Stantec

Memo

To: Mr. Claude Lavallee
PO Box 84
Arctic Bay NU
X0A 0A0

From: Malcolm Stephenson
Annick St-Amand
845 Prospect Street
Fredericton, NB E3B 2T7
Phone: 1-506-452-7000
Fax: 1-506-452-0112

File: 121810955

Date: March 20, 2015

2015 Nanisivik Monitoring Program

Hi Claude,

When you get this box, please give us a call:

- Annick at 1-506-457-3278 or 1-506-440-5028 (cell)
- Malcolm at 1-506-457-9623.

Enclosed you will find a new sampling book for the 2015 sampling season that reflects the requirements of the new Water Licence for the former mine site as well as calibration instructions for the pH/Conductivity meter. If you are experiencing any difficulties with the pH meters, please let us know right away so that a replacement meter can be procured if necessary.

The sampling book is very similar to previous years and should be used every time you go in the field.

Please note that the field book has been updated to reflect the changes in sampling frequency, stations, data requirements and analysis groups required by the new water licence for the former mine site.

Any questions give us a call or send us an email.

Thanks,

Annick and Malcolm

Annick.St-Amand@stantec.com

Malcolm.Stephenson@stantec.com

Stantec

PCSTester 35 Multi-Parameter – Instructions

pH CALIBRATION

Calibration for pH should be performed each day you use the meter.

1. Pour calibration solutions and clean water into containers.
2. Press the "ON OFF" button on the meter.
3. Press the "MODE ENT" button until finding "pH USA". Values for pH will be at the top and temperature at bottom.
4. Rinse sensor with clean water.
5. Put sensor in red buffer solution and press "CAL" button. Wait for top reading to stabilize and press "MODE ENT". Value will blink shortly and eventually change to 4.01.
6. Rinse sensor with clean water.
7. Put sensor in yellow buffer solution and press "CAL" button. Wait for top reading to stabilize and press "MODE ENT". Value will blink shortly and eventually change to 7.00.
8. Press "CAL" button to complete calibration.
9. Rinse sensor with clean water and press the "ON OFF" button to turn off.

CONDUCTIVITY CALIBRATION

1. Pour conductivity calibration solution and clean water in containers.
2. Press the "ON OFF" button.
3. Press the "MODE ENT" button until finding "Cond Auto". Values for conductivity will be at the top and temperature at bottom.
4. Rinse sensor with clean water.
5. Put sensor in the clear (no colour) conductivity solution and press "CAL" button. Wait for top reading to stabilize and press "MODE ENT". Value will blink shortly and eventually change to 1413.
6. Rinse sensor with clean water and press the "ON OFF" button to turn off.

FIELD MEASUREMENTS

1. Turn on the meter by pressing the "ON OFF" button.
2. Press the "MODE ENT" button until finding "pH USA". Values for pH will be at the top and temperature at bottom.
3. Take and write down pH and temperature measurements.
4. Press "MODE ENT" bottom.
5. pH meter will display "Cond Auto" with conductivity at top and temperature at bottom.
6. Take and write down conductivity measurements. Note units found between conductivity and temperature (should be either µS or mS).
7. Turn off the meter by pressing the "ON OFF" button.

GENERAL INSTRUCTIONS - 2015 WATER QUALITY MONITORING

Field collected data will be documented using this bound field notebook.
Photocopies or electronic scans of the notebook will be made immediately following each sampling event.
The photocopies or scanned file will be either e-mailed to Stantec at: Annick.St-Amand@stantec.com; or faxed to 1-506-452-0112.

Field measured parameters include: specific conductivity, water temperature and pH.
These measurements will be performed using field instruments.
The pH meter will be calibrated in advance of each sampling event.

All information must be provided within the available boxes. No box shall remain empty.
If a station has no flow, then "N/F" shall be used to indicate "no flow" in all applicable boxes.

For this program, all water samples will be collected as grab samples.
Water samples should be collected at a depth of 15 cm (where permitting).

Grab sample - plastic no preservative	Bottles and cap will be rinsed three times before filling to the top.
Grab sample - plastic with preservative	Bottles and cap will not be rinsed as it is pre-charged with a preservative. Care should be taken as bottles contain concentrated acid preservative.
Grab sample - amber glass	Bottles and cap will be rinsed three times before filling to the top.

Sample LABELS: include station, date, initials of sampler, intended analytical package (NAN1 (general chemistry), NAN2 (TPH analysis) or NAN4 (trace element scan)).

QA/QC (See field sheets - highlighted in light grey); One field duplicate and one field blank will be submitted for each analytical group for each sampling month.

MONTH 1 Week of June 28-July 4, 2015			Sampling Date pH-meter Calibration Date				Field Data and Observations			
Station / Bottle	**GPS Coordinates**	**Date / Time**	**Bottles Required per sample**	**rinse?**	**✓**	**Chain of Custody**	**Temp (°C)**	**pH**	**Conductivity**	**Observations** Hydrocarbon sheen, Turbidity, etc...
TWIN LAKES CREEK WATERSHED										
NML-23 (159-20) *Outflow from East Twin Lake*			1 liter plastic	YES		NAN-1			□ mS □ µS	
			125 mL plastic with H_2SO_4 preservative	NO						
			125 mL plastic with HNO_3 preservative	NO						
159-4 *Outflow from West Twin Lake Disposal Area*			1 liter plastic	YES		NAN-1			□ mS □ µS	
			125 mL plastic with H_2SO_4 preservative	NO						
			125 mL plastic with HNO_3 preservative	NO						
			1 liter plastic	YES		NAN-4				
159-6 *Outflow from West Twin Lake Disposal Area*			1 liter plastic	YES		NAN-1			□ mS □ µS	
			125 mL plastic with H_2SO_4 preservative	NO						
			125 mL plastic with HNO_3 preservative	NO						
			1 liter amber glass - **fill to top**	YES		NAN-2				
			1 liter plastic	YES		NAN-4				
DUP-1 *Field Duplicate - Twin Lakes Creek*			1 liter plastic	YES		NAN-1			□ mS □ µS	
			125 mL plastic with H_2SO_4 preservative	NO						
			125 mL plastic with HNO_3 preservative	NO						
			1 liter amber glass - **fill to top**	YES		NAN-2				
			1 liter plastic	YES		NAN-4				
CHRIS CREEK WATERSHED										
159-14 *Outflow from East Twin Lake*			1 liter plastic	YES		NAN-1			□ mS □ µS	
			125 mL plastic with H_2SO_4 preservative	NO						
			125 mL plastic with HNO_3 preservative	NO						
LANDFILL										
NML-29 (159-21) *East side of landfill*			1 liter plastic	YES		NAN-1			□ mS □ µS	
			125 mL plastic with H_2SO_4 preservative	NO						
			125 mL plastic with HNO_3 preservative	NO						
			1 liter amber glass - **fill to top**	YES		NAN-2				
NML-30 *West side of landfill*			1 liter plastic	YES		NAN-1			□ mS □ µS	
			125 mL plastic with H_2SO_4 preservative	NO						
			125 mL plastic with HNO_3 preservative	NO						
			1 liter amber glass - **fill to top**	YES		NAN-2				
DUP-2 *Field Duplicate - Landfill*			1 liter plastic	YES		NAN-1			□ mS □ µS	
			125 mL plastic with H_2SO_4 preservative	NO						
			125 mL plastic with HNO_3 preservative	NO						
			1 liter amber glass - **fill to top**	YES		NAN-2				
Quality Control										
BLANK *Field Blank*			1 liter plastic	YES		NAN-1				
			125 mL plastic with H_2SO_4 preservative	NO						
			125 mL plastic with HNO_3 preservative	NO						
			1 liter amber glass - **fill to top**	YES		NAN-2				
			1 liter plastic	YES		NAN-4				

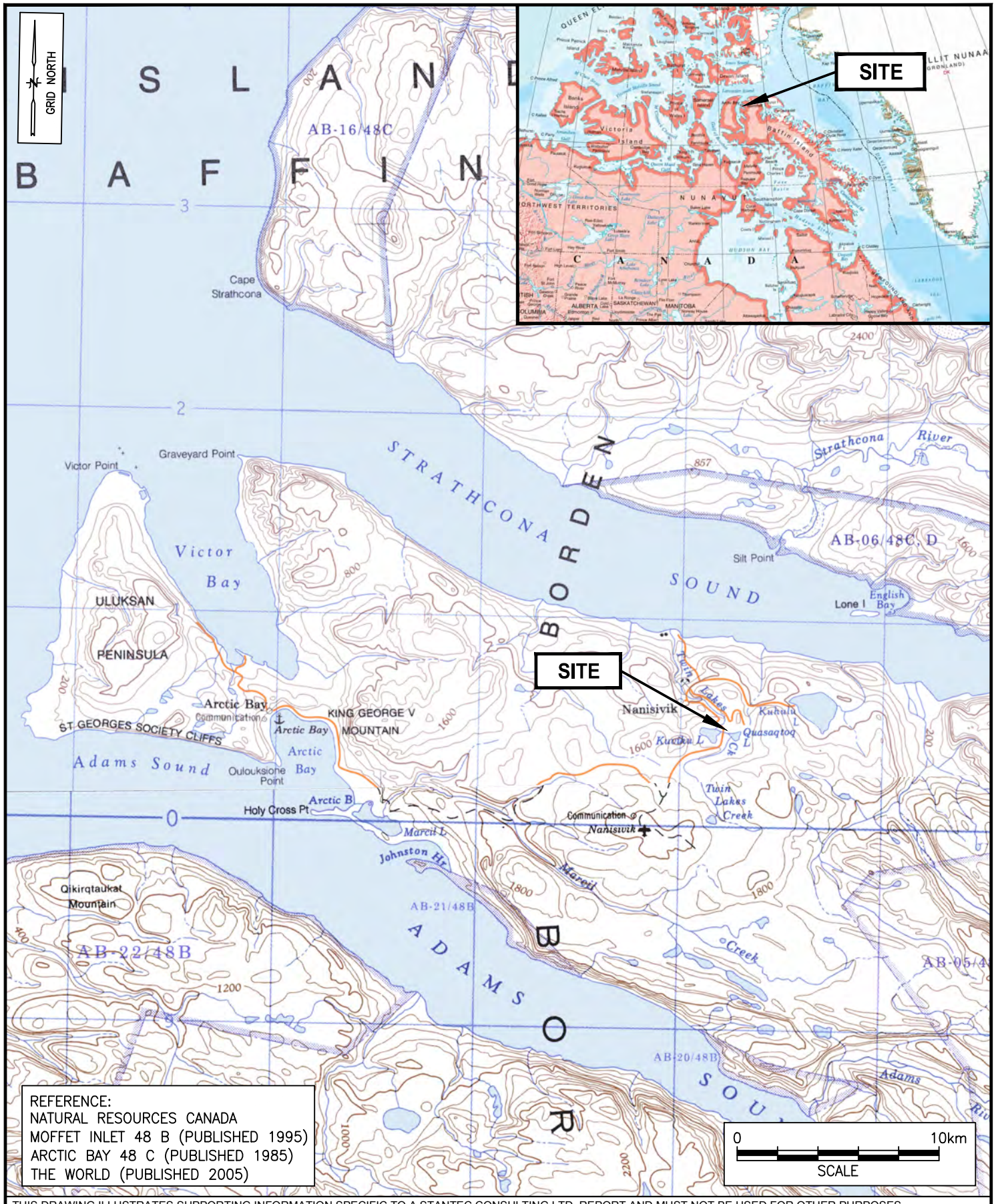
IF NO FLOW : INDICATE USING N/F.

MONTH 2 **Week of August 2-8, 2015**			Sampling Date pH-meter Calibration Date				**Field Data and Observations**			
Station / Bottle	**GPS Coordinates**	**Date / Time**	**Bottles Required** per sample	rinse?	✓	**Chain of Custody**	**Temp (°C)**	**pH**	**Conductivity**	**Observations** Hydrocarbon sheen, Turbidity, etc...
TWIN LAKES CREEK WATERSHED										
NML-23 (159-20) *Outflow from East Twin Lake*			1 liter plastic	YES		NAN-1			□ mS □ µS	
			125 mL plastic with H_2SO_4 preservative	NO						
			125 mL plastic with HNO_3 preservative	NO						
159-4 *Outflow from West Twin Lake Disposal Area*			1 liter plastic	YES		NAN-1			□ mS □ µS	
			125 mL plastic with H_2SO_4 preservative	NO						
			125 mL plastic with HNO_3 preservative	NO						
			1 liter plastic	YES		NAN-4				
159-6 *Outflow from West Twin Lake Disposal Area*			1 liter plastic	YES		NAN-1			□ mS □ µS	
			125 mL plastic with H_2SO_4 preservative	NO						
			125 mL plastic with HNO_3 preservative	NO						
			1 liter amber glass - **fill to top**	YES		NAN-2				
			1 liter plastic	YES		NAN-4				
DUP-1 *Field Duplicate - Twin Lakes Creek*			1 liter plastic	YES		NAN-1			□ mS □ µS	
			125 mL plastic with H_2SO_4 preservative	NO						
			125 mL plastic with HNO_3 preservative	NO						
			1 liter amber glass - **fill to top**	YES		NAN-2				
			1 liter plastic	YES		NAN-4				
CHRIS CREEK WATERSHED										
159-14 *Outflow from East Twin Lake*			1 liter plastic	YES		NAN-1			□ mS □ µS	
			125 mL plastic with H_2SO_4 preservative	NO						
			125 mL plastic with HNO_3 preservative	NO						
LANDFILL										
NML-29 (159-21) *East side of landfill*			1 liter plastic	YES		NAN-1			□ mS □ µS	
			125 mL plastic with H_2SO_4 preservative	NO						
			125 mL plastic with HNO_3 preservative	NO						
			1 liter amber glass - **fill to top**	YES		NAN-2				
NML-30 *West side of landfill*			1 liter plastic	YES		NAN-1			□ mS □ µS	
			125 mL plastic with H_2SO_4 preservative	NO						
			125 mL plastic with HNO_3 preservative	NO						
			1 liter amber glass - **fill to top**	YES		NAN-2				
DUP-2 *Field Duplicate - Landfill*			1 liter plastic	YES		NAN-1			□ mS □ µS	
			125 mL plastic with H_2SO_4 preservative	NO						
			125 mL plastic with HNO_3 preservative	NO						
			1 liter amber glass - **fill to top**	YES		NAN-2				
Quality Control										
BLANK *Field Blank*			1 liter plastic	YES		NAN-1				
			125 mL plastic with H_2SO_4 preservative	NO						
			125 mL plastic with HNO_3 preservative	NO						
			1 liter amber glass - **fill to top**	YES		NAN-2				
			1 liter plastic	YES		NAN-4				

IF NO FLOW : INDICATE USING N/F.

MONTH 3 Week of August 30-September 5, 2015			Sampling Date pH-meter Calibration Date				Field Data and Observations			
Station / Bottle	**GPS Coordinates**	**Date / Time**	**Bottles Required** per sample	rinse?	✓	**Chain of Custody**	**Temp (°C)**	**pH**	**Conductivity**	**Observations** Hydrocarbon sheen, Turbidity, etc...
TWIN LAKES CREEK WATERSHED										
NML-23 (159-20) *Outflow from East Twin Lake*			1 liter plastic	YES		NAN-1			□ mS □ µS	
			125 mL plastic with H_2SO_4 preservative	NO						
			125 mL plastic with HNO_3 preservative	NO						
159-4 *Outflow from West Twin Lake Disposal Area*			1 liter plastic	YES		NAN-1			□ mS □ µS	
			125 mL plastic with H_2SO_4 preservative	NO						
			125 mL plastic with HNO_3 preservative	NO						
			1 liter plastic	YES		NAN-4				
159-6 *Outflow from West Twin Lake Disposal Area*			1 liter plastic	YES		NAN-1			□ mS □ µS	
			125 mL plastic with H_2SO_4 preservative	NO						
			125 mL plastic with HNO_3 preservative	NO						
			1 liter amber glass - **fill to top**	YES		NAN-2				
			1 liter plastic	YES		NAN-4				
DUP-1 *Field Duplicate - Twin Lakes Creek*			1 liter plastic	YES		NAN-1			□ mS □ µS	
			125 mL plastic with H_2SO_4 preservative	NO						
			125 mL plastic with HNO_3 preservative	NO						
			1 liter amber glass - **fill to top**	YES		NAN-2				
			1 liter plastic	YES		NAN-4				
CHRIS CREEK WATERSHED										
159-14 *Outflow from East Twin Lake*			1 liter plastic	YES		NAN-1			□ mS □ µS	
			125 mL plastic with H_2SO_4 preservative	NO						
			125 mL plastic with HNO_3 preservative	NO						
LANDFILL										
NML-29 (159-21) *East side of landfill*			1 liter plastic	YES		NAN-1			□ mS □ µS	
			125 mL plastic with H_2SO_4 preservative	NO						
			125 mL plastic with HNO_3 preservative	NO						
			1 liter amber glass - **fill to top**	YES		NAN-2				
NML-30 *West side of landfill*			1 liter plastic	YES		NAN-1			□ mS □ µS	
			125 mL plastic with H_2SO_4 preservative	NO						
			125 mL plastic with HNO_3 preservative	NO						
			1 liter amber glass - **fill to top**	YES		NAN-2				
DUP-2 *Field Duplicate - Landfill*			1 liter plastic	YES		NAN-1			□ mS □ µS	
			125 mL plastic with H_2SO_4 preservative	NO						
			125 mL plastic with HNO_3 preservative	NO						
			1 liter amber glass - **fill to top**	YES		NAN-2				
Quality Control										
BLANK *Field Blank*			1 liter plastic	YES		NAN-1				
			125 mL plastic with H_2SO_4 preservative	NO						
			125 mL plastic with HNO_3 preservative	NO						
			1 liter amber glass - **fill to top**	YES		NAN-2				
			1 liter plastic	YES		NAN-4				

IF NO FLOW : INDICATE USING N/F.



REFERENCE:
NATURAL RESOURCES CANADA
MOFFET INLET 48 B (PUBLISHED 1995)
ARCTIC BAY 48 C (PUBLISHED 1985)
THE WORLD (PUBLISHED 2005)

SITE LOCATION

WATER QUALITY MONITORING
NANISIVIK MINE, NUNAVUT

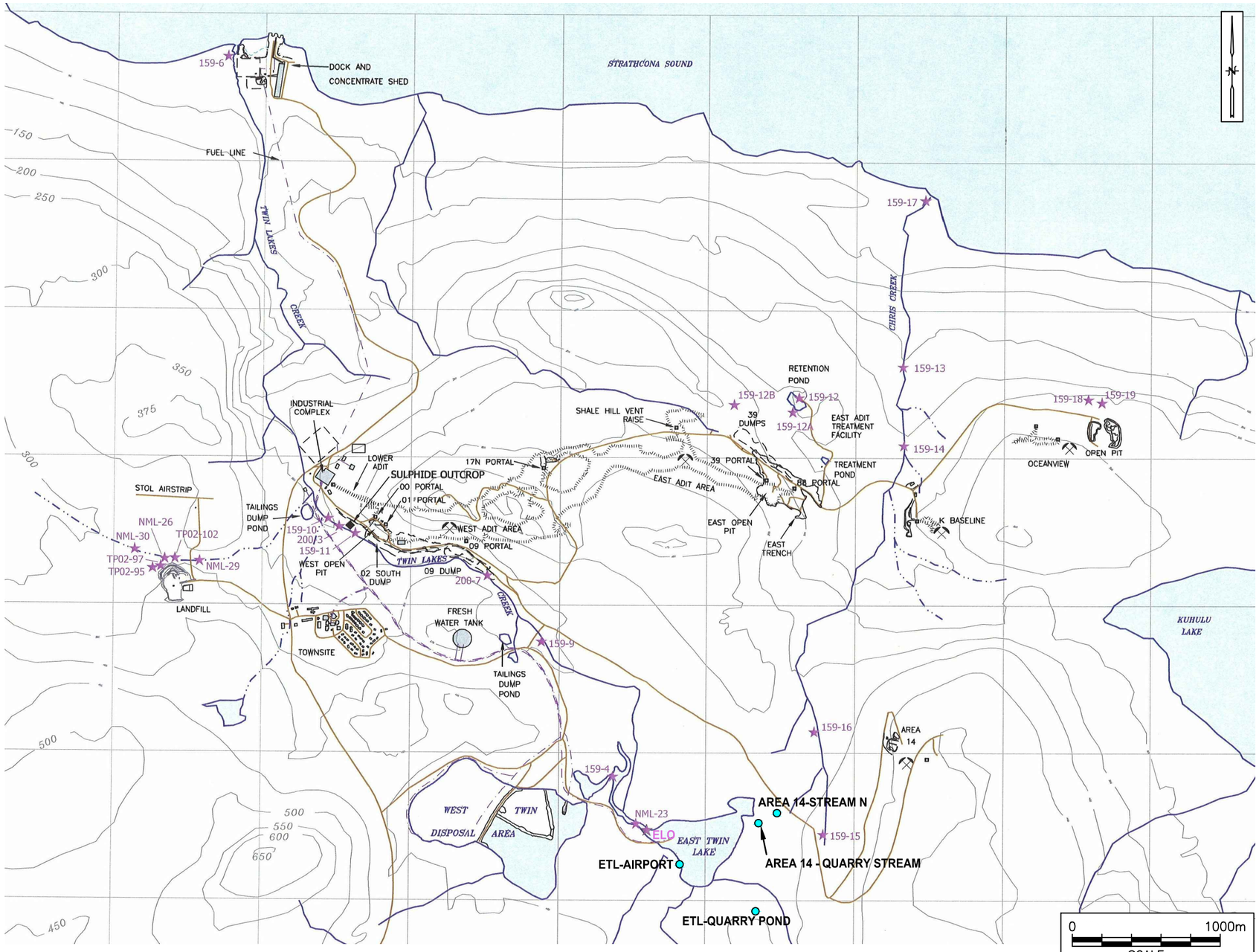
Client: CANZINCO LTD. c/o NYRSTAR CANADA (HOLDINGS) LTD.

Job No.:	121810955
Scale:	1 : 250,000
Date:	13-FEB-2015
Dwn. By:	JL
App'd By:	MS

Dwg. No.: A-1

Stantec

V:\1218\active\121810955\1_environmental\3_drawings\121810955_WQM_A-1.dwg



LEGEND:

- ROAD
- GROUND CONTOUR (50 m INTERVAL)
- SHORELINE, DRAINAGE, STREAMS
- INTERMITTENT DRAINAGE
- HIGH TIDE LINE – SURVEYED
- TOP OF BANK
- PIPELINE
- EXTENT OF UNDERGROUND WORKINGS
- MINING AREA
- ADIT, RAISE
- ★ NML-16 WATER SAMPLING LOCATION

V:\1218\active\121810955\1_environmental\3_drawings\121810955_WQM_A-2.dwg

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

Reference:
ORIGINAL FIGURES PROVIDED BY NANISIVIK MINE

WATER SAMPLING LOCATIONS - MINE AREA

WATER QUALITY MONITORING
NANISIVIK MINE, NUNAVUT

Client: CANZINCO LTD. c/o NYRSTAR CANADA (HOLDINGS) LTD.

Job No.:	121810955
Scale:	1 : 30,000
Date:	13-FEB-2015
Dwn. By:	JL
App'd By:	MS

Dwg. No.: A-2

Stantec