

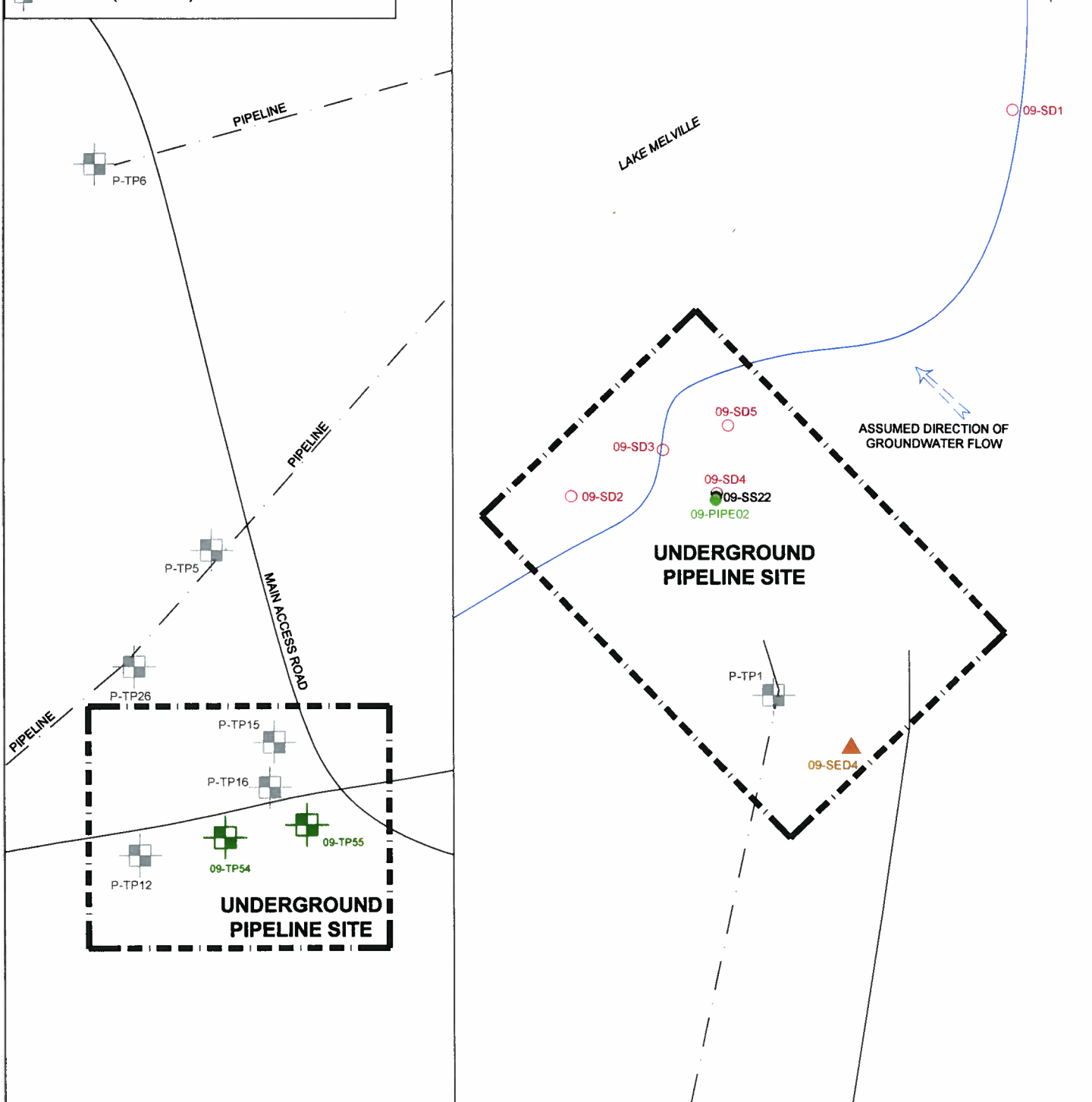
Appendix 13a

Site Drawings

– Underground Pipeline Site

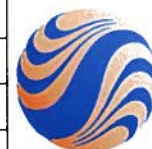
LEGEND

- SURFACE SOIL SAMPLE (STANTEC 2009)
- SURFACE DEBRIS LOCATION (STANTEC 2009)
- PIPE CONTENT SAMPLE (STANTEC 2009)
- ▲ SEDIMENT SAMPLE (STANTEC 2009)
- TEST PIT (STANTEC 2009)
- TEST PIT (AGRA 1999)



NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC CONSULTING LTD. REPORT AND MUST NOT BE USED FOR OTHER PURPOSES.

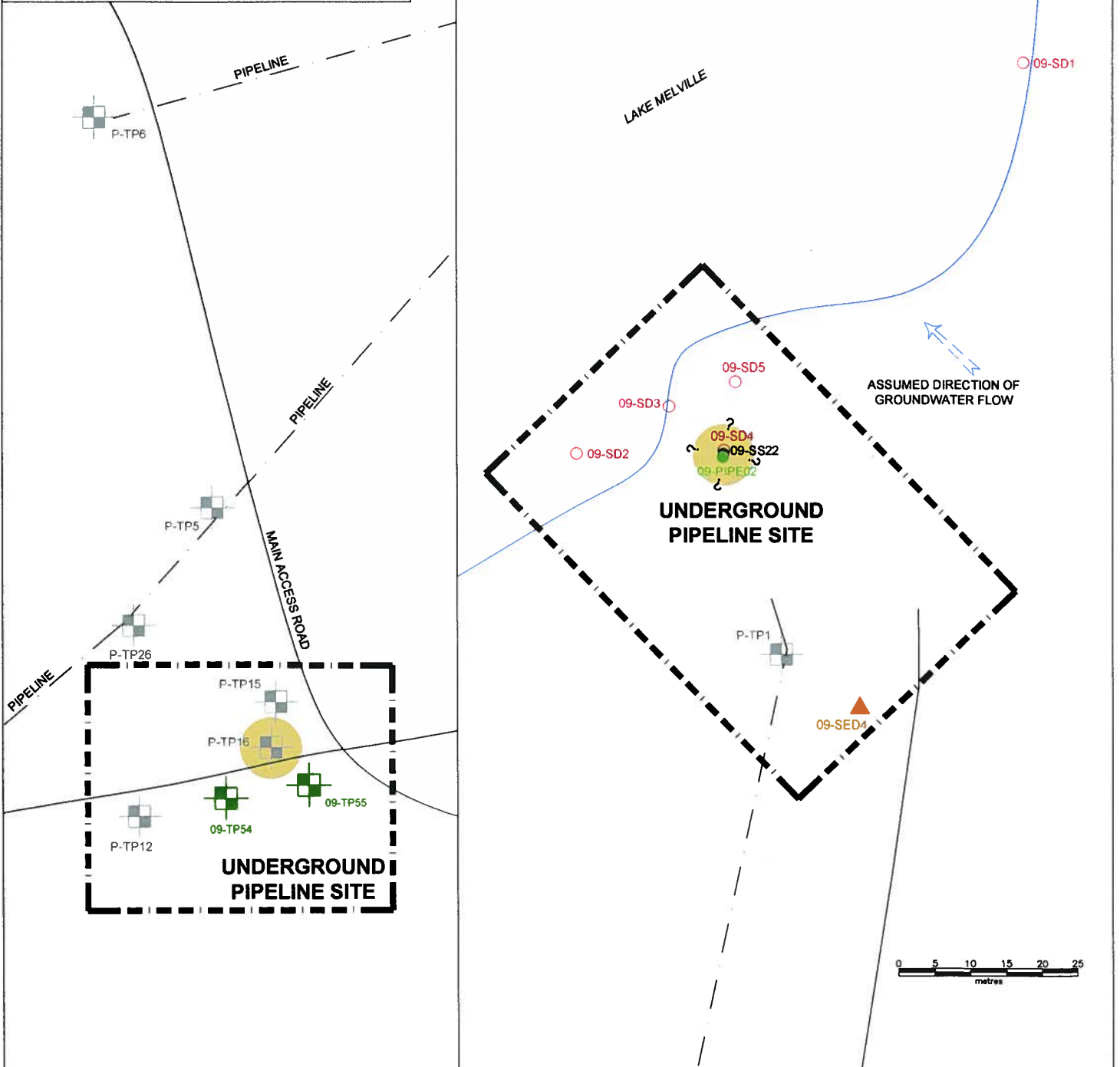
CLIENT:		NEWFOUNDLAND AND LABRADOR DEPARTMENT OF ENVIRONMENT AND CONSERVATION		SCALE: 1:800	DATE: JUNE 17, 2010
PROJECT TITLE:		PHASE III ESA, HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENTS, REMEDIAL ACTION PLAN FOR THE FORMER U.S. MILITARY FACILITY OF NORTHWEST POINT, NL		DRAWN BY: N.M.	CHECKED BY: A.R.
DRAWING TITLE:		SITE PLAN - UNDERGROUND PIPELINE SYSTEM		EDITED BY: -	REV. No. 0
				DRAWING No: 121410105-EE-13A	
				CAD FILE: 1044857-EE-07.DWG	



Stantec

LEGEND

- SURFACE SOIL SAMPLE (STANTEC 2009)
- SURFACE DEBRIS LOCATION (STANTEC 2009)
- PIPE CONTENT SAMPLE (STANTEC 2009)
- ▲ SEDIMENT SAMPLE (STANTEC 2009)
- TEST PIT (STANTEC 2009)
- TEST PIT (AGRA 1999)
- APPROXIMATE EXTENT OF TPH IMPACTS IN SOIL EXCEEDING GENERIC GUIDELINES



NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC CONSULTING LTD. REPORT AND MUST NOT BE USED FOR OTHER PURPOSES.

CLIENT:		NEWFOUNDLAND AND LABRADOR DEPARTMENT OF ENVIRONMENT AND CONSERVATION		SCALE:	1:800	DATE:	JUNE 18, 2010
PROJECT TITLE:		PHASE III ESA, HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENTS, REMEDIAL ACTION PLAN FOR THE FORMER U.S. MILITARY FACILITY OF NORTHWEST POINT, NL		DRAWN BY:	N.M.	CHECKED BY:	A.R.
DRAWING TITLE:		APPROXIMATE EXTENT OF TPH IMPACTS EXCEEDING GENERIC GUIDELINES - UNDERGROUND PIPELINE SYSTEM		EDITED BY:	-	REV. No.	0
				DRAWING No:	121410105-EE-13B		
				CAD FILE:	1044857-EE-10.DWG		



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Appendix 13b

Sample Coordinates

– Underground Pipeline Site

Sample Coordinates - Underground Pipeline Site
Phase III ESA, HHERA and RAP
Former U.S Military Facility, Northwest Point, NL
Stantec Consulting Ltd. Project No. 121410105

Sample ID	Coordinates (NAD27)	
	Easting	Northing
TEST PITS		
09-TP54	694423	5931317
09-TP55	694434	5931319
SURFACE SOIL		
09-SS22	694736	5932308
SEDIMENT		
09-SED4	694735	5932169
MISCELLANEOUS		
09-PIPE02	694736	5932308

Appendix 13c

Test Pit Records




– Underground Pipeline Site



TEST PIT RECORD

CLIENT NL Department of Environment and ConservationPROJECT Phase III ESA, HHRA & ERA, Former US Military FacilityLOCATION Northwest Point, NLDATES (mm-dd-yy): DUG 8-7-09WATER LEVEL 2.2m8-7-09TEST PIT No. 09-TP54PROJECT No. 121410105

DATUM _____




DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES					PID READINGS (ppm)	CHEMICAL ANALYSIS (ppm)				
					TYPE	NUMBER	HYDROCARBON	ODOUR	OTHER TESTS		TPH	BENZENE	TOLUENE	ETHYLBENZENE	XYLENES
0		Compact, brown, SAND with gravel (SP)			BS	1	0			0.6	-	-	-	-	-
1		Compact to dense, grey, SAND with silt (SP-SM)													
2					BS	2	0			0.3	nd	nd	nd	nd	nd
		End of Test Pit													
3		Very slow groundwater seepage observed at 2.2 m depth.													
		Bedrock not encountered.													
4															
5															



TEST PIT RECORD

CLIENT NL Department of Environment and Conservation
PROJECT Phase III ESA, HHRA & ERA, Former US Military Facility
LOCATION Northwest Point, NL
DATES (mm-dd-yy): DUG 8-7-09 WATER LEVEL 2.1m 8-7-09

TEST PIT No. 09-TP55
PROJECT No. 121410105
DATUM _____

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				PID READINGS (ppm)	CHEMICAL ANALYSIS (ppm)				
					TYPE	NUMBER	HYDROCARBON ODOUR	OTHER TESTS		TPH	BENZENE	TOLUENE	ETHYLBENZENE	XYLENES
0		Compact, brown, SAND with gravel (SP)			BS	1	0		0.0	-	-	-	-	-
1		Compact to dense, grey, SAND with silt (SP-SM)												
2				▽	BS	2	0		0.0	nd	nd	nd	nd	nd
3		End of Test Pit												
4		Very slow groundwater seepage observed at 2.1 m depth.												
5		Bedrock not encountered.												

Appendix 13d

Laboratory Analytical Results Summary Tables

– Underground Pipeline Site

Table 13.1 Results of Laboratory Analysis of TPH/BTEX in Soil - Underground Pipeline System
Phase III ESA, HHERA and RAP
Former U.S Military Facility, Northwest Point, NL
Stantec Consulting Ltd. Project No. 121410105

Sample Location	Sample Depth (m)	Benzene	Toluene	Ethyl-benzene	Xylenes	TPH Purgeable (<C ₁₀)	TPH Extractable (C ₁₀ -C ₃₂)	C ₆ -C ₁₀ (Gas Range)	C ₁₀ -C ₂₁ (Fuel Range)	C ₂₁ -C ₃₂ (Lube Range)	Modified TPH - Tier I ²	Resemblance
Units		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	-
Tier I RBSLs ¹		0.16	14	58	17	-	-	-	-	-	140	-
1999 Sampling (AMEC)												
P-TP1	0.3	<0.002	<0.002	<0.002	<0.004	<0.02	<0.2	-	-	-	<0.22	-
P-TP2	2.5	<0.002	<0.002	<0.002	<0.004	<0.02	<0.2	-	-	-	<0.22	-
P-TP3	2.5	<0.002	<0.002	<0.002	<0.004	<0.02	<0.2	-	-	-	<0.22	-
P-TP4	0.5	<0.002	<0.002	<0.002	<0.004	<0.02	18	-	-	-	18	NRD/G
P-TP5	1.5	<0.002	<0.002	<0.002	<0.004	<0.02	<0.2	-	-	-	<0.20	-
P-TP6	1.5	<0.002	<0.002	<0.002	<0.004	<0.02	<0.2	-	-	-	<0.20	-
P-TP8	1.5	<0.002	<0.002	<0.002	<0.004	<0.02	<0.2	-	-	-	<0.22	-
P-TP9	1.5	<0.002	<0.002	<0.002	<0.004	<0.02	<0.2	-	-	-	<0.22	-
P-TP10	0.75	<0.002	<0.002	<0.002	<0.004	0.52	<0.2	-	-	-	<0.72	NRD/G
P-TP11	0.75	<0.002	<0.002	<0.002	<0.004	0.12	<0.2	-	-	-	<0.32	NRD/G
P-TP12	0.75	<0.002	<0.002	<0.002	<0.004	0.13	<0.2	-	-	-	<0.33	NRD/G
P-TP13	0.5	<0.002	<0.002	<0.002	<0.004	<0.02	<0.2	-	-	-	<0.22	-
P-TP14	2.5	4.1	8.6	5.6	49.3	555	2140	-	-	-	2,695	D
P-TP15	0.5	<0.002	<0.002	<0.002	<0.004	<0.02	<0.2	-	-	-	<0.22	-
P-TP16	0.5	<0.002	<0.002	<0.002	<0.004	<0.02	<0.2	-	-	-	<0.22	-
P-TP16 (Cable Wrap)	0.5	<0.4	<0.4	<0.4	<0.8	<4	6,800	-	-	-	6,804	D
P-TP17	0.5	<0.002	<0.002	<0.002	<0.004	<0.02	54	-	-	-	54	NRD/G
P-TP17 Replicate	0.5	<0.002	<0.002	<0.002	<0.004	<0.02	43	-	-	-	43	NRD/G
P-TP18	0.5	<0.002	<0.002	<0.002	<0.004	<0.02	<0.2	-	-	-	<0.22	-
P-TP19	1.5	<0.002	<0.002	<0.002	<0.004	<0.02	13	-	-	-	13	NRD/G
P-TP20	0.5	<0.002	<0.002	<0.002	<0.004	<0.02	>0.2	-	-	-	<0.22	-
P-TP21	0.5	<0.002	<0.002	<0.002	<0.004	<0.02	<0.2	-	-	-	<0.22	-
P-TP22	0.5	<0.4	<0.4	0.8	1.5	69	15,900	-	-	-	15,969	D
P-TP26	1.5	<0.002	<0.002	<0.002	<0.004	<0.02	<0.2	-	-	-	<0.22	-
P-TP28	1.5	<0.002	<0.002	<0.002	<0.004	<0.02	<0.2	-	-	-	<0.22	-
P-TP29	0.5	<0.002	<0.002	<0.002	<0.004	<0.02	<0.2	-	-	-	<0.22	-
P-TP30	1.5	<0.002	<0.002	<0.002	<0.004	<0.02	<0.2	-	-	-	<0.22	-
P-TP31	0.75	5	6.5	22.4	38.7	699	795	-	-	-	1,494	D
P-TP35	0.5	<0.4	<0.4	<0.4	1.26	62.9	22,200	-	-	-	22,263	D
P-TP36	0.5	<0.002	<0.002	<0.002	<0.004	<0.02	<0.2	-	-	-	<0.22	-
P-TP37	0.5	<0.4	<0.4	<0.4	2.3	128	9,370	-	-	-	9,498	D
P-TP37 Replicate	0.5	<0.4	<0.4	<0.4	2.4	132	11,500	-	-	-	11,632	D
P-TP39	0.5	<0.002	<0.002	<0.002	<0.004	<0.02	<0.2	-	-	-	<0.22	-
P-T2	2.5	<0.002	<0.002	<0.002	<0.004	<0.02	<0.2	-	-	-	<0.22	-
MDL	-	0.002	0.002	0.002	0.002	0.02	0.2	-	-	-	0.2	-

Table 13.1 Results of Laboratory Analysis of TPH/BTEX in Soil - Underground Pipeline System
Phase III ESA, HHERA and RAP
Former U.S Military Facility, Northwest Point, NL
Stantec Consulting Ltd. Project No. 121410105

Sample Location	Sample Depth (m)	Benzene	Toluene	Ethyl-benzene	Xylenes	TPH Purgeable (<C ₁₀)	TPH Extractable (C ₁₀ -C ₃₂)	C ₆ -C ₁₀ (Gas Range)	C ₁₀ -C ₂₁ (Fuel Range)	C ₂₁ -C ₃₂ (Lube Range)	Modified TPH - Tier I ²	Resemblance
Units		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	-
Tier I RBSLs¹		0.16	14	58	17	-	-	-	-	-	140	-
2009 Sampling (Stantec)												
09-TP54-BS2	1.9 - 2.4	<0.03	<0.03	<0.03	<0.05	-	-	<3	<15	<15	<20	-
09-TP55-BS2	1.9 - 2.4	<0.03	<0.03	<0.03	<0.05	-	-	<3	<15	<15	<20	-
09-TP55-BS2 Lab-Dup	1.9 - 2.4	<0.03	<0.03	<0.03	<0.05	-	-	<3	<15	<15	-	-
09-SS22	0.0 - 0.15	<0.03	<0.03	<0.03	<0.05	-	-	<3	63	140	210	WFO/PLO
RDL	-	0.03	0.03	0.03	0.05	-	-	3	15	15	20	-

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

MDL = Method Detection Limit; RDL = Reportable Detection Limit for routine analysis

< # = Not detected above MDL/RDL noted

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

NRG/D = No resemblance to gasoline or diesel; D = Diesel; WFO = Weathered fuel oil; PLO = Possible Lube Oil

Table 13.2 Results of Laboratory Analysis of Metals in Soil - Underground Pipeline System
Phase III ESA, HHERA and RAP
Former U.S Military Facility, Northwest Point, NL
Stantec Consulting Ltd. Project No. 121410105

Parameters	Units	Criteria ¹	1999 Sampling (AMEC)				2009 Sampling (Stantec)	
			P-TP14	P-TP20	P-TP22	MDL	09-SS22	RDL
Sample Depth (m)			2.5	0.5	0.5	-	0.0 - 0.15	-
Aluminum	mg/kg	-	8,760	4,240	3,050	5	4,200	10
Antimony	mg/kg	20	<0.1	-	<0.1	0.1	<2	2
Arsenic	mg/kg	12	0.4	-	0.3	0.1	<2	2
Barium	mg/kg	500	69	27	17	1	37	5
Beryllium	mg/kg	4	0.2	<0.2	<0.2	0.2	<2	2
Bismuth	mg/kg	-	<0.2	<0.2	<0.2	0.2	<2	2
Boron	mg/kg	-	-	-	-	-	<5	5
Cadmium	mg/kg	10	<0.5	<0.5	<0.5	0.5	<0.3	0.3
Chromium	mg/kg	64	19	9	5	1	12	2
Cobalt	mg/kg	50	5	2	1	1	3	1
Copper	mg/kg	63	14	4	4	1	8	2
Iron	mg/kg	-	12,300	5,560	5,060	5	9,400	50
Lead	mg/kg	140	<5	<5	6	5	5.5	0.5
Lithium	mg/kg	-	-	-	-	-	4	2
Manganese	mg/kg	-	209	68	52	1	110	2
Mercury	mg/kg	6.6	0.03	-	0.0	0.01	<0.1	0.1
Molybdenum	mg/kg	10	<4	<4	<4	4	<2	2
Nickel	mg/kg	50	11	<5	<5	5	6	2
Rubidium	mg/kg	-	-	-	-	-	7	2
Selenium	mg/kg	1	<0.1	-	<0.1	0.1	<1	1
Silver	mg/kg	20	<5	<5	<5	5	<0.5	0.5
Strontium	mg/kg	-	-	-	-	-	12	5
Thallium	mg/kg	1	-	-	-	-	<0.1	0.1
Tin	mg/kg	-	-	-	-	-	3	2
Uranium	mg/kg	23	-	-	-	-	0.3	0.1
Vanadium	mg/kg	130	29	16	11	5	20	2
Zinc	mg/kg	200	25	9	10	2	18	5

Notes:

1 = CCME Canadian Soil Quality Guidelines for Protection of Environmental and Human Health at a Residential/Parkland site (2007)

MDL = Method Detection Limit; RDL = Reportable Detection Limit for routine analysis

< # = Not detected above MDL/RDL noted

"-" = No applicable guideline

**Table 13.3 Results of Laboratory Identification of Free Product Samples - Underground Pipeline System
Phase III ESA, HHERA and RAP
Former U.S Military Facility, Northwest Point, NL
Stantec Consulting Ltd. Project No. 121410105**

Sample Location	Product Identification
09-PIPE2	One product in fuel oil range resembling stove oil.

Table 13.4 Results of Laboratory Analysis of TPH/BTEX in Groundwater - Underground Pipeline System

Phase III ESA, HHERA and RAP

Former U.S Military Facility, Northwest Point, NL

Stantec Consulting Ltd. Project No. 121410105

Sample Location	Benzene	Toluene	Ethylbenzene	Xylenes	TPH Purgeable ($<C_{10}$)	TPH Extractable ($C_{10}-C_{32}$)	Modified TPH - Tier I ²	Resemblance
MDL	0.0002	0.0002	0.00022	0.00023	0.005	0.05	0.05	-
Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	-
Tier I RBSLs¹	1	20	20	20	-	-	12/20/20	-
1999 Sampling (AMEC)								
P-TP18	<0.0002	<0.0002	<0.00022	<0.00023	<0.005	<0.05	<0.05	-
P-TP39	<0.0002	<0.0002	<0.00022	<0.00023	<0.005	<0.05	<0.05	-

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

MDL = Method Detection Limit

< # = Not detected above MDL noted

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

Table 13.5 Results of Laboratory Analysis of TPH/BTEX in Standing Water - Underground Pipeline System

Phase III ESA, HHERA and RAP

Former U.S Military Facility, Northwest Point, NL

Stantec Consulting Ltd. Project No. 121410105

Sample Location	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 ¹	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	-
Criteria	na	na	na	na	na	na	na	na	-
2009 Sampling (Stantec)									
09-PIPE2	0.007	0.008	<0.001	0.007	5.5	1,100	3.7	1,100	WFO

Notes:

1 = Modified TPH - Tier I does not include BTEX

RDL = Reportable Detection Limit for routine analysis

< # = Not detected above RDL noted

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

WFO = Weathered fuel oil

na = No applicable guideline

Table 13.6 Results of Laboratory Analysis of TPH/BTEX in Sediment - Underground Pipeline System

Phase III ESA, HHERA and RAP

Former U.S Military Facility, Northwest Point, NL

Stantec Consulting Ltd. Project No. 121410105

Sample Location	Benzene	Toluene	Ethyl Benzene	Xylenes	C ₆ -C ₁₀ (Gas Range)	C ₁₀ -C ₂₁ (Fuel Range)	C ₂₁ -C ₃₂ (Lube Range)	Modified TPH 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	-
Criteria ¹	-	-	-	-	-	-	-	1,500	-
2009 Sampling (Stantec)									
09-SED4	<0.03	<0.03	<0.03	<0.05	<3	19	71	90	NRP

Notes:

1 = Ontario Ministry of Environment Guideline for sediments to be used as lake fill material (1993). 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

< # = Not detected above RDL noted

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

NFP = No resemblance to petroleum products

Table 13.7 Results of Laboratory Analysis of Metals in Sediment - Underground Pipeline System
Phase III ESA, HHERA and RAP
Former U.S Military Facility, Northwest Point, NL
Stantec Consulting Ltd. Project No. 121410105

Parameters	RDL	Units	Criteria ¹	Criteria ²	2009 Sampling (Stantec)
					09-SED4
Aluminum	10	mg/kg	-	-	1,900
Antimony	2	mg/kg	-	-	<2
Arsenic	2	mg/kg	5.9	17	<2
Barium	5	mg/kg	-	-	17
Beryllium	2	mg/kg	-	-	<2
Bismuth	2	mg/kg	-	-	<2
Boron	5	mg/kg	-	-	<5
Cadmium	0.3	mg/kg	0.6	3.5	<0.3
Chromium	2	mg/kg	37.3	90	5
Cobalt	1	mg/kg	-	-	1
Copper	2	mg/kg	35.7	197	3
Iron	50	mg/kg	-	-	3,600
Lead	0.5	mg/kg	35	91.3	2.4
Lithium	2	mg/kg	-	-	<2
Manganese	2	mg/kg	-	-	33
Mercury	0.1	mg/kg	-	-	<0.1
Molybdenum	2	mg/kg	-	-	<2
Nickel	2	mg/kg	-	-	3
Rubidium	2	mg/kg	-	-	3
Selenium	1	mg/kg	-	-	<1
Silver	0.5	mg/kg	-	-	<0.5
Strontium	5	mg/kg	-	-	6
Thallium	0.1	mg/kg	-	-	<0.1
Tin	2	mg/kg	-	-	<2
Uranium	0.1	mg/kg	-	-	0.1
Vanadium	2	mg/kg	-	-	9
Zinc	5	mg/kg	123	315	9

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

< = Not detected above RDL noted

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