

Appendix A

Supplementary Waste Transfer Station Environmental Site Assessment Investigation Report

May 28, 2019

Colliers Project Leaders
Suite 700, 150 Isabella Street
Ottawa, Ontario
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Attention: Mr. Erik Marko
Project Manager

Sampling Plan- Service Agreement SC902 (DRAFT)
Baseline Environmental Data Investigation
City of Iqaluit- Proposed Landfill and Waste Transfer Station

Dear Mr. Marko:

Dillon Consulting Limited (Dillon) is pleased to submit the following Sampling Plan to conduct the Baseline Environmental Data Collection program at the City of Iqaluit's (the City's) proposed Landfill and Waste Transfer Station (WTS) in Iqaluit, Nunavut (the Site). This submission includes a description of Dillon's proposed work program and assumptions/limitations to proposed activities. This plan has been prepared as a refinement to the original design proposal entitled: Proposal for Design and Construction Contract Administration Services of Solid Waste Landfill and Transfer Station, awarded to Dillon under Service Agreement SC902.

Objectives

The proposed Baseline Environmental Data Investigation will focus on collecting data from soil, groundwater and/or surface water in various areas in and around the proposed Landfill and WTS, in order to characterize current conditions at these locations. The results of the Baseline Environmental Data Investigation will be used to document current site conditions for comparison to future sampling programs. Additionally, a Qualitative Risk Assessment and Risk Management Plan for site development will be prepared for the WTS, using the collected data.

Work Program

Dillon will follow our standard health and safety (H&S) policies and procedures, including preparation of a Health and Safety Plan for all activities prior to conducting any on-site work.

The sampling program consists of installation of 10 drive-point groundwater monitoring wells at the WTS, sampling of shallow soil at the WTS, and groundwater and surface water sampling at both the WTS and Landfill locations. Fieldwork is tentatively scheduled for August 2019. Conducting this field visit in mid to late August will allow the permafrost to thaw sufficiently throughout the summer months, providing the best chance for groundwater and surface water samples to be collected across the Site.



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Table 1 below outlines the proposed Sampling Plan for the Landfill and WTS.

Table 1: Proposed Sampling Plan and Analytical Suite - Iqaluit Landfill and Waste Transfer Station

Sample Media		Sampling Location		
		WTS		Landfill
		FFTA/Storage	Staining/Storage	
Soil	Quantity	9	9	N/A
	Analyses	BTEX, F1-F4, PAHs, Glycols*, VOCs*, PFAS*	BTEX, F1-F4, PAHs, Glycols*, VOCs*	
Groundwater	Quantity	5	5	5
	Analyses	BTEX, F1-F2, dissolved metals, PAHs, Glycols*, VOCs*, PFAS*	BTEX, F1-F2, dissolved metals, PAHs, Glycols*, VOCs*	Dissolved metals, nutrients
Surface Water	Quantity	3		3
	Analyses	BTEX, F1-F2, dissolved metals, PAHs		BTEX, F1-F2, dissolved metals, PAHs

Notes:

FFTA: firefighter training area

BTEX: benzene, toluene, ethylbenzene, xylenes

PAHs: polycyclic aromatic hydrocarbons

VOCs: volatile organic compounds

PFAS: per- and polyfluoroalkyl substances

Nutrients to include Total Kjeldahl Nitrogen (TKN), ammonia nitrogen (N), nitrate (as N), nitrite (as N), sulphate, chloride, alkalinity

* to be conducted on select samples only

N/A: not applicable

Soil

Composite shallow soil samples will be collected from the top 30 cm of soil at 12 pre-determined areas of potential environmental concern at the WTS; some soil sampling locations may coincide with drive point monitoring well locations. Two bags of composite sample will be collected at each location, one for laboratory analysis and one for field screening using an RKI Eagle gas detector. All soil samples will be logged in the field for texture/grain size, colour, moisture content and visible signs of impact. Due to the volatile nature of certain parameters such as volatile organic compounds (VOCs) and light end hydrocarbons, collecting frozen soil samples will be avoided, as this can impact sample integrity and cause skewed results.

As a portion of the WTS has been historically used as a firefighting training area (FFTA), this area will also be assessed for per- and polyfluoroalkyl substances (PFAS) contamination. Aqueous film-forming foam used for firefighting activities is known to contain PFAS and is a common source of PFAS contamination. Dillon will collect six water and six soil samples across the FFTA to determine background levels of PFAS. Some of these sample locations will coincide with locations proposed for other analyses. The additional cost for PFAS analysis will be approximately \$6,500.00.

Water

Groundwater monitoring at both locations will consist of measurements of the headspace vapour readings, absence/presence of light non-aqueous phase liquid, depth to groundwater, depth to well bottom and stick-up height at all wells. Hydraulic conductivity testing and measurements of field parameters (i.e., pH, temperature, turbidity, electrical conductivity, oxidation-reduction potential) should also be conducted, but could be dependent on sampling methodology.

Groundwater samples will be collected from existing (Landfill) or new (WTS) monitoring well locations (Figure 1) using the low flow technique (electric or manual pump) into clean, laboratory supplied containers for analyses. Surface water samples will be collected from three nearby water bodies at the Landfill location and at the WTS from three points, along the adjacent watercourse (i.e., upstream, midstream and downstream; Figure 2). All collection locations will be recorded using a GPS. Samples slated for dissolved metals analysis will be field-filtered and preserved.

Reporting

Data collected during the Baseline Environmental Data Collection will be evaluated and analyzed for presentation in a Baseline Environmental Study report submitted to the City in October of 2019. This report will include field and laboratory data review for quality assurance/quality control (QA/QC) purposes, comparison of analytical data to applicable regulatory criteria, and outlines of baseline/background site conditions for future use. Additionally, a Qualitative Risk Assessment and Risk Management Plan for site development will be prepared for the WTS, using the collected data.

Other Considerations

Due to the remote nature of the Site and sampling locations, coupled with a potential for low productivity of groundwater in the monitoring wells, opportunistic sampling will be completed following a limited purge. Previous experience in similar conditions has shown that a limited purge of one bailer volume or one volume of the field reading container followed by sample collection provides a better chance of collecting a full suite of samples for laboratory analysis.

A wildlife monitor will be hired through the local Hunters and Trappers Association for field activities at the proposed Landfill location, as Dillon staff will be working in a remote area outside the City. All-terrain vehicle rentals will also be required to transport staff and their equipment to the Site, as road access has not yet been constructed.

The installation of 10 drive-point piezometers will require shipping well supplies to the City before Dillon field staff arrive on-site. While manually installing the piezometers from surface will be attempted, an excavator and operator may be required to dig test pits into which the piezometers can be installed. Once installed, field personnel will monitor the piezometers and determine if a groundwater sample can be collected. If no water is present and removing the piezometer is possible, the well may be moved to a different location.



To ensure the data quality objectives of the program are met, a field QA/QC protocol and a laboratory QA/QC protocol will be used to assist with data validation. The field QA/QC protocol will include measures to minimize the risk of sample cross-contamination, and will involve the collection of blank samples (e.g., equipment and field) and two blind field duplicates for both water and soil. Field data and laboratory results will be reviewed by the project manager and senior technical personnel to identify any discrepancies or potential errors. The results from internal laboratory QA/QC program will also be reviewed. The relative percent difference (RPD) for duplicate analyses will be reviewed to confirm results are within the acceptable ranges for RPD values.



Project Team and Schedule

Moving forward with the Baseline Environmental Data Investigation at the Site, Dillon will provide a dedicated project team with experience working in northern Canada. Due to the remote nature of this project and ensuring the H&S of Dillon employees, two Dillon field staff will mobilize to Iqaluit for this project. Selected staff for the project will be available to mobilize after mid-August to conduct the environmental sampling program. This timing will allow for an increased likelihood of sufficient groundwater and surface water to permit sampling due to reduced permafrost.

Project schedule is as follows:

Dillon field staff on-site	August 19-23, 2019
Lab Analysis Received	within three weeks of site visit
Report Due	October 25, 2019

Closure

We trust this submission meets your needs at this time. If you have any questions or require further information, please contact the undersigned at (403) 215-8885, ext. 4310.

Yours truly,

DILLON CONSULTING LIMITED

Keith Barnes, P.Eng.
Project Manager

APH:slg

Attachments: Figure 1 – Proposed Sample Locations
Figure 2 – Proposed Water Sampling Locations

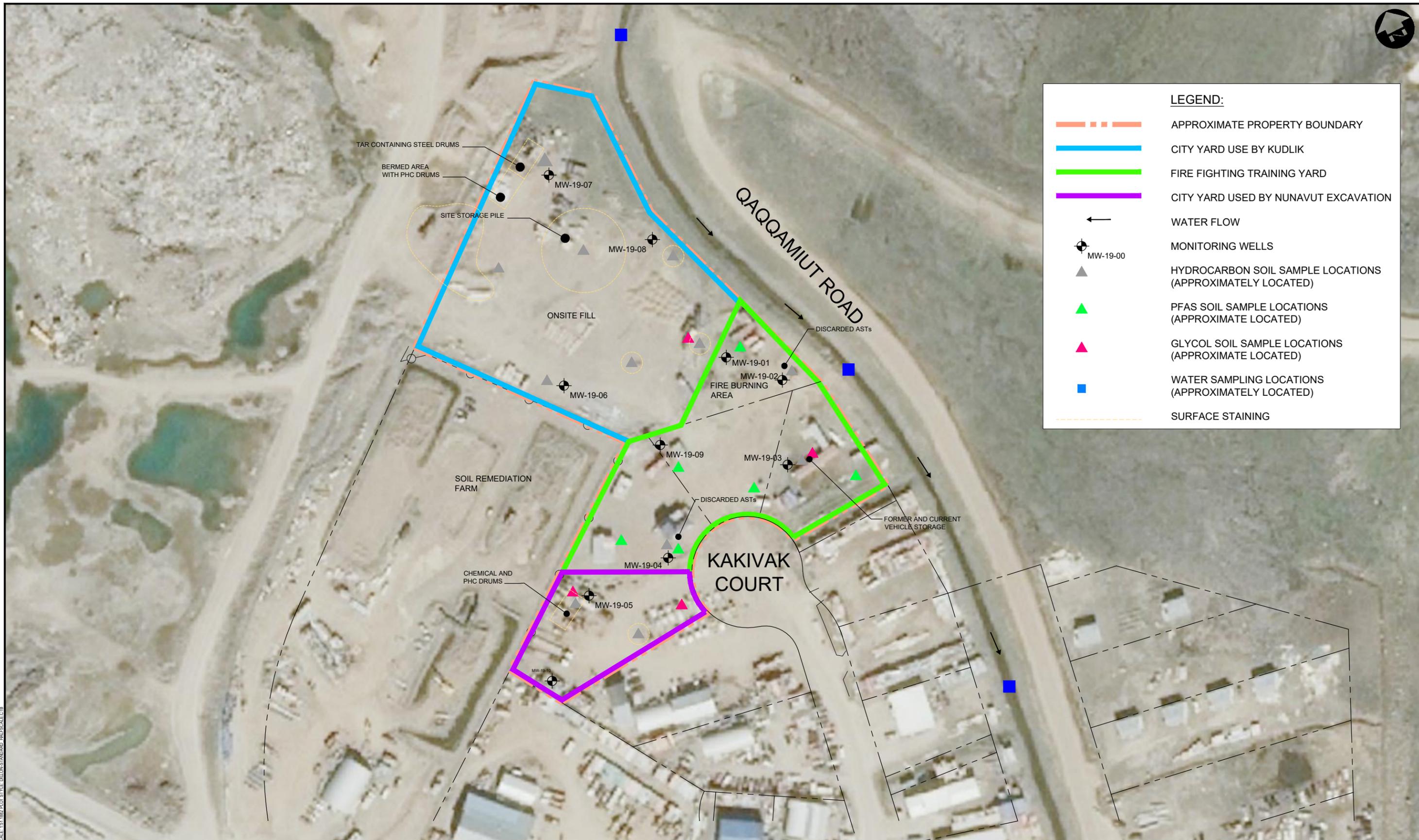
Cc: Chris Shortall, P. Eng., FEC, Dillon Consulting Limited

Our File: 19-9543



LEGEND:

- - - - APPROXIMATE PROPERTY BOUNDARY
- _ _ _ _ CITY YARD USE BY KUDLIK
- _ _ _ _ FIRE FIGHTING TRAINING YARD
- _ _ _ _ CITY YARD USED BY NUNAVUT EXCAVATION
- ← WATER FLOW
- ⊕ MONITORING WELLS
- ▲ HYDROCARBON SOIL SAMPLE LOCATIONS (APPROXIMATELY LOCATED)
- ▲ PFAS SOIL SAMPLE LOCATIONS (APPROXIMATE LOCATED)
- ▲ GLYCOL SOIL SAMPLE LOCATIONS (APPROXIMATE LOCATED)
- WATER SAMPLING LOCATIONS (APPROXIMATELY LOCATED)
- - - - SURFACE STAINING



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SCALE	1:500	
1	30% REVIEW	2019/05/31
No.	ISSUED FOR	DATE

CITY OF IQALUIT WASTE TRANSFER STATION		PROJECT NO. 19-9543
PROPOSED SAMPLE LOCATIONS		FIGURE NO. 1

