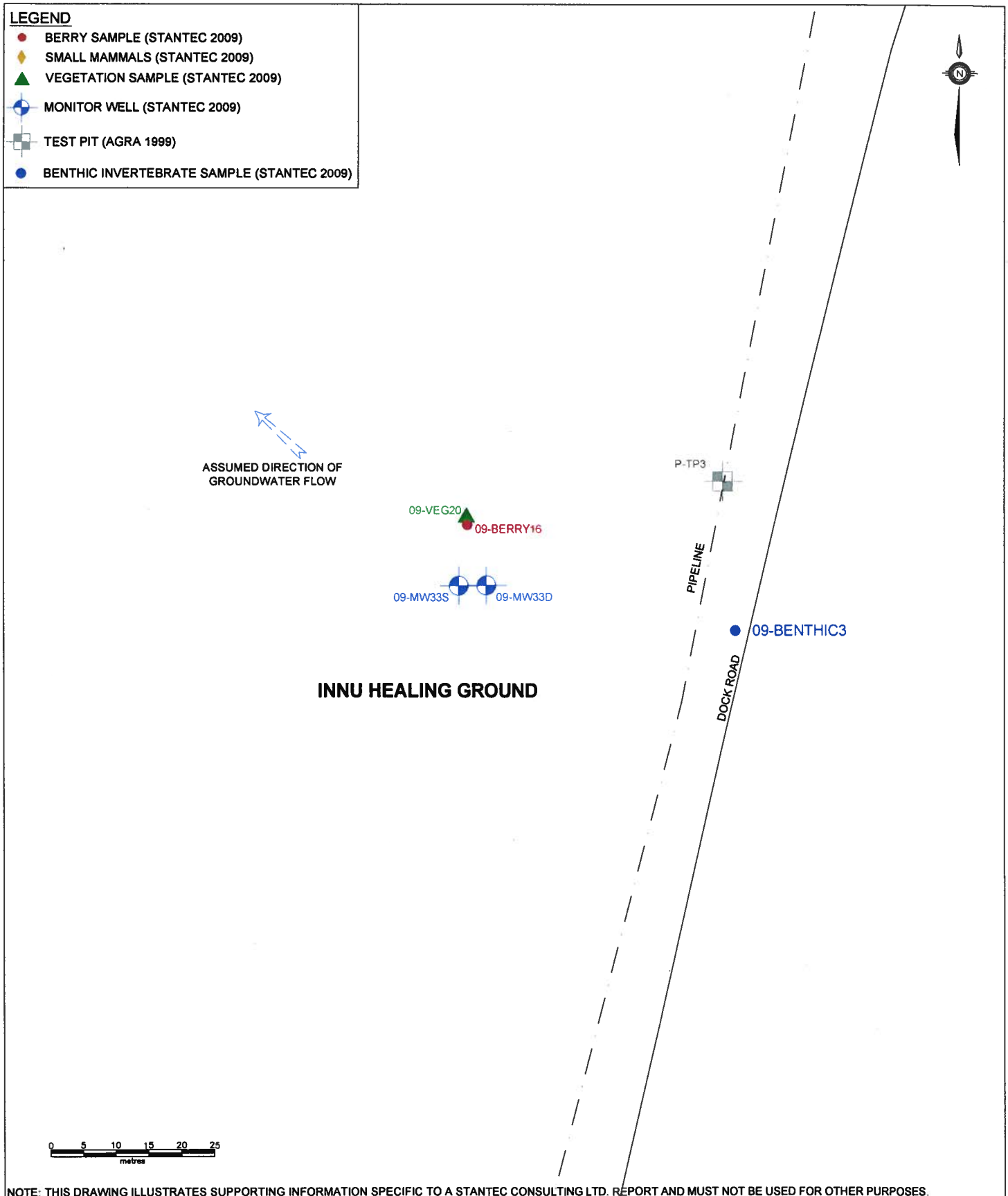
Appendix 18a

Site Drawings

– Innu Healing Ground



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
	DRAWN BY: N.M.
	CHECKED BY: A.R.
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	EDITED BY: -
	REV. No. 0
DRAWING TITLE: SITE PLAN - INNU HEALING GROUND	DRAWING No: 121410105-EE-18A
	CAD FILE: 1044857-EE-07.DWG

Stantec

17JUN10 1:00PM

Appendix 18b

Sample Coordinates

– Innu Healing Ground

Sample Coordinates - Innu Healing Ground
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
MONITOR WELLS		
09-MW33S	694623	5931850
09-MW33D	694623	5931850
BENTHIC		
09-BENTHIC3	Not recorded	
VEGETATION		
09-VEG20	694771	5932114
BERRIES		
09-BERRY16	694777	5932106

Appendix 18c

Monitor Well Records

– Innu Healing Ground

MONITOR WELL RECORD

Stantec

BOREHOLE No. **09-MW33S**
PAGE **1** of **1**
PROJECT No. **121410105**
DRILLING METHOD **Auger**
SIZE **100mm HS**
DATUM

CLIENT **NL Department of Enviroment and Conservation**
PROJECT **Phase III ESA, HHRA & ERA, Former US Military Facility**
LOCATION **Northwest Point, NL**
DATES (mm-dd-yy): BORING **8-9-09** WATER LEVEL **4.57m** **8-9-09**

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY mm	SAMPLES N-VALUE OR RQD %	HYDROCARBON ODOUR	APPARENT MOISTURE CONTENT	PID (ppm)	TPH (ppm)	WELL CONSTRUCTION DETAILS (0.61 m STICK UP)
0													CAST IRON WELL HEAD
0		Dark brown, SAND (SP); some organics			SS	1	305	20	0		0.0	-	
1		Dark brown, SAND (SP); some cobbles			SS	2	205	38	0		0.0	-	BENTONITE
2		Grey, SAND (SP)			SS	3	255	28	0		0.0	-	
2		Light brown to grey, SAND (SP); some cobbles			SS	4	305	26	0		0.0	-	
3		Grey to brown, SAND (SP)			SS	5	355	40	0		0.0	-	50 mm DIAMETER No. 10 SLOT PVC SCREEN IN No. 2 SILICA SAND PACK
5				▼	SS	6	405	43	0		0.0	-	
6					SS	7	-	45	0		0.0	-	
7					SS	8	-		0		-	-	
7		Light brown, SAND (SP); some cobbles											END CAP
8		End of Borehole											
9													
10													

MONITOR WELL RECORD

BOREHOLE No. **09-MW33D**
PAGE **1** of **2**
PROJECT No. **121410105**
DRILLING METHOD **Auger**
SIZE **100mm HS**
DATUM

CLIENT **NL Department of Enviroment and Conservation**
PROJECT **Phase III ESA, HHRA & ERA, Former US Military Facility**
LOCATION **Northwest Point, NL**
DATES (mm-dd-yy): BORING **8-8-09** to **8-9-09** WATER LEVEL **3.66m** **8-8-09**

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY mm	SAMPLES N-VALUE OR RQD %	HYDROCARBON ODOUR	APPARENT MOISTURE CONTENT	PID (ppm)	TPH (ppm)	WELL CONSTRUCTION DETAILS (0.61 m STICK UP)
0		Light brown, SAND (SP); some cobbles and organics			SS	1	405	18	0		0.0	-	CAST IRON WELL HEAD
1		Grey, SAND (SP); some cobbles			SS	2	150	36	0		-	-	
2					SS	3	480	26	1		21.2	nd	BENTONITE
		Grey, SAND (SP)			SS	4	560	18	1		0.3	-	
3				▼	SS	5	510	31	0		0.8	-	
4					SS	6	-	42	0		0.2	-	
5		Grey, SAND (SP); some cobbles			SS	7	305	93	0		0.1	60	
6					SS	8	305	71/610	0		0.1	-	50 mm DIAMETER No. 10 SLOT PVC SCREEN IN No. 2 SILICA SAND PACK
7		Grey, silty SAND (SM)			SS	9	405	97/125	0		-	-	END CAP
8													
9													
10													

Stantec

MONITOR WELL RECORD

BOREHOLE No. **09-MW33D**
PAGE **2** of **2**
PROJECT No. **121410105**
DRILLING METHOD **Auger**
SIZE **100mm HS**
DATUM

CLIENT **NL Department of Enviroment and Conservation**
PROJECT **Phase III ESA, HHRA & ERA, Former US Military Facility**
LOCATION **Northwest Point, NL**
DATES (mm-dd-yy): BORING **8-8-09** to **8-9-09** WATER LEVEL **3.66m** **8-8-09**

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY	SAMPLES N-VALUE OR RQD %	HYDROCARBON ODOUR	APPARENT MOISTURE CONTENT	PID (ppm)	TPH (ppm)	WELL CONSTRUCTION DETAILS
		Continued from Previous Page					mm						
10													
		End of Borehole											
11													
12													
13													
14													
15													
16													
17													
18													
19													
20													

Appendix 18d

Laboratory Analytical Results Summary Tables

– Innu Healing Ground

Table 18.1 Results of Laboratory Analysis of TPH/BTEX in Soil - Innu Healing Ground
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	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		0.03	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	-
Tier I RBSLs[1]		0.16	14	58	17	-	-	-	690	-
2009 Sampling (Stantec)										
MW33D-SS3	1.5 - 2.2	<0.03	<0.03	<0.03	<0.05	<3	<15	<15	<20	-
MW33D-SS7	4.6 - 5.2	<0.03	<0.03	<0.03	<0.05	<3	<15	60	60	LO

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, lube oil impacts (September, 2003)
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
LO = Lube oil fraction

Table 18.2 Results of Laboratory Analysis of Metals in Soil - Innu Healing Ground
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]	2009 Sampling (Stantec)
				09-MW33D-SS7
			Sample Depth (m)	4.6 - 5.2
Aluminum	10	mg/kg	-	2,500
Antimony	2	mg/kg	20	<2
Arsenic	2	mg/kg	12	<2
Barium	5	mg/kg	500	38
Beryllium	2	mg/kg	4	<2
Bismuth	2	mg/kg	-	<2
Boron	5	mg/kg	-	<5
Cadmium	0.3	mg/kg	10	<0.3
Chromium	2	mg/kg	64	13
Cobalt	1	mg/kg	50	3
Copper	2	mg/kg	63	9
Iron	50	mg/kg	-	7,900
Lead	0.5	mg/kg	140	1.8
Lithium	2	mg/kg	-	2
Manganese	2	mg/kg	-	83
Mercury	0.1	mg/kg	6.6	<0.1
Molybdenum	2	mg/kg	10	<2
Nickel	2	mg/kg	50	5
Rubidium	2	mg/kg	-	5
Selenium	2	mg/kg	1	<2
Silver	0.5	mg/kg	20	<0.5
Strontium	5	mg/kg	-	9
Thallium	0.1	mg/kg	1	<0.1
Tin	2	mg/kg	-	<2
Uranium	0.1	mg/kg	23	0.3
Vanadium	2	mg/kg	130	18
Zinc	5	mg/kg	200	13

Notes:
1 = CCME Canadian Soil Quality Guidelines for Protection of Environmental and Human Health at a Residential/Parkland site (2007)
RDL = Reportable Detection Limit for routine analysis
< # = Not detected above RDL noted
"-" = No applicable guideline

Table 18.3 Results of Laboratory Analysis of PCBs in Soil - Innu Healing Ground
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)	Polychlorinated Biphenyls (PCBs)
	RDL	0.05
	Units	ug/g
	Criteria[1]	1.3
2009 Sampling (Stantec)		
09-MW33D-SS7	4.6 - 5.2	<0.05

Notes:
1 = CCME Canadian Soil Quality Guidelines for a Residential/Parkland site (2007)
RDL = Reportable Detection Limit for routine analysis

Table 18.4 Results of Laboratory Analysis of TPH/BTEX in Groundwater - Innu Healing Ground
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[2]	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	-
Tier I RBSLs[1]	1	20	20	20	-	-	-	12/20/20	-
2009 Sampling (Stantec)									
09-MW33S	<0.001	<0.001	<0.001	<0.002	<0.01	0.08	0.2	0.2	WFO/LO
09-MW33S Lab-Dup	-	-	-	-	-	0.10	0.2	-	-
09-MW33D	<0.001	<0.001	<0.001	<0.002	<0.01	0.20	0.2	0.4	WFO/LO

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
Lab-Dup = Laboratory duplicate sample
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; LO= Lube oil

Table 18.5 Results of Laboratory Analysis of Dissolved Metals in Groundwater - Innu Healing Ground
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]	2009 Sampling (Stantec)	
				09-MW33S	09-MW33D
Aluminum	5.0	ug/L	-	59.4	33.0
Antimony	2.0	ug/L	16,000	<2.0	<2.0
Arsenic	2.0	ug/L	480	<2.0	<2.0
Barium	5.0	ug/L	23,000	11.6	12.9
Beryllium	2.0	ug/L	53	<2.0	<2.0
Bismuth	2.0	ug/L	-	<2.0	<2.0
Boron	5.0	ug/L	50,000	<5.0	23.0
Cadmium	0.017	ug/L	11	<0.017	0.038
Chromium	1.0	ug/L	2,000	<1.0	<1.0
Cobalt	0.40	ug/L	100	0.46	<0.40
Copper	2.0	ug/L	23	<2.0	7.1
Iron	50	ug/L	-	65	<50
Lead	0.50	ug/L	32	<0.50	<0.50
Manganese	2.0	ug/L	-	239	73.7
Mercury	0.02	ug/L	0.12	0.015	<0.02
Molybdenum	2.0	ug/L	7,300	<2.0	13.1
Nickel	2.0	ug/L	1,600	<2.0	<2.0
Selenium	1.0	ug/L	50	<1.0	<1.0
Silver	0.10	ug/L	1.2	<0.10	<0.10
Strontium	5.0	ug/L	-	38.0	38.6
Thallium	0.10	ug/L	400	<0.10	<0.10
Tin	2.0	ug/L	-	<2.0	<2.0
Titanium	2.0	ug/L	-	3.3	<2.0
Uranium	0.10	ug/L	-	<0.10	0.32
Vanadium	2.0	ug/L	200	<2.0	<2.0
Zinc	5.0	ug/L	1,100	8.7	<5.0

Notes:
1 = Ontario Ministry of the Environment (MOE) Soil, Groundwater and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act. March 28, 2004. Non-Potable Groundwater.
< # = Not detected above RDL noted
"-" = No applicable guideline

Table 18.6 Results of Laboratory Analysis of General Chemistry in Groundwater - Innu Healing Ground
Phase III ESA, HHERA and RAP
Former U.S Military Facility, Northwest Point, NL
Stantec Consulting Ltd. Project No. 121410105

Parameter	RDL	Units	Criteria[1]	2009 Sampling (Stantec)
				09-MW33D
Metals				
Dissolved Calcium	0.1	mg/L	-	4.2
Dissolved Magnesium	0.1	mg/L	-	3.6
Dissolved Phosphorus	0.1	mg/L	<0.004 to >0.1[3]	<0.1
Dissolved Potassium	0.1	mg/L	-	7.8
Dissolved Sodium	0.1	mg/L	-	11
Calculated Parameters				
Anion Sum	N/A	me/L	-	1.13
Bicarb. Alkalinity (calc. as $CaCO_3$)	1	mg/L	-	48
Calculated TDS	1	mg/L	-	76
Carb.Alkalinity (calc. as $CaCO_3$)	1	mg/L	-	<1
Cation Sum	N/A	me/L	-	1.18
Hardness ($CaCO_3$)	1	mg/L	-	26
Ion Balance (% Difference)	N/A	%	-	2.16
Langelier Index (@ 20C)	-	N/A	-	-1.30
Langelier Index (@ 4C)	-	N/A	-	-1.55
Nitrate (N)	0.05	mg/L	2.9	<0.05
Saturation pH (@20C)	-	N/A	-	9.02
Saturation pH (@4C)	-	N/A	-	9.27
Inorganics				
Total Alkalinity (Total as $CaCO_3$)	5	mg/L	-	48
Dissolved Chloride (Cl)	1	mg/L	-	3
Colour	5	TCU	-	9
Nitrate + Nitrite	0.05	mg/L	-	<0.05
Nitrite (N)	0.01	mg/L	0.06	<0.01
Nitrogen (Ammonia Nitrogen)	0.05	mg/L	-	<0.05
Total Organic Compound	50	mg/L	-	69(3)
Orthophosphate (P)	0.01	mg/L	-	0.01
pH	N/A	pH	6.5 - 9	7.72
Reactive Silica (SO_2)	0.5	mg/L	-	14
Dissolved Sulphate (SO_4)	2	mg/L	-	4
Turbidity	10	NTU	Narritive[2]	780
Conductivity	1	uS/cm	-	110

Notes:
1 = CCME Water Quality Guidelines for the protection of freshwater aquatic life (2007)
2 = Maximum increase of 8 NTUs from background levels when background levels are between 8 and 80 NTUs
3 = Phosphorous guideline is dependant on trophic status of the freswater environment
RDL = Reportable Detection Limit
< # = Not detected above RDL noted
"-" = indicates value is not available or does not apply
(3) Elevated detection limit due to matrix interference

Table 18.7 Results of Laboratory Analysis of PCBs in Vegetation - Innu Healing Ground
Phase III ESA, HHERA and RAP
Former U.S Military Facility, Northwest Point, NL
Stantec Consulting Ltd. Project No. 121410105

Sample Location	Polychlorinated Biphenyls (PCBs)
RDL	0.05
Units	ug/L
Criteria	na
2009 Sampling (Stantec)	
09-VEG20	<0.3

Notes:
RDL = Reportable Detection Limit
na = No applicable guideline
< # = Not detected above RDL noted

Table 18.8 Results of Laboratory Analysis of PCBs in Berries - Innu Healing Ground
Phase III ESA, HHERA and RAP
Former U.S Military Facility, Northwest Point, NL
Stantec Consulting Ltd. Project No. 121410105

Sample Location	Polychlorinated Biphenyls (PCBs)
RDL	0.05
Units	ug/g
Criteria	na
2009 Sampling (Stantec)	
09-BERRY16	<0.05

Notes:
RDL = Reportable Detection Limit
na = No applicable guideline
< # = Not detected above RDL noted

Appendix 18e

Results of Hydraulic Response (Bail-Down) Test

– Innu Healing Ground

Stantec Consulting Ltd.
607 Torbay Road
St. John's, NL, A1A 4Y6
Stantec Tel: (709) 576-1458

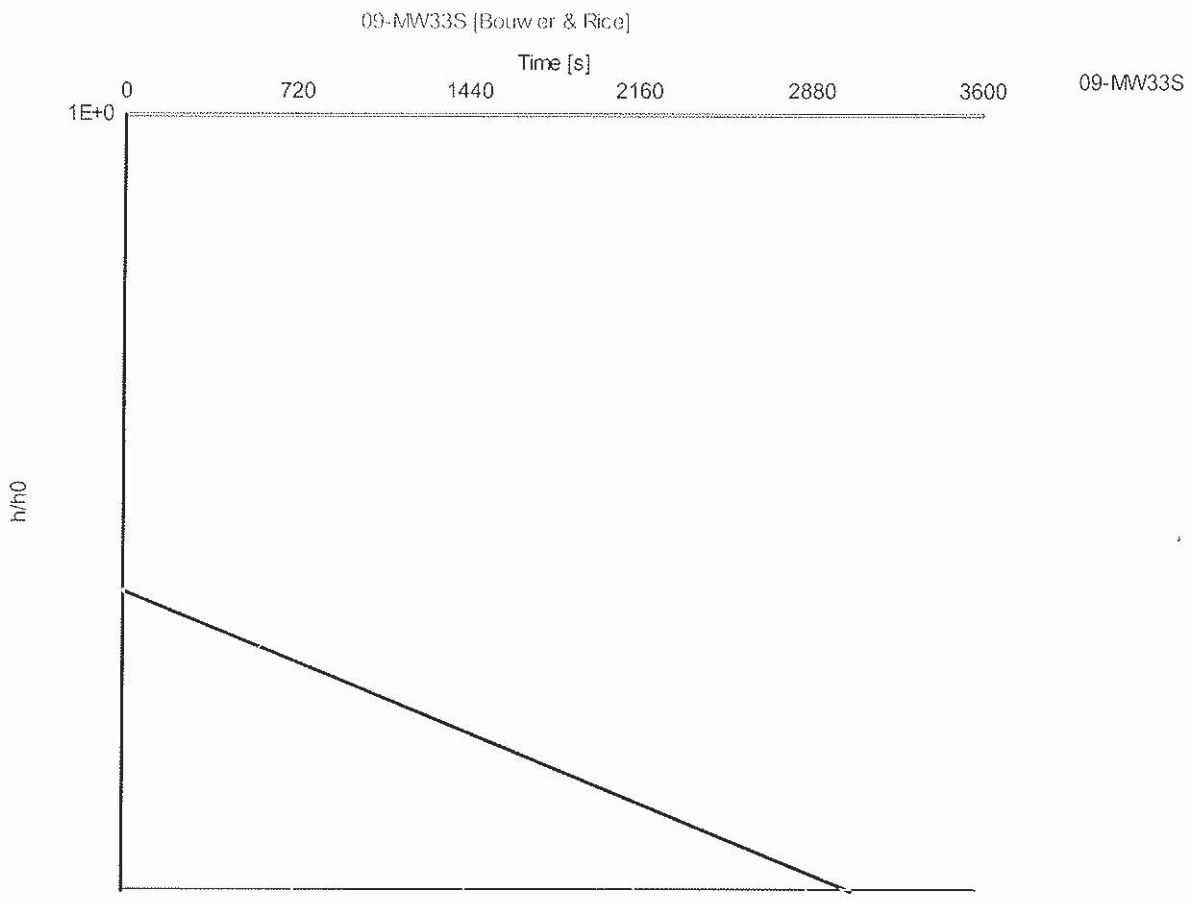
Slug Test Data Report
Project: Northwest Point
Number: 121410105
Client: NLDEC

Test Well:	**09-MW33S**	**Slug Test:**	**09-MW33S**
		Test Well:	09-MW33S
Depth to Static WL:	6.3 [m]	Casing radius:	0.025 [m]
Location:		Boring radius:	0.05 [m]
Recorded by:	Stantec	Screen length:	6.1 [m]
Date:	8/27/2009	Aquifer Thickness:	1.87 [m]

	Time [s]	Depth to WL [m]	Drawdown [m]
1	5	6.86	0.56
2	10	6.72	0.42
3	15	6.65	0.35
4	20	6.60	0.30
5	30	6.58	0.28
6	40	6.56	0.26
7	50	6.55	0.25
8	60	6.55	0.25
9	90	6.54	0.24
10	120	6.53	0.23
11	180	6.52	0.22
12	240	6.52	0.22
13	300	6.51	0.21
14	600	6.48	0.18
15	900	6.46	0.16
16	1200	6.44	0.14
17	1500	6.43	0.13
18	1800	6.43	0.13
19	2400	6.42	0.12
20	3000	6.41	0.11
21	3600	6.41	0.11

Stantec Consulting Ltd.
607 Torbay Road
St. John's, NL, A1A 4Y6
Tel: (709) 576-1458

Slug Test Analysis Report
Project: Northwest Point
Number: 121410105
Client: NLDEC



Slug Test: **09-MW33S**

Analysis Method: **Bouwer & Rice**

Analysis Results:

Conductivity: 3.17E-8 [m/s]

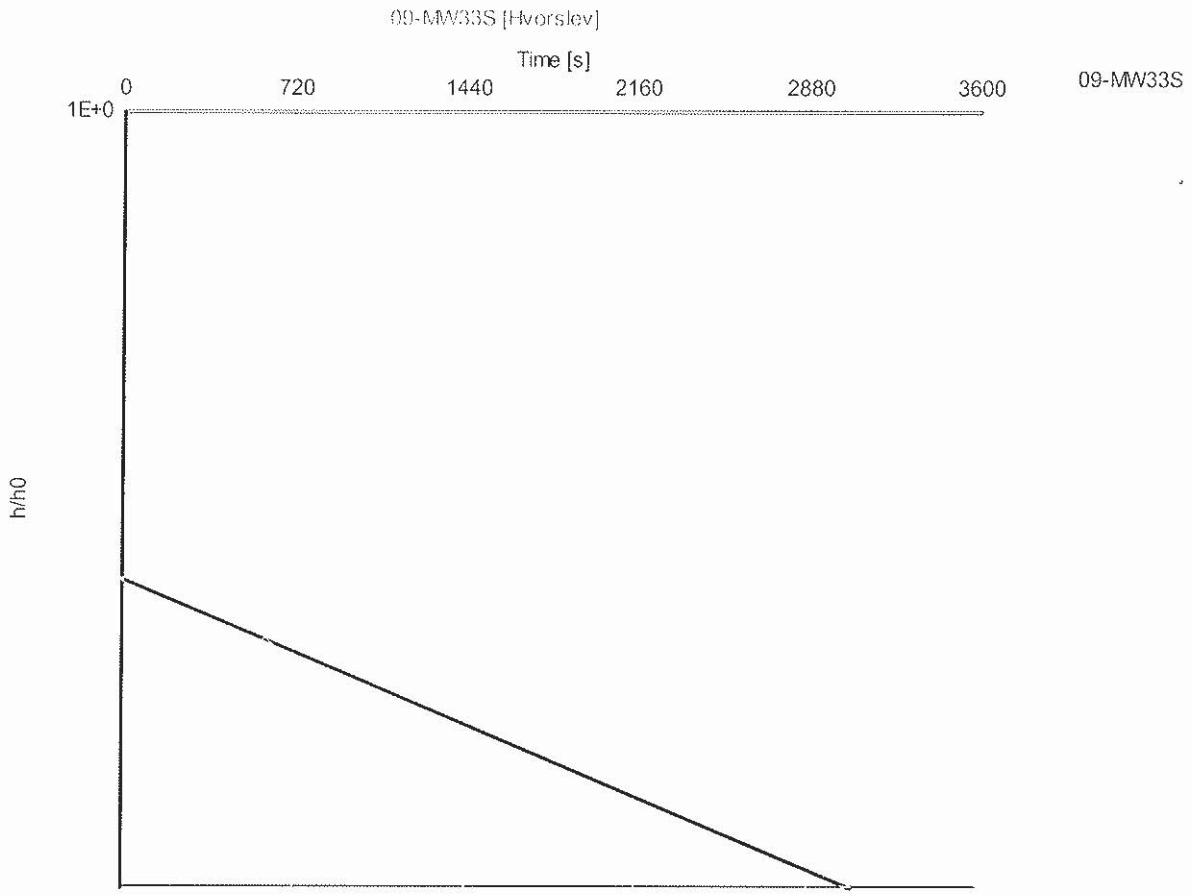
Test parameters:				
	Test Well:	09-MW33S	Aquifer Thickness:	1.87 [m]
	Casing radius:	0.025 [m]	Gravel Pack Porosity (%)	25
	Screen length:	6.1 [m]		
	Boring radius:	0.05 [m]		
	r(eff):	0.033 [m]		

Comments:

Evaluated by: AR
Evaluation Date: 6/9/2010

Stantec Consulting Ltd.
607 Torbay Road
St. John's, NL, A1A 4Y6
Tel: (709) 576-1458

Slug Test Analysis Report
Project: Northwest Point
Number: 121410105
Client: NLDEC



Slug Test: **09-MW33S**

Analysis Method: **Hvorslev**

Analysis Results:

Conductivity: 5.36E-8 [m/s]

Test parameters:

Test Well:	09-MW33S	Aquifer Thickness:	1.87 [m]
Casing radius:	0.025 [m]		
Screen length:	6.1 [m]		
Boring radius:	0.05 [m]		

Comments:

Evaluated by: AR

Evaluation Date: 6/9/2010