

Appendix 21a

Site Photos

– Residential Subdivision

Site Photographs – Residential Subdivision



Photo 1 View of Residential Subdivision from BMEWS site (looking southeast)



Photo 2 View of Residential Subdivision over Small Pond Bog (looking southeast)

Site Photographs – Residential Subdivision



Photo 3 View of stream northeast of the Residential Subdivision. Various metal debris was observed in the stream



Photo 4 View of debris along the stream northeast of the Residential Subdivision

Site Photographs – Residential Subdivision



Photo 5 View of debris in the stream northeast of the Residential Subdivision



Photo 6 View of debris cleanup in the stream northeast of the Residential Subdivision

Site Photographs – Residential Subdivision



Photo 7 View of debris cleanup in the stream northeast of the Residential Subdivision



Photo 8 View of debris cleanup in the stream northeast of the Residential Subdivision

Site Photographs – Residential Subdivision



Photo 9 View of debris cleanup in the stream northeast of the Residential Subdivision



Photo 10 View of excavator preparing to dig a test pit in the Residential Subdivision

Site Photographs – Residential Subdivision



Photo 11 View of buried debris encountered in the Residential Subdivision



Photo 12 View of buried barrels encountered in the Residential Subdivision

Site Photographs – Residential Subdivision



Photo 13 View of track mounted auger drill used to drill monitor wells

Appendix 21b

Sample Coordinates

– Residential Subdivision

Sample Coordinates - Residential Subdivision
Phase II/III ESA, HHERA and RAP/RMP
Former US Military Site and Residential Subdivision, Hopedale, NL
Project No. 121410103

Sample ID	Coordinates	
	Easting	Northing
TEST PITS		
TP-234	0675165	6149306
TP-235	0675325	6149506
TP-236	0675327	6149537
TP-237	0675267	6149567
TP-238	0675420	6149831
TP-239	0675451	6149494
TP-240	0675417	6149449
TP-241	0675372	6149396
TP-242	0675326	6149442
TP-243	0675505	-
TP-244	0675454	6149321
TP-245	0675452	6149428
TP-246	0675408	6149370
TP-247	0675410	6149320
TP-248	0675420	6149259
TP-249	0675428	6149262
SURFACE SOIL		
BS188	0675274	6149509
BS189	0675268	6149571
BS190	0675311	6149513
BS191	0675339	6149562
BS192	0675377	6149542
BS193	0675406	6149536
BS194	0675381	6149562
BS195	0675351	6149486
BS196	0675318	6149444
BS197	0675312	6149414
BS198	0675354	6149400
BS199	0675365	6149427
BS200	0675395	6149475
BS201	0675447	6149513
BS202	0675460	6149487
BS203	0675474	6149448
BS204	0675439	6149455
BS205	0675463	6149428
BS206	0675409	6149388
BS207	0675432	6149392
BS208	0675422	6149375
BS209	0675347	6149337
BS210	0675427	6149327
BS211	0675423	6149375
BS212	0675444	6149399
BS213	0675478	6149427
BS214	0675510	6149473

Sample ID	Coordinates	
	Easting	Northing
BS215	0675532	6149443
BS216	0675473	6149354
BS217	0675485	6149339
BS218	0675502	6149302
BS219	0675437	6149273
BS220	0675461	6149224
BS221	0675472	6149167
BS222	0675459	6149173
BS223	0675421	6149194
MONITOR WELLS		
MW-35	0675540	6149446
MW-36	0675510	6149463
MW-37	0675478	6149465
MW-38	0675419	6149530
MW-39	0675307	6149583
MW-40	0675208	6149546
MW-41	0675288	6149524
MW-42	0675358	6149470
MW-43	0675376	6149392
MW-44	0675431	6149403
MW-45	0675502	6149392
MW-46	0675469	6149406
MW-47	0675506	6149439
MW-48	0675481	6149427
MW-49	0675500	6149413
MW-50	0675456	6149369
MW-51	0675438	6149336
MW-52	0675427	6149314
MW-58	0675369	6149273
SEDIMENT		
SED-65	0675271	6149575
SED-66	0675329	6149575
SED-67	0675467	6149517
SED-68	0675500	6149493
SURFACE WATER		
SW-13	-	-
SW-14	-	-
SW-15	-	-
SW-16	-	-
SW-17	-	-
SW-18	-	-

Notes:

"-" = Coordinates not recorded

Appendix 21c

Test Pit and Monitor Well Records

– Residential Subdivision



FIELD TEST PIT RECORD

JOB NUMBER: 10448526
 TEST PIT NO.: TP 239
 MACHINE TYPE: _____
 TEMPERATURE: _____

JOB NAME: _____
 TEST PIT SIZE: _____
 CONTRACTOR: _____
 WEATHER: _____

DATE: Aug 4, 09
 ELEVATION: _____
 DATUM: _____

DEPTH		SOIL DESCRIPTION	SAMPLES		IN SITU DENSITY TEST		REMARKS	
FROM	TO		NO.	DEPTH	NO.	DEPTH		
0	0.1	<i>blown to grey silty sand and gravel</i>	BS1	0.0 0.1				
LOCATION SKETCH			WATER CONDITIONS IN TEST PIT: <input type="checkbox"/> Test Pit Dry.					

JOB NO.: _____
 TEST PIT NO.: _____
 ENGINEER: _____



SHEET: _____ OF _____

FIELD TEST PIT RECORD

JOB NUMBER: 1044856
 TEST PIT NO.: TP246
 MACHINE TYPE: _____
 TEMPERATURE: _____

JOB NAME: _____
 TEST PIT SIZE: _____
 CONTRACTOR: _____
 WEATHER: _____

DATE: Aug 4, 09
 ELEVATION: _____
 DATUM: _____

DEPTH		SOIL DESCRIPTION	SAMPLES		IN SITU DENSITY TEST		REMARKS
FROM	TO		NO.	DEPTH	NO.	DEPTH	
0	0.2	bluish silt sand with gravel	B1	0.0 0.2			
LOCATION SKETCH			WATER CONDITIONS IN TEST PIT:				
			<input type="checkbox"/> Test Pit Dry.				

JOB NO.: _____
 TEST PIT NO.: _____
 ENGINEER: _____



SHEET: _____ OF _____

FIELD TEST PIT RECORD

JOB NUMBER: 1041856
 TEST PIT NO.: TP243
 MACHINE TYPE: _____
 TEMPERATURE: _____

JOB NAME: _____
 TEST PIT SIZE: _____
 CONTRACTOR: _____
 WEATHER: _____

DATE: Aug 4, 07
 ELEVATION: _____
 DATUM: _____

DEPTH		SOIL DESCRIPTION	SAMPLES		IN SITU DENSITY TEST		REMARKS
FROM	TO		NO.	DEPTH	NO.	DEPTH	
<u>0</u>	<u>0.1</u>	<u>brown fine silty sand and gravel</u>					
<u>0.1</u>	<u>0.4</u>	<u>dark brown organics</u>	<u>BSI</u>	<u>0.2-0.4</u>			
LOCATION SKETCH			WATER CONDITIONS IN TEST PIT:				
			<input checked="" type="checkbox"/> Test Pit Dry.				

JOB NO.: _____
 TEST PIT NO.: _____
 ENGINEER: _____



SHEET: _____ OF _____

FIELD TEST PIT RECORD

JOB NUMBER: 10248376
 TEST PIT NO.: TP2514
 MACHINE TYPE: _____
 TEMPERATURE: _____

JOB NAME: _____
 TEST PIT SIZE: _____
 CONTRACTOR: _____
 WEATHER: _____

DATE: Aug 21, 07
 ELEVATION: _____
 DATUM: _____

DEPTH		SOIL DESCRIPTION	SAMPLES		IN SITU DENSITY TEST		REMARKS
FROM	TO		NO.	DEPTH	NO.	DEPTH	
0	0.6	blown organic with sand and gravel	BS1	0.0			
				0.6			
0.6	3.2	gray clay	BS2	0.6			
				3.2			
LOCATION SKETCH			WATER CONDITIONS IN TEST PIT: <input checked="" type="checkbox"/> Test Pit Dry.				

JOB NO.: _____
 TEST PIT NO.: _____
 ENGINEER: _____



SHEET: _____ OF _____

FIELD TEST PIT RECORD

JOB NUMBER: 1044856
 TEST PIT NO.: TP 245
 MACHINE TYPE: _____
 TEMPERATURE: _____

JOB NAME: _____
 TEST PIT SIZE: _____
 CONTRACTOR: _____
 WEATHER: _____

DATE: Aug 4, 09
 ELEVATION: _____
 DATUM: _____

DEPTH		SOIL DESCRIPTION	SAMPLES		IN SITU DENSITY TEST		REMARKS
FROM	TO		NO.	DEPTH	NO.	DEPTH	
0	2.0	cobbles, boulders with some sand and gravel	B51	0.0			
				0.3			
				0.5			
				2.0			
LOCATION SKETCH			WATER CONDITIONS IN TEST PIT:				
			<input checked="" type="checkbox"/> Test Pit Dry.				

JOB NO.: _____
 TEST PIT NO.: _____
 ENGINEER: _____



SHEET: _____ OF _____

FIELD TEST PIT RECORD

JOB NUMBER: 104498320
TEST PIT NO.: TP246
MACHINE TYPE: _____
TEMPERATURE: _____

JOB NAME: _____
TEST PIT SIZE: _____
CONTRACTOR: _____
WEATHER: _____

DATE: Aug 4, 09
ELEVATION: _____
DATUM: _____

DEPTH		SOIL DESCRIPTION	SAMPLES		IN SITU DENSITY TEST		REMARKS	
FROM	TO		NO.	DEPTH	NO.	DEPTH		
0	1.5	gray cobbles and boulders	BS1	1.5			ref @ 6'	
LOCATION SKETCH			WATER CONDITIONS IN TEST PIT:					
			<input checked="checked" type="checkbox"/> Test Pit Dry.					

JOB NO.: _____
TEST PIT NO.: _____
ENGINEER: _____



SHEET: _____ OF _____

FIELD TEST PIT RECORD

JOB NUMBER: 10448520
 TEST PIT NO.: TP247
 MACHINE TYPE: _____
 TEMPERATURE: _____

JOB NAME: _____
 TEST PIT SIZE: _____
 CONTRACTOR: _____
 WEATHER: _____

DATE: Aug 4, 09
 ELEVATION: _____
 DATUM: _____

DEPTH		SOIL DESCRIPTION	SAMPLES		IN SITU DENSITY TEST		REMARKS	
FROM	TO		NO.	DEPTH	NO.	DEPTH		
0	0.5		brown to reddish brown fine silty sand and clay	BS1	0.0 - 0.5			
LOCATION SKETCH			WATER CONDITIONS IN TEST PIT:					
			<input checked="" type="checkbox"/> Test Pit Dry.					

JOB NO.: _____
 TEST PIT NO.: _____
 ENGINEER: _____



SHEET: _____ OF _____

FIELD TEST PIT RECORD

JOB NUMBER: 1044830 JOB NAME: _____
 TEST PIT NO.: TP248 TEST PIT SIZE: _____
 MACHINE TYPE: _____ CONTRACTOR: _____
 TEMPERATURE: _____ WEATHER: _____
 DATE: Aug 4, 09
 ELEVATION: _____
 DATUM: _____

DEPTH		SOIL DESCRIPTION	SAMPLES		IN SITU DENSITY TEST		REMARKS
FROM	TO		NO.	DEPTH	NO.	DEPTH	
0	1.3		blown to grey gravel and sand with some boulders	BS1	0.1-0.5		
			BS2	1.0-1.3			Debris: pole
LOCATION SKETCH			WATER CONDITIONS IN TEST PIT: <input checked="" type="checkbox"/> gw @ surface <input checked="" type="checkbox"/> sheen on water <input type="checkbox"/> Test Pit Dry.				

JOB NO.: _____
 TEST PIT NO.: _____
 ENGINEER: _____



FIELD TEST PIT RECORD

JOB NUMBER: 1044836
 TEST PIT NO.: TP249
 MACHINE TYPE: _____
 TEMPERATURE: _____

JOB NAME: _____
 TEST PIT SIZE: _____
 CONTRACTOR: _____
 WEATHER: _____

DATE: Aug 11 09
 ELEVATION: _____
 DATUM: _____

DEPTH		SOIL DESCRIPTION	SAMPLES		IN SITU DENSITY TEST		REMARKS	
FROM	TO		NO.	DEPTH	NO.	DEPTH		
<u>0</u>	<u>0.8</u>	<u>reddish brown organics and top soil</u>	<u>BS1</u>	<u>0.8</u>				
<u>0.8</u>	<u>2.8</u>	<u>grey clay</u>	<u>BS2</u>	<u>2.8</u>				
LOCATION SKETCH			WATER CONDITIONS IN TEST PIT:					

Test Pit Dry.

JOB NO.: _____
 TEST PIT NO.: _____
 ENGINEER: _____



MONITOR WELL RECORD

BOREHOLE No. MW35
 PAGE 1 of 1
 PROJECT No. 121410103
 DRILLING METHOD _____
 SIZE _____
 DATUM N/A

CLIENT Newfoundland and Labrador Department of Environment and Conservation
 PROJECT Phase II/III ESAs, HHERA and RAP/RMP
 LOCATION Former U.S. Military Site and Residential Subdivision, Hopedale, NL
 DATES (mm-dd-yy): BORING 9-11-09 WATER LEVEL 0.83m 10-15-09

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				HYDROCARBON ODOUR	APPARENT MOISTURE CONTENT	PID (ppm)	TPH (ppm)	WELL CONSTRUCTION DETAILS
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD %					
0							mm						FLUSH MOUNTED WELL HEAD ENCLOSURE
0		Brown, coarse, SAND (SP); some cobbles			SS	1	178	12	0	-	-	-	<p>BACKFILL BENTONITE</p> <p>50 mm DIAMETER No. 10 SLOT PVC SCREEN IN No. 2 SILICA SAND PACK</p> <p>END CAP</p>
1		Brown, coarse, SAND (SP); some clay			SS	2	305	8	0	-	-	-	
1.5					SS	3	559	10	0	-	<20	-	
2					SS	4	305	58/305	0	-	-	-	
3		Pink and light to dark grey, BEDROCK			RC	5	100%		0	-	-	-	
4					RC	6	100%		0	-	-	-	
5		End of Borehole											
6													
7													
8													
9													
10													

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MONITOR WELL RECORD

BOREHOLE No. MW36
 PAGE 1 of 1
 PROJECT No. 121410103
 DRILLING METHOD _____
 SIZE _____
 DATUM N/A

CLIENT Newfoundland and Labrador Department of Environment and Conservation
 PROJECT Phase II/III ESAs, HHERA and RAP/RMP
 LOCATION Former U.S. Military Site and Residential Subdivision, Hopedale, NL
 DATES (mm-dd-yy): BORING 9-13-09 WATER LEVEL 0.37m 10-15-09

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				HYDROCARBON ODOUR	APPARENT MOISTURE CONTENT	PID (ppm)	TPH (ppm)	WELL CONSTRUCTION DETAILS
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD %					
0							mm						FLUSH MOUNTED WELL HEAD ENCLOSURE
0		Light to dark brown, coarse, SAND (SP)		▼	SS	1	356	6	0		-	-	<p>BACKFILL BENTONITE</p> <p>50 mm DIAMETER No. 10 SLOT PVC SCREEN IN No. 2 SILICA SAND PACK</p> <p>END CAP</p>
1		Brown, coarse, SAND (SP); some clay			SS	2	432	4	0		-	-	
1.5		Light to dark brown, coarse, SAND (SP); some clay and cobbles			SS	3	356	15	0		-	43	
2		Brown, coarse, SAND (SP); some cobbles			SS	4	51	30/152	0		-	-	
2		Light to dark grey, BEDROCK			RC	5	100%		0		-	-	
3					RC	6	100%		0		-	-	
4					RC	7	100%		0		-	-	
4		End of Borehole											
5													
6													
7													
8													
9													
10													

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MONITOR WELL RECORD

BOREHOLE No. MW37
 PAGE 1 of 1
 PROJECT No. 121410103
 DRILLING METHOD _____
 SIZE _____
 DATUM N/A

CLIENT Newfoundland and Labrador Department of Environment and Conservation
 PROJECT Phase II/III ESAs, HHERA and RAP/RMP
 LOCATION Former U.S. Military Site and Residential Subdivision, Hopedale, NL
 DATES (mm-dd-yy): BORING 9-13-09 WATER LEVEL 1.4m 10-15-09

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				HYDROCARBON ODOUR	APPARENT MOISTURE CONTENT	PID (ppm)	TPH (ppm)	WELL CONSTRUCTION DETAILS
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD %					
0							mm						FLUSH MOUNTED WELL HEAD ENCLOSURE
0		Brown, coarse, SAND (SP); trace organics			SS	1	410	6	0	-	94		BACKFILL
1					SS	2	0	4	0	-	-		BENTONITE
2		Brown, coarse SAND (SP); some cobbles			SS	3	229	39/410	0	-	-		
2		Pink and grey, BEDROCK			RC	4	100%		1	-	-		50 mm DIAMETER No. 10 SLOT PVC SCREEN IN No. 2 SILICA SAND PACK
3													
4					RC	5	100%		1	-	-		END CAP
5		End of Borehole											
6													
7													
8													
9													
10													

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CLIENT Newfoundland and Labrador Department of Environment and Conservation
 PROJECT Phase II/III ESAs, HHERA and RAP/RMP
 LOCATION Former U.S. Military Site and Residential Subdivision, Hopedale, NL
 DATES (mm-dd-yy): BORING 9-13-09 WATER LEVEL 2.27m 10-15-09

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				HYDROCARBON ODOUR	APPARENT MOISTURE CONTENT	PID (ppm)	TPH (ppm)	WELL CONSTRUCTION DETAILS
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD %					
0							mm						0.15 m STICK UP CAST IRON WELL HEAD
0.5		Pink and light to dark grey, BEDROCK	[Brick pattern]		RC	1	85%		0	-	-		BACKFILL
1.5		Pink and grey, BEDROCK	[Brick pattern]		RC	2	100%		0	-	-		BENTONITE
2.5		Light and dark grey, BEDROCK	[Brick pattern]	▼	RC	3	100%		0	-	-		50 mm DIAMETER No. 10 SLOT PVC SCREEN IN No. 2 SILICA SAND PACK
3.5		Pink and light to dark grey, BEDROCK	[Brick pattern]		RC	4	100%		1	-	-		END CAP
5.0		End of Borehole											
6.0													
7.0													
8.0													
9.0													
10.0													

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CLIENT Newfoundland and Labrador Department of Environment and Conservation
 PROJECT Phase II/III ESAs, HHERA and RAP/RMP
 LOCATION Former U.S. Military Site and Residential Subdivision, Hopedale, NL
 DATES (mm-dd-yy): BORING 9-13-09 WATER LEVEL 1.69m 10-15-09

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				HYDROCARBON ODOUR	APPARENT MOISTURE CONTENT	PID (ppm)	TPH (ppm)	WELL CONSTRUCTION DETAILS
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD %					
0		Grey and brown, coarse, SAND (SP); some cobbles Light and dark grey, BEDROCK					mm						0.1 m STICK UP CAST IRON WELL HEAD BACKFILL BENTONITE 50 mm DIAMETER No. 10 SLOT PVC SCREEN IN No. 2 SILICA SAND PACK END CAP
					SS	1	152	15/152	0		-	390	
1					RC	2	84%		0		-		
2		Pink and light to dark grey, BEDROCK											
					RC	3	100%		0		-	-	
					RC	4	100%		0		-	-	
5		End of Borehole											
6													
7													
8													
9													
10													

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MONITOR WELL RECORD

BOREHOLE No. MW40
 PAGE 1 of 1
 PROJECT No. 121410103
 DRILLING METHOD _____
 SIZE _____
 DATUM N/A

CLIENT Newfoundland and Labrador Department of Environment and Conservation
 PROJECT Phase II/III ESAs, HHERA and RAP/RMP
 LOCATION Former U.S. Military Site and Residential Subdivision, Hopedale, NL
 DATES (mm-dd-yy): BORING 9-14-09 WATER LEVEL 3.16m 10-15-09

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				HYDROCARBON ODOUR	APPARENT MOISTURE CONTENT	PID (ppm)	TPH (ppm)	WELL CONSTRUCTION DETAILS
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD %					
0		Dark brown, Organic Soil (OL) Pink and grey, BEDROCK				mm							0.61 m STICK UP CAST IRON WELL HEAD
				SS	1	51	5/51	0		-	360		BACKFILL
1				RC	2	90%		0		-	-		BENTONITE
2				RC	3	100%		0		-	-		50 mm DIAMETER No. 10 SLOT PVC SCREEN IN No. 2 SILICA SAND PACK
3		Light to dark grey, BEDROCK		RC	4	100%		0		-	-		
4		End of Borehole		RC	5	100%		0		-	-		END CAP

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MONITOR WELL RECORD

BOREHOLE No. MW41
 PAGE 1 of 1
 PROJECT No. 121410103
 DRILLING METHOD _____
 SIZE _____
 DATUM N/A

CLIENT Newfoundland and Labrador Department of Environment and Conservation
 PROJECT Phase II/III ESAs, HHERA and RAP/RMP
 LOCATION Former U.S. Military Site and Residential Subdivision, Hopedale, NL
 DATES (mm-dd-yy): BORING 9-14-09 WATER LEVEL 3.48m 10-15-09

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				HYDROCARBON ODOUR	APPARENT MOISTURE CONTENT	PID (ppm)	TPH (ppm)	WELL CONSTRUCTION DETAILS
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD %					
0							mm						FLUSH MOUNTED WELL HEAD ENCLOSURE
0		Pink and light to dark grey, BEDROCK			RC	1	45%		0	-	-		BACKFILL
1													
2					RC	2	92%		0	-	-		BENTONITE
3													
4					RC	3	100%		0	-	-		
5		Light to dark grey, BEDROCK			RC	4	97%		0	-	-		50 mm DIAMETER No. 10 SLOT PVC SCREEN IN No. 2 SILICA SAND PACK
6													
7		Pink and light to dark grey, BEDROCK			RC	5	97%		0	-	-		END CAP
8		End of Borehole											
9													
10													

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MONITOR WELL RECORD

BOREHOLE No. MW42
 PAGE 1 of 1
 PROJECT No. 121410103
 DRILLING METHOD _____
 SIZE _____
 DATUM N/A

CLIENT Newfoundland and Labrador Department of Environment and Conservation
 PROJECT Phase II/III ESAs, HHERA and RAP/RMP
 LOCATION Former U.S. Military Site and Residential Subdivision, Hopedale, NL
 DATES (mm-dd-yy): BORING 9-15-09 WATER LEVEL 2.07m 10-15-09

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				HYDROCARBON ODOUR	APPARENT MOISTURE CONTENT	PID (ppm)	TPH (ppm)	WELL CONSTRUCTION DETAILS
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD %					
0		Blast Rock	[Cross-hatch pattern]				mm						FLUSH MOUNTED WELL HEAD ENCLOSURE
1		Pink and light to dark grey, BEDROCK	[Brick pattern]		RC	1	100%		0	-	-		BACKFILL
2		Pink and grey, BEDROCK	[Brick pattern]	▼	RC	2	100%		0	-	-		BENTONITE
3			[Brick pattern]										50 mm DIAMETER No. 10 SLOT PVC SCREEN IN No. 2 SILICA SAND PACK
4			[Brick pattern]		RC	3	100%		0	-	-		END CAP
5		End of Borehole											
6													
7													
8													
9													
10													

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MONITOR WELL RECORD

BOREHOLE No. MW43
 PAGE 1 of 1
 PROJECT No. 121410103
 DRILLING METHOD _____
 SIZE _____
 DATUM N/A

CLIENT Newfoundland and Labrador Department of Environment and Conservation
 PROJECT Phase II/III ESAs, HHERA and RAP/RMP
 LOCATION Former U.S. Military Site and Residential Subdivision, Hopedale, NL
 DATES (mm-dd-yy): BORING 9-15-09 WATER LEVEL 1.05m 10-15-09

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				HYDROCARBON ODOUR	APPARENT MOISTURE CONTENT	PID (ppm)	TPH (ppm)	WELL CONSTRUCTION DETAILS
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD %					
0							mm						0.08 m STICK UP CAST IRON WELL HEAD
0		Greenish yellow, pink and grey, BEDROCK	[Brick pattern]	▼	RC	1	83%		0	-	-		BACKFILL
1													BENTONITE
1		Pink and light to dark grey, BEDROCK	[Brick pattern]		RC	2	100%		0	-	-		50 mm DIAMETER No. 10 SLOT PVC SCREEN IN No. 2 SILICA SAND PACK
2													END CAP
3		Light and dark grey, BEDROCK	[Brick pattern]		RC	3	100%		0	-	-		BENTONITE
4		End of Borehole											
5													
6													
7													
8													
9													
10													

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MONITOR WELL RECORD

BOREHOLE No. MW44
 PAGE 1 of 1
 PROJECT No. 121410103
 DRILLING METHOD _____
 SIZE _____
 DATUM N/A

CLIENT Newfoundland and Labrador Department of Environment and Conservation
 PROJECT Phase II/III ESAs, HHERA and RAP/RMP
 LOCATION Former U.S. Military Site and Residential Subdivision, Hopedale, NL
 DATES (mm-dd-yy): BORING 9-15-09 WATER LEVEL 2.48m 10-15-09

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				HYDROCARBON ODOUR	APPARENT MOISTURE CONTENT	PID (ppm)	TPH (ppm)	WELL CONSTRUCTION DETAILS
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD %					
0							mm						FLUSH MOUNTED WELL HEAD ENCLOSURE
0		Brown, coarse, SAND (SP); some cobbles, trace organics			SS	1	127	5	0	-	-	-	BACKFILL
1		Brown, coarse, SAND (SP); some cobbles			SS	2	76	15/305	0	-	66	-	BENTONITE
1		Pink and light to dark grey, BEDROCK			RC	3	100%		0	-	-	-	
2					RC	4	100%		0	-	-	-	50 mm DIAMETER No. 10 SLOT PVC SCREEN IN No. 2 SILICA SAND PACK
3					RC	5	94%		0	-	-	-	
4					RC	6	94%		0	-	-	-	
5					RC	6	94%		0	-	-	-	
6		End of Borehole											END CAP
7													
8													
9													
10													

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CLIENT Newfoundland and Labrador Department of Environment and Conservation
 PROJECT Phase II/III ESAs, HHERA and RAP/RMP
 LOCATION Former U.S. Military Site and Residential Subdivision, Hopedale, NL
 DATES (mm-dd-yy): BORING 9-16-09 WATER LEVEL 0.46m 10-15-09

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				HYDROCARBON ODOUR	APPARENT MOISTURE CONTENT	PID (ppm)	TPH (ppm)	WELL CONSTRUCTION DETAILS
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD %					
0				▼			mm						FLUSH MOUNTED WELL HEAD ENCLOSURE
		Brown, coarse, SAND (SP); some organics			SS	1	51	7	0		-	-	
1		Brown, coarse, SAND (SP); some clay and organics			SS	2	432	8	0		-	-	
		Brown, coarse, SAND (SP); some clay and cobbles			SS	3	279	19/305	0		-	<20	
2		White and light to dark grey, BEDROCK			RC	4	100%		0		-	-	
3													
		Light and dark grey, BEDROCK			RC	5	100%		0		-	-	
4		End of Borehole											
5													
6													
7													
8													
9													
10													

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MONITOR WELL RECORD

BOREHOLE No. MW46
 PAGE 1 of 1
 PROJECT No. 121410103
 DRILLING METHOD _____
 SIZE _____
 DATUM N/A

CLIENT Newfoundland and Labrador Department of Environment and Conservation
 PROJECT Phase II/III ESAs, HHERA and RAP/RMP
 LOCATION Former U.S. Military Site and Residential Subdivision, Hopedale, NL
 DATES (mm-dd-yy): BORING 9-16-09 WATER LEVEL 1.73m 10-15-09

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				HYDROCARBON ODOUR	APPARENT MOISTURE CONTENT	PID (ppm)	TPH (ppm)	WELL CONSTRUCTION DETAILS
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD %					
0		Brown, coarse, SAND (SP); some cobbles and organics				mm							FLUSH MOUNTED WELL HEAD ENCLOSURE
0					SS	1	127	10	0		-	500	BENTONITE
1													
2													50 mm DIAMETER No. 10 SLOT PVC SCREEN IN No. 2 SILICA SAND PACK
3													
4													
5													END CAP
5		End of Borehole											
6													
7													
8													
9													
10													

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CLIENT Newfoundland and Labrador Department of Environment and Conservation
 PROJECT Phase II/III ESAs, HHERA and RAP/RMP
 LOCATION Former U.S. Military Site and Residential Subdivision, Hopedale, NL
 DATES (mm-dd-yy): BORING 9-16-09 WATER LEVEL 0.68m 10-15-09

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				HYDROCARBON ODOUR	APPARENT MOISTURE CONTENT	PID (ppm)	TPH (ppm)	WELL CONSTRUCTION DETAILS
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD %					
0							mm						FLUSH MOUNTED WELL HEAD ENCLOSURE
		Brown, coarse, SAND (SP); some organics	[Strata Plot: Sand]	▼	SS	1	432	2	0		-	-	[Well Construction: Backfill Bentonite]
1		Brown, coarse, SAND (SP); some clay and organics	[Strata Plot: Sand]		SS	2	406	8	0		-	-	
		CLAY (CL)	[Strata Plot: Clay]		SS	3	330	10	0		-	-	
2					SS	4	305	12	0		-	<20	[Well Construction: 50 mm DIAMETER No. 10 SLOT PVC SCREEN IN No. 2 SILICA SAND PACK]
3													
4		End of Borehole											[Well Construction: END CAP]
5													
6													
7													
8													
9													
10													

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MONITOR WELL RECORD

BOREHOLE No. MW48
 PAGE 1 of 1
 PROJECT No. 121410103
 DRILLING METHOD _____
 SIZE _____
 DATUM N/A

CLIENT Newfoundland and Labrador Department of Environment and Conservation
 PROJECT Phase II/III ESAs, HHERA and RAP/RMP
 LOCATION Former U.S. Military Site and Residential Subdivision, Hopedale, NL
 DATES (mm-dd-yy): BORING 9-16-09 WATER LEVEL 1.86m 10-15-09

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				HYDROCARBON ODOUR	APPARENT MOISTURE CONTENT	PID (ppm)	TPH (ppm)	WELL CONSTRUCTION DETAILS
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD %					
0							mm						FLUSH MOUNTED WELL HEAD ENCLOSURE
0		Brown, coarse, SAND (SP); some cobbles			SS	1	330	8	0		-	-	BENTONITE
1					SS	2	229	6	0		-	-	
1		Brown, coarse, SAND (SP); some cobbles and organics			SS	3	256	10	2		-	4 000	
2		Brown, coarse, SAND (SP); some clay											50 mm DIAMETER No. 10 SLOT PVC SCREEN IN No. 2 SILICA SAND PACK
2					SS	4	203	6	0		-	-	END CAP
4		End of Borehole											
5													
6													
7													
8													
9													
10													

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MONITOR WELL RECORD

BOREHOLE No. MW49
 PAGE 1 of 1
 PROJECT No. 121410103
 DRILLING METHOD _____
 SIZE _____
 DATUM N/A

CLIENT Newfoundland and Labrador Department of Environment and Conservation
 PROJECT Phase II/III ESAs, HHERA and RAP/RMP
 LOCATION Former U.S. Military Site and Residential Subdivision, Hopedale, NL
 DATES (mm-dd-yy): BORING 9-17-09 WATER LEVEL 1.06m 10-15-09

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				HYDROCARBON ODOUR	APPARENT MOISTURE CONTENT	PID (ppm)	TPH (ppm)	WELL CONSTRUCTION DETAILS
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD %					
0							mm						FLUSH MOUNTED WELL HEAD ENCLOSURE
0		Brown, coarse, SAND (SP)			SS	1	330	3	0	-	-	-	 BACKFILL BENTONITE 50 mm DIAMETER No. 10 SLOT PVC SCREEN IN No. 2 SILICA SAND PACK END CAP
1		Brown, coarse, SAND (SP); some clay			SS	2	508	4	0	-	75	-	
1		Brown, coarse, SAND (SP)			SS	3	102	50/102	0	-	-	-	
4		End of Borehole											
5													
6													
7													
8													
9													
10													


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MONITOR WELL RECORD

BOREHOLE No. MW50
 PAGE 1 of 1
 PROJECT No. 121410103
 DRILLING METHOD _____
 SIZE _____
 DATUM N/A

CLIENT Newfoundland and Labrador Department of Environment and Conservation
 PROJECT Phase II/III ESAs, HHERA and RAP/RMP
 LOCATION Former U.S. Military Site and Residential Subdivision, Hopedale, NL
 DATES (mm-dd-yy): BORING 9-17-09 WATER LEVEL 1.12m 10-15-09

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				HYDROCARBON ODOUR	APPARENT MOISTURE CONTENT	PID (ppm)	TPH (ppm)	WELL CONSTRUCTION DETAILS
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD %					
0		Brown, coarse, SAND (SP); some cobbles		1.12m			mm		0		-	69	FLUSH MOUNTED WELL HEAD ENCLOSURE BACKFILL BENTONITE 50 mm DIAMETER No. 10 SLOT PVC SCREEN IN No. 2 SILICA SAND PACK END CAP
					SS	1	127	74/450					
4					SS	2	0						
5		End of Borehole											

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MONITOR WELL RECORD

BOREHOLE No. MW51
 PAGE 1 of 1
 PROJECT No. 121410103
 DRILLING METHOD _____
 SIZE _____
 DATUM N/A

CLIENT Newfoundland and Labrador Department of Environment and Conservation
 PROJECT Phase II/III ESAs, HHERA and RAP/RMP
 LOCATION Former U.S. Military Site and Residential Subdivision, Hopedale, NL
 DATES (mm-dd-yy): BORING 9-17-09 WATER LEVEL 0.15m 10-15-09

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				HYDROCARBON ODOUR	APPARENT MOISTURE CONTENT	PID (ppm)	TPH (ppm)	WELL CONSTRUCTION DETAILS
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD %					
0							mm						FLUSH MOUNTED WELL HEAD ENCLOSURE
0		Brown, coarse, SAND (SP); some cobbles		▼	SS	1	76	16	0	-	-	-	BACKFILL
1		Brown, coarse, SAND (SP); some clay and cobbles			SS	2	406	9	0	-	-	-	BENTONITE
2					SS	3	0	8	0	-	-	-	
2					SS	4	203	11	0	-	-	-	50 mm DIAMETER No. 10 SLOT PVC SCREEN IN No. 2 SILICA SAND PACK
3		Grey, SAND (SP); some cobbles			SS	5	279	18	0	-	<20	-	
4		Light and dark grey, BEDROCK			RC	6	61%		0	-	-	-	
4					RC	7	100%		0	-	-	-	END CAP
5		End of Borehole											
6													
7													
8													
9													
10													

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CLIENT Newfoundland and Labrador Department of Environment and Conservation
 PROJECT Phase II/III ESAs, HHERA and RAP/RMP
 LOCATION Former U.S. Military Site and Residential Subdivision, Hopedale, NL
 DATES (mm-dd-yy): BORING 9-17-09 WATER LEVEL 0.21m 10-15-09

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				HYDROCARBON ODOUR	APPARENT MOISTURE CONTENT	PID (ppm)	TPH (ppm)	WELL CONSTRUCTION DETAILS
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD %					
0				▼			mm						0.61 m STICK UP CAST IRON WELL HEAD
0		Brown, coarse, SAND (SP); some cobbles			SS	1	152	7	0		-	-	<p style="font-size: small;"> BENTONITE 50 mm DIAMETER No. 10 SLOT PVC SCREEN IN No. 2 SILICA SAND PACK END CAP </p>
1		Brown, coarse, SAND (SP); some clay and cobbles			SS	2	254	5	0		-	-	
1.5		Grey, SAND (SP); some cobbles			SS	3	406	10	0		-	170	
2		Light and dark grey, BEDROCK			SS	4	152	50/152	0		-	-	
2.5					RC	5	100%		0		-	-	
4					RC	6	100%		0		-	-	
5		End of Borehole											
6													
7													
8													
9													
10													



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MONITOR WELL RECORD

BOREHOLE No. MW58
 PAGE 1 of 1
 PROJECT No. 121410103
 DRILLING METHOD _____
 SIZE _____
 DATUM N/A

CLIENT Newfoundland and Labrador Department of Environment and Conservation
 PROJECT Phase II/III ESAs, HHERA and RAP/RMP
 LOCATION Former U.S. Military Site and Residential Subdivision, Hopedale, NL
 DATES (mm-dd-yy): BORING 9-26-09 WATER LEVEL 1.52m 10-15-09

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				HYDROCARBON ODOUR	APPARENT MOISTURE CONTENT	PID (ppm)	TPH (ppm)	WELL CONSTRUCTION DETAILS
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD %					
0		Black and dark grey, BEDROCK				mm							0.61 m STICK UP CAST IRON WELL HEAD
1				RC	1	74%		0	-	-	BACKFILL		
2				RC	2	100%		0	-	-	BENTONITE		
3		Light grey and black, BEDROCK											50 mm DIAMETER No. 10 SLOT PVC SCREEN IN No. 2 SILICA SAND PACK
4				RC	3	100%		0	-	-	END CAP		
5		End of Borehole											
6													
7													
8													
9													
10													

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Appendix 21d

Soil Vapour Concentrations

– Residential Subdivision

Sample Tipping Results -Residential Subdivision
Phase II/III ESA, HHERA and RAP/RMP
Former US Military Site and Residential Subdivision, Hopedale, NL
Project No. 121410103

Sample ID	Sample Depth (mbgs)	Hydrocarbon Odour	Soil Vapour Concentration (ppm)
TEST PITS			
TP234-BS1	0.2-0.6	No	3.5
TP234-BS2	0.9-1.2	No	3.2
TP235-BS1	0.0-0.1	No	2.7
TP236-BS1	0.0-0.2	No	1.5
TP237-BS1	0.0-0.1	No	1.4
TP238-BS1	0.0-0.3	No	1.4
TP238-BS2	0.5-0.8	No	4.1
TP239-BS1	0.0-0.1	No	1.1
TP240-BS1	0.0-0.2	No	1.1
TP241-BS1	0.0-0.2	No	1.0
TP242-BS1	0.0-0.3	No	1.4
TP243-BS1	0.2-0.4	No	1.3
TP244-BS1	0.0-0.6	No	1.4
TP244-BS2	0.6-3.2	No	1.5
TP245-BS1	0.0-0.3	No	0.8
TP245-BS2	0.5-2.0	No	0.8
TP246-BS1	1.2-1.8	No	0.9
TP247-BS1	0.0-0.5	No	4.5
TP248-BS1	0.1-0.5	No	2.0
TP248-BS2	1.0-1.3	No	1.8
TP249-BS1	0.5-0.8	No	2.4
TP249-BS2	2.6-2.8	No	5.5
SURFACE SOIL			
BS188	0.00-0.20	No	-
BS189	0.00-0.05	No	-
BS190	0.00-0.20	No	-
BS191	0.00-0.15	No	-
BS192	0.00-0.12	No	-
BS193	0.00-0.15	No	-
BS194	0.00-0.12	No	1.2
BS195	0.00-0.15	No	1.1
BS196	0.00-0.15	No	1.1
BS197	0.00-0.12	No	1.1
BS198	0.00-0.15	No	1.3
BS199	0.00-0.08	No	1.3
BS200	0.00-0.12	No	1.2
BS201	0.00-0.18	No	1.3
BS202	0.00-0.10	No	1.2
BS203	0.00-0.25	No	1.5
BS204	0.00-0.13	No	1.3
BS205	0.00-0.18	No	1.3
BS206	0.00-0.10	No	0.6
BS207	0.00-0.10	No	0.5
BS208	0.00-0.19	No	0.6
BS209	0.00-0.10	No	0.5
BS210	0.00-0.18	No	0.6
BS211	0.00-0.22	No	0.9
BS212	0.00-0.25	No	0.7
BS213	0.00-0.20	No	0.6
BS214	0.00-0.25	No	0.7

Sample Tipping Results -Residential Subdivision
Phase II/III ESA, HHERA and RAP/RMP
Former US Military Site and Residential Subdivision, Hopedale, NL
Project No. 121410103

Sample ID	Sample Depth (mbgs)	Hydrocarbon Odour	Soil Vapour Concentration (ppm)
BS215	0.00-0.15	No	0.7
BS216	0.00-0.20	No	0.8
BS217	0.00-0.25	No	0.8
BS218	0.00-0.15	No	1.0
BS219	0.00-0.13	No	0.9
BS220	0.00-0.19	No	1.1
BS221	0.00-0.13	No	0.9
BS222	0.00-0.28	No	1.0
BS223	0.00-0.20	No	1.9
SEDIMENT			
SED-65	-	-	-
SED-66	-	-	-
SED-67	-	-	-
SED-68	-	-	-

Notes:

"-" = Value not recorded

Appendix 21e

Laboratory Analytical Results Summary Tables

– Residential Subdivision

Table 21.1 Results of Laboratory Analysis of TPH/BTEX in Soil - Residential Subdivision
Phase II/III ESA, HHERA and RAP/RMP
Former US Military Site and Residential Subdivision, Hopedale, NL
Project No. 121410103

Sample ID	Sample Depth (m)	Benzene	Toluene	Ethylbenzene	Xylenes	C ₆ -C ₁₀ (Gas Range)	C ₁₀ -C ₂₁ (Fuel Range)	C ₂₁ -C ₃₂ (Lube Range)	Modified TPH - Tier I ²	Resemblance
	RDL	0.1/ 0.03	0.1/ 0.03	0.1/ 0.03	0.3/ 0.05	10/ 3	15	15	20	-
	Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	-
	Criteria ¹	0.16	14	58	17	-	-	-	140	-
TEST PITS										
TP235-BS1	0.0 - 0.1	<0.03	<0.03	<0.03	<0.05	<3	520	260	780	WFO; PLO
TP236-BS1	0.0 - 0.2	<0.1	<0.1	<0.1	<0.3	<10	320	720	1,000	-
TP238-BS2	0.5 - 0.8	<0.03	<0.03	<0.03	<0.05	<3	79	370	450	OPF/L; LO
TP239-BS1	0.0 - 0.1	<0.03	<0.03	<0.03	<0.05	<3	<15	27	27	-
TP241-BS1	0.0 - 0.2	<0.03	<0.03	<0.03	<0.05	<3	73	160	240	OPF/L; PLO
TP243-BS1	0.2 - 0.4	<0.03	<0.03	<0.03	<0.05	<3	260	180	440	WFO; LO
TP244-BS1	0.0 - 0.6	<0.03	<0.03	<0.03	<0.05	<3	52	110	160	OPF/L; UCF/L
TP245-BS2	0.5 - 2.0	<0.03	<0.03	<0.03	<0.05	<3	22	46	68	OPF/L
TP247-BS1	0.0 - 0.5	<0.03	<0.03	<0.03	<0.05	<3	780	410	1,200	WFO; LO
TP248-BS1	0.1 - 0.5	<0.03	<0.03	<0.03	<0.05	<3	4,700	720	5,400	FO; LO
TP249-BS2	2.6 - 2.8	<0.03	<0.03	<0.03	<0.05	<3	960	350	1,300	WFO; PLO
SURFACE SAMPLES										
BS194	0.00 - 0.12	<0.03	<0.03	<0.03	<0.05	<3	63	54	120	WFO; PLO
BS197	0.00 - 0.12	<0.03	<0.03	<0.03	<0.05	<3	<15	<15	<20	-
BS198	0.00 - 0.15	<0.03	<0.03	<0.03	<0.05	<3	58	32	90	WFO; PLO
BS201	0.00 - 0.18	<0.03	<0.03	<0.03	<0.05	<3	26	98	120	PLO; UCLO
BS203	0.00 - 0.25	<0.03	<0.03	<0.03	<0.05	<3	170	460	630	OPF/L; LO
BS211	0.00 - 0.22	<0.1	<0.1	<0.1	<0.3	<10	200	1,100	1,300	OPF/L; UCLO
BS215	0.00 - 0.15	<0.03	<0.03	<0.03	<0.05	<3	20	42	62	-
BS218	0.00 - 0.15	<0.1	<0.1	<0.1	<0.3	<10	250	1,000	1,300	OPF/L; PLO; UCLO
BS222	0.00 - 0.28	<0.03	<0.03	<0.03	<0.05	<3	34	66	100	-
BS222 -Lab-Dup	0.00 - 0.28	<0.03	<0.03	<0.03	<0.05	<3	-	-	-	-
BS223	0.00 - 0.20	<0.03	<0.03	<0.03	<0.05	<3	77	36	110	-
BS223 -Lab-Dup	0.00 - 0.14	-	-	-	-	-	67	28	-	-
MONITOR WELLS										
MW35-SS3	1.22 - 1.83	<0.03	<0.03	<0.03	<0.05	<3	<15	<15	<20	-
MW36-SS3	1.22 - 1.83	<0.03	<0.03	<0.03	<0.05	<3	<15	43	43	PLO
MW37-SS1	0.00 - 0.61	<0.03	<0.03	<0.03	<0.05	<3	21	74	94	NRF; LO
MW39-SS1	0.00 - 0.15	<0.03	<0.03	<0.03	<0.05	<3	40	350	390	OPF/L; LO
MW40-SS1	0.00 - 0.05	<0.03	0.15	0.10	0.65	<3	46	320	360	NRF; PLO
MW44-SS2	0.61 - 0.91	<0.03	<0.03	<0.03	<0.05	<3	24	42	66	WFO; LO
MW45-SS3	1.22 - 1.52	<0.03	<0.03	<0.03	<0.05	<3	<15	<15	<20	-
MW45- Lab-Dup	1.22 - 1.52	-	-	-	-	-	<15	<15	-	-
MW46-SS1	0.00 - 0.61	<0.03	<0.03	<0.03	<0.05	<3	60	440	500	LO
MW47-SS4	1.83 - 2.44	<0.03	<0.03	<0.03	<0.05	<3	<15	<15	<20	-
MW48-SS3	1.22 - 1.83	<0.03	<0.03	<0.03	<0.05	21	3,300	650	4,000	FO; LO
MW49-SS2	0.61 - 1.22	<0.03	<0.03	<0.03	<0.05	<3	44	30	75	WFO; LO

Table 21.1 Results of Laboratory Analysis of TPH/BTEX in Soil - Residential Subdivision
Phase II/III ESA, HHERA and RAP/RMP
Former US Military Site and Residential Subdivision, Hopedale, NL
Project No. 121410103

Sample ID	Sample Depth (m)	Benzene	Toluene	Ethylbenzene	Xylenes	C ₆ -C ₁₀ (Gas Range)	C ₁₀ -C ₂₁ (Fuel Range)	C ₂₁ -C ₃₂ (Lube Range)	Modified TPH - Tier I ²	Resemblance
	RDL	0.1/ 0.03	0.1/ 0.03	0.1/ 0.03	0.3/ 0.05	10/ 3	15	15	20	-
	Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	-
	Criteria ¹	0.16	14	58	17	-	-	-	140	-
MW50-SS1	0.00 - 0.46	<0.03	<0.03	<0.03	<0.05	<3	40	30	69	FO, LO
MW51-SS5	2.44 - 3.05	<0.03	<0.03	<0.03	<0.05	<3	<15	<15	<20	-
MW52-SS3	1.22 - 1.98	<0.03	<0.03	<0.03	<0.05	<3	110	58	170	WFO, PLO

Notes:

1 = Partnership in RBCA (Risk-Based Corrective Action) Implementation (PIRI) Tier I Risk Based Screening Levels (RBSLs) for a residential site with non-potable groundwater and coarse grained soil, fuel oil impacts (September, 2003)

2 = Modified TPH - Tier I does not include BTEX

RDL = Reportable Detection Limit for routine analysis

Lab-Dup = Laboratory duplicate sample

< # = Not detected above RDL noted

PLO = Possible lube oil; NRF = No resemblance to petroleum products in the fuel oil range; LO = Lube oil; OPF/L = One product in the fuel/lube range; WFO = Weathered fuel oil

Shaded = Value exceeds generic criteria for a residential site with non-potable groundwater, coarse grained soil and fuel oil impacts.

**Table 21.2 Results of Laboratory Analysis of PCBs in Soil - Residential Subdivision
Phase II/III ESA, HHERA and RAP/RMP
Former US Military Site and Residential Subdivision, Hopedale, NL
Project No. 121410103**

Sample ID	Sample Depth (m)	Polychlorinated Biphenyls (PCBs)
	RDL	0.05
	Units	ug/g
	Criteria ¹	1.3
TEST PITS		
TP236-BS1	0.0 - 0.2	0.54
TP238-BS2	0.5 - 0.8	2.6
TP239-BS1	0.0 - 0.1	<0.05
TP247-BS1	0.0 - 0.5	0.34
TP248-BS1	0.1 - 0.5	2.6
TP249-BS2	2.6 - 2.8	1.7
SURFACE SAMPLES		
BS197	0.00 - 0.12	<0.05
MONITOR WELLS		
MW35-SS3	1.22 - 1.83	<0.05
MW37-SS1	0.00 - 0.61	<0.05
MW40-SS1	0.00 - 0.05	<0.05
MW44-SS1	0.00 - 0.61	<0.05
MW46-SS1	0.00 - 0.61	<0.05
MW47-SS4	1.83 - 2.44	<0.05
MW48-SS3	1.22 - 1.83	<0.05
MW50-SS1	0.00 - 0.46	<0.05

Notes:

1 = CCME Canadian Soil Quality Guidelines for a Residential/Parkland Site (2007)

RDL = Reportable Detection Limit for routine analysis

< # = Not detected above RDL noted

Shaded = Value exceeds applicable criteria

Table 21.3 Results of Laboratory Analysis of PAHs in Soil - Residential Subdivision
Phase II/III ESA, HHERA and RAP/RMP
Former US Military Site and Residential Subdivision, Hopedale, NL
Project No. 121410103

Parameters	RDL	Units	Criteria ^{1,3}	Criteria ^{2,3}	MONITOR WELLS	
					MW37-SS1	MW47-SS4
Non-carcinogenic PAHs						
1-Methylnaphthalene	0.05	mg/kg	-	-	<0.05	<0.05
2-Methylnaphthalene	0.05	mg/kg	-	-	<0.05	<0.05
Acenaphthene	0.05	mg/kg	-	-	<0.05	<0.05
Acenaphthylene	0.05	mg/kg	-	-	<0.05	<0.05
Anthracene	0.05	mg/kg	2.5	-	<0.05	<0.05
Fluoranthene	0.05	mg/kg	50	-	<0.05	<0.05
Fluorene	0.05	mg/kg	-	-	<0.05	<0.05
Naphthalene	0.05	mg/kg	-	-	<0.05	<0.05
Perylene	0.05	mg/kg	-	-	<0.05	0.07
Phenanthrene	0.05	mg/kg	-	-	<0.05	<0.05
Pyrene	0.05	mg/kg	-	-	<0.05	<0.05
Carcinogenic PAHs						
Benzo(a)anthracene	0.05	mg/kg	-	-	<0.05	<0.05
Benzo(a)pyrene	0.05	mg/kg	20	-	<0.05	<0.05
Benzo(b)fluoranthene	0.05	mg/kg	-	-	<0.05	<0.05
Benzo(k)fluoranthene	0.05	mg/kg	-	-	<0.05	<0.05
Benzo(g,h,i)perylene	0.05	mg/kg	-	-	<0.05	<0.05
Chrysene	0.05	mg/kg	-	-	<0.05	<0.05
Dibenz(a,h,)anthracene	0.05	mg/kg	-	-	<0.05	<0.05
Indeno(1,2,3-c,d) pyrene	0.05	mg/kg	-	-	<0.05	<0.05
Benzo (a)pyrene TPE ⁴			-	5.3	0.061	0.061

Notes:

1 = CCME Canadian Soil Quality Guidelines for the Protection of Environmental Health at a Residential/Parkland Site (2008)

2 = CCME Canadian Soil Quality Guidelines for Protection of Human Health for a Residential Site (Direct Soil Contact) (2008)

3 = As per CCME recommendations, soil samples are compared against the SQG for the protection of human health and environmental health separately

4 = Carcinogenic PAHs Assessed as Benzo(a)pyrene Total Potency Equivalent (TPE)

5 - Elevated RDL(s) due to sample dilution

RDL = Reportable Detection Limit for routine analysis

< # = Not detected above RDL noted

"-" = indicates value is not available or does not apply

Shaded = Value exceeds applicable criteria

**Table 21.4 Results of Laboratory Analysis of VOCs in Soil - Residential Subdivision
Phase II/III ESA, HHERA and RAP/RMP
Former US Military Site and Residential Subdivision, Hopedale, NL
Project No. 121410103**

Parameters	RDL	Units	Criteria ¹	Criteria ²	MONITOR WELLS
					MW49-SS2
1,1,1-Trichloroethane	30	µg/kg	-	-	<30
1,1,2,2-Tetrachloroethane	30	µg/kg	-	-	<30
1,1,2-Trichloroethane	30	µg/kg	-	-	<30
1,1-Dichloroethane	30	µg/kg	-	-	<30
1,1-Dichloroethylene	30	µg/kg	-	-	<30
1,2-Dichlorobenzene	30	µg/kg	-	1,000	<30
1,2-Dichloroethane	30	µg/kg	-	-	<30
1,2-Dichloropropane	30	µg/kg	-	-	<30
1,3-Dichlorobenzene	30	µg/kg	-	1,000	<30
1,4-Dichlorobenzene	30	µg/kg	-	1,000	<30
Benzene	30	µg/kg	30/11	-	<30
Bromodichloromethane	30	µg/kg	-	-	<30
Bromoform	30	µg/kg	-	-	<30
Bromomethane	200	µg/kg	-	-	<200
Carbon Tetrachloride	30	µg/kg	-	-	<30
Chlorobenzene	30	µg/kg	-	2,000	<30
Chloroform	30	µg/kg	-	-	<30
Chloromethane	30	µg/kg	-	-	<30
cis-1,2-Dichloroethylene	30	µg/kg	-	-	<30
cis-1,3-Dichloropropene	30	µg/kg	-	-	<30
Dibromochloromethane	30	µg/kg	-	-	<30
Ethylbenzene	30	µg/kg	82	-	<30
Ethylene Dibromide	30	µg/kg	-	-	<30
Methylene Chloride(Dichloromethane)	30	µg/kg	-	-	<30
o-Xylene	30	µg/kg	-	-	<30
p+m-Xylene	30	µg/kg	-	-	<30
Styrene	30	µg/kg	-	-	<30
Tetrachloroethylene	30	µg/kg	200	-	<30
Toluene	30	µg/kg	370	-	<30
trans-1,2-Dichloroethylene	30	µg/kg	-	-	<30
trans-1,3-Dichloropropene	30	µg/kg	-	-	<30
Trichloroethylene	30	µg/kg	-	-	<30
Trichlorofluoromethane (FREON 11)	30	µg/kg	10	-	<30
Vinyl Chloride	30	µg/kg	-	-	<30

Notes:

1 = CCME Canadian Soil Quality Guidelines for a Residential/Parkland site, subsoil (2007)

2 = CCME Interim remediation criteria for soil that have not been replaced by Canadian Soil Quality Guidelines (1991)

RDL = Reportable Detection Limit for routine analysis

< # = Not detected above RDL noted

Shaded = Value exceeds applicable criteria

Table 21.5 Results of Laboratory Analysis of Available Metals in Soil - Residential Subdivision
Phase II/III ESAs, HHERA and RAP/RMP
Project No. 121410103
Stantec Consulting Ltd. Project No. 121410103

Parameters	RDL	Units	Criteria ¹	TEST PITS							
				TP235-BS1	TP237-BS1	TP238-BS2	TP239-BS1	TP240-BS1	TP243-BS1	TP245-BS1	TP245-BS2
Aluminum	10	mg/kg	-	4,300	7,100	4,500	6,600	4,700	8,100	7,500	7,800
Antimony	2	mg/kg	20	<2	<2	<2	<2	<2	<2	<2	<2
Arsenic	2	mg/kg	12	<2	<2	<2	<2	<2	<2	<2	<2
Barium	5	mg/kg	500	13	42	23	13	13	21	42	42
Beryllium	2	mg/kg	4	<2	<2	<2	<2	<2	<2	<2	<2
Bismuth	2	mg/kg	-	<2	<2	<2	<2	<2	<2	<2	<2
Boron	5	mg/kg	-	<5	<5	<5	<5	<5	<5	<5	<5
Cadmium	0.3	mg/kg	10	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Chromium	2	mg/kg	64	16	13	39	16	13	15	12	11
Cobalt	1	mg/kg	50	3	5	4	5	5	4	5	5
Copper	2	mg/kg	63	18	17	13	15	12	8	16	19
Iron	50	mg/kg	-	5,800	10,000	7,700	9,100	7,000	8,300	11,000	10,000
Lead	0.5	mg/kg	140	15	4.9	12	2.4	2.4	5.3	7.2	8.0
Lithium	2	mg/kg	-	5	10	5	6	5	6	14	13
Manganese	2	mg/kg	-	76	200	96	110	110	98	160	150
Mercury	0.1/ 0.2 ²	mg/kg	6.6	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Molybdenum	2	mg/kg	10	<2	<2	<2	<2	<2	<2	<2	<2
Nickel	2	mg/kg	50	8	10	40	13	12	10	9	10
Rubidium	2	mg/kg	-	3	17	8	3	3	6	21	21
Selenium	2	mg/kg	1	<2	<2	<2	<2	<2	<2	<2	<2
Silver	0.5	mg/kg	20	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Strontium	5	mg/kg	-	6	11	8	9	8	16	8	9
Thallium	0.1	mg/kg	1	0.1	0.2	0.1	<0.1	<0.1	<0.1	0.2	0.2
Tin	2	mg/kg	50	3	<2	<2	<2	<2	<2	<2	<2
Uranium	0.1	mg/kg	23	0.4	0.6	0.7	0.3	0.3	0.4	0.8	0.9
Vanadium	2	mg/kg	130	11	19	16	19	14	16	21	21
Zinc	5	mg/kg	200	63	42	45	19	23	22	32	34

Notes:

1 = CCME Canadian Soil Quality Guidelines for a Residential/Parkland Site (2007)

2 - Elevated reporting limit due to matrix interferences.

RDL = Reportable Detection Limit for routine analysis

Lab-Dup = Laboratory duplicate sample

< # = Not detected above RDL noted

"-" = indicates value is not available or does not apply

Shaded = Value exceeds applicable criteria

Table 21.5 Results of Laboratory Analysis of Available Metals in Soil - Residential Subdivision
Phase II/III ESAs, HHERA and RAP/RMP
Project No. 121410103
Stantec Consulting Ltd. Project No. 121410103

Parameters	RDL	Units	Criteria ¹	TEST PITS					SURFACE SOIL		
				TP245-BS2-Lab-Dup	TP246-BS1	TP247-BS1	TP248-BS1	TP249-BS2	BS195	BS204	BS207
Aluminum	10	mg/kg	-	8,000	5,200	12,000	12,000	12,000	3,500	3,200	5,100
Antimony	2	mg/kg	20	<2	<2	<2	<2	<2	<2	<2	<2
Arsenic	2	mg/kg	12	<2	<2	<2	<2	<2	<2	<2	<2
Barium	5	mg/kg	500	41	41	39	44	46	20	11	36
Beryllium	2	mg/kg	4	<2	<2	<2	<2	<2	<2	<2	<2
Bismuth	2	mg/kg	-	<2	<2	<2	<2	<2	<2	<2	<2
Boron	5	mg/kg	-	<5	<5	<5	<5	5	<5	<5	<5
Cadmium	0.3	mg/kg	10	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Chromium	2	mg/kg	64	11	8	26	30	25	14	5	9
Cobalt	1	mg/kg	50	5	5	7	6	7	3	3	4
Copper	2	mg/kg	63	16	18	14	19	15	11	6	14
Iron	50	mg/kg	-	11,000	9,300	14,000	13,000	13,000	5,700	5,500	8,800
Lead	0.5	mg/kg	140	8.4	13	170	45	18	4.8	1.8	3.4
Lithium	2	mg/kg	-	13	14	8	10	10	5	5	13
Manganese	2	mg/kg	-	160	120	210	120	150	86	88	130
Mercury	0.1/ 0.2 ²	mg/kg	6.6	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Molybdenum	2	mg/kg	10	<2	<2	<2	<2	2	<2	<2	<2
Nickel	2	mg/kg	50	9	6	17	20	17	11	4	7
Rubidium	2	mg/kg	-	21	22	10	9	10	6	4	18
Selenium	2	mg/kg	1	<2	<2	<2	<2	<2	<2	<2	<2
Silver	0.5	mg/kg	20	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Strontium	5	mg/kg	-	9	6	31	26	34	8	6	<5
Thallium	0.1	mg/kg	1	0.2	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1
Tin	2	mg/kg	50	<2	<2	<2	13	2	<2	<2	<2
Uranium	0.1	mg/kg	23	0	0.3	0.9	1.3	2.2	0.5	0.2	0.4
Vanadium	2	mg/kg	130	20	17	24	24	29	10	8	17
Zinc	5	mg/kg	200	32	30	56	51	42	25	21	34

Notes:

1 = CCME Canadian Soil Quality Guidelines for a Residential/Parkland Site (2007)

2 - Elevated reporting limit due to matrix interferences.

RDL = Reportable Detection Limit for routine analysis

Lab-Dup = Laboratory duplicate sample

< # = Not detected above RDL noted

"-" = indicates value is not available or does not apply

Shaded = Value exceeds applicable criteria

Table 21.5 Results of Laboratory Analysis of Available Metals in Soil - Residential Subdivision
Phase II/III ESAs, HHERA and RAP/RMP
Project No. 121410103
Stantec Consulting Ltd. Project No. 121410103

Parameters	RDL	Units	Criteria ¹	SURFACE SOIL			MONITOR WELLS				
				BS210	BS220	BS225	MW36-SS3	MW37-SS3	MW47-SS2	MW48-SS2	MW51-SS2
Aluminum	10	mg/kg	-	12,000	6,900	5,100	8,000	6,500	3,200	6,400	20,000
Antimony	2	mg/kg	20	<2	<2	<2	<2	<2	<2	<2	<2
Arsenic	2	mg/kg	12	<2	5	<2	<2	<2	<2	<2	<2
Barium	5	mg/kg	500	40	26	36	20	15	13	18	70
Beryllium	2	mg/kg	4	<2	<2	<2	<2	<2	<2	<2	<2
Bismuth	2	mg/kg	-	<2	<2	<2	<2	<2	<2	<2	<2
Boron	5	mg/kg	-	<5	<5	<5	<5	<5	<5	<5	5
Cadmium	0.3	mg/kg	10	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Chromium	2	mg/kg	64	21	16	16	20	11	6	16	34
Cobalt	1	mg/kg	50	8	4	3	4	4	1	4	12
Copper	2	mg/kg	63	17	30	15	8	17	2	15	23
Iron	50	mg/kg	-	14,000	8,800	7,900	10,000	12,000	3,900	12,000	24,000
Lead	0.5	mg/kg	140	4.6	13	6.9	3.2	11	12	6.4	7.0
Lithium	2	mg/kg	-	12	7	9	8	6	2	6	19
Manganese	2	mg/kg	-	210	130	96	100	100	46	97	320
Mercury	0.1/ 0.2 ²	mg/kg	6.6	<0.1	<0.1	<0.1	<0.1	<0.2 ²	<0.1	<0.1	<0.1
Molybdenum	2	mg/kg	10	<2	<2	<2	<2	<2	<2	<2	<2
Nickel	2	mg/kg	50	18	11	10	12	11	3	14	28
Rubidium	2	mg/kg	-	13	7	10	6	4	2	5	20
Selenium	2	mg/kg	1	<2	<2	<2	<2	<2	<2	<2	<2
Silver	0.5	mg/kg	20	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Strontium	5	mg/kg	-	26	14	8	16	10	13	11	53
Thallium	0.1	mg/kg	1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1
Tin	2	mg/kg	50	<2	<2	<2	<2	80	<2	<2	<2
Uranium	0.1	mg/kg	23	0.5	0.4	0.4	1.4	1.1	0.2	0.4	0.8
Vanadium	2	mg/kg	130	25	15	13	20	14	8	15	42
Zinc	5	mg/kg	200	89	60	40	24	300	13	25	60

Notes:

1 = CCME Canadian Soil Quality Guidelines for a Residential/Parkland Site (2007)

2 - Elevated reporting limit due to matrix interferences.

RDL = Reportable Detection Limit for routine analysis

Lab-Dup = Laboratory duplicate sample

< # = Not detected above RDL noted

"-" = indicates value is not available or does not apply

Shaded = Value exceeds applicable criteria

Table 21.6 Results of Laboratory Analysis of TPH/BTEX in Sediment - Residential Subdivision
Phase II/III ESA, HHERA and RAP/RMP
Former US Military Site and Residential Subdivision, Hopedale, NL
Project No. 121410103

Sample ID	Benzene	Toluene	Ethyl Benzene	Xylenes	C ₆ -C ₁₀ (Gas)	C ₁₀ -C ₂₁ (Fuel Range)	C ₂₁ -C ₃₂ (Lube Range)	Modified TPH - Tier I ²	Resemblance
RDL	0.03	0.03	0.03	0.05	3	15	15	20	-
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	-
Criteria¹	-	-	-	-	-	-	-	1,500	-
SEDIMENT									
SED-65	<0.03	<0.03	<0.03	<0.05	<3	61	33	94	OPF/L; WFO
SED-65 Lab Dup	<0.03	<0.03	<0.03	<0.05	<3	-	-	-	-
SED-66	<0.03	<0.03	<0.03	<0.05	<3	32	68	100	OPF/L; WFO
SED-67	<0.03	<0.03	<0.03	<0.05	<3	19	63	82	OPF/L
SED-68	<0.03	<0.03	<0.03	<0.05	<3	21	84	110	OPF/L

Notes:

1 = Ontario Ministry of Environment Guidelines for oil and grease in Freshwater Sediment. There are no federal or provincial guidelines for TPH or BTEX in freshwater sediment

2 = Modified TPH - Tier I does not include BTEX

RDL = Reportable Detection Limit for routine analysis

Lab-Dup = Laboratory duplicate sample

< # = Not detected above RDL noted

"-" = indicates value is not available or does not apply

OPF/L = One Product in the Fuel/Lube Oil range; WFO = Weathered Fuel Oil

**Table 21.7 Results of Laboratory Analysis of PCBs in Sediment - Residential Subdivision
Phase II/III ESA, HHERA and RAP/RMP
Former US Military Site and Residential Subdivision, Hopedale, NL
Project No. 121410103**

Sample ID	Polychlorinated Biphenyls (PCBs)
RDL	0.05
Units	mg/kg
Criteria ¹	0.0341
Criteria ²	0.277
SEDIMENT	
SED-65	<0.05
SED-66	<0.05
SED-67	0.48
SED-68	0.40

Notes:

1 = CCME Interim Sediment Quality Guidelines (ISQGs) for freshwater sediment (2002)

2 = CCME Probable Effects Levels (PELs) for freshwater sediment (2002)

RDL = Reportable Detection Limit for routine analysis

< # = Not detected above RDL noted

Shaded = Value exceeds CCME ISQG

Shaded/ Bold = Value exceeds CCME ISQG and CCME PEL

**Table 21.8 Results of Laboratory Analysis of PAHs in Sediment - Residential Subdivision
Phase II/III ESA, HHERA and RAP/RMP
Former US Military Site and Residential Subdivision, Hopedale, NL
Project No. 121410103**

Parameters	RDL	Units	Criteria ¹	Criteria ²	SEDIMENT			
					SED-65	SED-66	SED-67	SED-68
1-Methylnaphthalene	0.01	mg/kg	-	-	<0.01	<0.01	<0.01	<0.01
2-Methylnaphthalene	0.01	mg/kg	0.0202	0.201	<0.01	<0.01	<0.01	<0.01
Acenaphthene	0.01	mg/kg	0.00671	0.0889	<0.01	<0.01	<0.01	<0.01
Acenaphthylene	0.01	mg/kg	0.00587	0.128	<0.01	<0.01	<0.01	<0.01
Anthracene	0.01	mg/kg	0.0469	0.245	<0.01	<0.01	<0.01	<0.01
Benz[a]anthracene	0.01	mg/kg	0.0317	0.385	<0.01	<0.01	<0.01	<0.01
Benzo[a]pyrene	0.01	mg/kg	0.0319	0.782	<0.01	<0.01	<0.01	<0.01
Benzo[b]fluoranthene	0.01	mg/kg	-	-	<0.01	<0.01	<0.01	<0.01
Benzo[ghi]perylene	0.01	mg/kg	-	-	<0.01	<0.01	<0.01	<0.01
Benzo[k]fluoranthene	0.01	mg/kg	-	-	<0.01	<0.01	<0.01	<0.01
Chrysene	0.01	mg/kg	0.0571	0.862	<0.01	<0.01	<0.01	<0.01
Dibenz[a,h]anthracene	0.01	mg/kg	0.00622	0.135	<0.01	<0.01	<0.01	<0.01
Fluoranthene	0.01	mg/kg	0.111	2.355	<0.01	<0.01	<0.01	<0.01
Fluorene	0.01	mg/kg	0.0212	0.144	<0.01	<0.01	<0.01	<0.01
Indeno[1,2,3-cd]pyrene	0.01	mg/kg	-	-	<0.01	<0.01	<0.01	<0.01
Naphthalene	0.01	mg/kg	0.0346	0.391	<0.01	<0.01	<0.01	<0.01
Perylene	0.01	mg/kg	-	-	<0.01	<0.01	<0.01	<0.01
Phenanthrene	0.01	mg/kg	0.0419	0.515	<0.01	<0.01	<0.01	<0.01
Pyrene	0.01	mg/kg	0.053	0.875	<0.01	<0.01	<0.01	<0.01

Notes:

1 = CCME Interim Sediment Quality Guidelines (ISQGs) for freshwater sediment (2002)

2 = CCME Probable Effects Levels (PELs) for freshwater sediment (2002)

RDL = Reportable Detection Limit

"-" = indicates value is not available or does not apply

< # = Not detected above RDL noted

**Table 21.9 Results of Laboratory Analysis of VOCs in Sediment - Residential Subdivision
Phase II/III ESA, HHERA and RAP/RMP
Former US Military Site and Residential Subdivision, Hopedale, NL
Project No. 121410103**

Parameters	RDL	Units	Criteria ¹	Criteria ²	SEDIMENT			
					SED-65	SED-66	SED-67	SED-68
1,1,1-Trichloroethane	30	ug/kg	-	-	<30	<30	<30	<30
1,1,2,2-Tetrachloroethane	30	ug/kg	-	-	<30	<30	<30	<30
1,1,2-Trichloroethane	30	ug/kg	-	-	<30	<30	<30	<30
1,1-Dichloroethane	30	ug/kg	-	-	<30	<30	<30	<30
1,1-Dichloroethylene	30	ug/kg	-	-	<30	<30	<30	<30
1,2-Dichlorobenzene	30	ug/kg	-	-	<30	<30	<30	<30
1,2-Dichloroethane	30	ug/kg	-	-	<30	<30	<30	<30
1,2-Dichloropropane	30	ug/kg	-	-	<30	<30	<30	<30
1,3-Dichlorobenzene	30	ug/kg	-	-	<30	<30	<30	<30
1,4-Dichlorobenzene	30	ug/kg	-	-	<30	<30	<30	<30
Benzene	30	ug/kg	-	-	<30	<30	<30	<30
Bromodichloromethane	30	ug/kg	-	-	<30	<30	<30	<30
Bromoform	30	ug/kg	-	-	<30	<30	<30	<30
Bromomethane	200	ug/kg	-	-	<200	<200	<200	<200
Carbon Tetrachloride	30	ug/kg	-	-	<30	<30	<30	<30
Chlorobenzene	30	ug/kg	-	-	<30	<30	<30	<30
Chloroform	30	ug/kg	-	-	<30	<30	<30	<30
Chloromethane	30	ug/kg	-	-	<30	<30	<30	<30
cis-1,2-Dichloroethylene	30	ug/kg	-	-	<30	<30	<30	<30
cis-1,3-Dichloropropene	30	ug/kg	-	-	<30	<30	<30	<30
Dibromochloromethane	30	ug/kg	-	-	<30	<30	<30	<30
Ethylbenzene	30	ug/kg	-	-	<30	<30	<30	<30
Ethylene Dibromide	30	ug/kg	-	-	<30	<30	<30	<30
Methylene Chloride(Dichloromethane)	30	ug/kg	-	-	<30	<30	<30	<30
o-Xylene	30	ug/kg	-	-	<30	<30	<30	<30
p+m-Xylene	30	ug/kg	-	-	<30	<30	<30	<30
Styrene	30	ug/kg	-	-	<30	<30	<30	<30
Tetrachloroethylene	30	ug/kg	-	-	<30	<30	<30	<30
Toluene	30	ug/kg	-	-	<30	<30	<30	<30
trans-1,2-Dichloroethylene	30	ug/kg	-	-	<30	<30	<30	<30
trans-1,3-Dichloropropene	30	ug/kg	-	-	<30	<30	<30	<30
Trichloroethylene	30	ug/kg	-	-	<30	<30	<30	<30
Trichlorofluoromethane (FREON 11)	30	ug/kg	-	-	<30	<30	<30	<30
Vinyl Chloride	30	ug/kg	-	-	<30	<30	<30	<30

Notes:

1 = CCME Interim Sediment Quality Guidelines (ISQGs) for freshwater sediment (2002)

2 = CCME Probable Effects Levels (PELs) for freshwater sediment (2002)

RDL = Reportable Detection Limit for routine analysis

< # = Not detected above RDL noted

"-" = indicates value is not available or does not apply

**Table 21.10 Results of Laboratory Analysis of Available Metals in Sediment - Residential Subdivision
Phase II/III ESA, HHERA and RAP/RMP
Former US Military Site and Residential Subdivision, Hopedale, NL
Project No. 121410103**

Parameters	RDL	Units	Criteria ¹	Criteria ²	SEDIMENT			
					SED-65	SED-66	SED-67	SED-68
Aluminum	10	mg/kg	-	-	8,000	8,300	4,600	3,000
Antimony	2	mg/kg	-	-	<2	<2	<2	<2
Arsenic	2	mg/kg	5.9	17.0	<2	<2	<2	<2
Barium	5	mg/kg	-	-	30	40	21	13
Beryllium	2	mg/kg	-	-	<2	<2	<2	<2
Bismuth	2	mg/kg	-	-	<2	<2	<2	<2
Boron	5	mg/kg	-	-	<5	<5	<5	<5
Cadmium	0.3	mg/kg	0.6	3.5	<0.3	<0.3	<0.3	<0.3
Chromium	2	mg/kg	37.3	90.0	15	16	10	6
Cobalt	1	mg/kg	-	-	8	6	4	3
Copper	2	mg/kg	35.7	197	6	13	9	5
Iron	50	mg/kg	-	-	9,800	12,000	7,800	5,900
Lead	0.5	mg/kg	35.0	91.3	2.8	4.2	4.4	3.1
Lithium	2	mg/kg	-	-	7	10	8	6
Manganese	2	mg/kg	-	-	240	230	130	92
Mercury	0.1	mg/kg	0.17	0.486	<0.1	<0.1	<0.1	<0.1
Molybdenum	2	mg/kg	-	-	<2	<2	<2	<2
Nickel	2	mg/kg	-	-	12	13	8	5
Rubidium	2	mg/kg	-	-	6	13	10	6
Selenium	2	mg/kg	-	-	<2	<2	<2	<2
Silver	0.5	mg/kg	-	-	<0.5	<0.5	<0.5	<0.5
Strontium	5	mg/kg	-	-	18	15	7	<5
Thallium	0.1	mg/kg	-	-	<0.1	<0.1	0	<0.1
Tin	2	mg/kg	-	-	<2	<2	<2	<2
Uranium	0.1	mg/kg	-	-	0.4	0.5	5.7	0.2
Vanadium	2	mg/kg	-	-	18	22	15	9
Zinc	5	mg/kg	123	315	38	46	31	26

Notes:

1 = CCME Interim Sediment Quality Guidelines (ISQGs) for freshwater sediment (2002)

2 = CCME Probable Effects Levels (PELs) for freshwater sediment (2002)

RDL = Reportable Detection Limit

nd = Not detected above standard RDL

< = Not detected above RDL noted

"-" = indicates value is not available or does not apply

Table 21.11 Results of Laboratory Analysis of TPH/BTEX in Groundwater - Residential Subdivision
Phase II/III ESA, HHERA and RAP/RMP
Former US Military Site and Residential Subdivision, Hopedale, NL
Project No. 121410103

Sample ID	Benzene	Toluene	Ethylbenzene	Xylenes	C ₆ -C ₁₀ (Gas Range)	C ₁₀ -C ₂₁ (Fuel Range)	C ₂₁ -C ₃₂ (Lube Range)	Modified TPH - Tier 1 ²	Resemblance
RDL	0.01/ 0.001	0.01/ 0.001	0.01/ 0.001	0.02/ 0.002	0.1/ 0.01	0.05	0.1	0.1	-
Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	-
Criteria¹	1	20	20	20	-	-	-	20	-
MONITOR WELLS									
MW35	<0.001	<0.001	<0.001	<0.002	<0.01	<0.05	<0.1	<0.1	WFO
MW35 Field-Dup	<0.001	<0.001	<0.001	<0.002	<0.01	<0.05	<0.1	<0.1	-
MW36	<0.001	0.003	<0.001	<0.002	<0.01	<0.05	<0.1	<0.1	-
MW37	<0.001	0.001	<0.001	<0.002	<0.01	<0.05	<0.1	<0.1	-
MW38	<0.001	<0.001	<0.001	<0.002	<0.01	0.08	<0.1	<0.1	-
MW39	<0.001	<0.001	<0.001	<0.002	<0.01	<0.05	<0.1	<0.1	-
MW39 Field-Dup	<0.001	<0.001	<0.001	<0.002	<0.01	<0.05	<0.1	<0.1	-
MW40	<0.001	0.004	<0.001	0.004	<0.01	<0.05	0.1	0.1	PLO
MW41	0.001	0.015	0.004	0.021	<0.01	<0.05	<0.1	<0.1	-
MW42	0.001	0.008	<0.001	0.002	<0.01	0.06	0.5	0.5	LO
MW44	<0.001	0.003	<0.001	<0.002	<0.01	0.12	<0.1	0.1	WFO
MW44 Field-Dup	<0.001	0.002	<0.001	<0.002	<0.01	0.13	<0.1	0.1	WFO
MW45	0.002	<0.001	<0.001	<0.002	<0.01	0.19	<0.1	0.2	OP F/L
MW46	0.014	0.006	<0.001	0.002	<0.01	0.14	<0.1	0.1	WFO
MW47	<0.01	0.47	<0.01	<0.02	<0.1	0.19	<0.1	<0.1	WFO
MW47 Field-Dup	<0.01	0.43	<0.01	<0.02	<0.1	0.18	0.1	0.1	WFO
MW49	<0.01	0.24	0.02	0.08	<0.1	1.5	0.3	1.7	WFO
MW50	0.002	0.007	0.002	0.008	<0.01	0.08	0.2	0.2	UCFO; NRLO
MW51	0.004	0.004	<0.001	0.003	<0.01	0.14	<0.1	0.1	WFO
MW52	<0.001	0.004	<0.001	0.004	<0.01	0.07	<0.1	<0.1	NRFO

Notes:

1 = Partnership in RBCA (Risk-Based Corrective Action) Implementation (PIRI) Tier I Risk Based Screening Levels (RBSLs) for a residential site with non-potable groundwater and coarse grained soil, fuel oil impacts (September, 2003)

2 = Modified TPH - Tier I does not include BTEX

RDL = Reportable Detection Limit for routine analysis

Lab-Dup = Laboratory duplicate sample

Field-Dup = Field duplicate sample

< # = Not detected above RDL noted

"-" = indicates value is not available or does not apply

PLO = Possible lube oil; NRFO = No resemblance to petroleum products in the fuel oil range; LO = Lube oil fraction; OP F/L = One Product in the fuel/lube oil range;

WFO = Weathered fuel oil fraction; NRLO = No resemblance to petroleum products in the lube oil range; UCFO = Unidentified compounds in the fuel oil range

**Table 21.12 Results of Laboratory Analysis of PCBs in Groundwater - Residential Subdivision
Phase II/III ESA, HHERA and RAP/RMP
Former US Military Site and Residential Subdivision, Hopedale, NL
Project No. 121410103**

Sample ID	Polychlorinated Biphenyls (PCBs)
RDL	0.05
Units	ug/L
Criteria ¹	0.2
MONITOR WELLS	
MW38	<0.05
MW39	<0.05
MW39 Field-Dup	<0.05
MW40	<0.05
MW43	<0.05
MW46	<0.05
MW46 Lab-Dup	<0.05
MW47	0.32
MW47 Lab-Dup	0.15
MW47 Field-Dup	0.19
MW52	<0.05

Notes:

1 = OMOE Soil, Groundwater and Sediment Standards for Use Under Part XV.1 of the *Environmental Protection Act*, Non-Potable Groundwater (2004)

RDL = Reportable Detection Limit

Lab-Dup = Laboratory duplicate sample

Field-Dup = Field duplicate sample

< # = Not detected above RDL noted

Shaded = Value exceeds applicable criteria

Table 21.13 Results of Laboratory Analysis of PAHs in Groundwater - Residential Subdivision
Phase II/III ESA, HHERA and RAP/RMP
Former US Military Site and Residential Subdivision, Hopedale, NL
Project No. 121410103

Parameter	RDL	Units	Criteria ¹	MONITOR WELLS							
				MW35	MW35 Field-Dup	MW37	MW44	MW44 Field-Dup	MW47	MW47 Field-Dup	MW50
1-Methylnaphthalene	0.05	ug/L	13,000 ²	<0.05	<0.05	<0.05	0.66	0.64	<0.05	<0.05	<0.05
2-Methylnaphthalene	0.05	ug/L		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acenaphthene	0.01/0.04 ³	ug/L	1,700	<0.01	<0.01	<0.01	<0.04 ³	<0.04 ³	<0.01	<0.01	<0.01
Acenaphthylene	0.01	ug/L	2,000	<0.01	<0.01	<0.01	0.03	0.03	<0.01	<0.01	<0.01
Acridine	0.05	ug/L	-	<0.05	<0.05	<0.05	-	-	<0.05	<0.05	<0.05
Anthracene	0.01	ug/L	12	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.07
Benzo[a]anthracene	0.01	ug/L	5.0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo[a]pyrene	0.01	ug/L	1.9	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01
Benzo[b]fluoranthene	0.01	ug/L	7.0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo[ghi]perylene	0.01	ug/L	0.2	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo[k]fluoranthene	0.01	ug/L	0.4	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Chrysene	0.01	ug/L	3.0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Dibenzo[a,h]anthracene	0.01	ug/L	0.25	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Fluoranthene	0.01	ug/L	130	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Fluorene	0.01	ug/L	290	<0.01	<0.01	<0.01	0.11	0.1	<0.01	<0.01	<0.01
Indeno[1,2,3-cd]pyrene	0.01	ug/L	0.27	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Naphthalene	0.2	ug/L	5,900	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.2
Perylene	0.01	ug/L	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Phenanthrene	0.01	ug/L	63	<0.01	0.02	<0.01	0.09	0.08	0.01	0.02	<0.2
Pyrene	0.01	ug/L	40	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Quinoline	0.05	ug/L	-	<0.05	<0.05	<0.05	-	-	<0.05	<0.05	<0.05

Notes:

1 = OMOE Soil, Groundwater and Sediment Standards for Use Under Part XV.1 of the *Environmental Protection Act*, Non-Potable Groundwater (2004)

2 = 2-methylnaphthalene soil criterion is applicable to 1-methylnaphthalene with the provision that if both are detected in the soil, the sum of the two concentrations cannot exceed the soil criterion

3 = Elevated RDL due to matrix interface

RDL = Reportable Detection Limit for routine analysis

Lab-dup = Laboratory duplicate sample

< # = Not detected above RDL noted

"-" = indicates value is not available or does not apply

Shaded = Value exceeds applicable criteria

**Table 21.14 Results of Laboratory Analysis of Available Metals in Groundwater - Residential Subdivision
Phase II/III ESA, HHERA and RAP/RMP
Former US Military Site and Residential Subdivision, Hopedale, NL
Project No. 121410103**

Parameters	RDL	Units	Criteria ¹	MONITOR WELLS						
				MW35	MW35 Field- Dup	MW39	MW39 Field-Dup	MW47	MW47 Field-Dup	MW49
Aluminum	5	ug/L	-	<50	50	159	173	1,630	1,690	572
Antimony	2	ug/L	16,000	<20	<20	<2.0	<2.0	<2.0	<2.0	<20
Arsenic	2	ug/L	480	<20	<20	<2.0	<2.0	3.5	3.6	<20
Barium	5	ug/L	23,000	<50	<50	<5.0	<5.0	21.3	23.9	<50
Beryllium	2	ug/L	53	<20	<20	<2.0	<2.0	<2.0	<2.0	<20
Bismuth	2	ug/L	-	<20	<20	<2.0	<2.0	<2.0	<2.0	<20
Boron	5	ug/L	50,000	<50	<50	10.5	13.0	13.9	15.4	<50
Cadmium	0.017	ug/L	11	<0.17	<0.17	0.031	0.026	0.076	0.071	<0.17
Chromium	1	ug/L	2,000	<10	<10	<1.0	<1.0	4.9	4.8	<10
Cobalt	0.4	ug/L	100	<4.0	<4.0	<0.40	<0.40	4.65	5.11	7.0
Copper	2	ug/L	23	<20	<20	11.2	13.2	6.3	5.4	<20
Iron	50	ug/L	-	1200	1240	54	62	7980	8450	26300
Lead	0.5	ug/L	32	<5.0	<5.0	<0.50	<0.50	2.05	1.93	<5.0
Manganese	2	ug/L	-	334	343	7.2	7.9	377	427	709
Molybdenum	2	ug/L	7,300	<20	<20	<2.0	<2.0	<2	<2.0	<20
Nickel	2	ug/L	1,600	<20	<20	<2.0	<2.0	8.8	8.7	<20
Selenium	1	ug/L	50	<10	<10	<1.0	<1.0	<1.0	1.0	<10
Silver	0.1	ug/L	1.2	<1.0	<1.0	<0.10	<0.10	<0.10	<0.10	<1.0
Strontium	5	ug/L	-	593	579	22.8	23.3	76.4	89.9	109
Thallium	0.1	ug/L	400	<1.0	<1.0	<0.10	<0.10	<0.10	<0.10	<1.0
Tin	2	ug/L	-	<20	<20	<2.0	<2.0	<2.0	<2.0	<20
Titanium	2	ug/L	-	<20	<20	2.9	2.9	44.3	42.5	<20
Uranium	0.1	ug/L	-	2.7	2.8	1.04	0.94	0.78	0.84	<1.0
Vanadium	2	ug/L	200	<20	<20	<2.0	<2.0	9.9	9.9	<20
Zinc	5	ug/L	1,100	<50	<50	8.7	8.6	46.9	43.3	<50

Notes:

1 = OMOE Soil, Groundwater and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, Non-Potable Groundwater (2004)

RDL = Reportable Detection Limit for routine analysis

Field-Dup = Field duplicate sample

< # = Not detected above RDL noted

"-" = indicates value is not available or does not apply

Table 21.15 Results of Laboratory Analysis of TPH/BTEX in Surface Water - Residential Subdivision
Phase II/III ESA, HHERA and RAP/RMP
Former US Military Site and Residential Subdivision, Hopedale, NL
Project No. 121410103

Sample ID	Benzene	Toluene	Ethylbenzene	Xylenes	C ₆ -C ₁₀ (Gas Range)	C ₁₁ -C ₂₀ (Fuel Range)	C ₂₁ -C ₃₂ (Lube Range)	Modified TPH - Tier I ³	Resemblance
RDL	0.001	0.001	0.001	0.002	0.01	0.05	0.1	0.1	-
Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	-
Criteria¹	0.37	0.002	0.09	-	-	-	-	-	-
SURFACE WATER									
SW-13	<0.001	0.004	<0.001	0.003	<0.01	<0.05	<0.1	<0.1	-
SW-13 Lab Dup	-	-	-	-	-	<0.05	<0.1	-	-
SW-14	<0.001	0.004	<0.001	0.005	<0.01	<0.05	<0.1	<0.1	-
SW-15	<0.001	0.002	<0.001	0.002	<0.01	<0.05	<0.1	<0.1	-
SW-16	<0.001	0.004	<0.001	0.002	<0.01	<0.05	<0.1	<0.1	-
SW-17	<0.001	0.003	<0.001	0.002	<0.01	<0.05	<0.1	<0.1	-
SW-18	<0.001	0.001	<0.001	<0.002	<0.01	<0.05	<0.1	<0.1	-
SW-18 Field-Dup	<0.001	0.005	<0.001	0.003	<0.01	<0.05	<0.1	<0.1	-

Notes:

1 = CCME Water Quality Guidelines (2007) for the protection of freshwater aquatic life

3 = Modified TPH - Tier I does not include BTEX

"-" = Value is not available or does not apply

RDL = Reportable Detection Limit for routine analysis

Lab-Dup = Laboratory duplicate sample

Field-Dup = Field duplicate sample

< # = Not detected above RDL noted

**Table 21.16 Results of Laboratory Analysis of PCBs in Surface Water - Residential Subdivision
Phase II/III ESA, HHERA and RAP/RMP
Former US Military Site and Residential Subdivision, Hopedale, NL
Project No. 121410103**

Sample ID	Polychlorinated Biphenyls (PCBs)
RDL	0.05
Units	ug/L
Criteria ¹	na
Surface Water	
SW-13	<0.05
SW-13 Lab Dup	<0.05
SW-14	<0.05
SW-15	<0.05
SW-16	<0.05
SW-17	<0.05
SW-18	<0.05
SW-18 Field-Dup	<0.05

Notes:

1 = CCME Water Quality Guidelines (2007) for the protection of freshwater aquatic life

RDL = Reportable Detection Limit

na = No applicable guideline

Lab-Dup = Laboratory duplicate sample

Field-Dup = Field duplicate sample

< # = Not detected above RDL noted

**Table 21.17 Results of Laboratory Analysis of PAHs in Surface Water - Residential Subdivision
Phase II/III ESA, HHERA and RAP/RMP
Former US Military Site and Residential Subdivision, Hopedale, NL
Project No. 121410103**

Parameter	RDL	Units	Criteria ¹	SURFACE WATER						
				SW-13	SW-14	SW-15	SW-16	SW-17	SW-18	SW-18 Field-Dup
1-Methylnaphthalene	0.05	ug/L	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
2-Methylnaphthalene	0.05	ug/L	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acenaphthene	0.01	ug/L	5.8	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Acenaphthylene	0.01	ug/L	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Acridine	0.05	ug/L		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Anthracene	0.01	ug/L	0.012	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benz[a]anthracene	0.01	ug/L	0.018	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo[a]pyrene	0.01	ug/L	0.015	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo[b]fluoranthene	0.01	ug/L	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo[ghi]perylene	0.01	ug/L	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo[k]fluoranthene	0.01	ug/L	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Chrysene	0.01	ug/L	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Dibenzo[a,h]anthracene	0.01	ug/L	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Fluoranthene	0.01	ug/L	0.04	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Fluorene	0.01	ug/L	3	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Indeno[1,2,3-cd]pyrene	0.01	ug/L	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Naphthalene	0.2	ug/L	1.1	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Perylene	0.01	ug/L	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Phenanthrene	0.01	ug/L	0.4	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Pyrene	0.01	ug/L	0.025	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Quinoline	0.05	ug/L	3.4	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Notes:

1 = CCME Water Quality Guidelines (2007) for the protection of freshwater aquatic life

RDL = Reportable Detection Limit

Field-Dup = Field duplicate sample

"-" = indicates value is not available or does not apply

< # = Not detected above RDL noted

**Table 21.18 Results of Laboratory Analysis of VOCs in Surface Water - Residential Subdivision
Phase II/III ESA, HHERA and RAP/RMP
Former US Military Site and Residential Subdivision, Hopedale, NL
Project No. 121410103**

Parameters	RDL	Units	Criteria ¹	SURFACE WATER								
				SW-13	SW-13 Lab-Dup	SW-14	SW-15	SW-16	SW-17	SW-18	SW-18 Field-Dup	
1,2-Dichlorobenzene	0.5	ug/L	0.7	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichlorobenzene	1	ug/L	150	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,4-Dichlorobenzene	1	ug/L	26	<1	<1	<1	<1	<1	<1	<1	<1	<1
Chlorobenzene	1	ug/L	1.3	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,1,1-Trichloroethane	1	ug/L	-	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,1,2,2-Tetrachloroethane	1	ug/L	111	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,1,2-Trichloroethane	1	ug/L	-	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,1-Dichloroethane	2	ug/L	-	<2	<2	<2	<2	<2	<2	<2	<2	<2
1,1-Dichloroethylene	0.5	ug/L	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloroethane	1	ug/L	100	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,2-Dichloropropane	1	ug/L	-	<1	<1	<1	<1	<1	<1	<1	<1	<1
Benzene	1	ug/L	370	<1	<1	<1	<1	<1	<1	<1	<1	<1
Bromodichloromethane	1	ug/L	-	<1	<1	<1	<1	<1	<1	<1	<1	<1
Bromoform	1	ug/L	-	<1	<1	<1	<1	<1	<1	<1	<1	<1
Bromomethane	3	ug/L	-	<3	<3	<3	<3	<3	<3	<3	<3	<3
Carbon Tetrachloride	1	ug/L	13.3	<1	<1	<1	<1	<1	<1	<1	<1	<1
Chloroethane	8	ug/L	-	<8	<8	<8	<8	<8	<8	<8	<8	<8
Chloroform	1	ug/L	1.8	<1	<1	<1	<1	4	<1	<1	<1	<1
Chloromethane	8	ug/L	-	<8	<8	<8	<8	<8	<8	<8	<8	<8
cis-1,2-Dichloroethylene	2	ug/L	-	<2	<2	<2	<2	<2	<2	<2	<2	<2
cis-1,3-Dichloropropene	2	ug/L	-	<2	<2	<2	<2	<2	<2	<2	<2	<2
Dibromochloromethane	1	ug/L	-	<1	<1	<1	<1	<1	<1	<1	<1	<1
Ethylbenzene	1	ug/L	90	<1	<1	<1	<1	<1	<1	<1	<1	<1
Ethylene Dibromide	1	ug/L	-	<1	<1	<1	<1	<1	<1	<1	<1	<1
Methylene Chloride(Dichloromethane)	3	ug/L	98.1	<3	<3	<3	<3	<3	<3	<3	<3	<3
o-Xylene	1	ug/L	-	<1	<1	<1	<1	<1	<1	<1	<1	<1
p+m-Xylene	2	ug/L	-	2	<2	<2	2	3	3	3	3	3
Styrene	1	ug/L	72	<1	<1	<1	<1	<1	<1	<1	<1	<1
Tetrachloroethylene	1	ug/L	-	<1	<1	<1	<1	<1	<1	<1	<1	<1
Toluene	1	ug/L	-	3	2	2	3	4	4	4	4	4
trans-1,2-Dichloroethylene	2	ug/L	-	<2	<2	<2	<2	<2	<2	<2	<2	<2
trans-1,3-Dichloropropene	1	ug/L	-	<1	<1	<1	<1	<1	<1	<1	<1	<1
Trichloroethylene	1	ug/L	21	<1	<1	<1	<1	<1	<1	<1	<1	<1
Trichlorofluoromethane (FREON 11)	8	ug/L	-	<8	<8	<8	<8	<8	<8	<8	<8	<8
Vinyl Chloride	0.5	ug/L	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

Notes:

1 = CCME Water Quality Guidelines for the protection of freshwater aquatic life (2007)

RDL = Reportable Detection Limit

Lab-Dup = Laboratory duplicate sample

Field-Dup = Field duplicate sample

< # = Not detected above RDL noted

"-" = indicates value is not available or does not apply

Table 21.19 Results of Laboratory Analysis of Available Metals in Surface Water - Residential Subdivision
Phase II/III ESA, HHERA and RAP/RMP
Former US Military Site and Residential Subdivision, Hopedale, NL
Project No. 121410103

Parameters	RDL	Units	Criteria ²	SURFACE WATER								
				SW-13	SW-14	SW-14 Lab-Dup	SW-15	SW-16	SW-17	SW-18	SW-18 Field-Dup	
Aluminum	5	ug/L	5-100 ²	131	107	113	126	114	128	124	130	
Antimony	2	ug/L	-	<2	<2	<2	<2	<2	<2.0	<2.0	<2.0	
Arsenic	2	ug/L	5	<2	<2	<2	<2	<2	<2.0	<2.0	<2.0	
Barium	5	ug/L	-	<5	<5	<5	<5	<5	<5.0	5.2	5.2	
Beryllium	2	ug/L	-	<2	<2	<2	<2	<2	<2.0	<2.0	<2.0	
Bismuth	2	ug/L	-	<2	<2	<2	<2	<2	<2.0	<2.0	<2.0	
Boron	5	ug/L	-	<5	<5	<5	<5	<5	5.1	5.1	5.1	
Cadmium	0.017	ug/L	0.0017 ³	0.027	<0.017	<0.017	0.039	0.028	0.033	0.029	0.017	
Chromium	1	ug/L	8.9	<1	<1	<1	<1	1	<1.0	<1.0	<1.0	
Cobalt	0.4	ug/L	-	<0.4	<0.4	<0.4	<0.4	<0.4	<0.40	<0.40	<0.40	
Copper	2	ug/L	2-4 ⁴	<2	<2	<2	<2	6.2	2.1	2.7	2.3	
Iron	100	ug/L	300	109	80	97	273	290	469	415	431	
Lead	0.5	ug/L	1-7 ⁵	<0.5	<0.5	<0.5	<0.5	<0.5	0.8	0.84	0.79	
Manganese	2	ug/L	-	3.8	<2	<2	7.8	6.8	3.9	3.1	3	
Molybdenum	2	ug/L	73	<2	<2	<2	<2	<0.2	<2.0	<2.0	<2.0	
Nickel	2	ug/L	25-150 ⁶	<2	<2	<2	<2	<0.2	<2.0	<2.0	<2.0	
Selenium	1	ug/L	1	<1	<1	<1	<1	<1	<1.0	<1.0	<1.0	
Silver	0.1	ug/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.10	<0.10	<0.10	
Strontium	5	ug/L	-	19.3	18	18.3	20.8	20.5	17.5	18	17.9	
Thallium	0.1	ug/L	0.8	<0.1	<0.1	<0.1	<0.1	<0.1	<0.10	<0.10	<0.10	
Tin	2	ug/L	-	<2	<2	<2	<2	<2	<2.0	<2.0	<2.0	
Titanium	2	ug/L	-	<2	<2	<2	<2	<2	2.2	2.7	3.1	
Uranium	0.1	ug/L	-	0.1	0.12	0.12	0.14	0.23	0.16	0.17	0.17	
Vanadium	2	ug/L	-	<2	<2	<2	<2	<2	<2.0	<2.0	<2.0	
Zinc	5	ug/L	30	16	10.3	9.9	35.8	14.3	9.3	11.1	13.3	

Notes:

1 = CCME Water Quality Guidelines for the protection of freshwater aquatic life (2007)

2 = Aluminum guideline = 5 µg/L at pH<6.5
= 100 µg/L at pH>=6.5

3 = Cadmium guideline = $10^{-4} \{0.86[\log(\text{hardness})] - 3.2\}$ = 0.0017 mg/L at a water hardness of 45 mg/L as CaCO₃

4 = Copper guideline = 2 µg/L at water hardness of 0-120 mg/L as CaCO₃
= 3 µg/L at water hardness of 120-180 mg/L as CaCO₃
= 4 µg/L at water hardness >180 mg/L as CaCO₃

5 = Lead guideline = 1 µg/L at water hardness of 0-60 mg/L as CaCO₃
= 2 µg/L at water hardness of 60-120 mg/L as CaCO₃
= 4 µg/L at water hardness of 120-180 mg/L as CaCO₃
= 7 µg/L at water hardness >180 mg/L as CaCO₃

6 = Nickel guideline = 25 µg/L at water hardness of 0-60 mg/L as CaCO₃
= 65 µg/L at water hardness of 60-120 mg/L as CaCO₃
= 110 µg/L at water hardness of 120-180 mg/L as CaCO₃
= 150 µg/L at water hardness >180 mg/L as CaCO₃

RDL = Reportable Detection Limit for routine analysis

Lab-Dup = Laboratory duplicate sample

Field-Dup = Field duplicate sample

"-" = Not analysed or no applicable guideline

< # = Not detected above RDL noted

Shaded = Value exceeds freshwater aquatic life guideline

Table 21.20 Results of Laboratory Analysis of PCBs in Swab Sample - Residential Subdivision
Phase II/III ESA, HHERA and RAP/RMP
Former US Military Site and Residential Subdivision, Hopedale, NL
Project No. 121410103

Sample ID	Polychlorinated Biphenyls (PCBs)
RDL	5
Units	µg
Debris	
PCB SWAB-2	<5
PCB SWAB-3	<5
PCB SWAB-4	<5
PCB SWAB-5	<5
PCB SWAB-6	<5

Notes:

RDL = Reportable Detection Limit
< # = Not detected above RDL noted

**Table 21.20 Results of Laboratory Analysis of PCBs in Swab Sample - Residential Subdivision
Phase II/III ESA, HHERA and RAP/RMP
Former US Military Site and Residential Subdivision, Hopedale, NL
Project No. 121410103**

Sample ID	Polychlorinated Biphenyls (PCBs)
RDL	5
Units	$\mu\text{g}/100 \text{ cm}^2$
Criteria¹	10
Debris	
PCB SWAB-2	<5
PCB SWAB-3	<5
PCB SWAB-4	<5
PCB SWAB-5	<5
PCB SWAB-6	<5

Notes:

1 = CCME Transformer Decontamination Standards and Protocols (December 1995)

RDL = Reportable Detection Limit

< # = Not detected above RDL noted

**Table 21.21 Results of Laboratory Identification of Free Product in Tar - Residential Subdivision
Phase II/III ESA, HHERA and RAP/RMP
Former US Military Site and Residential Subdivision, Hopedale, NL
Project No. 121410103**

Sample ID	Product Identification
Tar-1	No product could be identified within the analysis ranges

Table 21.22 Results of Laboratory Analysis of PCBs in Tar - Residential Subdivision
Phase II/III ESA, HHERA and RAP/RMP
Former US Military Site and Residential Subdivision, Hopedale, NL
Project No. 121410103

Sample ID	Polychlorinated Biphenyls (PCBs)
RDL	1
Units	mg/kg
Tar	
Tar-1	<1