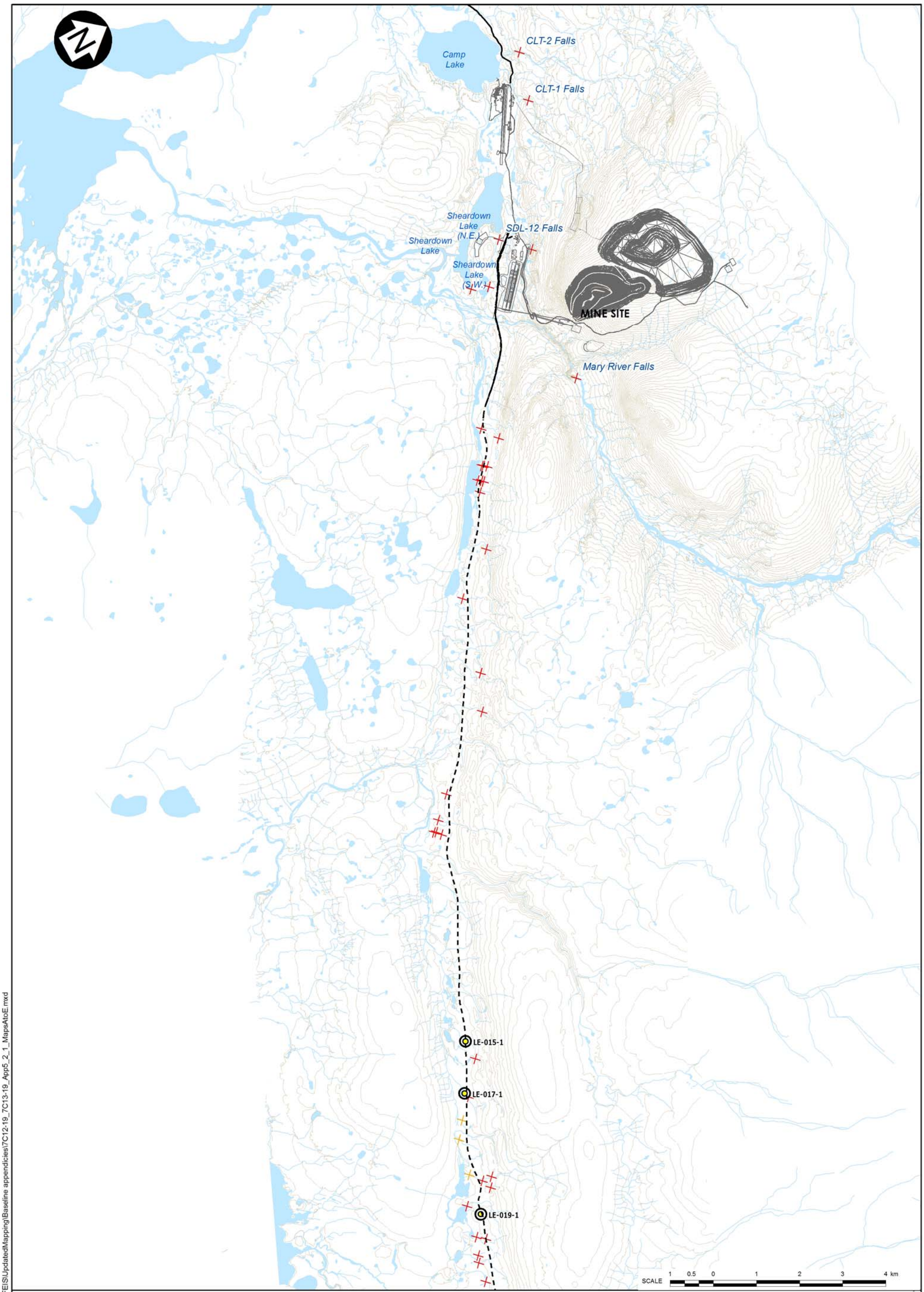

LEGEND:

LAKE ENCROACHMENT SURVEY YEAR
- 2008
- 2010

STREAM CROSSING

FISH BARRIER (CONFIRMED)

FISH BARRIER (AERIAL PHOTO INTERPRETATION)

CONTOUR

MILNE INLET TOTE ROAD (EXISTING)

RAILWAY ALIGNMENT (PROPOSED)

CONSTRUCTION ACCESS ROAD (PROPOSED)

WATER

INFRASTRUCTURE (PROPOSED FOR CONSTRUCTION AND OPERATIONS PERIODS)

NOTES:

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5. LOCATION OF PROPOSED INFRASTRUCTURE IS APPROXIMATE AND SUBJECT TO FIELD ADJUSTEMENTS
6. CONTOUR INTERVAL IS 25 M AND IS IN METRES.

BAFFINLAND IRON MINES CORPORATION

MARY RIVER PROJECT

Railway Lake Encroachment Sites (MAP A)

North/South Consultants Inc.
Aquatic Environment Specialists

P/A NO.	REF NO.
-	03-24-1
DATE: 16/12/2011	REV 2

Path: G:\MARYRIV_GDB\EIS_GDB\FEIS\UpdatedMapping\Baseline appendicies\7C12-19_7C13-19_App5_2_1_MapsAtoE.mxd

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-015-1
UTM Coordinates: 17 W 576946 7903233
Date/Time Surveyed: 20-Jul-08 / 05:05

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted: Y **Effort (min):** 2:32 **Electrofisher Settings:** 900V, 70Hz, 40%DC

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	0	-	-	-
NNST	0	-	-	-

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

The maximum water depth was 0. 05 m. The steam morphology at the crossing was a pool (< 0.2 m) and the substrate composition was 100% small cobble.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-015-1
UTM Coordinates: 17 W 576946 7903233
Date/Time Surveyed: 20-Jul-08 / 05:05

Photographs

A

B

Figure 1. View of habitat (A-B).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-017-1
UTM Coordinates: 17 W 577999 7902627
Date/Time Surveyed: 20-Jul-08 / 03:05

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted: Y **Effort (min):** 3:45 **Electrofisher Settings:** 700V, 70Hz, 40%DC

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	0	-	-	-
NNST	0	-	-	-

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	Yes
NNST	No	No	No	No

Comments & Summary

ARCH must migrate from large D/S river during high water into CV-017-1. The maximum water depth at the crossing was 0.45 m and the substrate was 100% fines. The water temperature was 4.0 °C.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-017-1
UTM Coordinates: 17 W 577999 7902627
Date/Time Surveyed: 20-Jul-08 / 03:05

Photographs

A

B

C

Figure 1. View of habitat (A-C).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-019-1
UTM Coordinates: 17 W 580628 7901598
Date/Time Surveyed: 24-Jul-08 / 04:35

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted: Y **Effort (min):** 4:30 **Electrofisher Settings:** 600V, 40Hz, 30%DC

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	0	-	-	-
NNST	0	-	-	-

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

No connections with overwintering habitat. The substrate composition at the crossing was 70% small cobble and 30% large cobble.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-019-1
UTM Coordinates: 17 W 580628 7901598
Date/Time Surveyed: 24-Jul-08 / 04:35

Photographs

A

B

C

Figure 1. View of habitat (A-C).

LE-023-1
LE-024-1
LE-024-2
RAVN RIVER CAMP
LE-R36
LE-R37
LE-R38
LE-R39
Pingimajuq Ridge
LE-R40
LE-R42
LE-R41
LE-047-1
LE-048-1
LE-051-1
MID-RAIL CAMP
Mid-rail Camp Lake
SCALE 1 0.5 0 1 2 3 4 km

LEGEND:

LAKE ENCROACHMENT SURVEY YEAR
- 2008
- 2010
- STREAM CROSSING
- FISH BARRIER (CONFIRMED)
- FISH BARRIER (AERIAL PHOTO INTERPRETATION)
- CONTOUR
- MILNE INLET TOTE ROAD (EXISTING)
- RAILWAY ALIGNMENT (PROPOSED)
- CONSTRUCTION ACCESS ROAD (PROPOSED)
- WATER
- INFRASTRUCTURE

NOTES:

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5. LOCATION OF PROPOSED INFRASTRUCTURE IS APPROXIMATE AND SUBJECT TO FIELD ADJUSTEMENTS
6. CONTOUR INTERVAL IS 25 AND IS IN METRES.

BAFFINLAND IRON MINES CORPORATION

MARY RIVER PROJECT

Railway Lake Encroachment Sites (MAP B)

North/South Consultants Inc.
Aquatic Environment Specialists

P/A NO.	REF NO.
-	-
DATE: 19/11/2010	REV 2

Path: G:\MARYRIV_GDB\EIS_GDB\EIS_Figures_2010EIS_Figures\MXD\Synthesis_RailLine_AccessRoad\Rev2Apdx\20101119_ApdxLE_sg.mxd

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-23-1
UTM Coordinates: 17 W 584445 7900426
Date/Time Surveyed: 24-Jul-08 / 03:55

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted: Y **Effort (min):** 5:00 **Electrofisher Settings:** 600V, 40Hz, 30%DC

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	9	1.8	75-95	6-8
NNST	0	-	-	-

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	High	No
NNST	No	No	No	No

Comments & Summary

The water body was 10 X 200 m and the maximum water depth ranged from 1.0 – 1.5 m. The substrate composition at the crossing was 50% small cobble, 30% large cobble and 20% boulders. The flow regime was permanent and the water temperature was 1ºC.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-23-1
UTM Coordinates: 17 W 584445 7900426
Date/Time Surveyed: 24-Jul-08 / 03:55

Photographs

A

B

C

Figure 1. View of habitat (A-C).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-024-1
UTM Coordinates: 17 W 584840 7900434
Date/Time Surveyed: 24-Jul-08 / 04:00

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted: Y **Effort (min):** 4:30 **Electrofisher Settings:** 600V, 40Hz, 30%DC

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	0	-	-	-
NNST	0	-	-	-

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

No fish habitat. Not connected to any river or deep lake. The substrate composition at the crossing was 45% small cobble, 45% large cobble and 10% boulders.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-024-1
UTM Coordinates: 17 W 584840 7900434
Date/Time Surveyed: 24-Jul-08 / 04:00

Photographs

A

B

Figure 1. View of habitat (A-B).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-024-2
UTM Coordinates: 17 W 585107 7900222
Date/Time Surveyed: 24-Jul-08 / 04:20

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted: Y **Effort (min):** 4:00 **Electrofisher Settings:** 600V, 40Hz, 30%DC

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	0	-	-	-
NNST	0	-	-	-

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

No fish habitat. The substrate composition at the crossing was 80% fines, 10% small cobble and 10% large cobble.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-024-2
UTM Coordinates: 17 W 585107 7900222
Date/Time Surveyed: 24-Jul-08 / 04:20

Photographs

A

B

Figure 1. View of habitat (A) and substrate (B).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-R36
UTM Coordinates: 17 W 595380 7894213
Date/Time Surveyed: 3-Sept-2008

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted: Y **Effort (min):** 2:32 **Electrofisher Settings:** 300V, 30Hz, 30%

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	0	-	-	-
NNST	0	-	-	-

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

The channel gradient was 1.25° and the water temperature was 6.0 °C. The maximum water depth at the crossing was 0.75 m and the substrate was 95% algae, 2% large cobble and 3% boulders.

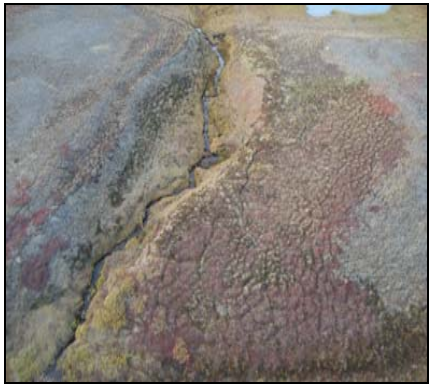
This is the shallow pond downstream of CV-R19 and R20. It is separated by a stretch of dry land that has a small amount of water running down over the grass in one spot. Approximately 50m downstream there is nice fish habitat, but even at high water it is very unlikely fish could reach the pond.

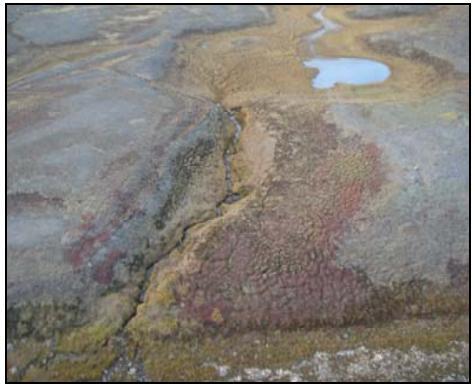
Rail Alignment Watercourse Crossing Assessment

Location

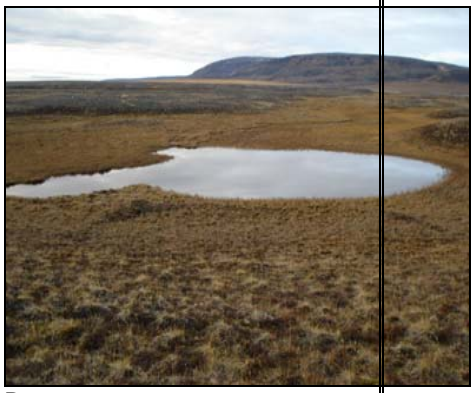
Crossing ID: LE-R36
UTM Coordinates: 17 W 595380 7894213
Date/Time Surveyed: 3-Sept-2008

Photographs


A


B


C


D


E


F


G

Figure 1. Aerial view of downstream stream (A), barrier between lake and downstream (B), lake (C), lake (D), disconnected stream downstream of lake (E), barrier downstream of lake (F), and lake substrate (G).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-R37
UTM Coordinates: 17 W 595790 7893228
Date/Time Surveyed: 3-Sept-2008

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted: Y **Effort (min):** 2:52 **Electrofisher Settings:** 300V, 30Hz, 30%

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	0	-	-	-
NNST	0	-	-	-

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

The maximum water depth at the crossing ranged from 1.0-1.5 m and the substrate was 90% fines, 8% gravel and 2% boulders.

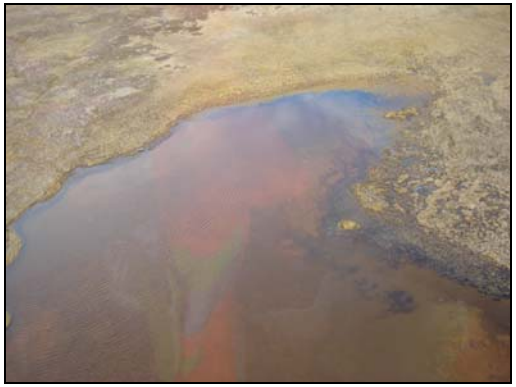
Isolated pool on top of a rise, with no significant connectivity to other waterbodies. Fish cannot likely reach this pond.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-R37
UTM Coordinates: 17 W 595790 7893228
Date/Time Surveyed: 3-Sept-2008

Photographs



A

B

C

Figure 1. Aerial view of lake (A), lake (B), and substrate of lake (C).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-R38
UTM Coordinates: 17 W 595911 7892779
Date/Time Surveyed: 3-Sept-2008

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted: Y **Effort (min):** 3:10 **Electrofisher Settings:** 300V, 30Hz, 30%

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	0	-	-	-
NNST	0	-	-	-

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

The maximum water depth at the crossing was 0.5 m and the substrate was 98% fines, 1% gravel and 1% boulders.

Isolated pool on a rise. Not connected to any other water body.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-R38
UTM Coordinates: 17 W 595911 7892779
Date/Time Surveyed: 3-Sept-2008

Photographs

A

B

C

Figure 1. Aerial view of lake (A), lake (B), and substrate (C).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-R39
UTM Coordinates: 17 W 596583 7891540
Date/Time Surveyed: 11-Aug-08 / 11:50

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

Distance and Direction from Crossing (m)	Channel Width (m)		Water Depth (m)				Water Velocity (m/s)			
	Wetted	High Water	25%	50%	75%	Max	25%	50%	75%	Max
0	~183X366		~1	-	~1	>2				

Distance and Direction from Crossing (m)	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
0							30		25	40	5

Fisheries Information

Electrofishing Conducted: Y **Effort (min):** 5:05 **Electrofisher Settings:** 400V, 40Hz, 30%DC

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	3	0.59	77-107	5-14
NNST	2	0.39	26-29	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	Moderate	No
NNST	Moderate	No	Moderate	No

Comments & Summary

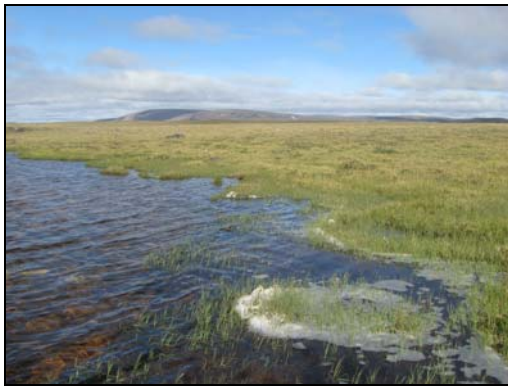
Electrofishing was conducted in conjunction with assessment at site CV-R24.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-R39
UTM Coordinates: 17 W 596583 7891540
Date/Time Surveyed: 11-Aug-08 / 11:50

Photographs



A

B

Figure 1. View of habitat at encroachment (A-B).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-R40
UTM Coordinates: 17 W 597331 7889379
Date/Time Surveyed: 3-Sept-2008

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted: Y **Effort (min):** 2:42 **Electrofisher Settings:** 200V, 30Hz, 30%

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	0	-	-	-
NNST	0	-	-	-

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	Low	No
NNST	No	No	Low	No

Comments & Summary

The maximum water depth at the crossing ranged was 0.75 m and the substrate was 30% fines, 20% algae, 20% gravel, 20% large cobble and 10% boulders.

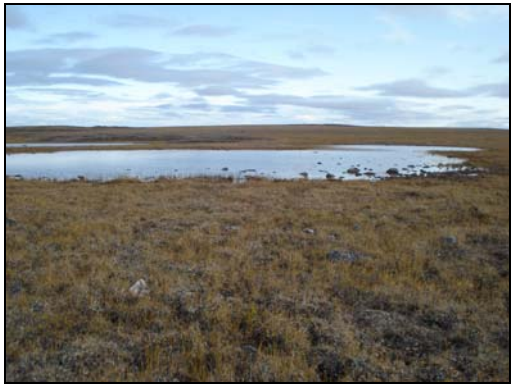
Not currently connected to any other water body except via flooded terrestrial. The lake is not deep enough to overwinter fish, but in the spring this lake may be connected indirectly (through 3 or 4 ponds) to CV-029, which has fish.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-R40
UTM Coordinates: 17 W 597331 7889379
Date/Time Surveyed: 3-Sept-2008

Photographs



A

B

C

Figure 1. View of nearby lake (A), nearby lake substrate (B), and substrate at the crossing (C).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-R41
UTM Coordinates: 17 W 597137 7886910
Date/Time Surveyed: 3-Sept-2008

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted: Y **Effort (min):** 2:33 **Electrofisher Settings:** 200V, 25Hz, 30%

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	0	-	-	-
NNST	0	-	-	-

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

The maximum water depth at the crossing was 0.5 m and the substrate was 30% fines, 20% gravel, 40% large cobble and 10% boulders.

Not deep enough for fish to overwinter. Not connected to any other water body that is capable of providing overwinter habitat.

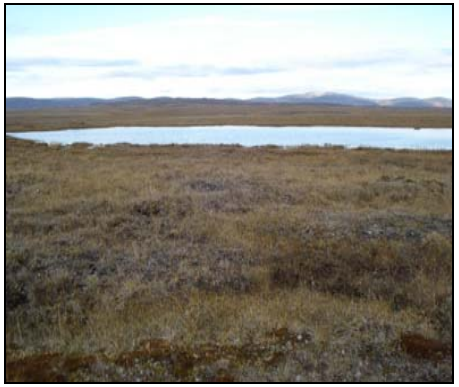
Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-R41
UTM Coordinates: 17 W 597137 7886910
Date/Time Surveyed: 3-Sept-2008

Photographs


A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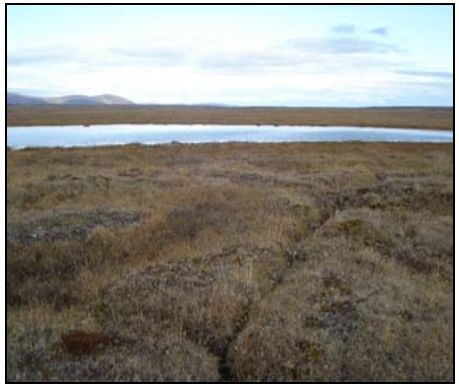

C


D

Figure 1. Views of lake (A-C), and lake substrate (D).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-R42
UTM Coordinates: 17 W 597067 7886846
Date/Time Surveyed: 3-Sept-2008

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted: Y **Effort (min):** 2:30 **Electrofisher Settings:** 200V, 25Hz, 30%

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	0	-	-	-
NNST	0	-	-	-

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

The maximum water depth at the crossing was 0.30 m and the substrate was 70% flooded terrestrial and 30% algae. The water temperature was 6.0 °C.

This area cannot really be considered a lake. No access to overwintering sites.

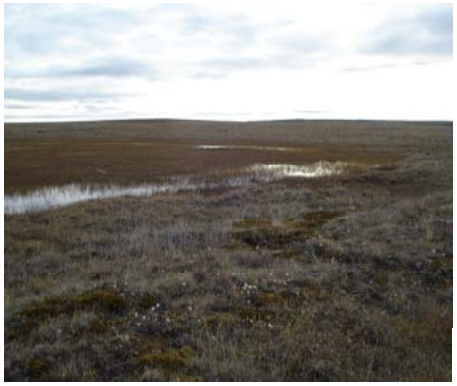
Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-R42
UTM Coordinates: 17 W 597067 7886846
Date/Time Surveyed: 3-Sept-2008

Photographs


A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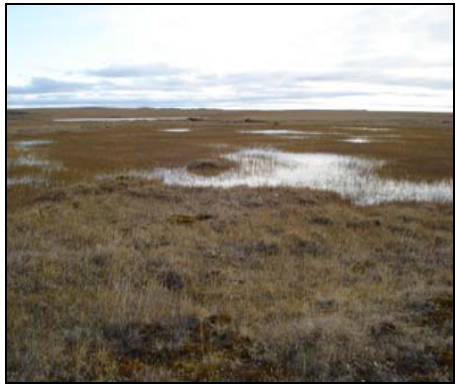

C

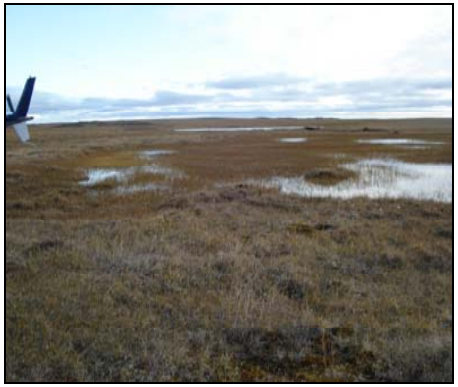

D

Figure 1. View of lake substrate (A), and lake from (B-D).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-47-1
UTM Coordinates: 17 W 597766 7883332
Date/Time Surveyed: 4-Sept-2008

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted: Y **Effort (min):** 3:18 **Electrofisher Settings:** 200V, 50Hz, 30%

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	0	-	-	-
NNST	0	-	-	-

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

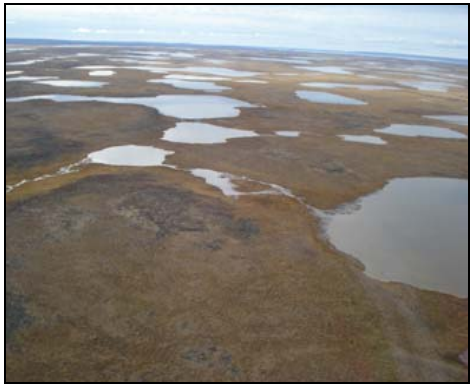
Small pond connected to larger pond. It is currently indirectly connected to the big downstream river at UTM 17 W 597787 7884098. Very close to encroachment, a channel of water that drains from the pool into an adjacent pond. Substrate in the channel is 100% FT. At best this pond is used as a migration corridor, but no fish were seen in good habitat in downstream pond at UTM 17 W 597814 7883386. The water depth at 75% was 0.75 m.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-47-1
UTM Coordinates: 17 W 597766 7883332
Date/Time Surveyed: 4-Sept-2008

Photographs


A


B


C


A


B


C

Figure 1. Aerial view of crossing between two ponds (A), crossing downstream (B), substrate and flow in downstream channel (C), crossing substrate (D), crossing upstream (E), and upstream pond (F).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-48-1
UTM Coordinates: 17 W 598097 7881675
Date/Time Surveyed: 4-Sept-2008

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted: Y **Effort (min):** 3:56 **Electrofisher Settings:** 300V, 50Hz, 30%

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	0	-	-	-
NNST	0	-	-	-

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

The lake is not currently connected to any other water body. It is on an elevated piece of land and does not appear to ever have anything except run-off streams running into it. The maximum water depth at the crossing ranged from 0.75-1.0 m. The substrate at the crossing was 10% flooded terrestrial, 40% sand, 48% silt and 2% large cobble.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-48-1
UTM Coordinates: 17 W 598097 7881675
Date/Time Surveyed: 4-Sept-2008

Photographs

A

B

C

D

E

F

Figure 1. Aerial view of lake 1 (A), lake 2 (B), lake from ground (C), lake substrate (D), substrate of waypoint (E), and view of lake from waypoint (F).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-51-1
UTM Coordinates: 17 W 596614 7879326
Date/Time Surveyed: 4-Sept-2008

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted: Y **Effort (min):** 2:46 **Electrofisher Settings:** 400V, 50Hz, 30%

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	0	-	-	-
NNST	0	-	-	-

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	Low	No	Moderate	No

Comments & Summary

Indirectly connected to large downstream river. Saw NNST along shore at UTM 17 W 596602 7879287. Poor fish habitat, but they can get here. The maximum water depth at the crossing was 0.5 m. The substrate composition was 1% flooded terrestrial, 97% silt and 2% small cobble.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-51-1
UTM Coordinates: 17 W 596614 7879326
Date/Time Surveyed: 4-Sept-2008

Photographs

A B C D

Figure 1. Dead fish found along shore (A), lake (B), and substrate of lake (C-D).

MID-RAIL CAMP

Mid-rail Camp Lake

LE-057-1

LE-057-2

LE-062-1

LE-068-1

LE-074-1

LE-082-1

SCALE 1 0.5 0 1 2 3 4 km

LEGEND:

LAKE ENCROACHMENT SURVEY YEAR
- 2008
- 2010

STREAM CROSSING

FISH BARRIER (CONFIRMED)

FISH BARRIER (AERIAL PHOTO INTERPRETATION)

CONTOUR

MILNE INLET TOTE ROAD (EXISTING)

RAILWAY ALIGNMENT (PROPOSED)

CONSTRUCTION ACCESS ROAD (PROPOSED)

WATER

INFRASTRUCTURE

NOTES:

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5. LOCATION OF PROPOSED INFRASTRUCTURE IS APPROXIMATE AND SUBJECT TO FIELD ADJUSTEMENTS
6. CONTOUR INTERVAL IS 25 AND IS IN METRES.

BAFFINLAND IRON MINES CORPORATION

MARY RIVER PROJECT

Railway Lake Encroachment Sites (MAP C)

North/South Consultants Inc.
Aquatic Environment Specialists

P/A NO.	REF NO.
-	-
DATE: 19/11/2010	REV 2

Path: G:\MARYRIV_GDB\EIS_GDB\EIS_Figures_2010EIS_Figures\MXD\Synthesis_RailLine_AccessRoad\Rev2Apdx\20101119_ApdxLE_sg.mxd

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-57-1
UTM Coordinates: 17 W 599442 7874619
Date/Time Surveyed: 4-Sept-2008

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted: Y **Effort (min):** 4:04 **Electrofisher Settings:** 600V, 50Hz, 30%

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	0	-	-	-
NNST	2(1 observed)	0.74	21-24	-

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	Moderate	No	High	Low

Comments & Summary

Currently isolated, but in the spring connected to the lake at UTM 17 W 599208 7874592 through one of the 2 currently dry pools. The fish in this pond will freeze during the winter. Maximum depth at the crossing ranged form 0.5-1.0 m. The substrate composition was 10% flooded terrestrial and 90 % silt.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-57-1
UTM Coordinates: 17 W 599442 7874619
Date/Time Surveyed: 4-Sept-2008

Photographs

A

B

C

D

Figure 1. Aerial view of dry connection to overwintering lake (A-B), lake (C), and lake substrate (D).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-57-2
UTM Coordinates: 17 W 599389 7874250
Date/Time Surveyed: 5-Sept-2008/15:00

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted: Y **Effort (min):** 16:25 **Electrofisher Settings:** 200V. 50Hz, 30%

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	1	0.06	46	1
NNST	26	1.52	21-59	1-2

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	Low	No
NNST	High	Low	High	No

Comments & Summary

From the air this lake looks potentially deep enough for fish to overwinter. The maximum water depth at the crossing was approximately > 3 m. The substrate was 20% flooded terrestrial, 20% small cobble, 40% large cobble and 20% boulders. The water temperature was 5.0 °C.

Rail Alignment Watercourse Crossing Assessment

Location

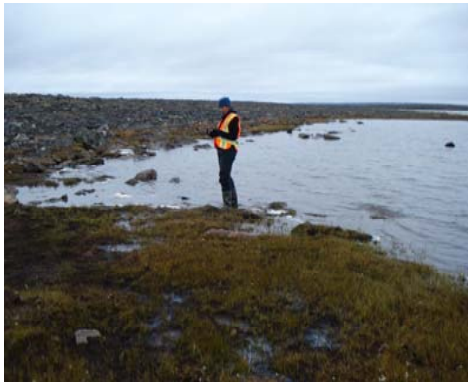
Crossing ID: LE-57-2
UTM Coordinates: 17 W 599389 7874250
Date/Time Surveyed: 5-Sept-2008/15:00

Photographs


A


B


C


A


B


C

Figure 1. Views across lake (A-D), and lake substrate (E-F).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-62-1
UTM Coordinates: 17 W 598254 7869613
Date/Time Surveyed: 5-Sept-2008/17:03

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted: Y **Effort (min):** 9:39 **Electrofisher Settings:** 700V, 40Hz, 30%

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	0	-	-	-
NNST	12	1.24	18-37	1-<1

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	High	Low	High	No

Comments & Summary

Shallow pond upstream of CV-062-1. The maximum water depth at the crossing was < 1.0 m and the substrate composition was 4% flooded terrestrial, 95% silt, and 1% boulders.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-62-1
UTM Coordinates: 17 W 598254 7869613
Date/Time Surveyed: 5-Sept-2008/17:03

Photographs

A

B

C

Figure 1. View of crossing across (A-B), and crossing substrate (C).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-068-1
UTM Coordinates: 17 W 601085 7865468
Date/Time Surveyed: 4-Aug-08 / 4:15

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

Distance and Direction from Crossing (m)	Channel Width (m)		Water Depth (m)				Water Velocity (m/s)			
	Wetted	High Water	25%	50%	75%	Max	25%	50%	75%	Max
0	95.10 X 64.0		0.20	1.6	0.25	1.6	N/M	N/M	N/M	N/M

Distance and Direction from Crossing (m)	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
0		20	80				99			1	

Fisheries Information

Electrofishing Conducted: N
Effort (min): N/A
Electrofisher Settings: N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

The flow regime was permanent and the water temperature was 15.0 °C. Overwintering doesn't appear possible and this lake is isolated. Fish use unlikely.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-068-1
UTM Coordinates: 17 W 601085 7865468
Date/Time Surveyed: 4-Aug-08 / 4:15

Photographs

A

Figure 1. View of habitat (A).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-074-1
UTM Coordinates: 17 W 603758 7860035
Date/Time Surveyed: 26-Jul-08 / 23:30

General Physical Characteristics

Floodplain Width (m):	N/M	**Channel Pattern:**	Pond	**Stage:**	N/M
Channel Confinement:	N/M	**Channel Gradient (range):**	N/M	**Flow Regime:**	PER
Bank Height (range in m):	0.25	**Bank Shape:**	STR	**T_W (°C):**	11.0

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted:	N	**Effort (min):**	N/A	**Electrofisher Settings:**	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

The water body (10 X 20 m) had a maximum water depth of 0.50 m. The water body was 90% pool (< 0.2 m) and 10% pool (> 0.2 m) and made up of 50% small cobble, 45% large cobble and 5% boulders.

Pond not deep enough for overwintering and not connected to anything else. No habitat, therefore no need to electrofish.

Baffinland Iron Mines
Mary River Project

North/South Consultants Inc.
Aquatic Environment Specialists

Fish Habitat Quality – NO FISH HABITAT

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-074-1
UTM Coordinates: 17 W 603758 7860035
Date/Time Surveyed: 26-Jul-08 / 23:30

Photographs

A

B

Figure 1. View of habitat (A) and substrate (B).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-082-1
UTM Coordinates: 17 W 606379 7852516
Date/Time Surveyed: 4-Aug-08 / 11:45

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

Distance and Direction from Crossing (m)	Channel Width (m)		Water Depth (m)				Water Velocity (m/s)			
	Wetted	High Water	25%	50%	75%	Max	25%	50%	75%	Max
0	60.35X44.80		0.2	0.4	0.2	0.5				

Distance and Direction from Crossing (m)	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
0		60	40				80		5	10	5

Fisheries Information

Electrofishing Conducted: N **Effort (min):** N/A **Electrofisher Settings:** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

Isolated pond. No inflows/outflows. The flow regime was permanent and the water temperature was 14.0 °C.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-082-1
UTM Coordinates: 17 W 606379 7852516
Date/Time Surveyed: 4-Aug-08 / 11:45

Photographs

A

B

Figure 1. View of habitat (A-B).

Cockburn Lake

AR-050a

AR-050b

LE-095-1

Cockburn Lake

COCKBURN
TUNNELS CAMP

LE-109-1

LE-117-1

SCALE 1 0.5 0 1 2 3 4 km

Path: G:\MARYRIV_GDB\EIS_GDB\EIS_Figures_2010EIS_Figures\MXD\Synthesis_RailLine_AccessRoad\Rev2Apdx\20101119_ApdxLE_sg.mxd

LEGEND:

LAKE ENCROACHMENT SURVEY YEAR
- 2008
- 2010

STREAM CROSSING

FISH BARRIER (CONFIRMED)

FISH BARRIER (AERIAL PHOTO INTERPRETATION)

CONTOUR

MILNE INLET TOTE ROAD (EXISTING)

RAILWAY ALIGNMENT (PROPOSED)

CONSTRUCTION ACCESS ROAD (PROPOSED)

WATER

INFRASTRUCTURE

NOTES:

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5. LOCATION OF PROPOSED INFRASTRUCTURE IS APPROXIMATE AND SUBJECT TO FIELD ADJUSTEMENTS
6. CONTOUR INTERVAL IS 25 AND IS IN METRES.

BAFFINLAND IRON MINES CORPORATION

MARY RIVER PROJECT

Railway Lake Encroachment Sites (MAP D)

North/South Consultants Inc.
Aquatic Environment Specialists

P/A NO.	REF NO.
-	-

DATE: 19/11/2010

REV 2

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-095-1
UTM Coordinates: 17 W 608265 7840508
Date/Time Surveyed: 4-Aug-08 / 01:22

General Physical Characteristics

Floodplain Width (m):	N/M	**Channel Pattern:**	Lake	**Stage:**	N/M
Channel Confinement:	C	**Channel Gradient (range):**	0-15^{o}	**Flow Regime:**	PER
Bank Height (range in m):	UD	**Bank Shape:**	45^{o} S	**T_W ($^{\circ}$C):**	7.0

Hydrology & Habitat Characteristics

Distance and Direction from Crossing (m)	Channel Width (m)		Water Depth (m)				Water Velocity (m/s)			
	Wetted	High Water	25%	50%	75%	Max	25%	50%	75%	Max
0			0.3			2				

Distance and Direction from Crossing (m)	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
0		30	70				5	20	45	25	5

Fisheries Information

Electrofishing Conducted: N **Effort (min):** N/A **Electrofisher Settings:** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	Low	Moderate	High	No
NNST	Low	Moderate	Low	No

Comments & Summary

Although depth barely sufficient for overwintering, this lake is accessible from other areas and provides abundant suitable habitat. Fish use is likely.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-095-1
UTM Coordinates: 17 W 608265 7840508
Date/Time Surveyed: 4-Aug-08 / 01:22

Photographs


A


B


C

Figure 1. View of habitat at crossing (A-B), and of substrate (C).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-050a
UTM Coordinates: 17 W 608059 7840743
Date/Time Surveyed: 27-Aug-10

General Physical Characteristics

Floodplain Width (m):	N/M	**Channel Pattern:**	N/M	**Stage:**	N/A
Channel Confinement:	N/M	**Channel Gradient (range):**	N/M	**Flow Regime:**	N/A
Bank Height (range in m):	N/M	**Bank Shape:**	N/M	**T_W (°C):**	N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted: Y **Effort (min):** 2.92 **Electrofisher Settings:** 990 V, 30 Hz, 12%DC

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	3	1.03	75 - 100	-
NNST	5	1.71	18 - 50	-

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	Low	No
NNST	Low	No	Moderate	No

Comments & Summary

Small waterbody with boulder/cobble substrate. Connected to Cockburn Lake via short channel that was dry during survey. Approximate dimensions: 40 x 55 m; < 2 meters deep. Fish stranded after higher spring water levels and would then winter kill.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-050a
UTM Coordinates: 17 W 608059 7840743

Date/Time Surveyed: 27-Aug-10

Photographs

A

B

Figure 1. Waterbody AR-050a (A), dry channel connecting AR-050a with Cockburn Lake (B).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-050b
UTM Coordinates: 17 W 608049 7840793
Date/Time Surveyed: 27-Aug-10

General Physical Characteristics

Floodplain Width (m):	N/M	**Channel Pattern:**	N/M	**Stage:**	N/A
Channel Confinement:	N/M	**Channel Gradient (range):**	N/M	**Flow Regime:**	N/A
Bank Height (range in m):	N/M	**Bank Shape:**	N/M	**T_W (°C):**	N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted: Y **Effort (min):** 3.75 **Electrofisher Settings:** 990 V, 30 Hz, 12%DC

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	3/1	0.80	70 - 100	-
NNST	1	0.27	20	-

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	Low	No
NNST	Low	No	Moderate	No

Comments & Summary

Small waterbody with boulder/cobble substrate. Connected to AR-050a, which is connected to Cockburn Lake via short channel that was dry during survey. Approximate dimensions: 40 x 200 m; < 2 meters deep. Fish stranded after higher spring water levels and would then winter kill.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-050b
UTM Coordinates: 17 W 608049 7840793

Date/Time Surveyed: 27-Aug-10

Photographs

A

Figure 1. Waterbody AR-050b (A).

Rail Alignment Watercourse Crossing Assessment

Crossing ID: LE-109-1
UTM Coordinates: 17 W 600834 7832070
Date/Time Surveyed: 3-August-08 / 05:00

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

Distance and Direction from Crossing (m)	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
0		10	90				20		30	50	

Fisheries Information

Electrofishing Conducted: N **Effort (min):** N/A **Electrofisher Settings:** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	High	High	High	Low
NNST	Moderate	High	Moderate	Low

Comments & Summary

The flow regime was permanent and the maximum water depth was > 2.0 m. The bank height was > 10.0 m. Overwintering possible and depths and substrates suitable for char spawning as well. Fish use of this lake probably extensive.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-109-1
UTM Coordinates: 17 W 600834 7832070
Date/Time Surveyed: 3-August-08 / 05:00

Photographs

A B C D

Figure 1. View of habitat at crossing (A-D).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-117-1
UTM Coordinates: 17 W 597920 7825799
Date/Time Surveyed: 3-Aug-08 / 04:40

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted: Y **Effort (min):** 5:00 **Electrofisher Settings:** 400V, 40Hz, 30%DC

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	0	-	-	-
NNST	0	-	-	-

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

The water body was 26.52X16.46 m, with a permanent flow regime. The water temperature was 6.0 °C. The substrate was 10% fines, 25% gravel, 35% small cobble and 30% large cobble.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-117-1
UTM Coordinates: 17 W 597920 7825799
Date/Time Surveyed: 3-Aug-08 / 04:40

Photographs

A

B

C

Figure 1. View of habitat (A-B), and substrate (C).

Cockburn Lake

LE-121-1

COCKBURN SOUTH CAMP

LE-127-1

LE-127-2

LE-127-3

LE-128-1

LE-129-1

LE-131-1

LE-132-1

LE-134-1

LE-133-1

LE-134-2

LE-136-1

LE-142-1

LE-142-2

ST28

STEP-LE-001-1

STEP-LE-006-1

STEP-LE-002-1

STEENSBY INLET

STEENSBY PORT

SCALE 1 0.5 0 1 2 3 4 km

LEGEND:

LAKE ENCROACHMENT SURVEY YEAR
- 2008
- 2010

STREAM CROSSING

FISH BARRIER (CONFIRMED)

FISH BARRIER (AERIAL PHOTO INTERPRETATION)

CONTOUR

MILNE INLET TOTE ROAD (EXISTING)

RAILWAY ALIGNMENT (PROPOSED)

CONSTRUCTION ACCESS ROAD (PROPOSED)

WATER

INFRASTRUCTURE (PROPOSED FOR CONSTRUCTION AND OPERATIONS PERIODS)

NOTES:

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5. LOCATION OF PROPOSED INFRASTRUCTURE IS APPROXIMATE AND SUBJECT TO FIELD ADJUSTEMENTS
6. CONTOUR INTERVAL IS 25 M AND IS IN METRES.

BAFFINLAND IRON MINES CORPORATION

MARY RIVER PROJECT

Railway Lake Encroachment Sites (MAP E)

North/South Consultants Inc.
Aquatic Environment Specialists

P/A NO.	REF NO.
-	03-24-5
DATE: 16/12/2011	REV 2

Path: G:\MARYRIV_GDB\EIS_GDB\FEIS\UpdatedMapping\Baseline appendicies\7C12-19_7C13-19_App5_2_1_MapsAtoE.mxd

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-121-1
UTM Coordinates: 17 W 598561 7822010
Date/Time Surveyed: 2-Aug-08 / 03:25

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

Distance and Direction from Crossing (m)	Channel Width (m)		Water Depth (m)				Water Velocity (m/s)			
	Wetted	High Water	25%	50%	75%	Max	25%	50%	75%	Max
0	30.18X16.46		0.15	0.3	0.15	0.3				

Distance and Direction from Crossing (m)	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
0		100					100				

Fisheries Information

Electrofishing Conducted: Y **Effort (min):** 3:00 **Electrofisher Settings:** 400V, 40Hz, 30%DC

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	0	-	-	-
NNST	0	-	-	-

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Baffinland Iron Mines
Mary River Project

North/South Consultants Inc.
Aquatic Environment Specialists

Fish Habitat Quality – NO FISH HABITAT

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-121-1
UTM Coordinates: 17 W 598561 7822010
Date/Time Surveyed: 2-Aug-08 / 03:25

Comments & Summary

Under higher water conditions, would flow through CV-121-7. The flow regime of the pond is permanent and the water temperature was 12.0 °C.

Photographs

A

B

Figure 1. (A) View of habitat, and (B) substrate.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-127-1
UTM Coordinates: 17 W 598534 7816263
Date/Time Surveyed: 3-Aug-08 / 11:31

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted: Y **Effort (min):** 8:30 **Electrofisher Settings:** 700V, 70Hz, 60%DC

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	0	0	-	-
NNST	10	1.18	22-25	-

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	High	No	High	No

Comments & Summary

The flow regime is permanent, the stage is normal and the water temperature was 12.0°C. The maximum water depth at the crossing was 0.25 m. The water body was 85% pool (< 0.2 m) and 15% ool (>0.2 m). The substrate composition was 20% fines, 10% gravel and 70% small cobble. Not overwintering habitat, but connected to other waterbodies. Habitat ideal for stickleback spawning and rearing during summer.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-127-1
UTM Coordinates: 17 W 598534 7816263
Date/Time Surveyed: 3-Aug-08 / 11:31

Photographs

A

B

Figure 1. View of habitat, inlet/outlet (A), and pond (B).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-127-2
UTM Coordinates: 17 W 598559 7816054
Date/Time Surveyed: 3-Aug-08 / 12:30

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

Distance and Direction from Crossing (m)	Channel Width (m)		Water Depth (m)				Water Velocity (m/s)			
	Wetted	High Water	25%	50%	75%	Max	25%	50%	75%	Max
100D	>200					~0.5	Stagnant pool			
80D	>200					~0.5	Stagnant pool			
60D	>200					~0.5	Stagnant pool			
40D	23.5		0.1	0.25	0.1		Stagnant pool			
20D	25.0		0.1	0.25	0.1		Stagnant pool			
0	30.5		0.1	0.25	0.1		Stagnant pool			
20U	41.0		0.1	0.25	0.1		Stagnant pool			
40U	37.0		0.1	0.25	0.1		Stagnant pool			
60U	29.5		0.1	0.25	0.1		Stagnant pool			
80U	End of lake		0.1	0.25	0.1		Stagnant pool			
100U										

Distance and Direction from Crossing (m)	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
100D		90	10				10	20	65	5	
80D		90	10				10	20	65	5	
60D		90	10				10	20	65	5	
40D		90	10				10	20	65	5	
20D		90	10				10	20	65	5	
0		90	10				10	20	65	5	
20U		90	10				10	20	65	5	
40U		90	10				10	20	65	5	
60U		90	10				10	20	65	5	
80U		90	10				10	20	65	5	
100U											

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-127-2
UTM Coordinates: 17 W 598559 7816054
Date/Time Surveyed: 3-Aug-08 / 12:30

Fisheries Information

Electrofishing Conducted: Y **Effort (min):** 2:23 **Electrofisher Settings:** 700V, 70Hz, 20%DC

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	0	-	-	-
NNST	0	-	-	-

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	High	No	High	No

Comments & Summary

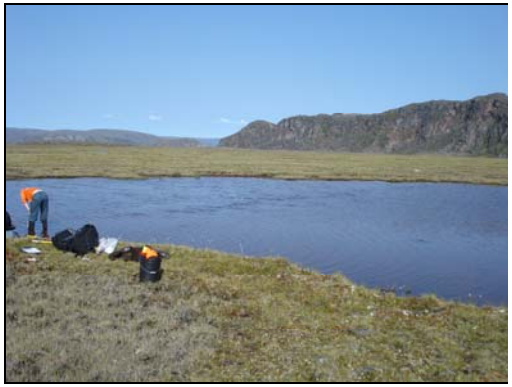
YOY NNST seen at all points along the banks in 2008. YOY NNST were also captured at this site during an electrofishing survey in 2007. The flow regime was permanent and the stage was normal in 2008. The water temperature was 18.0 °C.

Rail Alignment Watercourse Crossing Assessment

Location

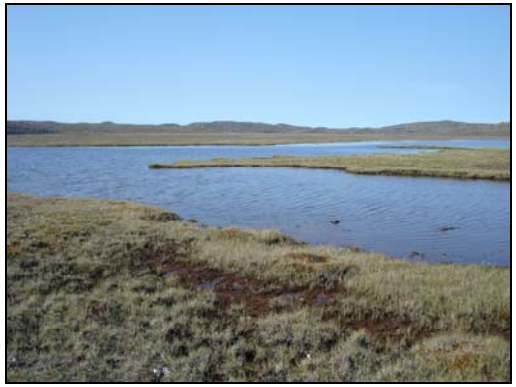
Crossing ID: LE-127-2
UTM Coordinates: 17 W 598559 7816054
Date/Time Surveyed: 3-Aug-08 / 12:30

Photographs



A

B



C

D

Figure 1. View of habitat, at crossing (A), towards the end of the bay (B), looking out toward main lake (C), and substrate (D).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-127-3
UTM Coordinates: 17 W 598579 7815814
Date/Time Surveyed: 3-Aug-08 / 14:11

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted: N
Effort (min): N/A
Electrofisher Settings: N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	High	Low	High	No

Comments & Summary

Large numbers of YOY and larger NNST observed along the shoreline. The wetted channel width and the high water channel width were each 9.14 m, and the maximum water depth at the crossing was 1.0 m. The substrate composition 50% fines, 30% small cobble, 10% large cobble and 10% boulders.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-127-3
UTM Coordinates: 17 W 598579 7815814
Date/Time Surveyed: 3-Aug-08 / 14:11

Photographs

A

B

C

D

E

Figure 1. View of habitat, at crossing (A), at the dry creek flowing into the water body (B), facing north (C) facing south (D), and substrate (E).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-128-1
UTM Coordinates: 17 W 598604 7815605
Date/Time Surveyed: 3-Aug-08 / 14:27

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted: Y **Effort (min):** 1:00 **Electrofisher Settings:** 700V, 70Hz, 20%DC

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	0	-	-	-
NNST	1	1.0	-	-

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	Low	No

Comments & Summary

The pond is elevated and not connected to any other water bodies. The flow regime is permanent, the stage is normal and the water temperature was 21.5 °C. The wetted width was 9.0 m, the high water channel width was 15 m, and the maximum water depth was 0.2 m. The stream morphology composition was a pool (< 0.2 m), substrate made up of 90% fines, and 10% gravel.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-128-1
UTM Coordinates: 17 W 598604 7815605
Date/Time Surveyed: 3-Aug-08 / 14:27

Photographs

A **B** **C**

Figure 1. View of habitat, at the crossing (A), facing south (B), and at the inlet /outlet (C).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-129-1
UTM Coordinates: 17 W 599356 7814495
Date/Time Surveyed: 3-Aug-08 / 17:00

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted: Y **Effort (min):** 5:00 **Electrofisher Settings:** 800V, 70Hz, 20%DC

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	2	0.4	114-116	13-15
NNST	4	0.8	49-73	4

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	Low	No
NNST	Low	No	Moderate	No

Comments & Summary

Channel Characteristics and Velocity: Wetted width that'll be encroached upon is 50 m. The wetted width was 87.78 m. The flow regime was permanent and the stage was normal.
Fish Habitat: Large cobble (60%) and boulders (30%) packed together and covered in orange algae, also with 10% fines.

Rail Alignment Watercourse Crossing Assessment

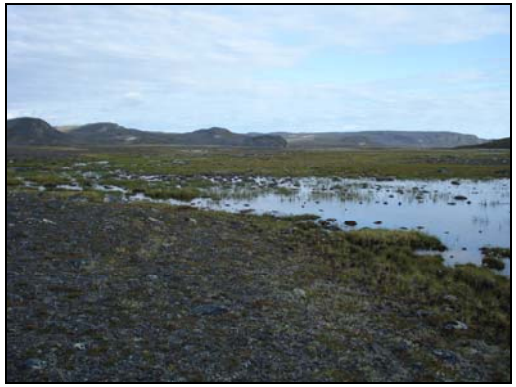
Location

Crossing ID: LE-129-1
UTM Coordinates: 17 W 599356 7814495
Date/Time Surveyed: 3-Aug-08 / 17:00

Photographs

A

B



C

D

Figure 1. View of habitat, at crossing (A), facing main lake body –NW (B) facing outlet (C), and of substrate (D).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-131-1
UTM Coordinates: 17 W 600654 7812572
Date/Time Surveyed: 3-Aug-08 / 09:30

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted: Y **Effort (min):** 3:10 **Electrofisher Settings:** 700V, 40Hz, 20%DC

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	0	-	-	-
NNST	2	0.63	20-45	-

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	Moderate	No	Moderate	No

Comments & Summary

Decent spawning/rearing habitat but no way out of habitat. Many other NNST seen, but low conductivity in the pond prevented their capture.
The maximum water depth was 0.2 m, the water body was a pool (< 0.2 m) and the substrate composition was 99% fines and 1% large cobble.

Rail Alignment Watercourse Crossing Assessment

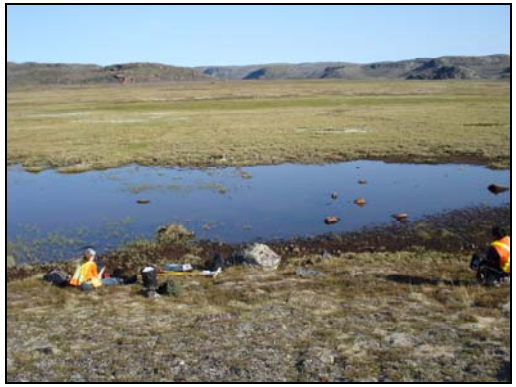
Location

Crossing ID: LE-131-1
UTM Coordinates: 17 W 600654 7812572
Date/Time Surveyed: 3-Aug-08 / 09:30

Photographs


A


B


C


D

Figure 1. View of habitat, at the crossing (A) at the outflow (B), towards outflow (C), and a YOY NNST (D).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-132-1
UTM Coordinates: 17 W 600775 7812191
Date/Time Surveyed: 3-Aug-08 / 08:29

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted: Y **Effort (min):** 1:10 **Electrofisher Settings:** 400V, 50Hz, 20%DC

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	1	0.86	~50-70	N/A
NNST	0	-	-	-

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	Low
NNST	Low	No	Low	Low

Comments & Summary

Due to lack of cover fish saw us coming and evaded the electrofisher. Fish present in W pool (20 m W of crossing).
Didn't see any NNST YOY maybe ARCH have eaten them. Substrate too soft to enter pool.
Fish habitat Potential: ARCH Migration Corridor into a dead end pond to the W that also doesn't have good habitat of any kinds they're trapped there and will probably die.

Maximum water depth of the lake (riffle) was 0.05 m and the substrate was 100% fines. The flow regime is permanent and the stage is normal.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-132-1
UTM Coordinates: 17 W 600775 7812191
Date/Time Surveyed: 3-Aug-08 / 08:29

Photographs

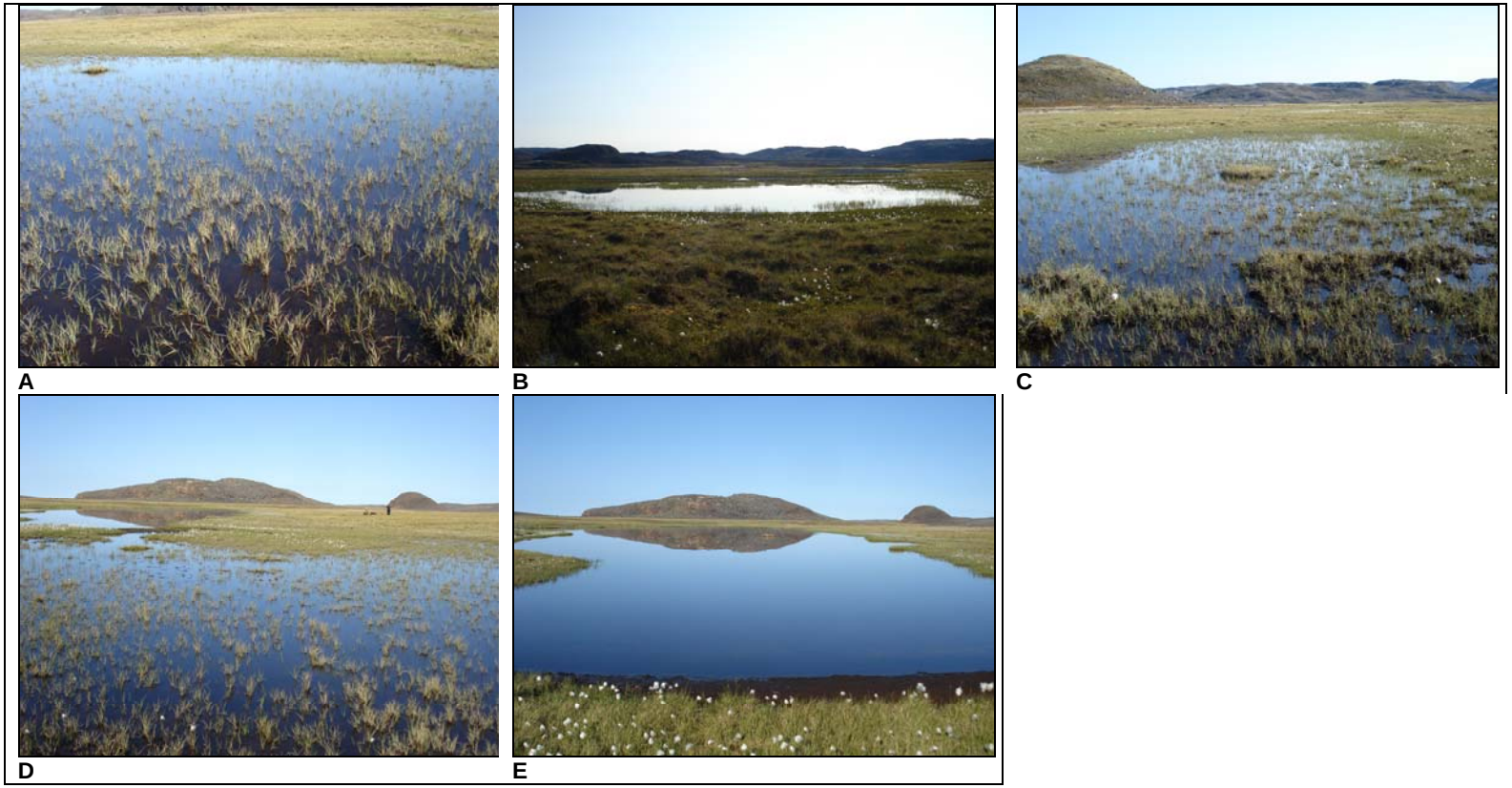


Figure 1. View of habitat, at crossing facing north (A), of the pool to the east (B), same flooded area as crossing facing east (C), same flooded area as crossing facing west (D), and west pool (E).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-133-1
UTM Coordinates: 17 W 600853 7810637
Date/Time Surveyed: 25-Jul-08 / 02:50

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted: N
Effort (min): N/A
Electrofisher Settings: N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

There is a large DS lake ~ 75m DS with ARCH that is not accessible to this pond (DS take = 40 Bo, 30 lg Co, 30 Sm Co, and > 2 m day).
Suitable for overwintering and maybe spawning. Juveniles were observed.

The flow regime of the 10X10 water body (pool (<0.2 m**)** is intermittent and the maximum water depth was 0.10 m. The substrate was 50% small cobble, 45% large cobble and 5% boulders.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-133-1
UTM Coordinates: 17 W 600853 7810637
Date/Time Surveyed: 25-Jul-08 / 02:50

Photographs

A

B

Figure 1. View of habitat (A) and substrate (B).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-134-1
UTM Coordinates: 17 W 600381 7810342
Time Surveyed: 5-Jul-08 / 02:25

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted: Y **Effort (min):** 4:00 **Electrofisher Settings:** 600V, 60Hz, 50%DC

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	0	-	-	-
NNST	0	-	-	-

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

The water body (150X100 m) was made up of 40% pool (<0.2 m) and 60% pool (> 2.0 m) and the substrate composition was made up of 5 % fines, 25% small cobble, 40% large cobble, and 30% boulders. The water temperature was 8.0 °C and the flow regime was permanent. The maximum water depth at the crossing was 0.75 m

Not deep enough for overwintering and no connection. Photos were not taken of this site.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-134-2
UTM Coordinates: 17 W 599985 7810263
Date/Time Surveyed: 25-Jul-08 / 02:00

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted: Y **Effort (min):** 5:10 **Electrofisher Settings:** 600V, 60Hz, 80%DC

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	0	-	-	-
NNST	0	-	-	-

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

The water body (200X150 m) was made up of 70% pool (<0.2 m) and 30% riffle. The substrate was 15 % fines, 15% small cobble, 50% large cobble, and 20% boulders. The water temperature was 2.0 °C and the flow regime was permanent. The maximum water depth at the crossing was approximately 1 m.

Not deep enough for overwintering and not connected to anything else.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-134-2
UTM Coordinates: 17 W 599985 7810263
Date/Time Surveyed: 25-Jul-08 / 02:00

Photographs

A

B

Figure 1. View of habitat (A) and substrate (B).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-136-1
UTM Coordinates: 17 W 598899 7809533
Date/Time Surveyed: 25-Jul-08 / 01:20

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted: Y **Effort (min):** 6:00 **Electrofisher Settings:** 600V, 60Hz, 50%DC

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	5	0.83	50-104	1-9
NNST	0	-	-	-

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	Moderate	High	High	No
NNST	Low	Low	Low	No

Comments & Summary

The water body (250X100) was a pool (< 0.2 m) and the substrate was 20% small cobble, 40% large cobble, and 40% boulders. The flow regime was permanent and the maximum water depth at the crossing was > 2.0 m.

Not as many fish as expected, but maybe further out in lake.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-136-1
UTM Coordinates: 17 W 598899 7809533
Date/Time Surveyed: 25-Jul-08 / 01:20

Photographs


A


B


C


D

Figure 1. View of habitat (A-C) and of substrate (D).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE -142-1
UTM Coordinates: 17 W 596885 7803858
Date/Time Surveyed: 24-Jul-08 /22:00

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted: Y **Effort (min):** N/A **Electrofisher Settings:** N/A

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	0	-	-	-
NNST	0	-	-	-

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	High	Moderate
NNST	Moderate	No	High	Moderate

Comments & Summary

The water body (200X280) was a pool (< 0.2 m) and the substrate composition was 30% fines, 10% small cobble, 30% large cobble, and 30% boulders. The flow regime was permanent, water temperature was 9.0 °C and the maximum water depth at the crossing was approximately 1.5 m.

Fish Habitat Potential: Probably not deep enough for overwintering.
Fish Habitat: Excellent habitat.
Electrofishing: As part of fishing during CV-142-2 survey. Lots of ARCH AND NNST present.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE -142-1
UTM Coordinates: 17 W 596885 7803858
Date/Time Surveyed: 4-Jul-08 /22:00

Photographs

A

Figure 1: View of Habitat (A).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-142-2
UTM Coordinates: 17 W 597004 7803817
Date/Time Surveyed: 24-Jul-08 /22:10

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted: Y **Effort (min):** N/A **Electrofisher Settings:** N/A

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	0	-	-	-
NNST	0	-	-	-

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	Low	High	High	Low
NNST	High	High	High	Low

Comments & Summary

The water body was a pool (> 0.2 m) and the substrate composition was 30% fines, 30% small cobble, 30% large cobble, and 100% boulders. The flow regime was permanent and the water temperature was 9.0 °C. The wetted width at the crossing was > 200 m and the maximum water depth was > 2.0 m.

Fish Habitat Potential: Deep enough for overwintering, but spawning will probably depend on resident, probably stunted population (did observe some small, very colorful char)
Fish Habitat: Excellent
Electrofishing: As part of fishing during CV-142-2. Lots of ARCH and NNST.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-142-2
UTM Coordinates: 17 W 597004 7803817
Date/Time Surveyed: 24-Jul-08 /22:10

Photographs

A

Figure 1. View of habitat at crossing (A).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: ST28
UTM Coordinates: 17 W 595532 7803279
Date/Time Surveyed: 04-Aug-2008/16:53

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted: N **Effort (min):** **Electrofisher Settings:**

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	Low	Low	Moderate	No
NNST	**Moderate**	**Low**	**Moderate**	**No**

Comments & Summary

Gillnetting and observational studies were conducted and only one NNST was observed.

Substrate was 50% large cobble, 40% boulder and 10% fines.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: ST28
UTM Coordinates: 17 W 595532 7803279

Date/Time Surveyed: 04-Aug-2008/16:53

Photographs

A

B

C

Figure 1. Pan view of ST-028 during summer (A), shoreline view (B) and substrate (C).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: STEP-LE-1-1
UTM Coordinates: 17W 595035 7802582
Date/Time Surveyed: 1-Aug-08 / 22:00

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

Distance and Direction from Crossing (m)	Channel Width (m)		Water Depth (m)				Water Velocity (m/s)			
	Wetted	High Water	25%	50%	75%	Max	25%	50%	75%	Max
0	127X127		0.20	1	0.2	1-2				

Distance and Direction from Crossing (m)	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
0		30	70				95			4	1

Fisheries Information

Electrofishing Conducted: Y **Effort (min):** 15:00 **Electrofisher Settings:** 400V, 40Hz,30%DC

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	0	-	-	-
NNST	12	0.8	31-57	-

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	Low	Low
NNST	High	Low	High	Low

Comments & Summary

The flow regime is permanent and the water temperature was 13.0 °C.
A stream leads to another lake that connects to the coast eventually.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: STEP-LE-1-1
UTM Coordinates: 17W 595035 7802582

Date/Time Surveyed: 1-Aug-08 / 22:00

Photographs

A

B

C

Figure 1. View of habitat (A-B), and substrate (C).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: STEP-LE-6-1
UTM Coordinates: 17 W 594607 7801558
Date/Time Surveyed: 1-Aug-08 / 21:30

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

Distance and Direction from Crossing (m)	Channel Width (m)		Water Depth (m)				Water Velocity (m/s)			
	Wetted	High Water	25%	50%	75%	Max	25%	50%	75%	Max
0	205.7X153.6		0.05	2	0.05	2-3	N/M	N/M	NM	N/M

Distance and Direction from Crossing (m)	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
0		30	70				15	10	25	40	10

Fisheries Information

Electrofishing Conducted: Y **Effort (min):** 12:00 **Electrofisher Settings:** 600V, 50Hz, 40%DC

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	1	0.08	72	-
NNST	3	0.25	34-40	-

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	Low	Low	No
NNST	Moderate	Low	Moderate	No

Rail Alignment Watercourse Crossing Assessment

Location

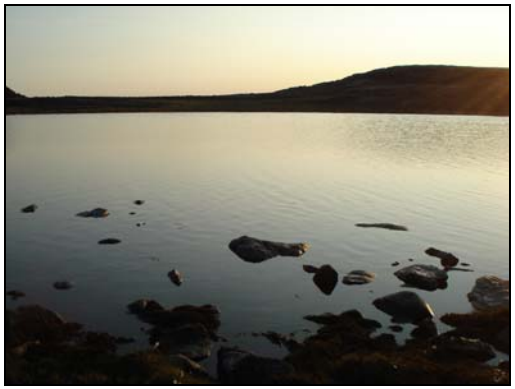
Crossing ID: STEP-LE-6-1
UTM Coordinates: 17 W 594607 7801558
Date/Time Surveyed: 1-Aug-08 / 21:30

Comments & Summary

The flow regime was permanent and the water temperature was 11.0 °C.
Stream coming from STEP-LE-02-1.

Photographs


A.


B


C


D


E


F


G

Figure 1. View of habitat (A-D), and substrate (E-G).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: STEP-LE-2-1
UTM Coordinates: 17 W 594483 7801196
Date/Time Surveyed: 1-Aug-08 / 20:45

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

Distance and Direction from Crossing (m)	Channel Width (m)		Water Depth (m)				Water Velocity (m/s)			
	Wetted	High Water	25%	50%	75%	Max	25%	50%	75%	Max
0	151.8 X116.1		0.10	0.45	0.15	0.50				

Distance and Direction from Crossing (m)	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
0		60	40				10	20	50	15	5

Fisheries Information

Electrofishing Conducted: Y **Effort (min):** 17:00 **Electrofisher Settings:** 600V, 40Hz, 30%DC

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	17	1.0	44-123	-
NNST	6	0.35	23-71	-

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	High	No
NNST	Moderate	No	Moderate	No

Comments & Summary

The flow regime was permanent and the water temperature was 13.0 °C.
Caught most of the fish near an outlet into a tributary stream.

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A B C D

Figure 1. View of habitat (A-C), and substrate (D)